

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Mercedes-Benz Group AG,
Petitioner,

v.

Phelan Group LLC,
Patent Owner.

Case (to be assigned)
Patent 10,259,470

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 10,259,470
UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §42.100 *et seq.***

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TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. MANDATORY NOTICES	3
A. Real Party-in-Interest	3
B. Related Matters.....	3
C. Counsel and Service Information	5
III. NOTICE OF FEES PAID	5
IV. CERTIFICATION OF GROUNDS FOR STANDING	5
V. PRECISE RELIEF REQUESTED	5
VI. '470 OVERVIEW	6
VII. CLAIM CONSTRUCTION AND POSITA DEFINITION.....	8
A. Claim Construction.....	8
B. Definition of a Person of Ordinary Skill in the Art.....	8
VIII. ANALYSIS OF GROUNDS FOR UNPATENTABILITY	8
A. <u>Ground 1a</u> – Arshad in view of Petrik Renders Obvious Claims 1, 3-9, 11-12, and 18-20.....	8
1. Independent Claim 1	9
2. Dependent Claims	17
a. <u>Claim 3</u>	17
b. <u>Claim 4</u>	19
c. <u>Claim 5</u>	19
d. <u>Claim 6</u>	20
e. <u>Claim 7</u>	21
f. <u>Claim 8</u>	23
g. <u>Claim 9</u>	23
h. <u>Claims 11 and 12</u>	25
i. <u>Claim 18</u>	26
j. Claim 19	27
k. Claim 20	28
B. <u>Ground 1b</u> – Arshad-Petrik in View of Siwinski Renders Obvious Claims 13-14	29

C.	<u>Ground 1c</u> – Arshad-Petrik in View of Wu Renders Obvious Claim 17	31
D.	<u>Ground 1d</u> – Arshad-Petrik in View of Kudo Renders Obvious Claims 2, 10, and 15-16.....	33
	1. Claim 2	33
	2. Claim 15.....	36
	3. Claim 16.....	39
	4. Claim 10.....	40
E.	<u>Ground 2a</u> – Murphy Anticipates and Renders Obvious Claims 1, 3, 8, 11-12, and 18-20.....	41
	1. Independent Claim 1	41
	2. Dependent Claims	51
	a. Claim 3	51
	b. Claim 8	52
	c. Claims 11-12	53
	d. Claim 18	54
	e. Claim 19	54
	f. Claim 20	55
F.	<u>Ground 2b</u> – Murphy in view of Arshad Renders Obvious Claims 1, 3-8, 11-12, and 18-20.....	56
	1. Claims 1, 4	56
	2. Claim 5.....	58
	3. Claims 6-7	58
	4. Claims 3, 8, 11-12, 18-20.....	60
G.	<u>Ground 2c</u> – Murphy (Alone or With Arshad) in view of Petrik Renders Obvious Claim 9.....	61
H.	<u>Ground 2d</u> – Murphy (Alone or with Arshad) in view of Siwinski Renders Obvious Claims 13-14.....	62
I.	<u>Ground 2e</u> – Murphy (Alone or With Arshad) in View of Wu Renders Obvious Claim 17.....	63
J.	<u>Ground 2f</u> – Murphy (Alone or with Arshad) in View of Kudo Renders Obvious Claims 2, 10, and 15-16.....	66
	1. Claim 2.....	66
	2. Claim 15.....	68
	3. Claim 16.....	69

4.	Claim 10.....	70
IX.	DISCRETIONARY CONSIDERATIONS UNDER 314(A) AND 325(D) STRONGLY FAVOR INSTITUTION.....	71
X.	CONCLUSION	72

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH</i> IPR2019-01469	71
<i>Advanced Display Sys., Inc. v. Kent State Univ.,</i> 212 F.3d 1272 (Fed. Cir. 2000)	44
<i>Oticon Medical AB v. Cochlear Ltd.,</i> IPR2019-00975	71
<i>Sotera Wireless, Inc. v. Masimo Corp.,</i> IPR2020-01019	71
<i>Viken Detection Corp. v. Am. Sci. and Eng’g, Inc.,</i> No. IPR2022-00027	44
Other Authorities	
37 C.F.R. § 42.100(b)	8
35 U.S.C. §314(a)	71
35 U.S.C. §325(d)	71

I. INTRODUCTION

Mercedes-Benz Group AG (“**Petitioner**”) challenges Claims 1-20 of US10,259,470 (EX1001) (“**’470**”). The ’470 purportedly invents a “driver authentication and safety system” for “monitoring and controlling vehicle usage.” (’470, Abstract, 2:32-50.) An “occupant” (driver) uses a “wireless identification and data logging module” to “authenticate” herself, after which the vehicle can be operated within her “operating profile,” *e.g.*, maximum speed, location, and hours of operation. (*Id.*, 7:33-45, 6:58-64, Cl. 1.) If the profile is violated, the system provides feedback, including by generating alarm signals and controlling vehicle operations. (*Id.*, 7:58-8:8.) The system can also record data on vehicle operation. (*Id.*, 7:46-57.)

This was not new at the time of the ’470. For example, US2003/0189482 (EX1007) (“**Arshad**”) discloses a system for “authoriz[ing]” and monitoring drivers. (Arshad, Abstract, [0028].) A wireless “transponder” is used to identify the driver and transmit “operational limits,” such as “maximum speed,” authorized “geographical area,” and “hours of authorized use.” (*Id.*, [0019], [0033], [0043], [0057].) If these are violated, Arshad can “limit the speed” or disable the vehicle, “display a message,” or sound an “alarm.” (*Id.*, [0043]-[0045], [0063].) Arshad’s transponder also stores vehicle data. (*Id.*, [0027].)

US2007/0168125 (EX1008) (“**Petrik**”) discloses a complimentary system to that of Arshad, using a “smart card” in place of Arshad’s “transponder.” The “smart card” communicates with Petrik’s “in-vehicle monitoring unit,” which is used to control operation of a vehicle. (Petrik, Abstract, [0016]-[0026].) GPS location and speed data is recorded, and violations of restrictions trigger warnings or vehicle control actions. (*Id.* [0025]- [0026], [0028], [0030].)

As another example, US6,225,890 (“**Murphy**”) (EX1006) discloses a “system for restricting use of a vehicle by a selected vehicle operator.” (Murphy, Abstract, 3:20-40, 11:60-63.) In Murphy, (1) the driver provides “ident indicium” (e.g., unique biometric samples, token or card, keypad code); (2) the system “identifies the driver” and allows vehicle operation within “operation restrictions”; and (3) if the driver violates the profile, an “alarm signal is transmitted” or “appropriate control actions are taken,” such as “reduc[ing] the vehicle speed.” (*Id.*, Abstract, 5:12-60, 13:28-16:11, 16:50-17:63, Figs. 6-7.) Murphy’s system also includes a vehicle “operations log.” (*Id.*, 12:1-5, 15:42-47.)

These references, alone or in combination with additional prior art, invalidate all challenged claims

II. MANDATORY NOTICES

A. Real Party-in-Interest

The real parties-in-interest are Mercedes-Benz Group AG, Mercedes-Benz AG, Mercedes-Benz USA, LLC and Mercedes-Benz Intellectual Property GmbH & Co. KG.

B. Related Matters

The '470 was involved in *ex parte* Reexamination Control No. 90/015,287, and in Appeal No. 2025-001876 thereof. A Decision on Appeal affirming the Examiner's decision to reject claims 1 and 4 (the only claims challenged) issued on May 2, 2025.

Assignee of record The Phelan Group, LLC ("PO") asserted the '470 in the following active proceedings:

- *The Phelan Group, LLC v. Mercedes-Benz Group AG*, No. 1-25-cv01399 (N.D. Ga.), filed Mar. 17, 2025, transferred from *The Phelan Group, LLC v. Mercedes-Benz Group AG*, No. 2-23-cv-00607 (E.D. Tex.), filed December 15, 2023;

The Georgia court has not set a status conference or entered a case schedule. Phelan also asserted the '470 in the following proceedings which have been dismissed or stayed:

- *The Phelan Grp., LLC v. Toyota Motor Corp.*, No. 2-23-cv-00093 (E.D. Tex.), filed March 7, 2023, voluntarily dismissed with prejudice.

- *The Phelan Grp., LLC v. Kia Corp.*, No. 2-23-cv-00094 (E.D. Tex.), filed March 7, 2023, voluntarily dismissed with prejudice.
- *The Phelan Group, LLC v. Honda Motor Co.*, No. 2-23-cv-00606 (E.D. Tex.), filed December 15, 2023.
- *Phelan Group, LLC v. State Farm Mutual Automobile Insurance Co.*, Case No. 2-23-cv-00611 (E.D. Tex.), filed December 18, 2023.

Petitioner has also filed *inter partes* reviews against the following patents which are in the same patent family as the '470:

- *Mercedes-Benz Group AG v. The Phelan Group, LLC*, IPR2025-00986 regarding US9,493,149 (P.T.A.B. May 9, 2025);
- *Mercedes-Benz Group AG v. The Phelan Group, LLC*, IPR2025-00930 regarding US11,472,427 (P.T.A.B. Apr. 25, 2025);
- *Mercedes-Benz Group AG v. The Phelan Group, LLC*, IPR2025-00919 regarding US10,259,465 (P.T.A.B. Apr. 23, 2025);
- *Mercedes-Benz Group AG v. The Phelan Group, LLC*, IPR2025-00758 regarding US9,908,508 (P.T.A.B. Mar. 21, 2025);
- *Mercedes-Benz Group AG v. The Phelan Group, LLC*, IPR2025-00413 regarding US9,045,101 (P.T.A.B. Jan. 6, 2025).

C. Counsel and Service Information

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III. NOTICE OF FEES PAID

Fees are submitted herewith. If additional fees are due during the proceeding, the undersigned authorizes the Office to charge them to Deposit Account No. 50-1349.

IV. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies that the '470 is available for inter partes review, and that it is not barred or estopped from requesting this review.

V. PRECISE RELIEF REQUESTED

The relief requested is cancellation of the challenged claims, as follows:

Ground	References	Claims	Basis
1a	Arshad in view of Petrik	1, 3-9, 11-12, and 18-20	103

Ground	References	Claims	Basis
1b	Arshad-Petrik in view of Siwinski	13, 14	103
1c	Arshad-Petrik in view of Wu	17	103
1d	Arshad-Petrik in view of Kudo	2, 10, 15-16	103
2a	Murphy	1 , 3, 8, 11-12, and 18-20	102/103
2b	Murphy in view of Arshad	1 , 3-8, 11-12, 18-20	103
2c	Murphy (alone or with Arshad) in view of Petrik	9	103
2d	Murphy (alone or with Arshad) in view of Siwinski	13, 14	103
2e	Murphy (alone or with Arshad) in view of Wu	17	103
2f	Murphy (alone or with Arshad) in view of Kudo	2, 10, 15-16	103

VI. '470 OVERVIEW

The '470 relates to a “driver authentication and safety system” for “monitoring and controlling vehicle usage.” ('470, Abstract.) An “authorized vehicle owner” can create an “operating profile” for “high-risk drivers.” (*Id.*, 2:37-41, 6:52-64, 5:64-6:5.) The profile, which can include restrictions like allowable “speed,” “vehicle location,” or “hours of operation,” is enforced by a “master control unit”

and a “slave control unit” associated therewith. (*Id.* at 6:8-11, 6:58-64, Fig. 6, Cls. 1, 18.)

Drivers or “occupants” authenticate themselves via a “wireless identification and data logging module.” (*Id.*, 7:9-25, 7:33-45, Cl. 1, 2:63-67.) Once authenticated, the system monitors vehicle operation, *e.g.*, using GPS “time of day, speed and location” data, and compares this to the driver’s profile. (*Id.*, 3:1-7, 10:13-21, Cl. 1.) If the driver violates her profile, the system can provide feedback by generating an “alarm signal.” (*Id.*, 7:58-8:8, 2:46-63.)

The ’470 was filed October 27, 2016, as a continuation of US9,493,149, filed August 20, 2014, which is a continuation-in-part of US9,045,101, filed April 8, 2013, which is a continuation of US8,417,415, filed July 1, 2009, and purportedly claims priority to US61/077,568, filed July 2, 2008.¹ The ’470 received one Office Action. (EX1002, 82-84.) Claims 1-19 were rejected for double patenting over related patents, but no prior art rejections were made. (*Id.*) Applicant filed a terminal disclaimer and added new Claim 20: the slave control unit “is mounted under a dash board of the vehicle.” (*Id.*, 153-54, 152.) A Notice of Allowance then issued. (*Id.*, 162-64.)

¹ All prior art herein predates this. Petitioner reserves the right to challenge this date in other proceedings, however, as all ’470 claims are not entitled to this priority date.

VII. CLAIM CONSTRUCTION AND POSITA DEFINITION

A. Claim Construction

Unless indicated otherwise, all claim terms herein are given the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the '470. 37 C.F.R. § 42.100(b).

B. Definition of a Person of Ordinary Skill in the Art

A POSITA at the time of the alleged invention would have at least a bachelor's degree in electrical engineering, computer science, or similar disciplines, and two years of experience in the automotive industry with research, design, or development of automotive electrical and control systems, or an equivalent level of skill, knowledge, and experience. (Declaration of Dr. Mark Ehsani (EX1004) (“**Ehsani**”), ¶22.) The more education one has, the less experience needed. (*Id.*) Similarly, more field experience may serve as a substitute for formal education. (*Id.*)

VIII. ANALYSIS OF GROUNDS FOR UNPATENTABILITY

A. Ground 1a – Arshad in view of Petrik Renders Obvious Claims 1, 3-9, 11-12, and 18-20

Arshad in view of Petrik renders obvious Claims 1, 3-9, 11-12, and 18-20. (Ehsani, ¶¶35-90.) Arshad was filed April 3, 2003, published October 9, 2003, and is prior art under pre-AIA §102(b). Petrik was filed August 9, 2005, published July 19, 2007, and is prior art under pre-AIA §§102(a),(e).

1. Independent Claim 1

Arshad-Petrik renders obvious Claim 1. (Ehsani, ¶¶35-62.)

1[pre]: *A vehicle control system, comprising:*

Arshad discloses Claim 1[pre]. (*Id.*, ¶¶39-40.)

Arshad discloses a “vehicle control system 12” for “[f]leet vehicles.” (Arshad, Abstract, [0005], [0008]-[0009], [0019], [0028].) A driver’s “transponder 20” transmits data to the control system to “uniquely identify the person carrying the transponder.” (*Id.*, [0033], [0019], [0012], Cl. 7.) After authenticating the driver, the system monitors vehicle operation, “determines whether the operator is authorized” to take certain actions, and controls the vehicle in response to unauthorized actions by issuing “alert message[s]” and controlling and disabling subsystems. (*Id.*, [0061], [0071]; *see also* [0028]-[0031], [0041]-[0045], [0072]-[0074].)

1[A]: *a wireless identification and data logging module;*

Arshad discloses Claim 1[A]. (Ehsani, ¶¶41-45.)

Each driver has a wireless “**radio (RF)** transponder” that stores an “identification number” in its memory. (Arshad, [0019], [0031]-[0033].) This number is transmitted to a “reader circuit” in the vehicle, allowing Arshad to identify drivers. (*Id.*, [0031]-[0034], [0010]-[0012], Cl. 7.) *See* Claim 1[B].

Moreover, each transponder has a “digital memory” that logs data. (Arshad, [0023], [0025]-[0027], Fig. 2.) **First**, “data stored in the memory of microcontroller 30” of each transponder “may include numeric or digital values that are remotely

downloaded into the transponder and are indicative of (1)... total distance which the vehicle is authorized to travel for that operator, (2)... geographical area in which the vehicle may only be operated, (3)... allowed times and dates of operation... (4)... total time of vehicle operation that is authorized, and (5)... subsystems that the operator is allowed or authorized to use.” (*Id.*, [0026], [0029], [0034], [0056]-[0057], [0060], [0071]-[0074].)

Second, “data stored in microcontroller 30 of the transponder” includes operational data like “distance traveled,” times of events, service reminders, “vehicle conditions,” “fault or error conditions,” and “consumables remaining.” (*Id.*, [0027].) This data may be wirelessly received by the transponder from the reader. (*Id.*, [0025], [0029]-[0034].)

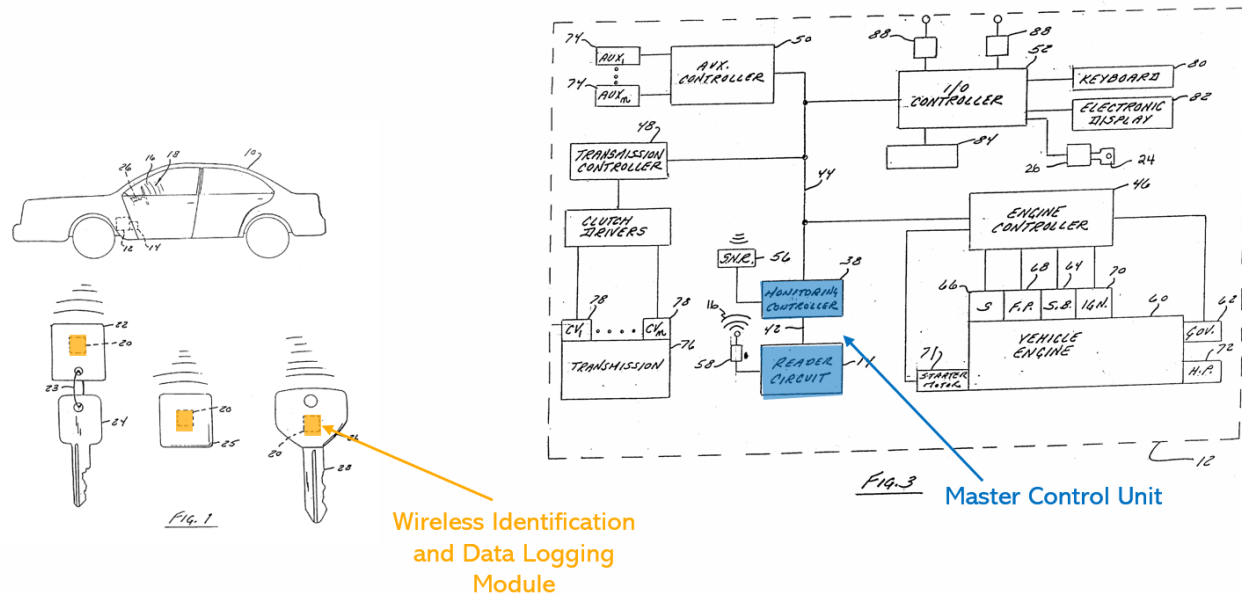
Third, each transponder has an “identification number stored in its memory” in the microcontroller. (*Id.*, [0033].)

1[B]: a master control unit in a vehicle for wirelessly authenticating at least one occupant via said wireless driver identification and data logging module and associating an operating profile with said at least one occupant;

Arshad discloses Claim 1[B]. (Ehsani, ¶46-49.)

Arshad’s “master control unit” comprises “vehicle status and monitoring controller 38” coupled to “reader circuit 14.” (Arshad, [0028]-[0029].) Like reader 14, controller 38 is “mounted on” the vehicle and coupled to other “microprocessor-based controllers.” (*Id.*, [0019], [0028], [0010]-[0013].) Controller 38 and reader 14

“wirelessly authenticate” drivers (e.g., occupants) via the “wireless identification and data logging module,” e.g., “transponder 20,” which wirelessly communicates with antenna 58 of reader 14 via RF signals:



(*Id.*, Figs. 1, 3 (annotated); [0020]-[0025], 0029]-[0040].) See Claim 1[A].

First, to wirelessly authenticate drivers, controller 38 issues “commands... to the control module” of reader 14, including to “query for any transponder in range, and... for a specific transponder by its embedded identification number.” (*Id.*, [0031].) With a general query, nearby transponders send “a response that includes their identification number.” (*Id.*, [0033].) Reader 14 will then “single out and **identify** any transponder within range,” and the controller and reader can communicate with identified transponders by sending “specific queries” including particular identification numbers. (*Id.*, [0032]-[0033].) Any nearby transponder is “energized and internally checks to see if it has” the particular identification number.

(*Id.*, [0032].) If it does, it “responds with an affirmative message, and thereby establishes a communication session with controller 38.” (*Id.*, [0030]-[0033].)

Second, to associate an operating profile with a driver, once reader 14 “establishes the existence of a particular transponder” (by authenticating through identification numbers), it “download[s] information” from the transponder’s memory “and thence to controller 38 for processing.” (*Id.*, [0033]-[0034], [0008]-[0012], [0020].) See Claims 1[A], 1[F]. Further, each driver has “**different** degrees of vehicle access.” (*Id.*, [0008]-[0012], [0020].) A driver’s transponder stores “**operational limits**,” such as “maximum speed,” “maximum load on the engine,” “total distance” of travel, allowed “geographical area,” “allowed times and dates of operation,” “total time” of allowed operation, or “subsystems” the operator can use. (*Id.*, [0026], [0043]-[0044], [0057], [0074].)

This operating profile (*e.g.*, degrees of access and operational limits) can be “downloaded” from transponder 20 (*e.g.*, wireless driver identification and data logging module) to controller 38 (*e.g.*, master control unit), which accesses the profile to determine whether the driver is “authorized” to use the vehicle or subsystem or is approaching or exceeding a limit, thereby associating a profile with the particular authenticated driver. (*Id.*, [0031], [0034], [0043]-[0044], [0057], [0071]; *see also* [0011], [0019], [0040], [0059]-[0060], [0068], [0073]-[0074].)

1[C]: a module for receiving at least location and speed information in association with a movement of said vehicle;

Arshad-Petrik renders obvious Claim 1[C]. (Ehsani, ¶¶50-53.)

Arshad includes “satellite navigation receiver 56” (*e.g.*, module), which receives “data indicative of the vehicle’s current location” and provides this to controller 38. (Arshad, [0029], [0073], Fig. 3.)

Additionally, it would have been obvious for this module to receive and provide speed information. (Ehsani, ¶¶52-53.) Petrik, in the same field, discloses a “GPS based” system with an “in-vehicle monitoring unit” for authenticating drivers (*e.g.*, occupants), monitoring vehicle operation, and taking actions if the driver deviates from her limits. (Petrik, [0016]-[0026], [0030], Fig. 1.) Petrik uses a “GPS receiver module” which receives location **and** speed information and “keeps a constant log of the date, time, location, distance travelled and speed of the vehicle both in the units’ memory and in the smart card.” (*Id.*, [0001], [0025]-[0026], [0009], [0040].) The in-vehicle unit uses GPS speed and location to prevent exceeding of speed limits and to determine if a driver deviates from an allowed route. (*Id.*, [0025]-[0028], [0030].)

A POSITA would have been motivated to use GPS in Arshad to determine both location **and** speed, as taught by Petrik, so as to have an accurate source of location, speed, and time information that could not be manipulated and that could be stored in operation logs. (Petrik, [0001], [0009], [0012], [0025]-[0028].) A

POSITA would have had a reasonable expectation of success using a GPS module to receive speed and location, as this would simply be use of a known component for its intended function. (Ehsani, ¶¶52-53.) Using GPS speed and location would provide the information necessary to determine if a driver has violated speed or geographic limits. (*Id.*)

1[D]: a data logging device that records vehicle operation data associated with a use of said vehicle, the vehicle operation data comprising at least said location and speed information received from said module; and

Arshad-Petrik renders obvious Claim 1[D]. (Ehsani, ¶¶54-56.)

Arshad’s “microcontroller 30” within transponder 20 can “receive[] data from the vehicle” and “store[] this data in its internal memory”—thus comprising a “data logging device that records vehicle operation data” (*e.g.*, distance travelled, time vehicle started/stopped). (Arshad, [0025]-[0027], [0030]-[0033].) Further, each of Arshad’s controllers includes “RAM memory” to “store working variables required by the microprocessor.” (Arshad, [0075], [0077]-[0078], Fig. 4.) These include operational data, including vehicle location, as the controllers compare operational data to operating restrictions. (Arshad, [0042]-[0045], [0057]-[0058], [0073].)

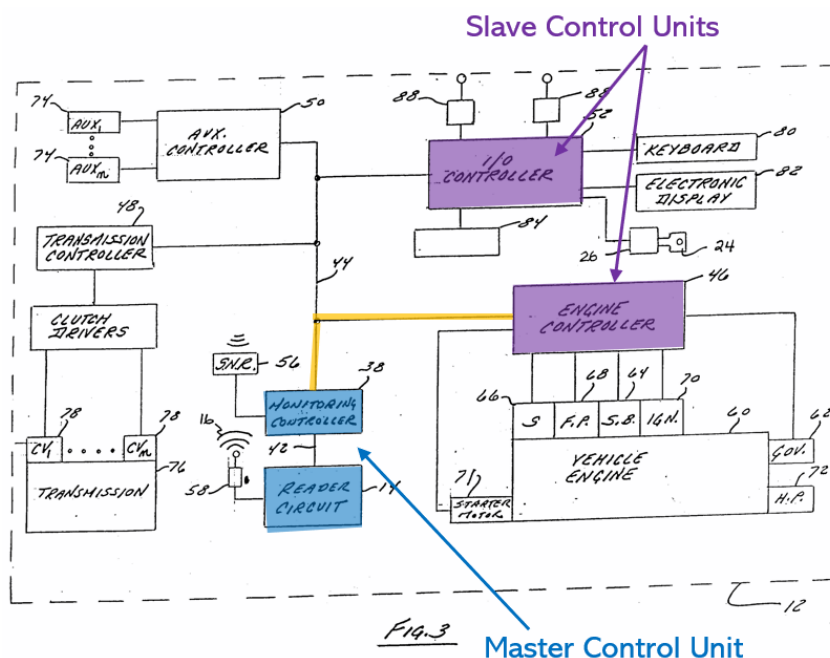
Moreover, Petrik teaches “automatically and irrefutably logging via GPS, ...vehicle location, vehicle speeds, speeding offences, distance covered etc. and recording these on a secure smart card as well as in the vehicle units’ memory.” (Petrik, [0009], [0012], [0018], [0025]-[0029].) It would have been obvious to a

POSITA to modify Arshad to record GPS location **and** speed received by the GPS module in transponder 20, as well as in controller 38's memory. (Ehsani, ¶¶55-56, 53.) A POSITA would have understood this would provide a log of operational and infraction data that could not be manipulated by the driver. (*Id.*) See also Ground 1a, Claim 1[C].

1[E]: a slave control unit in said vehicle which communicates with said master control unit, wherein said slave control unit receives commands from said master control unit and generate an alarm signal;

Arshad discloses Claim 1[E]. (Ehsani, ¶¶57-60.)

First, Arshad discloses a “slave control unit” in the vehicle which communicates with the master control unit. “Engine controller 46” and I/O controller 52 are “microprocessor-based controller[s]” “coupled together with” monitoring controller 38 over “communication bus 44”:



(Arshad, Fig. 3 (annotated), [0028], [0041]-[0042].) Monitoring controller 38 “**communicates with**” engine controller 46 and I/O controller 52 by sending/receiving data “packets” over the bus. (*Id.*, [0041], [0043]-[0045], [0054]-0059], [0065], [0071]-[0074].)

Second, engine controller 46 and I/O controller 52 receive commands from monitoring controller 38 and generate alarm signals if the driver violates her operating profile. When operational limits are exceeded, monitoring controller 38 transmits “packets” (*i.e.*, commands) to engine controller 46 and I/O controller 52 to take actions. (*Id.*, [0044]-[0046], [0057]-[0063], [0071]-[0074].)

For example, in response to information from engine controller 46 that an engine limit was exceeded, monitoring controller 38 can transmit a packet instructing engine controller 46 to “shut down the fuel pump, the ignition system, or to limit the speed of the vehicle or the engine”—thus generating an “alarm signal”² that provides feedback regarding vehicle operation. (*Id.*) And I/O controller 52 is instructed to display “an alert message” indicating the limit being approached or

² The ’470 describes the “alarm signal” as a signal that “**can result** in an actual audible alarm, or it can be used to control/govern operational aspects of the vehicle.” (’470, 7:63-8:8.)

profile condition violated, and may also “energize annunciator 84” to generate “a sound to get the operator’s attention.” (*Id.*)

1[F]: *wherein said master control unit provides operation governance of said vehicle within said operating profile.*

Arshad discloses Claim 1[F]. (Ehsani, ¶¶61-62.)

Arshad’s controller 38 and reader 14 govern vehicle operations within the operating profile after a driver is authenticated. *See* Ground 1a, Claim 1[B].

Controller 38 will not allow the vehicle to operate “until [it] has received the data stored in transponder 20 and determined whether the operator is authorized to operate specific vehicle systems.” (Arshad, [0040], [0034].) Further, controller 38 “compares” data from other controllers and sensors with “data it received from the transponder” to determine whether the driver has “attempted to exceed any of the operational limits that were indicated by the transponder data.” (*Id.*, [0043]-[0045], [0040]-[0042], [0057]-[0063], [0071]-[0074].) If limits are violated, controller 38 governs operations by issuing commands to, for example, shut down vehicle subsystems, limit vehicle or engine speed, or display a message indicating what limit has been exceeded. (*Id.*) *See also* Ground 1a, Claim 1[E].

2. Dependent Claims

a. Claim 3

Arshad-Petrik renders obvious Claim 3. (Ehsani, ¶¶63-66.)

Claim 3 adds a generic “vehicle control module” for controlling vehicle speed and location. The ’470 states that “module” means “a physical hardware component and/or... a software module,” like a “collection of routines and data structures that perform[] particular tasks...,” and further describes how the “master control unit” and “slave control unit” can include such “modules.” (’470, 6:8-36; *see also* 10:1-9.)

Arshad discloses this, as its monitoring controller (*e.g.*, master control unit) controls vehicle speed and location by (i) “compar[ing] the data it has received from the other controllers and from its own sensors... with the transponder data [*e.g.*, ‘maximum speed,’ ‘geographical area in which the vehicle can operate,’ etc.] to determine whether the operator has attempted to exceed any of the operational limits that were indicated by the transponder data” and (ii) “[i]f these limits are exceeded... transmit[ting] a packet that shuts down a particular vehicle subsystem,” such as “directing the engine controller [*e.g.*, slave control unit] to shut down the fuel pump, the ignition system, or limit the speed of the vehicle or engine.” (Arshad, [0043]-[0045], [0058]-[0059].) Shutting down the engine when the vehicle reaches or exceeds a total distance of travel limit or geographic limit (such as not allowing the vehicle to be used outside of Michigan) controls allowable locations. (*Id.*; Ehsani, ¶65.) *See* Ground 1a, Claims 1[F], 18.

Further, the monitoring controller and engine controller each include a microprocessor 90 for executing the functionality of controlling vehicle speed and location, along with ROM memory 94, which contains “the ***programmed instructions*** that control the operation of the microprocessor 90.” (Arshad, [0075]-[0080], [0070], Fig. 4.) Thus, microprocessor 90 and ROM memory 94 within the controllers are “vehicle control modules” because they are “hardware components” and contain software modules (*e.g.*, “programmed instructions”) to control vehicle speed and location. (Ehsani, ¶66.)

b. Claim 4

Arshad-Petrik renders obvious Claim 4. (Ehsani, ¶67.)

Arshad’s “***radio (RF)*** transponder 20” is an RFID-enabled device, “preferably one of Texas Instruments RFID products.” (Arshad, [0023].)

c. Claim 5

Arshad-Petrik renders obvious Claim 5. (Ehsani, ¶68.)

Arshad’s transponder stores “***operational limits***,” such as “maximum speed,” “maximum load on the engine,” “total distance,” “geographical area,” “allowed times and dates of operation,” “total time,” or “subsystems” the driver can use. (*Id.*, [0043]-[0044], [0057], [0026], [0074].) This operating profile can be “downloaded” from the transponder to controller 38 and reader 14 (*e.g.*, master control unit) via “radio signals,” thereby wirelessly loading the profile into controller 38. (*Id.*, [0031]-

[0034], [0043]-[0044], [0071]-[0074]; *see also* [0011], [0019], [0040], [0058]-[0060], [0068].) *See* Claim 1[B].

d. Claim 6

Arshad-Petrik renders obvious Claim 6. (Ehsani, ¶¶69-72.)

Arshad's transponder may include data “**downloaded** from the vehicle itself, such as (1) the distance traveled... (2) the date and times of specific events... (4) vehicle conditions, such as a threshold or maximum engine load experienced by the vehicle during operation..., (5) fault or error conditions experienced during operation...” (Arshad, [0026]-[0027].) Arshad's transponder receives this wirelessly from the “master control unit” through radio signals sent from reader 14. (*Id.*, [0025], [0029]-[0030].)

Petrik, like Arshad, discloses a fleet management system that authenticates and monitors drivers and allows vehicle operation within a driver's parameters, including speed limits, geographic route plans, and time limits. (Petrik, Abstract, [0016], [0024]-[0028].) Petrik's monitoring unit uses a “smart card” to authenticate drivers and log the “date, time, location, distance travelled and speed of the vehicle” in the unit's memory and smart card. (*Id.*, [0024]-[0026].) Additionally, “infraction data,” like “speeding offenses” and violations of route plans and rest times, is recorded in the smart card. (*Id.*, [0009], [0020], [0025]-[0030], [0033].)

It would have been obvious to modify Arshad's transponder to wirelessly receive infraction data, like speeding offenses and profile violations, from the master control unit, as taught by Petrik. (Ehsani, ¶¶71-72.) A POSITA would have understood this could be done by wirelessly sending infraction data from the monitoring controller's reader antenna, at the same time vehicle operation data is sent to the transponder. (Petrik, [0009], [0024]-[0026], [0043]; Arshad, [0024]-[0027].) Arshad was ready for such improvement, and a POSITA would have had a reasonable expectation of success, because this would have simply used Arshad's existing wireless communications between reader 14 and transponder 20, and the infraction data would be transmitted to the transponder in the same way as other data. (Ehsani, ¶72.) A POSITA would have been motivated to send infraction data, as well performance data, to the transponder to have an "irrefutable" log of violations on the transponder that could be read by a fleet manager. This would have facilitated Arshad's goals of managing fleets. (Arshad, [0008]-[0013]; Ehsani, ¶72.)

e. Claim 7

Arshad-Petrik renders obvious Claim 7. (Ehsani, ¶¶73-75.)

Arshad's transponder (*e.g.*, wireless identification and data logging module) stores driver restrictions, like "total distance which the vehicle is authorized to travel for that operator," and "data downloaded from the vehicle itself," including "vehicle performance data" like "the distance traveled by the vehicle." (Arshad, [0025]-

[0027], [0034].) See Ground 1a, Claim 1[A]. Moreover, when authenticating a driver, this information is “downloaded to controller 38 [e.g., master control unit] from transponder 20,” after which processor 90 and ROM memory 94 (e.g., vehicle control module) in controller 38 use it to guide vehicle operation. (Arshad, [0057], [0010]-[0013], [0027], [0031]-[0034].) See Ground 1a, Claim 3 (discussing ROM containing instructions that “control the operation” of processor in controller).

For example, the processor/ROM “periodically compares the data it has received from the other controllers and from its own sensors... with the transponder to determine whether the operator has attempted to exceed any of the operational limits that were indicated by the transponder.” (Arshad, [0043], [0071]-[0074], [0010]-[0013]; Ehsani, ¶75.) See Ground 1a, Claim 1[F]. Additionally, as Arshad teaches, if a driver were restricted to a “total distance” and drives to a first location and stops, then the “distance traveled by the vehicle” to this first location would be “downloaded” back to the transponder. (Ehsani, ¶75.) If the driver thereafter starts the car again to drive to a second location, then the data on the transponder, including such distance traveled, would be provided back to the monitoring controller (including the processor and memory therein), so that it could continue to monitor whether the driver has violated the “**total** distance which the vehicle is authorized to travel.” (*Id.*) Moreover, as Arshad discloses that multiple drivers can use the same vehicle (Arshad, [0010]-[0013]), a POSITA would have understood that by having

each individual driver's transponder provide details of that driver's prior operation when establishing communication with the controller 38, the controller and its vehicle control module would be able to control operation of the vehicle to keep that particular driver from exceeding, for example, her daily maximum distance or maximum time of operation. (Ehsani, ¶75.)

f. Claim 8

Arshad-Petrik renders obvious Claim 8. (Ehsani, ¶¶76-77.)

Arshad's controller 38, as modified by Petrik, receives data indicative of vehicle speed, location, and time of day from a GPS module. *See* Claim 1[B]. A POSITA would have understood this GPS module "wirelessly" receives such data from an "RF source"—namely, GPS "satellites" sending RF spectrum signals to the GPS receiver. (Arshad, [0029], [0073], Fig. 3; Petrik, [0012], [0025]-[0026]; Ehsani, ¶77.)

g. Claim 9

Arshad-Petrik renders obvious Claim 9. (Ehsani, ¶¶78-81.)

Petrik's monitoring unit has an "upgradeable software program," which has "a table of the geographical location of every speed zone change as per the... road speed signs throughout the country and provides intelligent speed adaptation." (Petrik, [0018]-[0019].) A remote command center database has a "geographical speed zone locations table of every speed zone as displayed by road speed signs

throughout the country,” which is wirelessly “downloaded” to the in-vehicle unit using “**Satellite/GPRS/GSM/Short Range/Bluetooth** enabled wireless communications.” (*Id.*, Cls. 49-50, 52-54.) Thus, Petrik’s in-vehicle unit wirelessly receives data indicative of speed limits for roads on which the vehicle is travelling from an RF or Bluetooth source.

It would have been obvious to modify Arshad’s monitoring controller (*e.g.*, master control unit) to, as taught by Petrik, wirelessly receive speed zone tables from a command center database using RF or Bluetooth. (Petrik, [0019], [0025]-[0026], Cls. 49-50, 52-54; Ehsani, ¶80.) A POSITA would have understood such speed limits would allow Arshad’s controller to determine when speeding violations occur and keep a record thereof. (Petrik, [0025]-[0026]; Ehsani, ¶80.) This would further Arshad’s fleet management goals, as managers would be provided with information regarding how safely their drivers are driving. (*Id.*) Arshad was ready for improvement in this regard, and a POSITA would have had a reasonable expectation of success, because this would have involved simply using known networked computers and communication interfaces for their intended functions. (*Id.*, ¶¶80-81.)

Further, as a POSITA would have understood, Arshad’s controller 38 wirelessly receiving a table with road speed limits, as taught by Petrik, would give the controller accurate speed limit information associated with the road on which the vehicle is traveling, allowing it to monitor compliance and provide warnings if a

speed limit is exceeded. (*Id.*, ¶81.) As Petrik teaches, such speed limit information would allow the controller to send commands to the engine, throttle, and transmission controllers to slow the vehicle and keep it within the speed limit. (*Id.*, ¶81.)

h. Claims 11 and 12

Arshad-Petrik renders obvious Claims 11-12. (Ehsani, ¶¶82-84.)

Petrik includes a remote “Command Centre” comprising “a computer network supporting an internet on-line facility” (*e.g.*, an alarm module comprising a computer, which may be Bluetooth-enabled) that is in “real-time” communication with Petrik’s in-vehicle system. (Petrik, [0010]-[0011], [0030]-[0032], Cls. 48-56.) The Command Centre computer receives vehicle operation data, including location, speed, and infractions, in real-time from the in-vehicle unit, which can be presented to dispatchers who are tracking drivers and vehicles in real-time. (*Id.*, [0030]-[0032], Cls. 49-51, 55, 58.) For example, in case of an accident, the in-vehicle unit “automatically reports” to the Command Centre computer “sudden change in speed” with “date, time and place coordinates,” which in turn “immediately” presents this to police/rescue crews and guides other vehicles around the area. (*Id.*, Petrik, [0010]-[0011], [0024], [0032], Cls. 55, 61.) The Command Centre also receives notifications when a vehicle violates its filed route plan or vehicle/driver details. (*Id.*, [0030], [0058]-[0060].)

It would have been obvious to modify Arshad to include a remote facility with a computer (*e.g.*, alarm module) for communicating with its in-vehicle system, as taught by Petrik. (Ehsani, ¶¶83-84.) A POSITA would have understood this would allow fleet managers to view real-time vehicle operation and violations data, improving safety and flexibility. (*Id.*, ¶84.) Arshad was ready for such an improvement, as it includes multiple controllers communicating over a bus, and adding the two-way communication module would simply be the addition of another controller on this same bus. (*Id.*) A POSITA would have had a reasonable expectation of success, because this would have involved simply using known networked computers and communication interfaces for their intended functions. (*Id.*) Moreover, this would have facilitated Arshad’s goals of managing fleets of vehicles. (*Id.*)

i. Claim 18

Arshad-Petrik renders obvious Claim 18. (Ehsani, ¶85.)

Arshad’s “operational limits” include (i) “maximum speed” (*i.e.*, maximum allowable vehicle speed), (ii) “geographical area in which the vehicle” can operate and “distance of authorized travel” (*i.e.*, allowable vehicle locations), (iii) authorized “routes” (*i.e.*, allowable destinations), and (iv) “allowed times and dates of operation” and hours of authorized use and engine operation (*i.e.*, allowable hours

of operation). (Arshad, [0005], [0011]-[0013], [0026], [0043]-[0045], [0057]-[0059], [0072]-[0074].)

j. Claim 19

Arshad-Petrik renders obvious Claim 19. (Ehsani, ¶¶86-88.)

Arshad monitors whether a vehicle is being operated within the profile, and, if not, can “display a message” that provides an alert “indicating what limit has been exceeded.” See Claims 1[B], 1[F]. Further, Petrik’s “in-vehicle monitoring unit” generates an alarm signal which “notifies” ***authorized personnel at a remote facility*** (*e.g.*, “Transportation Management Command Centre”), via a “SATELLITE/GPRS/GSM” link, when a vehicle violates the profile, such as by “divert[ing] inappropriately from the ‘filed’ route plan.” (Petrik, [0030], Cls. 58-60.)

It would have been obvious to modify Arshad’s system (*e.g.*, engine controller 46) to send “alarm signals” to remote authorized personnel via a communications link, as taught by Petrik. (Ehsani, ¶88.) A POSITA would have understood that, after determining a violation, Arshad’s engine controller could generate an “alarm signal” causing its system to transmit an alert to authorized persons at a remote facility. (*Id.*) The inclusion of a communications link to alert remote personnel would have merely required well-known components complementary to Arshad’s existing system. (*Id.*)

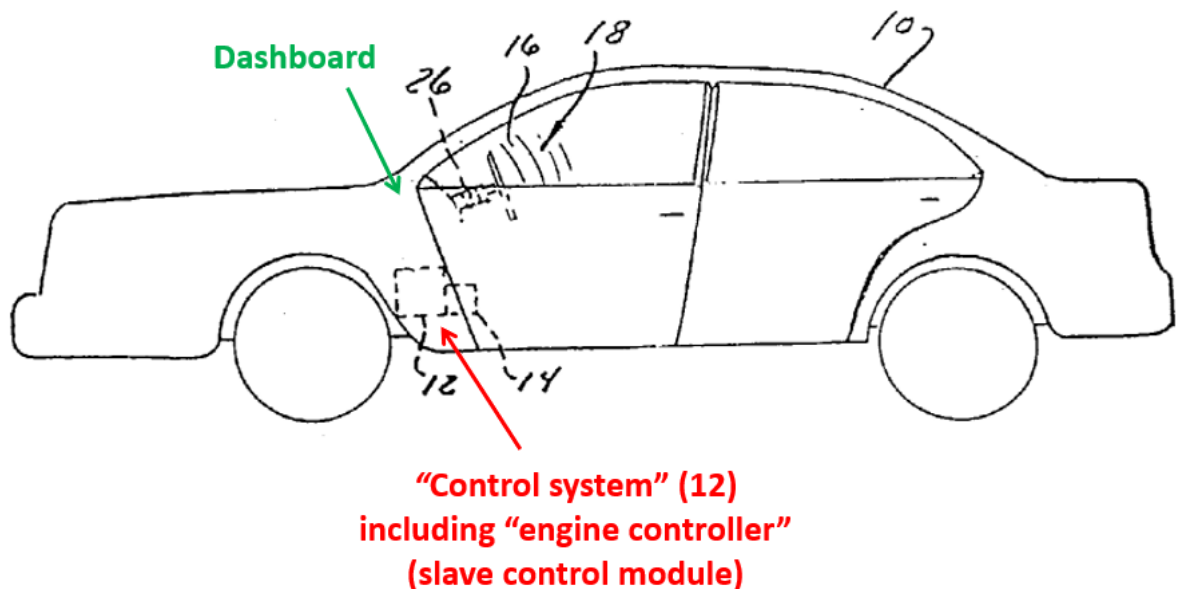
A POSITA would have been motivated (and it would have been obvious to try) to have engine controller 46 generate such alerts, since it already monitors

vehicle component operations and determines whether violations have occurred. (*Id.*) By having Arshad's engine controller and system send such alerts to authorized personnel at a remote facility, Arshad can better manage fleet use, as remote personnel could monitor vehicles in real-time and take action if necessary. (*Id.*)

k. Claim 20

Arshad-Petrik renders obvious Claim 20. (Ehsani, ¶¶89-90.)

Arshad describes its "control system 12" as modular, disclosing that the system is "mounted on the vehicle." (Arshad, [0012], Cl. 7.) Arshad specifically shows the system being mounted under the vehicle dashboard of "vehicle 10":



(Arshad, Fig. 1 (annotated), [0019], Fig. 3, [0027].) Engine controller 46 and I/O

controller 52 (*e.g.*, slave control units) are part of control system 12 shown above and, thus, are likewise under the dashboard. (*Id.*)

B. Ground 1b – Arshad-Petrik in View of Siwinski Renders Obvious Claims 13-14

Siwinski is US2002/0141600 (EX1010), published October 3, 2002, and is prior art under pre-AIA §102(b).

Arshad-Petrik in view of Siwinski renders obvious Claims 13-14. (Ehsani, ¶¶91-97.)

Siwinski, in the same field as Arshad-Petrik, discloses a system to “reduce or eliminate distractions” caused by “electronic devices,” like “cell phones” and “hand-held computers,” that are “portable” or “installed in the vehicle” and “connected to the Internet.” (Siwinski, Abstract, [0001]-[0002], [0004], [0008], [0014], [0021], Cl. 9.) In Siwinski, “main processor 30” receives data from “sensor 20” regarding whether the vehicle is “in motion,” and if it is, can communicate this to “processor 60” in the electronic device. (*Id.*, [0006], [0013]-[0016], [0020], Figs. 1-3.) “Processor 60” can then (a) “disable” the “audio output,” “voice input,” and “data network” connection, and limit information provided on a visual display, preventing the device, like a driver’s cell phone, from making calls or text messages, and (b) “prohibit operation of the Internet connection,” preventing the device from accessing “Internet-related information.” (*Id.*, [0016]-[0020], Cls. 1-8; Ehsani, ¶94.)

It would have been obvious to apply these teachings and include such a “governor module” disabling telephone calls, text messages, and in-vehicle Internet-related activities when the vehicle is in motion in Arshad-Petrik. (*Id.*, ¶95.) All three references are analogous and in the same field, as each are directed to monitoring and controlling vehicle operation and improving safety. (*Id.*) Adding such a “governor module” to disable such activities to Arshad-Petrik would have been the mere inclusion of a well-known component in a vehicle safety system. (*Id.*)

Arshad-Petrik suggests the modification, as its transponder indicates whether the driver is “authorized to operate specific sub-systems,” including “accessories” like the “radio,” “CD player,” “navigation computer,” and “TV.” (Arshad, [0060].) “Cell phones,” “hand-held computers,” and portable or “permanently installed” electronic devices with Internet connections are similar “accessories.” (Ehsani, ¶96.) Moreover, controlling these, as Siwinski teaches, would not impact the functioning of Arshad-Petrik. (*Id.*)

Indeed, Arshad-Petrik would continue to control operation as before, with its “monitoring controller” monitoring for driver profile compliance and controlling vehicle access and operations. (*Id.*, ¶97.) Now, however, “monitoring controller 38” would further control cellphone and Internet usage, *e.g.*, additional “accessories.” (*Id.*) These would be controlled in the same manner as other accessories and as

taught by Siwinski. (*Id.*) A POSITA would have been motivated to control such accessories in Arshad-Petrik to reduce driver distraction. (*Id.*)

C. Ground 1c – Arshad-Petrik in View of Wu Renders Obvious Claim 17

Wu is US2008/0114501 (EX1011), was filed November 15, 2006, and published February 21, 2008, and is prior art under pre-AIA §§102(a),(e).

Arshad-Petrik in view of Wu renders obvious Claim 17. (Ehsani, ¶¶98-107.)

Each of the well-known components recited in Claim 17 is disclosed or would have been obvious based on Arshad-Petrik or, at minimum, in view of Wu. (*Id.*)

Arshad's slave control unit includes a "power regulator module." (Ehsani, ¶¶102-03.) Engine controller 46 includes a "driver circuit 102" that "controls the application of power" to "actuators" such as the "fuel pump, governor and ignition system." (Arshad, [0077], [0044], [0048]-[0049], [0074].) Because it is an electronic component and controls electronic components, a POSITA would have understood engine controller 46 to have a "power regulator" to ensure receipt of a stable supply of the required voltage. (Ehsani, ¶103.)

Arshad's slave control unit includes a "starter relay module." (*Id.*, ¶104.) Engine controller 46 is coupled to "engine starting motor 71" to turn it on/off under computer control. (Arshad, [0049]-[0050].) Wu discloses "starter relays" are commonly used with couplings to energize starter motors. (Wu, [0020]-[0021], [0025]-[0026], [0030]-[0031], [0039], Figs. 1-2), and a POSITA would have

included such relay in Arshad to provide a commonly-used mechanism for activating the starting motor. (Ehsani, ¶104.)

Arshad's slave control unit includes a "definable relay module." (Ehsani, ¶105.) Engine controller 46 is "coupled to ignition system 70 of the engine" and can "energize or de-energize the ignition under computer control." (Arshad, [0049]-[0050]; [0044].) Such coupling would involve a relay module to (de)activate the ignition system. (Ehsani, ¶105.) Wu discloses ignition systems can be (de)energized using an ignition circuit enabling means comprising a processor (like in Arshad's engine controller) and a relay. (Wu, [0020]-[0021], [0025], [0031], [0039], Figs. 1-2.) A POSITA would have been motivated to use such a processor and ignition relay to implement computerized ignition system control with Arshad's engine controller. (Ehsani, ¶105.) This would have merely been the implementation of known components for their intended purpose to achieve the same results. (*Id.*)

Arshad's slave control unit includes a "slave microcontroller." (Ehsani, ¶106.) Arshad's engine controller 46 and other controllers are "microprocessor-based," each including a microprocessor, RAM, ROM, sensor circuit, driver circuits, and communication processor. (Arshad, [0028], [0075]-[0080], Fig. 4.)

Arshad renders obvious its slave control unit including an "alarm synthesizer." (Ehsani, ¶107.) Arshad's I/O controller can "energize annunciator 84" to "generate a sound to get the operator's attention" when operational limits are

exceeded. (Arshad, [0054], [0063], [0071]-[0072].) Similarly, Wu discloses generating such audible alerts with a synthesizer, including an “operational amplifier” and “resistor,” and a POSITA would have understood this to be a common way to implement Arshad’s audible alerts. (Wu, [0030]; Ehsani, ¶107.)

D. Ground 1d – Arshad-Petrik in View of Kudo Renders Obvious Claims 2, 10, and 15-16

Kudo is US20070069873 (EX1012), published March 29, 2007, and is prior art under pre-AIA §102(b).

1. Claim 2

Arshad-Petrik in view of Kudo renders obvious Claim 2. (Ehsani, ¶¶108-17.)

Kudo, in the same field as Arshad-Petrik, discloses a vehicle with an “ACC (automatic cruise control system)” providing control of acceleration, deceleration, and steering and having an “alarm function” for detected “obstacles.” (Kudo, [0019]-[0020], Fig. 1.) Kudo’s ACC includes transducers with “at least one of an image capturing sensor and a proximity sensor.” (Ehsani, ¶¶111-17.)

First, Kudo discloses a “stereo camera 3” comprised of left and right CCD cameras that capture “stereo images of a target out of the vehicle from different view points and output the image data to the stereo image recognizing device 4.” (Kudo, [0021]-[0025].) The image recognizing device 4 receives the image data and detects “solid objects” (*e.g.*, other vehicles, guardrails, and obstacles) and “white line data” (*e.g.*, white roadside lines) near the vehicle “on the basis of the image data from the

stereo camera 3.” (*Id.*, [0025]-[0027].) Thus, each CCD camera is an “image capturing device.” (Ehsani, ¶112.) Further, these stereo cameras and the associated image recognizing device are proximity sensors, as the “image recognition unit 4” determines the proximity (or distance) to preceding vehicles and objects based on image data from the stereo camera and vehicle speed data from a “speed sensor 6.” (Kudo, [0021]-[0028].)

Second, Kudo discloses that a preceding vehicle can also be recognized using “a milli-meter wave radar or a single-eye camera.” (*Id.*, [0085].) Thus, for detecting the presence of and distance to a preceding vehicle, a radar proximity sensor could so be used. (Ehsani, ¶113.) This radar sensor would be used in addition to a stereo or mono camera, which would still be required to provide the image data for detecting objects like the “white lines” of the road that are used to set an “alarm area.” (Kudo, [0021]-[0028], [0046], [0085]; Ehsani, ¶113.)

Moreover, information—including vehicle speed, steering angle, yaw rate, and distances to preceding vehicles and objects (whether from the stereo camera, radar, or mono camera)—is input to “control unit 5.” (*Id.*, [0022]-[0025], [0085].) Control unit 5 uses this to alert the driver by automatically controlling acceleration, deceleration, and steering and by issuing “alarms.” (*Id.*, [0027]-[0034], Figs. 1-2, 5, 7A-7B.) When determining whether to issue an alarm, Kudo detects whether “interrupting vehicles” or “obstacles” ahead of the equipped vehicle are within an

“alarm area” using this information. (*Id.*, [0027]-[0028], [0034]-[0035], [0039]-[0056], [0064]-[0077].) If so, it issues an alarm by providing a message on “display 14,” issuing a voice message, and vibrating the steering. (*Id.*, [0033]-[0046], [0053]-[0056], [0064]-[0077], [0080]-[0084], Figs. 2-4; *see also* [0035]-[0079] (detailing alarm process).)

It would have been obvious to modify Arshad-Petrik to include a plurality of transducers, including an image capturing camera and proximity sensors, as Kudo teaches. (Ehsani, ¶¶115-17.) A POSITA would have been motivated to include such cameras and proximity sensors in Arshad-Petrik to determine the presence of and distance to other vehicles/objects and to (i) issue alarms when obstacles exist in an alarm area and (ii) adjust vehicle speed and steering where appropriate. (*Id.*) Arshad-Petrik disclose systems which, like Kudo, sense vehicle speed and control components to maintain a desired speed. (Arshad, [0044]-[0046]; Petrik, [0025]-[0026].) Adding Kudo’s cameras and proximity sensors to Arshad-Petrik would have simply been the use of known components for their intended purpose, allowing Arshad-Petrik to take into account presence of and proximity to other vehicles/objects when alerting the driver and controlling the vehicle, including its speed. (Ehsani, ¶115.)

A POSITA would have known to implement Kudo’s cameras and proximity sensors and generating of alerts in Arshad-Petrik in the same manner as Arshad-

Petrik's other sensors are used. (Ehsani, ¶¶116-17.) Arshad's engine controller 46 and I/O controller are already configured to receive information from numerous sensors and inputs, analyze received information, and determine if actions are required. (Arshad, [0046]-[0050], [0054]-[0060], [0064]-[0074].) Kudo's camera and proximity sensors, when in Arshad, would likewise provide signals to engine controller 46 and/or IO controller 52, so the controller could determine if a driving condition requiring a warning exists and then notify monitoring controller 38. (Ehsani, ¶116.)

A POSITA would have been motivated to have the engine or I/O controller send image and proximity data to monitoring controller 38, so that it could take into account all vehicle operation information when issuing commands and deciding whether and how to alert the driver. (Ehsani, ¶117.) Having these controllers send such signals to monitoring controller 38 would also be consistent with Arshad's approach of keeping all controllers in "constant communication with each other" (Arshad, [0064]) and allowing the monitoring controller to assess "priority" when determining which actions to take. (*Id.*, [0043]-[0045].)

2. Claim 15

Arshad-Petrik in view of Kudo renders obvious Claim 15. (*Id.*, ¶¶118-21.)

Kudo discloses "power steering control unit 13" (*e.g.*, steering control module), "throttle control unit 10" (*e.g.*, acceleration control module), and

“automatic brake control unit 12” (*e.g.*, a braking control module). (Kudo, [0020]-[0021], [0023], [0029]-[0032].)

These units receive instructions from “controller 5,” which sends signals to implement a “constant speed travel function” and “an automatic follow-up control (follow-up acceleration/deceleration and follow-up steering control) function.” (Kudo, [0029]-[0032].) *See also* Ground 1d, Claim 2.

In particular, signals are sent to “throttle control unit 10” to open the throttle and increase vehicle speed to a desired speed, or to the “automatic brake control device 12” to actuate automatic braking and reduce speed, thereby performing “follow-up acceleration/deceleration control.” (*Id.*, [0029]-[0031].) In addition to increasing/reducing speed, this follow-up control alters the vehicle position on the road, and the proximity of the vehicle to a preceding vehicle, as the vehicle maintains a “target inter-vehicle time” and “target inter-vehicle distance” through the acceleration/deceleration. (*Id.*)

To achieve follow-up steering, yaw rate or steering angle values required to follow a preceding vehicle as that vehicle turns or changes direction of travel are calculated. (*Id.*, [0025], [0029]-[0032].) These calculated values are “output” to “electrically-driven power steering device 13,” which steers the vehicle to follow the preceding vehicle. (*Id.*) This alters the position of the equipped vehicle with respect

to the road, and alters the proximity of the vehicle to the preceding vehicle. (Ehsani, ¶120.)

In addition, a “target route” of the vehicle is calculated based on the positions of the equipped vehicle and target vehicle as part of the ACC. (Kudo, [0034]-[0049], [0064]-[0081].) Where the road ahead is curved, this target route is “approximated as an arc” with a radius. (*Id.*, [0064], Fig. 7B.) Kudo discloses that objects are detected, and if an object is determined to be within an alarm area along the target route of the vehicle (the route it will take to follow the preceding vehicle), alarms may be issued and the controller may also “output a signal to the electrically-driven power steering control device 13 and vibrate the steering with torque for a preset period, thereby promoting the turning of the steering to the right.” (Kudo, [0072]-[0077], [0080]-[0082].) By issuing the signal to the power steering control device to vibrate the steering with a torque, causing the steering to turn to the right to avoid the object, the system alters the proximity of the vehicle with respect to the object. (Ehsani, ¶120.)

It would have been obvious to modify Arshad-Petrik to include steering, braking, and acceleration control modules, as Kudo teaches, and have them receive instructions from monitoring controller 38 (*e.g.*, master control unit) to safely provide for automatic cruise control when following a preceding vehicle and to avoid obstacles. (*Id.*, ¶121.) A POSITA would have understood such instructions could be

sent from the monitoring controller (either directly or through the engine controller) to throttle, braking, and steering control modules to reduce/increase vehicle speed, alter vehicle direction, and alter proximity to other vehicles/objects. (*Id.*)

A POSITA would have had a reasonable expectation of success, as Arshad’s monitoring controller already receives information from numerous sensors and controllers, and issues commands to controllers to operate vehicle subsystems. (*Id.*) Adding commands to steering control, acceleration control (which Arshad already discloses), and braking control systems would have merely been additional control of known vehicle sub-systems in a known manner, and would have provided greater overall vehicle control within the driver’s operational limits. (*Id.*)

3. Claim 16

Arshad-Petrik in view of Kudo renders obvious Claim 16. (Ehsani, ¶¶122-25.)

Claim 16 recites nothing more than the result of implementing commands sent to the acceleration, deceleration, and steering control modules of Claim 15. (*Id.*)

Moreover, Arshad discloses that a vehicle equipped with its system operates autonomously, without driver action, when a driver exceeds operational limits, as its monitoring controller directs “engine controller 46 to shut down the fuel pump, the ignition system, or to limit the speed of the vehicle or engine.” (Arshad, [0043].) *See also* Ground 1a, Claim 1[F].

And Arshad-Petrik, as modified by Kudo, implements autonomous control of vehicle steering, acceleration, and deceleration when the “constant speed” function and/or “automatic follow-up control” function is implemented. *See* Ground 1d, Claim 15. (Ehsani, ¶¶124-25.)

4. Claim 10

Arshad-Petrik in view of Kudo renders obvious Claim 10. (Ehsani, ¶¶126-28.)

Arshad discloses controller 38 (*e.g.*, master control unit) defines a speed and a geofence limit of the vehicle. Arshad’s controller 38 “determine[s]” operating limits received from the transponder, and uses these to define limits such as “geographical area in which the vehicle may only be operated” (*e.g.*, geo-fence limits) and “maximum speed of authorized operation” (*e.g.*, maximum speed limits). (Arshad, [0011]-[0013], [0026], [0057]-[0060].) The controller also defines current speed of the vehicle, as it checks when vehicle speed “approaches its maximum authorized speed.” (*Id.*, [0057]-[0059], [0045].)

Moreover, it would have been obvious to modify Arshad’s monitoring controller to, as taught by Kudo, define a speed, a positioning of the vehicle on a road, a distance from other objects, and distances from other vehicles in order to implement automatic steering, acceleration, and braking for automatic cruise control operation. *See* Ground 1d, Claims 2, 15. For example, in determining and maintaining inter-vehicle distance and issuing an alarm when an object is in an

“alarm area” around the vehicle, Kudo discloses that the controller defines a speed and position of the equipped vehicle, a distance to a preceding vehicle, and a distance to obstacles. *Id.*

E. Ground 2a – Murphy Anticipates and Renders Obvious Claims 1, 3, 8, 11-12, and 18-20

Murphy anticipates or renders obvious Claims 1, 3, 8, 11-12, and 18-20. (Ehsani, ¶¶129-171.)

1. Independent Claim 1

Murphy anticipates and renders obvious Claim 1. (*Id.*, ¶¶129-58.)

1[pre]: *A vehicle control system, comprising:*

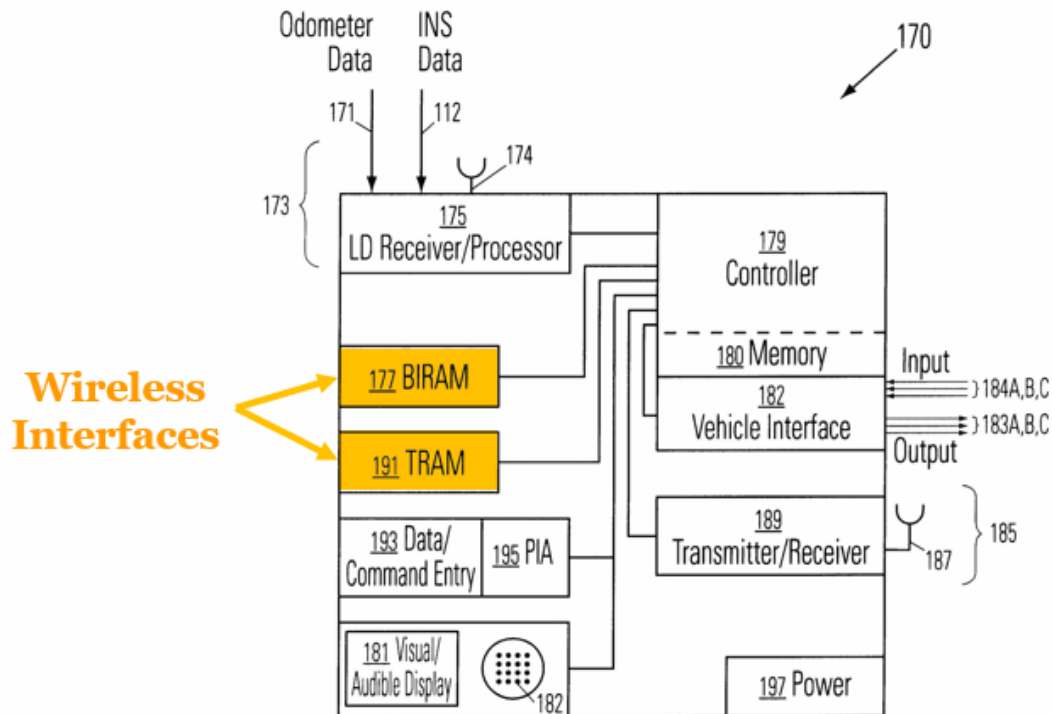
Murphy discloses Claim 1[pre]. (*Id.*, ¶133.)

Murphy discloses a “vehicle control system” for “restricting use of a vehicle by a selected vehicle operator” that can “monitor operation of the vehicle by a teenager or other inexperienced driver, with restrictions imposed upon... vehicle maximum speed...,” *inter alia*. (Murphy, Abstract, 4:44-53, 15:1-8, 11:60-64, 19:3-12; *see also* Figs. 1, 6-7.) Murphy’s system includes a “controller” that can “authenticate” drivers. (*Id.*, 13:28-42, 14:46-15:31, 6:55-7:29, Figs. 6-7.)

1[A]: *a wireless identification and data logging module;*

Murphy discloses and renders obvious Claim 1[A]. (Ehsani, ¶¶134-37.)

Murphy “authenticates” drivers via multiple interfaces, including (1) “token receiving analysis mechanism” (TRAM) and “token or smart card” and (2) “biometric indicium receiving and analysis mechanism” (BIRAM):



(Murphy, Fig. 6 (annotated), 13:28-42, 14:46-15:31, 6:55-7:24, Fig. 7.)³ These interfaces can be used alone or together. (*Id.*) See also Claim 1[B] (discussing interfaces being used to authenticate drivers).

³ Murphy can further include a “data entry module” and “personal information analysis (PIA) module.” (Murphy, 14:55-65, 7:15-7:29.)

When a driver “turn[s] on the ignition,” the system prompts for “a sample of his/her ident indicium (a biometric indicium and/or token or keypad entries).” (*Id.*, 7:49-54, Fig. 2, Abstract.) The “token or smart card” can be “insert[ed]” in ***or*** “***present[ed]***” to the TRAM. (*Id.*, 6:55-7:14.) Smart cards “present[ed]” to a reader, rather than inserted, are contactless and thus “wireless.” (Ehsani, ¶136.) Further, the token has a log of “personal information on the... token holder and/or information on limitations under which the token holder can operate a vehicle.” (Murphy, 6:55-7:14, 14:46-61, 2:32-34, Cl. 38.)⁴

Similarly, the BIRAM receives “samples of ident indicium” for drivers, such as “fingerprints,” “facial scans,” or “voice samples.” (*Id.*, Abstract, 4:39-5:12; see also 2:20-34, 16:50-17:2, Cl. 37.) The BIRAM can be implemented using various “[s]ystems for obtaining and analyzing” biometric indicia, including a “portable fingerprint scanning apparatus that optically scans, ***records***, and ***transmits fingerprint images*** over a ***wireless*** channel to a mobile unit for analysis and verification,” as disclosed in US5,222,152 (EX1014) (“**Fishbine**”). (*Id.*, 17:63-19:2;

⁴ It also would have been obvious in view of Arshad for Murphy’s “interfaces” to be wireless and log data. See Ground 2b, Claims 1, 4-6.

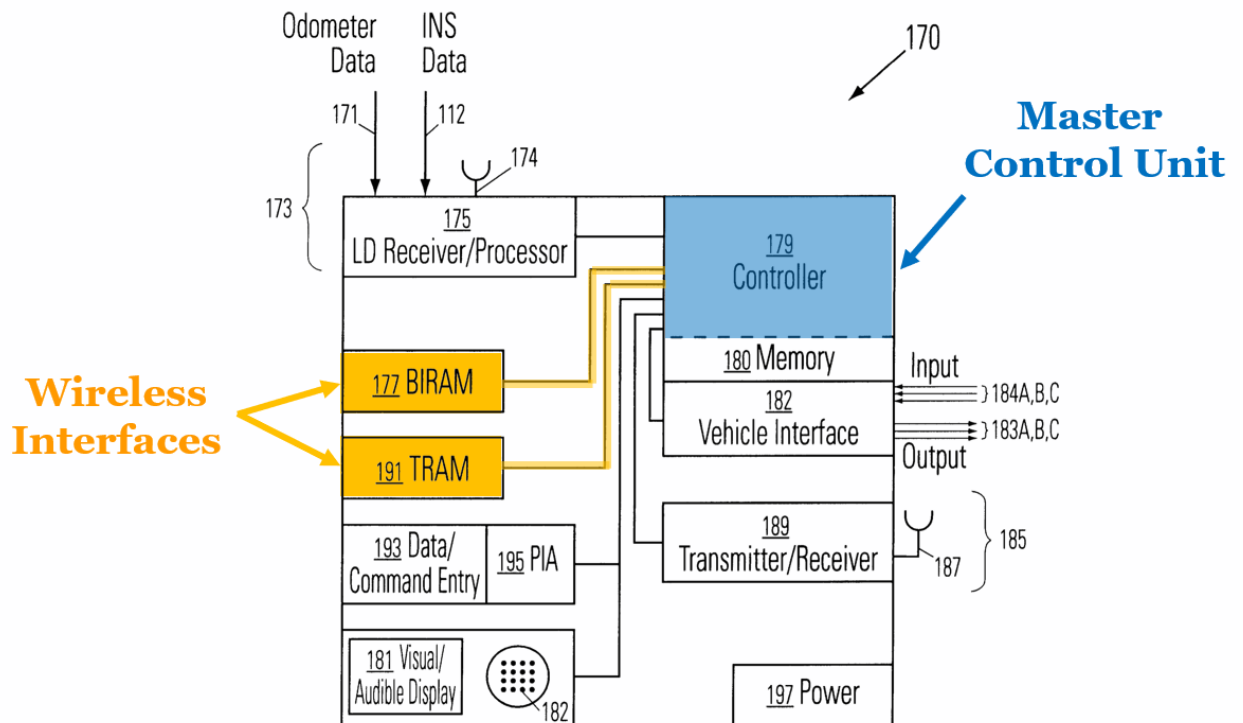
Fishbine, Abstract, Fig. 1, 1:8-12, 3:4-4:51, 5:10-14, Cl. 1.)⁵ Moreover, the “fingerprint images” in such apparatus are “recorded” (*e.g.*, logged) using an “image recorder,” enabling the images to be displayed by the apparatus and wirelessly transmitted to another device for identity verification. (*Id.*; Ehsani, ¶137.) Murphy’s BIRAM logs other information too, including how many times the “driver fails to provide a legible/interrogatable biometric indicium.” (Murphy, 6:35-39.)

1[B]: a master control unit in a vehicle for wirelessly authenticating at least one occupant via said wireless driver identification and data logging module and associating an operating profile with said at least one occupant;

Murphy discloses and renders obvious Claim 1[B]. (Ehsani, ¶¶138-44.)

“Ident indicium” obtained from Murphy’s wireless interfaces is “sent to the **controller** module 179 and associated memory module 180” for “**authenticating** the identity” of the driver (*e.g.*, occupant):

⁵ Murphy incorporates Fishbine by reference and makes clear that Fishbine is part of Murphy’s disclosure. (Murphy, 17:63-19:2.) *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000); *Viken Detection Corp. v. Am. Sci. and Eng’g, Inc.*, No. IPR2022-00027, Paper 12 at 18, 44 (P.T.A.B. Apr. 27, 2021).



(Murphy, Fig. 6 (annotated), 6:46-7:24, 13:36-40, 15:8-54, Fig. 7.) The controller “*compares* [the received] indicium *with indicia stored*” in the system (*e.g.*, in a “database with identities and matching indicia”) to identify the driver. (*Id.*, 5:12-24, 15:8-21, 2:26-38, 7:49-63, 10:45-11:27, 14:46-65, 15:55-16:11, 16:50-17:62, Figs. 2-3, 6.)

Moreover, drivers have different “operating profiles.” They can be divided into categories, with “[*different driving restrictions... imposed[]*] depending upon the category,” like permitted “time intervals and... travel corridor(s) and speeds for travel.” (Murphy, 7:64-8:2, 1:66-2:53, Fig. 2, 7:49-9:44, 5:18-26, 7:3-13, 3:20-47, 11:60-67.) Drivers can also have “*individualized*” restrictions, like “maximum

speed,” “geographic region” and “routes,” “maximum accumulated” mileage and time, and “time intervals” when the vehicle can be driven. (*Id.*, 6:8-17, 17:14-29; see also 15:66-16:11, 6:55-7:14, 8:29-53, 10:45-11, Figs. 2-3, Abstract, Cls. 3, 10.) Drivers’ profiles can be stored in a “database” or “memory” the controller can access. (*Id.*, Figs. 6-7, 13:35-41, 14:51-16:11.)

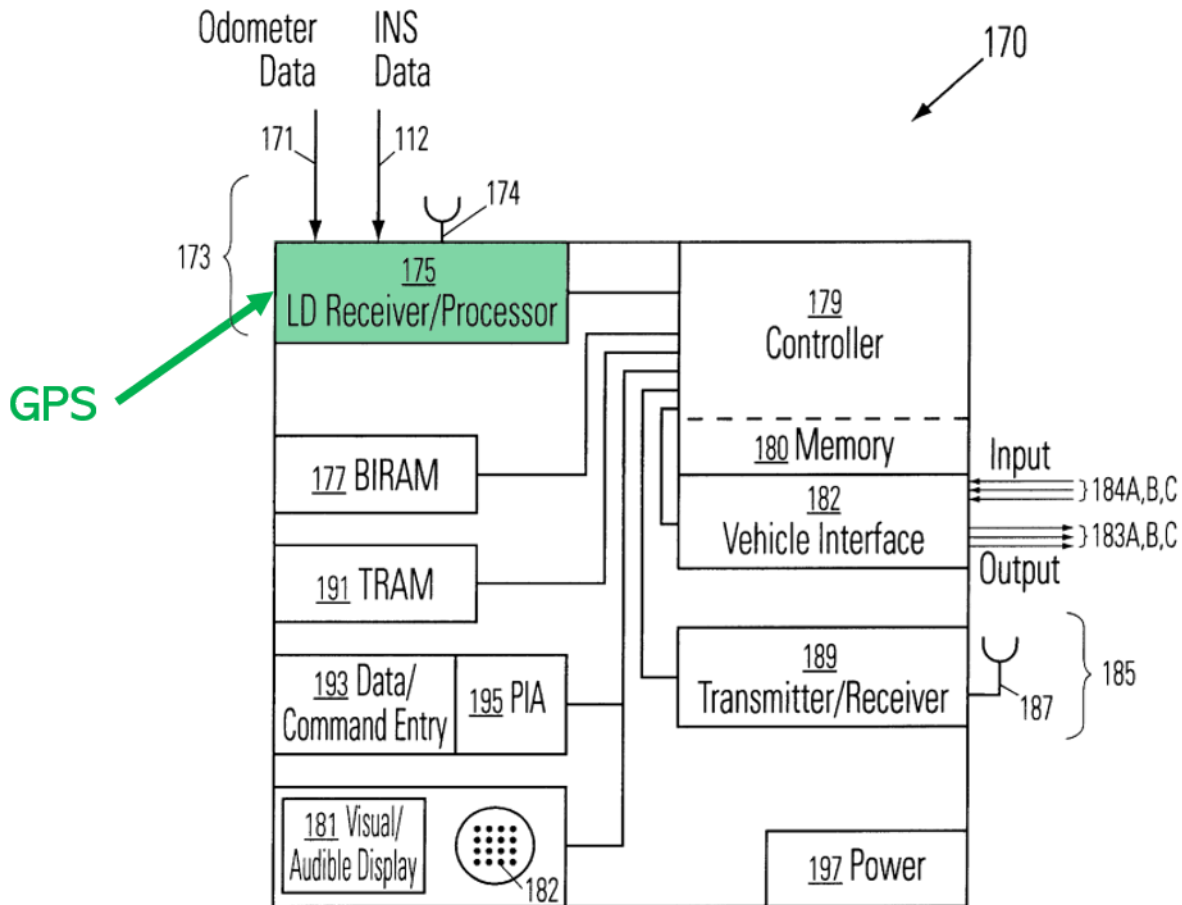
After authenticating a driver, Murphy accesses her profile and permits her to operate the vehicle in accordance with it. Specifically, when “[ident] indicum is satisfactorily presented and analyzed, the system allows operation of the vehicle” but will monitor “whether the vehicle location and/or speed are within **permitted ranges for the driver** and... whether the present time and/or accumulated time or mileage are within **permitted ranges for the driver.**” (*Id.*, Abstract, 8:28-49, 2:46-53, 5:13-28, 6:55-7:14, 7:49-8:14, 8:54-61, 10:45-11:19, Figs. 2-3.) The controller can access “**limitations** on vehicle operation **for each** authorized vehicle **operator**” and can use this and vehicle information to “determine[] which Control Action(s), if any, should be imposed.” (*Id.*, 15:9-42, 13:53-16:17, 17:14-62, 12:6-27, Figs. 6-7.) See Claim 1[F].

1[C]: a module for receiving at least location and speed information in association with a movement of said vehicle;

Murphy discloses Claim 1[C]. (Ehsani, ¶¶145-46.)

Murphy includes a “**location determination (LD) module**” that is “part of an LD system, such as GPS,” and receives signals and determines “the **present location**,

present speed... of the vehicle” from them. (Murphy, 3:48-64.) This information is “sent by the LD module 173 to the controller” for determining whether to take control actions:



(*Id.*, Fig. 6 (annotated), 13:28-65, Abstract, 14:23-45, 15:32-54, 3:64-4:38, 13:11-26, 7:49-9:44, Cls. 1, 10, Figs. 2, 5, 7.)

1[D]: a data logging device that records vehicle operation data associated with a use of said vehicle, the vehicle operation data comprising at least said location and speed information from said module; and

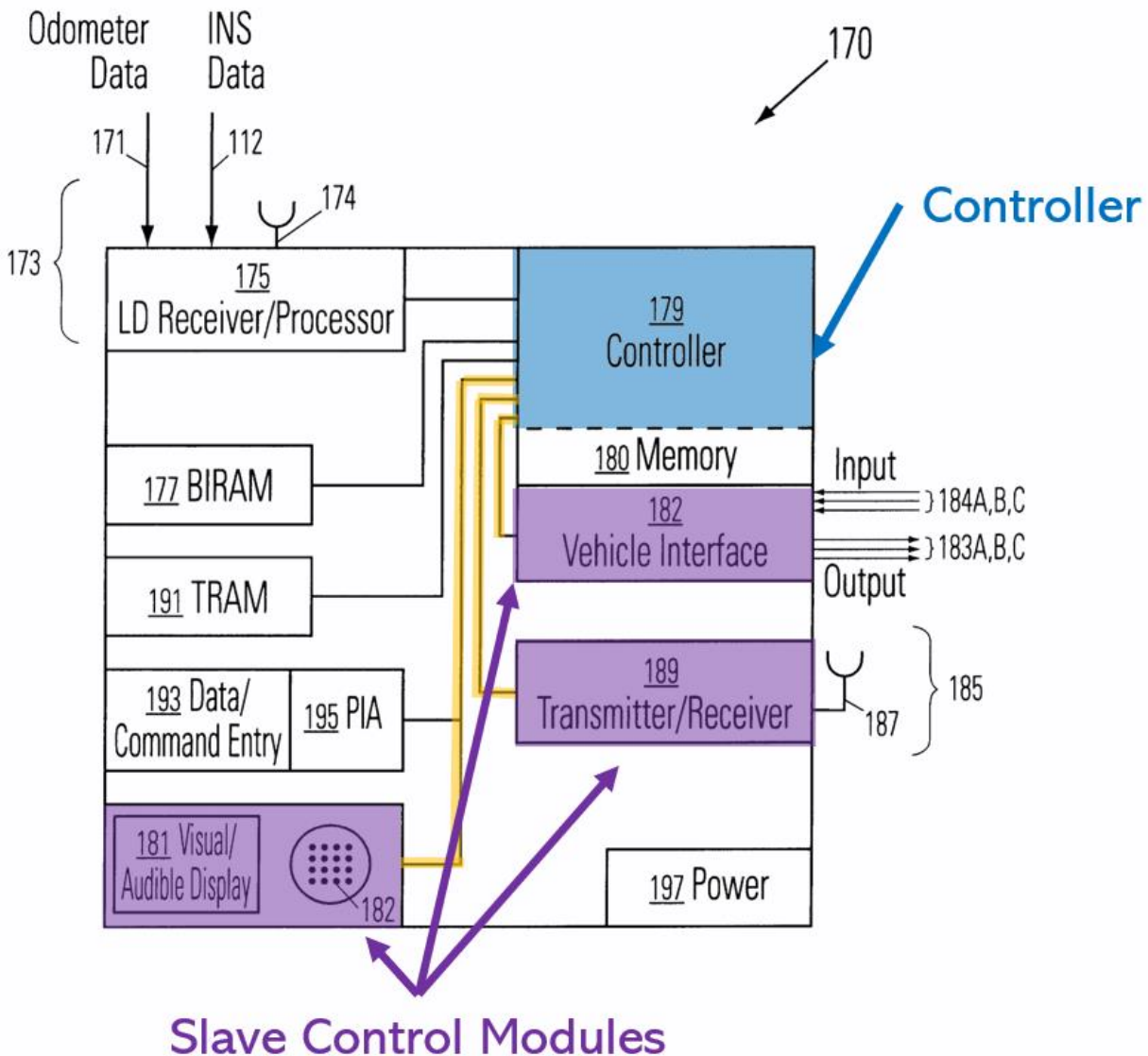
Murphy discloses Claim 1[D]. (Ehsani, ¶¶147-50.)

Murphy includes “an *operations log, including periodic recording of the present observation time, vehicle location and/or vehicle speed in a memory*” (Murphy, 12:1:5, Fig. 6, 13:53-15:65, 14:18-22.) This allows location and speed from the LD module to be stored for “subsequent review and analysis” and “copied from or removed from the system for subsequent analysis or storage.” (*Id.*, 15:42-16:11, Fig. 7, 5:52-54.) Further, GPS “location and selected status parameters” can be stored in a remote “base station” for determining whether to take actions remotely (such as modifying or adding new restrictions). (*Id.*, 4:15-27, 1:66-2:24, 16:30-49.)

1[E]: a slave control unit in said vehicle and which communicates with said master control unit, wherein said slave control unit receives commands from said master control unit and generate an alarm signal;

Murphy discloses Claim 1[E]. (Ehsani, ¶¶151-55.)

Murphy includes “slave control units” that (b) communicate with and receive commands from the controller and (b) generate “alarm signals” if the driver’s profile is violated. Murphy has numerous “modules” which communicate with its controller, including: (x) “vehicle [or control action] interface module,” (y) “visual and/or audible display [or feedback] module” and (z) “telecommunication module”:



(Murphy, Fig. 6 (annotated); see also 13:28-15:8, Fig. 7, 15:8-54, 16:12-16:49.)

Murphy’s controller performs a “comparison” of vehicle location, speed, time, and accumulated operating time and mileage with “vehicle operation restrictions” for the driver, and if it determines the driver has violated her profile and a “Control Action” should be “imposed on vehicle use,” it “communicates this” to the **interface module** “for implementation.” (*Id.*, 13:28-14:22, 15:9-16:11, 13:66-

14:17, 16:50-17:63, 5:13-54, 6:1-18, Cls. 1, 10, Abstract, 1:66-2:6, 2:20-53, 7:49-9:44, 10:45-11:27, Figs. 2-3, 6-7.) If the interface module receives such a command, it generates an “alarm signal” by “controlling or restricting operation” of “vehicle component[s]” that are connected to its “output terminals.” (*Id.*; *see also* 15:55-16:11, 16:50-17:63, Cls. 1, 10, Abstract, 2:20-53, 7:49-9:44, 10:45-11:27, Figs. 2-3.)

Similarly, the controller can command the **display module** to “announc[e] or visually display[] that a violation has occurred....” (*Id.*, 5:29-60, 13:61-65, 15:47-50, Figs. 6-7, 12:6-15, 10:29-40.) It can also command the **telecommunication module** to transmit an “alarm signal” to an “information processing facility” when a driver violates her profile. (*Id.*, 14:23-45, Fig. 6, Abstract, 2:6-9, 4:15-27, 12:16-27, Cls. 7, 9, 12, 15, 18,.)

1[F]: wherein said master control unit provides operation governance of said vehicle within said operating profile.

Murphy discloses Claim 1[F]. (Ehsani, ¶¶156-58.)

Murphy’s controller provides operation governance within the “operating profile” after a driver is authenticated. *See* Ground 2a, Claim 1[B]. For example, once the controller authenticates the driver, it permits the vehicle to operate in accordance with the profile and governs operations to ensure compliance with the profile. Specifically, when “[ident] indicum is satisfactorily presented and analyzed, the system allows operation of the vehicle” but will monitor “whether the vehicle

location and/or speed are within ***permitted ranges for the driver*** and... whether the present time and/or accumulated time or mileage are within ***permitted ranges for the driver.***” (Murphy, Abstract, 8:28-49, 2:46-53, 5:13-28, 6:55-7:14, 7:49-8:14, 8:54-61, 10:45-11:19, Figs. 2-3.) The “controller” can receive “***limitations*** on vehicle operation ***for each*** authorized vehicle ***operator***” and can use information it receives on vehicle status (*e.g.*, location, speed, time) “for comparison... with any vehicle operation ***restrictions that may be imposed on an identified...***” driver. (*Id.*, 13:53-65, 14:46-65, 15:9-16:11, 17:14-29, 12:6-27, Figs. 6-7.) If it determines the vehicle is not operating within the profile, the controller governs operations by issuing commands to, for example, “disable[e]” vehicle operation, transmit an alarm signal, or reduce vehicle speed. (*Id.*, Abstract, 5:29-60, Fig. 2, 13:53-14:17.) See Claim 1[E].

2. Dependent Claims

a. Claim 3

Murphy anticipates and renders obvious Claim 3. (Ehsani, ¶¶159-61.)

Murphy discloses a “vehicle control module” for controlling vehicle speed and location, as its controller module (*e.g.*, master control unit) includes a “specially programmed computer to carry out tasks” assigned to it, including tasks to control vehicle speed and location by (i) “comparison” of “present vehicle ***location and/or*** vehicle ***speed*** and/or time” with “any vehicle operation restrictions that may be

imposed” on a driver to determine if these are within “*permitted ranges*” and (ii) if not, communicating “Control Action(s)” to be taken to the vehicle interface module (e.g., slave control unit), so that it can “control[] or restrict[] operation of the vehicle” accordingly. (Murphy, Fig. 2, 7:49-9:44, 13:53-14:20, 15:32-47, 17:14-62, 5:29-60, Abstract.) Such “Control Actions” issued by the controller through the programming modules on its computer, and implemented by the interface module, can include “halting the vehicle” (e.g., if it is outside of a permitted geographic region) and “reducing the vehicle speed to a maximum selected speed.” (*Id.*; Ehsani, ¶160.) Murphy further teaches its modules can be “computer system[s] or similar electronic computing devices” and include software modules in the form of “sequence[s] of steps or instructions leading to a desired result.” (Murphy, 16:12-50.) See Ground 2a, Claims 1[F], 18.

Thus, certain programming modules in the controller module’s “specially programmed computer to carry out the tasks assigned to the controller module...” are dedicated to controlling the vehicle, including speed and location. (Murphy, 14:18-20.) As such, this “specially programmed computer” within the controller module is a “vehicle control module” because it is hardware and includes software modules that carry out the tasks of controlling vehicle speed and location. (*Id.*; Ehsani, ¶161.)

b. Claim 8

Murphy anticipates and renders obvious Claim 8. (Ehsani, ¶¶162-63.)

Murphy's LD module includes an "LD signal antenna" for receiving "LD signals" wirelessly transmitted from "satellites or transmitting ground-based towers"—i.e., "RF sources." (Murphy, 3:48-64, 13:28-65, Fig. 6.) These "LD signals" are "data indicative of" vehicle speed, location, and time of day, and are used to "determine[] the present **location**, present **speed** (optional) and observation **time** (optional)." (Murphy, 3:48-4:38.) Further, the LD module "communicates this information to the controller. (*Id.*, 15:32-54.) The controller and LD module can also "coincide or both be parts of a larger module..." (*Id.*, 14:17-22.) See Claim 1[C].

c. Claims 11-12

Murphy anticipates and renders obvious Claim 11-12. (Ehsani, ¶¶164-65.)

Murphy includes a remote "monitoring station" (*e.g.*, an alarm module comprising a computer) that presents "infraction data" that is received wirelessly from the in-vehicle system and controller in real-time. (Murphy, 5:13-60, 16:11-49, Fig. 6, 14:23-45, Abstract, 4:15-27, 17:30-63, Cls. 1, 12, 20, 30.) The controller is continuously determining "vehicle **present** location and velocity and **present** time" and determining if these are within "permitted ranges" in a loop. (*Id.*, Figs. 2-4, 7:12-13:10.) If not, it can cause the telecommunication module to transmit an "alarm signal" over "suitable communication systems" (*e.g.*, wireless networks), and the alarm signal is presented at the remote station. (*Id.*) In response to being presented

with the alarm signal, the remote station can take various actions in real-time, including “modify[ing], add[ing], or delet[ing] vehicle operation restrictions.” (*Id.*) See also Claim 18.

d. Claim 18

Murphy anticipates and renders obvious Claim 18. (Ehsani, ¶¶166-67.)

Murphy’s profiles include “***parameters for vehicle operation***, including restrictions on (a) “selected maximum speed” (*i.e.*, maximum allowable speed), (b) “selected geographic region” (*i.e.*, allowable location), (c) “specific routes” (*i.e.*, allowable destinations), and (d) “one or more selected time intervals during the day, or to selected days of the week” (*i.e.*, allowable operation hours). (Murphy, 17:14-28, 14:40-45, Abstract, 5:12-54, 11:60-67, 2:46-53, 6:8-17, Fig. 2, 8:5-67, 12:16-35, 15:66-16:11.) See Claim 1[B].

e. Claim 19

Murphy anticipates and renders obvious Claim 19. (Ehsani, ¶¶168-69.)

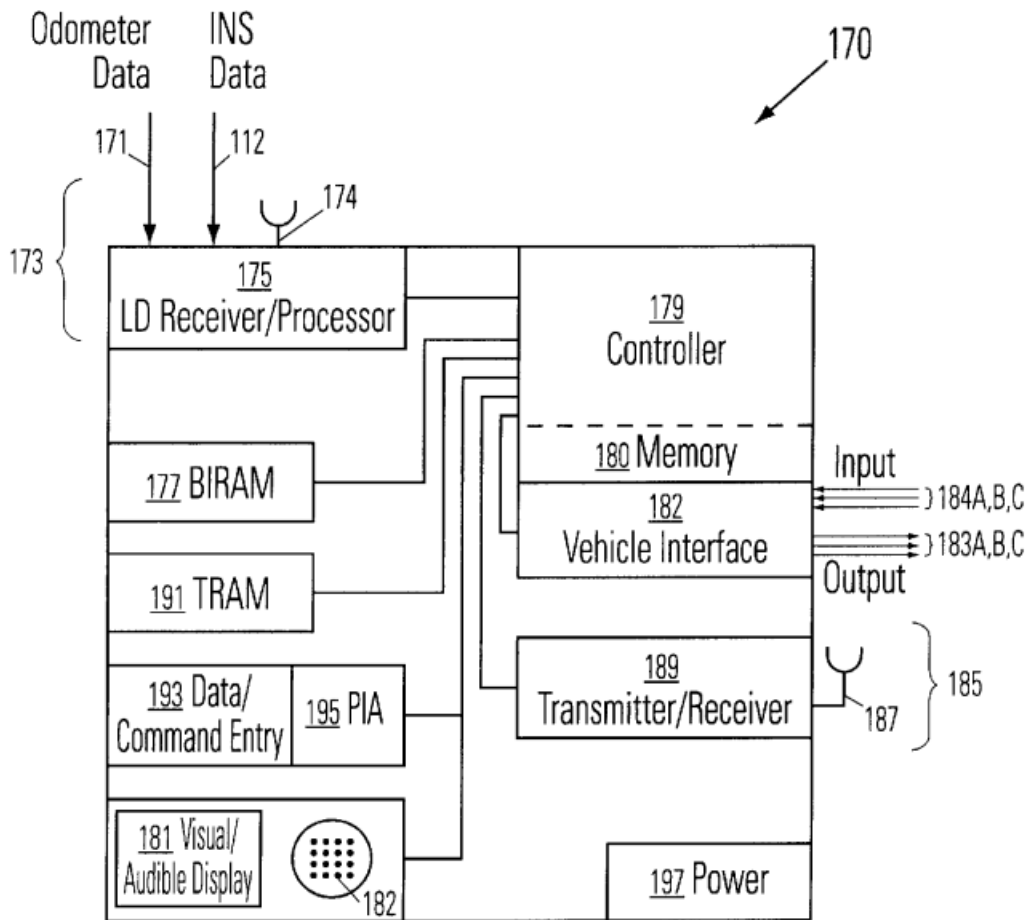
Murphy monitors whether a vehicle is being operated in accordance with the operating profile, and, if not, takes “control actions,” including generating “alarm signals.” See Claim 1[E]. For example, if Murphy determines the “present time” is not within “permitted time intervals” or “vehicle present location and/or speed” is not within the “permitted travel region or speed range,” it can cause (a) the telecommunication module to “***transmit[] a selected alarm signal to a selected***

facility that is spaced apart from the vehicle” (*e.g.*, alert authorized personnel at the remote facility); and (b) the interface module to “activate[] an on-board alarm the [sic] is visually or audibly perceptible **to a person outside the vehicle**” (that is, alert others). (Murphy, 5:13-60, Cl. 1, Abstract, 17:30-63, Cl. 20, 2:6-9, 4:15-27, 12:8-12, 13:60-65, 14:23-45, 15:37-50, 16:11-49, Figs. 6-7.) See Claims 1[E], 11-12.

f. Claim 20

Murphy anticipates or renders obvious Claim 20. (Ehsani, ¶¶170-71.)

Murphy’s “apparatus 170” (shown below) includes numerous “slave control modules,” including “vehicle interface module 182.” See Ground 2a, Claim 1[E]. Moreover, apparatus 170 can be provided as a “stand-alone device” and “installed in the vehicle dashboard or elsewhere in the vehicle.” (Murphy, 15: 1-8, Fig. 6.) A POSITA would have understood in the “dashboard” to mean that the apparatus is mounted underneath the surface of the dashboard. (Ehsani, ¶171.) Moreover, as the apparatus can be installed “elsewhere in the vehicle,” such would include installing the apparatus (including the vehicle interface module) under the dashboard. (*Id.*)



F. Ground 2b – Murphy in view of Arshad Renders Obvious Claims 1, 3-8, 11-12, and 18-20

Murphy-Arshad renders obvious Claims 1, 3-8, 11-12, and 18-20. (Ehsani, ¶¶172-82.)

1. Claims 1, 4

Murphy discloses Claims 1[pre]-1[F]. See Ground 2a, Claim 1.

Regarding Claims 1[B] and 4, it would have additionally been obvious to configure Murphy’s token as a wireless RFID transponder, as taught by Arshad. (Ehsani, ¶¶173-75.) Arshad discloses an RFID transponder that, like Murphy’s

token, identifies the individual carrying it. *See* Ground 1a, Claims 1[A], 1[F], 4. And like Murphy’s token, Arshad’s transponder stores driver restrictions that are loaded from the transponder to a “master control unit.” *See* Ground 1a, Claim 1[A]-[B], [F].

It would have been obvious to configure Murphy’s token “presented” to its reader as an RFID transponder as in Arshad. (Ehsani, ¶¶174-75.) Such would be the use of known technology for its intended purpose—transferring information stored on a small, user-carried device to a controller in a vehicle. (*Id.*) A POSITA would have had a reasonable expectation of success, as this would have simply required configuring Murphy’s token with circuitry described in Arshad and configuring Murphy’s TRAM to include reader circuitry (such as Arshad’s reader 14 connected to antenna 58) which can transmit/receive RF signals. (*Id.*)

Implementing Murphy’s token as an RFID transponder would have allowed Murphy to continue its normal operation. (*Id.*) For example, Arshad’s RFID transponder can store the same types of identifying and restriction information as Murphy’s token. (*Id.*) Moreover, a POSITA would have been motivated to implement Murphy’s token as an RFID transponder so it can be read when the driver is near the vehicle, speeding up authentication. (*Id.*) And implementing Murphy’s token as an RFID transponder would allow vehicle operation information to be transmitted back to, and stored on, the transponder as a record that could later be

read by someone monitoring Murphy’s “restricted operators,” as Murphy suggests. (*Id.*)

2. Claim 5

Murphy-Arshad renders obvious Claim 5. (Ehsani, ¶176.)

Murphy, as modified by Arshad to include an RFID transponder and corresponding reader, renders obvious wirelessly loading a driver’s operating profile to Murphy’s master control unit. *See* Ground 1a, Claim 5; Ground 2b, Claims 1, 4.

3. Claims 6-7

Murphy-Arshad renders obvious Claims 6-7. (Ehsani, ¶¶177-81.)

Regarding claim 6, Murphy includes “an ***operations log, including periodic recording of the present observation time, vehicle location and/or vehicle speed in a memory***” (Murphy, 12:1:5, Fig. 6, 13:53-15:65, 14:18-22.) *See* Ground 2a, Claim 1[D]. Further, this can include recording of profile violations (*e.g.*, infractions), such as when the vehicle is operated outside of permitted times, speed, or locations. (Murphy, 5:12-54 (noting control action (12) includes logging the violation “activity”).) Murphy’s logged data can be stored for “subsequent review and analysis” and “copied from or removed from the system for subsequent analysis or storage.” (Murphy, 15:42-54, Fig. 7, 5:52-54; *see also* 15:66-16:11.)

As discussed, Arshad discloses similar data regarding vehicle performance can be wirelessly sent from a monitoring controller (*e.g.*, master control unit) to an

RFID identification and data logging module. See Ground 1, Claims 1[B], 6. It would have been obvious to modify Murphy to implement its token as an RFID transponder, including so that vehicle performance information and violations can be stored on the transponder for later review outside the vehicle and by individuals other than the driver. See Ground 2a, Claims 1, 4.

Regarding Claim 7, Arshad's transponder (*e.g.*, wireless identification and data logging module) stores driver restrictions, like "total distance which the vehicle is authorized to travel for that operator," and "data downloaded from the vehicle itself," including "vehicle performance data" like "the distance traveled by the vehicle." (Arshad, [0025]-[0027], [0034].) See Ground 1a, Claim 1[A]. Moreover, when authenticating a driver this information is "downloaded to controller 38 [*e.g.*, master control unit] from transponder 20," after which processor 90 and ROM memory 94 (*e.g.*, vehicle control module) in controller 38 use it to guide vehicle operation. (Arshad, [0057], [0010]-[0013], [0027], [0031]-[0034].) See Ground 1a, Claim 3 (discussing ROM containing instructions that "control the operation" of processor in controller).

For example, the processor/ROM "periodically compares the data it has received from the other controllers and from its own sensors... with the transponder to determine whether the operator has attempted to exceed any of the operational limits that were indicated by the transponder." (Arshad, [0043], [0071]-[0074],

[0010]-[0013]; Ehsani, ¶¶180-81.) See Ground 1a, Claim 1[F]. Additionally, as Arshad teaches, if a driver were restricted to a “total distance” and drives to a first location and stops, then the “distance traveled by the vehicle” to this first location would be “downloaded” back to the transponder. (Ehsani, ¶¶180-81, 75.) If the driver thereafter starts the car again to drive to a second location, then the data on the transponder, including such distance traveled, would be provided back to the monitoring controller (including the processor and memory therein), so that it could continue to monitor whether the driver has violated the “**total** distance which the vehicle is authorized to travel.” (*Id.*) Moreover, as Arshad discloses that multiple drivers can use the same vehicle (Arshad, [0010]-[0013]), a POSITA would have understood that by having each individual driver’s transponder provide details of that driver’s prior operation when establishing communication with the controller 38, the controller and its vehicle control module would be able to control operation of the vehicle to keep that particular driver from exceeding, for example, her daily maximum distance or maximum time of operation. (Ehsani, ¶181.)

4. Claims 3, 8, 11-12, 18-20

Murphy-Arshad renders obvious Claims 3, 8, 11-12, 18-20. (Ehsani, ¶¶182, 159-71.) See Ground 2a, Claims 3, 8, 11-12, 18-20.

G. Ground 2c – Murphy (Alone or With Arshad) in view of Petrik Renders Obvious Claim 9

Murphy (alone or with Arshad) in view of Petrik renders obvious Claim 9. (Ehsani, ¶¶183-85.)

Murphy’s driver restrictions include permitted “travel corridor(s) and speeds for travel,” “maximum speed,” “geographic region[s],” and routes. See Ground 2a, Claim 1[B]. Thus, Murphy contemplates having both permitted speeds and permitted travel corridors, routes, or regions where the driver can operate. (Ehsani, ¶183.)

Petrik discloses a remote command facility maintaining a database including “a geographical speed zone locations table of every speed zone as displayed by road speed signs throughout the country.” See Ground 1a, Claim 9. This road speed limit information can be “remotely” sent to in-vehicle control units via wireless RF or Bluetooth communication links. *Id.*

It would have been obvious to modify Murphy, so its controller wirelessly receives road speed limit information from a remote facility, as taught by Petrik. (Ehsani, ¶185.) A POSITA would have understood such information would assist in Murphy’s setting of permitted speeds for certain geographic areas, as the speeds could be set to be within required speed limits. (*Id.*) This would help ensure drivers did not incur speeding violations, and would have further helped the controller set allowed speed ranges specific to restricted operators in view of a general safe speed limit for particular roads. (*Id.*) A POSITA would have had a reasonable expectation

of success in modifying Murphy for its controller to wirelessly receive road speed limit information from a source at a remote facility, as its controller is already connected to a “telecommunication module” with an “antenna 187 and associated receiver/transmitter” that exchanges information with a remote facility, akin to Petrik’s facility maintaining the speed limit database, using cellular or radio communications. (Murphy, 14:23-45; Ehsani, ¶185.)

H. Ground 2d – Murphy (Alone or with Arshad) in view of Siwinski Renders Obvious Claims 13-14

Murphy (alone or with Arshad) in view of Siwinski renders obvious Claims 13-14. (Ehsani, ¶¶186-91.)

Siwinski, in the same field as Murphy, discloses a vehicle system that uses “processors” to govern—including disable—telephone calls, text messages, and Internet applications on “cell phones,” “hand-held computers,” and other “electronic devices” with Internet connections that are “portable” or “installed in the vehicle.” *See supra* Ground 1b, Claims 13-14.

It would have been obvious to include in Murphy such “governor modules” disabling telephone calls, text messages, and Internet-related activities when the vehicle is in motion for the reasons discussed above for Claims 13-14. *Id.* For example, Murphy is analogous and in the same field, and adding such a module to Murphy would have been inclusion of a well-known component in a vehicle safety system. (Ehsani, ¶¶189-91.) Murphy also suggests the modification, as it can disable

various “accessories,” and electronic devices with cellular and Internet access (*e.g.*, cellphones) are additional examples of accessories. (*Id.*, ¶190.)

Moreover, controlling these would not impact Murphy’s functioning—which would continue to control vehicle operation as before—only now Murphy would further control cellphone and Internet usage, as taught by Siwinski. (*Id.*, ¶¶190-91.) A POSITA would also have been motivated to control such accessories in Murphy, as this would provide an additional mechanism to regulate high-risk drivers and improve safety. (*Id.*)

I. Ground 2e – Murphy (Alone or With Arshad) in View of Wu Renders Obvious Claim 17

Murphy (alone or with Arshad) in view of Wu renders obvious Claim 17. (Ehsani, ¶¶192-99.)

Murphy discloses and renders obvious its slave control unit including a “slave microcontroller.” (Ehsani, ¶193.) For example, the interface module includes a “**microcomputer**” and “output terminals” connecting to the “microcomputers” of the components it controls. (Murphy, Fig. 6, 13:53-14:17, Fig. 7, 15:32-16:49.) Because these “microcomputers” are part of or connected to, and take the actions instructed by, the interface module, they are “slave microcontrollers.” (Ehsani, ¶193.)

Murphy discloses and renders obvious its slave control unit including an “alarm synthesizer.” (*Id.*, ¶194.) Murphy includes a “**loudspeaker** 182.” (Murphy, Fig. 6, 12:8-12, Fig. 7, 15:37-50.) When the system (*e.g.*, interface module)

determines a violation has occurred, it can cause the speaker to synthesize an “audibly perceptible presentation.” (*Id.*, 15:47-50, 5:13-60; *see also* Cl. 1, 17:30-63, 13:60-65; Ehsani, ¶194.) Moreover, a POSITA would have understood the “output terminals” of the interface module, which are used to control myriad components, could likewise be connected to the “alarm synthesizer.” (Ehsani, ¶194.) Similarly, Wu discloses a synthesizer, including an “operational amplifier” and “resistor,” that can generate such audible alerts, and a POSITA would have understood this to be a common way to implement Murphy’s alerts. (Wu, [0030]; Ehsani, ¶194.)

Murphy in view Wu discloses and renders obvious its slave control unit including a “power regulator module.” (Ehsani, ¶¶195-97.) Murphy’s interface module is connected to a “power supply” and regulates power to components. (Murphy, 13:66-14:4, 14:66-15:8; Ehsani, ¶195.) Moreover, Wu discloses it was “standard” to include a power (or voltage) regulating device in modules, like Murphy’s, to regulate voltage to levels the system “requires.” (Wu, [0020], [0022], [0027]-[0028].) It would have thus been obvious to include a voltage regulator with the interface module, as this would be the use of a well-known component to perform its intended function. (Ehsani, ¶¶195-97.)

Murphy in view of Wu discloses and renders obvious its slave control unit including a “starter relay module.” (Ehsani, ¶198.) Murphy includes an “ignition circuit,” and if a driver is authenticated, the system can “enabl[e]” this “ignition

circuit,” allowing the engine to be started. (Murphy, Abstract, 6:55-59, 8:10-14.) Wu discloses that when its controller receives a command to start the vehicle, its processor sends a signal to initiate a “starter relay,” which will engage a starter motor and cause the engine to start. (*Id.*, [0020]-[0021], [0025]-[0027], [0030]-[0031], [0039], Figs. 1-2.) A POSITA would have been motivated to include a “starter relay” as taught by Wu in Murphy to provide a well-known and commonly used mechanism for starting the engine. (Ehsani, ¶198.) Moreover, a POSITA would have understood the “output terminals” of the interface module, which are used to control myriad components, could be connected to the ignition circuit and starter relay and used to allow the vehicle to start, *e.g.*, if the driver is authenticated. (*Id.*)

Murphy in view of Wu discloses and renders obvious its slave control unit including a “definable relay module.” (Ehsani, ¶199.) Murphy’s interface module includes “output terminals” connected to other components that cause the activation of defined circuitry or functionality such as “turn[ing] on at least one of the lights, exterior flashers or horn.” (Murphy, 5:29-60, *see also* 13:66-14:17; Ehsani, ¶199.) In addition, Wu discloses that components, such as the ignition system, lights, and accessories, can be controlled by a processor sending a signal to a “defined relay” for such components. (Wu, [0020]-[0021], [0025]-[0026], [0030]-[0031], [0039], Figs. 1-2.) A POSITA would have been motivated to use such definable “relays” in Murphy, as such would have merely been the implementation of known components

for their intended purpose and would have allowed Murphy's interface module to selectively (de)activate the ignition, lights, fuel injector, and other accessories. (Ehsani, ¶199.)

J. Ground 2f – Murphy (Alone or with Arshad) in View of Kudo Renders Obvious Claims 2, 10, and 15-16

1. Claim 2

Murphy (alone or with Arshad) in view of Kudo renders obvious Claim 2. (Ehsani, ¶¶200-04.)

Kudo, in the same field as Murphy, discloses including a plurality of transducers in a vehicle, including an image capturing sensor and proximity sensors. *See* Ground 1d, Claim 2.

It would have been obvious to modify Murphy to include such sensors and use the data from them to generate alerts, as taught by Kudo. (Ehsani, ¶¶201-04.) *See* Ground 1f, Claim 2. A POSITA would have been motivated to include such cameras and proximity sensors in Murphy to determine the presence of and distance to other vehicles/objects and to (i) issue alarms when obstacles exist in an alarm area and (ii) adjust vehicle speed and steering where appropriate. (*Id.*) Murphy, like Kudo, senses vehicle speed and controls components to maintain a desired speed. (Murphy, 5:29-60.) Adding Kudo's cameras and proximity sensors to Murphy would have simply been the use of known components for their intended purpose, allowing Murphy to take into account presence of and proximity to other vehicles/objects

when alerting the driver and controlling the vehicle, including its speed. (Ehsani, ¶202.)

Moreover, a POSITA would have known to implement Kudo's cameras and proximity sensors and generating of alerts in Murphy in the same manner as Murphy's other sensors are used. (*Id.*, ¶203.) Murphy's interface module is already configured to receive information from components regarding vehicle operation and can analyze received information to determine if actions are required. (Murphy, 5:12-67, 13:53-15:54.) Kudo's camera and proximity sensors, when in Murphy, would likewise provide signals to Murphy's interface module (*e.g.*, slave control unit), so that it could determine if there is a driving condition that may require a warning and then notify Murphy's controller (*e.g.*, master control unit). (Ehsani, ¶203.)

A POSITA would have been motivated to have the interface module send image and proximity data to Murphy's controller, so that it can receive this feedback and take into account this information when issuing commands and deciding whether and how to alert the driver. (*Id.*, ¶204.) A POSITA would have had a reasonable expectation of success, as Murphy was ready for such improvement. As noted, Murphy has an interface module, similar to Kudo's controller 5, that is used to control speed. Thus, Murphy's interface module could continue functioning in the same way, sensing information relevant to operations, determining a driving

condition may require a warning (*e.g.*, the vehicle is getting too close to a preceding vehicle or an obstacle), alerting the controller of this, and receiving commands from the controller to control the engine or other components in a manner that would maintain safe distances. (Ehsani, ¶204.) Moreover, Murphy’s controller could determine, as taught by Kudo, to additionally instruct its display module to produce audible/visual alarms to the driver regarding obstacles in the vehicle path, in the same way it displays messages regarding operational limitation violations. (*Id.*)

2. Claim 15

Murphy (alone or with Arshad) in view of Kudo renders obvious Claim 15. (Ehsani, ¶¶205-08.)

Kudo discloses steering control, braking control, and acceleration control modules. *See* Ground 1d, Claim 15. These units receive instructions from “controller 5,” which sends signals to implement a “constant speed travel function” and “an automatic follow-up control (follow-up acceleration/deceleration and follow-up steering control) function.” *Id.*

It would have been obvious to modify Murphy to include steering, braking, and acceleration control modules, as taught by Kudo, and have them receive instructions from Murphy’s controller (*e.g.*, master control unit) to safely provide for automatic cruise control when following a preceding vehicle and to avoid obstacles. (Ehsani, ¶¶207-08.) *See* Ground 1d, Claim 15. A POSITA would have

understood such instructions could be sent from the controller (directly or through the interface module) to throttle, braking, and steering control modules to reduce/increase vehicle speed, alter vehicle direction, and alter proximity to other vehicles/objects. (Ehsani, ¶207.)

A POSITA would have had a reasonable expectation of success, as Murphy’s controller already receives information from numerous components and issues commands to controllers to operate the same. (*Id.*, ¶208.) Adding commands to steering, acceleration, and braking control systems would have merely been additional control of known vehicle components in a known manner, and would have provided greater overall vehicle control within the driver’s operational limits. (*Id.*)

3. Claim 16

Murphy (alone or with Arshad) in view of Kudo renders obvious Claim 16. (Ehsani, ¶¶209-12.)

Claim 16 recites nothing more than the result of implementing commands sent to the acceleration, deceleration, and steering control modules of Claim 15. (*Id.*)

Moreover, Murphy discloses that a vehicle equipped with its system operates autonomously, without driver action, when a driver exceeds operational limits, as its controller causes the system to take one of 12 “Control Actions” including to, for example, “disable[e]” vehicle operation, transmit an alarm signal, or reduce vehicle speed. (*Id.*, Abstract, 5:29-60, Fig. 2, 13:53-14:17.) *See also* Ground 2a, Claim 1[F].

And Murphy, as modified by Kudo, implements autonomous control of vehicle steering, acceleration, and deceleration when the “constant speed” function and/or “automatic follow-up control” function is implemented. *See* Ground 2f, Claim 15. (Ehsani, ¶212.)

4. Claim 10

Murphy (alone or with Arshad) in view Petrik and further in view of Kudo renders obvious Claim 10. (Ehsani, ¶¶213-14.)

Murphy’s controller defines a present speed the vehicle, as well as maximum speed and geofence limits for the vehicle, as it determines “whether the vehicle present location and/or speed are within permitted ranges.” (Murphy, Abstract, 2:46-53, 5:13-28, 12:16-27, 15:8-31.)

Moreover, it would have been obvious to modify Murphy’s controller to, as taught by Kudo, define a speed, positioning of the vehicle on a road, a distance from other objects, and distances from other vehicles in order to implement automatic steering, acceleration, and braking for automatic cruise control operation. *See* Ground 2f, Claims 2, 15. For example, in determining and maintaining inter-vehicle distance and issuing an alarm when an object is in an “alarm area” around the vehicle, Kudo discloses that the controller defines a position of the equipped vehicle, a distance to a preceding vehicle, and a distance to obstacles. *Id.*

IX. DISCRETIONARY CONSIDERATIONS UNDER 314(A) AND 325(D) STRONGLY FAVOR INSTITUTION.

The Board should institute review because Petitioner has been diligent and the circumstances around the parallel district court case (which involves seven patents with over 130 claims) do not warrant denial under §314(a). *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 11-21 (Dec. 1, 2020) (precedential) (citations omitted). The case was recently transferred to NDGA, and the Georgia court has not set a trial date, issued a schedule, or even set an initial conference date. Even before the transfer, the case was in its early stages in EDTX. Little fact discovery had taken place (including no depositions), and *Markman* proceedings had not commenced.

Similarly, analysis under the framework from *Advanced Bionics, LLC v. MED-EL Elektromedizinische Gerate GmbH* demonstrates that denial under §325(d) is not appropriate. IPR2019-01469, Paper 6 at 8-9 (P.T.A.B. Feb. 13, 2020) (precedential). The grounds in this Petition are not the same or substantially the same as art and arguments raised during prosecution. The “new, noncumulative prior art asserted in the Petition” strongly favors IPR. *Oticon Medical AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (P.T.A.B. Oct. 16, 2019) (§§II.B and II.C precedential). Should PO attempt to analogize any previously considered art or arguments to those here, Petitioner reserves the right to respond.

The Board should institute review because the merits are strong and the

circumstances here do not warrant discretionary denial. Should Patent Owner raise discretionary denial theories, Petitioner reserves the right to respond before institution. *See* March 26, 2025, USPTO Memorandum titled “Interim Processes for PTAB Workload Management.”

X. CONCLUSION

Mercedes respectfully requests that a Trial be instituted. Claims 1-20 of the '470 should be found unpatentable over the prior art.

Dated: May 11, 2025

Respectfully submitted,

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TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,259,470 (<i>Challenged Patent</i>)
1002	File History for the '470 Patent
1003	Reserved
1004	Declaration of Dr. Mark Ehsani
1005	Curriculum Vitae of Dr. Mark Ehsani
1006	U.S. Patent No. 6,225,890 (“ Murphy ”)
1007	U.S. Patent Application Publication No. 2003/0189482 A1 (“ Arshad ”)
1008	U.S. Patent Application Publication No. 2007/0168125 A1 (“ Petrik ”)
1009	Reserved
1010	U.S. Patent Application Publication No. 2002/0141600 to Siwinski (“ Siwinski ”)
1011	U.S. Patent Application Publication No. 2008/0114501 A1 (“ Wu ”)
1012	U.S. Patent Application Publication No. 2007/0069873 to Kudo (“ Kudo ”)
1013	Reserved
1014	U.S. Patent No. 5,222,152 (“ Fishbine ”)

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 13,450 words, excluding those portions identified in 37 C.F.R. § 42.24(a), as measured by the word-processing system used to prepare this paper.

/s/ Celine J. Crowson

Celine J. Crowson, Lead Counsel
(Reg. No. 40,357)

CERTIFICATE OF SERVICE

The undersigned certifies that, in accordance with 37 C.F.R. § 42.6(e) and 37 C.F.R. § 42.105, the foregoing Petition for *Inter Partes* Review and exhibits thereto were served on **May 11, 2025**, by Overnight Courier at the following address of record and addresses known to Petitioner as likely to effect service and the address of record for the '149 Patent:

64064 - Ortiz & Lopez, PLLC P.O. BOX 4484 Albuquerque, NM 87196 United States	Ortiz & Lopez, PLLC 6605 Uptown Blvd. NE 260 Albuquerque, NM 87196 United States
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Appendix A

Claim	Limitations
Independent Claim 1	[pre] A vehicle control system, comprising:
	[A] a wireless identification and data logging module;
	[B] a master control unit in a vehicle for wirelessly authenticating at least one occupant via said wireless driver identification and data logging module and associating an operating profile with said at least one occupant;
	[C] a module for receiving at least location and speed information in association with a movement of said vehicle;
	[D] a data logging device that records vehicle operation data associated with a use of said vehicle, the vehicle operation data comprising at least said location and speed information received from said module; and
	[E] a slave control unit in said vehicle and which communicates with said master control unit, wherein said slave control unit receives commands from said master control unit and generate an alarm signal;
	[F] wherein said master control unit provides operation governance of said vehicle within said operating profile.
Claim 2	The vehicle control system of claim 1 further comprising: a plurality of transducers comprising at least one of an image capturing sensor and a proximity sensor, wherein said plurality of transducers transmits signals to said slave control unit and wherein said slave control unit determines if said signals are indicative of a driving condition requiring a warning and in turn signals said master control unit.
Claim 3	The vehicle control system of claim 1 further comprising: a vehicle control module that controls a speed of the vehicle and an allowable location of the vehicle.

Claim 4	The vehicle control system of claim 1 wherein said wireless identification and data logging module comprises at least one of: a WIFI enabled device; an RFID enabled device; a Bluetooth enabled device; a cellular telephone; and a smart phone.
Claim 5	The vehicle control system of claim 4 wherein said wireless identification and data logging module is further configured to wirelessly load said operating profile into said master control unit.
Claim 6	The vehicle control system of claim 4 wherein said wireless identification and data logging module is further configured to wirelessly receive specific vehicle performance and infraction data of the vehicle from said master control unit.
Claim 7	The vehicle control system of claim 3 wherein said wireless identification and data logging module is further configured to present vehicle performance data of the vehicle to said vehicle control module in order to guide the operation governance of said vehicle by said vehicle control module.
Claim 8	The vehicle control system of claim 1 wherein said master control unit is further configured for wirelessly receiving data indicative of a speed of said vehicle, a location of said vehicle, and a time of day from at least one of: a WIFI source; an RF source; a Bluetooth source; an image capturing source; a processing device; a proximity sensor; and a smart-road network source.
Claim 9	The vehicle control system of claim 8 wherein said master control is configured for wirelessly receiving data indicative of a speed limit associated with a road said vehicle is currently traveling on from at least one of: a WIFI source; an RF source; a Bluetooth source; an image capturing source; a processing device; a proximity sensor; and a smart-road network source.
Claim 10	The vehicle control system of claim 9 wherein said master control unit is configured to define a speed, a positioning of said vehicle on a road, a distance from another object, a distance from another vehicle, and a geo-fence limit for said vehicle.
Claim 11	The vehicle control system of claim 1 further comprising an alarm module configured to wirelessly receive data from at least one of

	said master control unit, said slave control unit, and said GPS module wherein said alarm module is further configured to present at least one of location data, speed data, and infraction data in real time.
Claim 12	The vehicle control system of claim 11 wherein said alarm module comprises at least one of: a cellular telephone; a smartphone; a computer; a vehicle integrated wireless communication device; a WIFI enabled device; an RFID enabled device; and a Bluetooth enabled device.
Claim 13	The vehicle control system of claim 1 further comprising a phone governor module configured to receive instructions from said master control unit, said instructions comprising at least one of: restricting calls on a cellular telephone associated with a driver of said vehicle; powering off said cellular telephone; and disabling text messaging for said cellular telephone.
Claim 14	The vehicle control system of claim 1 further comprising an Internet governor module configured to disable integrated in-vehicle Internet related applications when said vehicle is in operation.
Claim 15	The vehicle control system of claim 2 further comprising a steering control module, a braking control module, and an acceleration control module configured to receive instructions from said master control unit said instructions comprising at least one of: reducing a speed of said vehicle; increasing said speed of said vehicle; altering a direction of said vehicle on said road; altering a proximity of said vehicle with respect to other vehicles; and altering said proximity of said vehicle with respect to other objects.
Claim 16	The vehicle control system of claim 15 wherein said vehicle operates autonomously.
Claim 17	The vehicle control system of claim 1, wherein said slave control unit further comprises a power regulator module; a starter relay module; a definable relay module; a slave microcontroller; and an alarm synthesizer.

Claim 18	The vehicle control system of claim 1, wherein said operating profile comprises at least one operating parameter including at least one of: a maximum allowable speed of said vehicle; an allowable location of said vehicle; allowable hours of operation of said vehicle; an allowable destination; and a seatbelt usage.
Claim 19	The vehicle control system of claim 1 wherein said slave control unit generates an alarm signal for remotely alerting an authorized user when said vehicle violates said operating profile.
Claim 20	The vehicle control system of claim 1 wherein the slave control unit is mounted under a dash board of the vehicle.