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 9,493,149

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 9,493,149
UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §42.100 *et seq.*

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I. INTRODUCTION

Mercedes-Benz Group AG ("**Petitioner**") challenges Claims 1-18 of US9,493,149 (EX1001) ("**'149**"). The '149 purportedly invents a "driver authentication and safety system" for "monitoring and controlling vehicle usage." ('149, Abstract, 2:20-39.) A driver uses a "wireless identification and data logging module" to "authenticate" herself, after which she can operate the vehicle within her "operating profile," *e.g.*, maximum speed, location, and hours of operation. (*Id.*, 7:22-33, 6:47-53.) If the driver violates her profile, the system provides feedback, including by generating alarm signals. (*Id.*, 7:46-63.) The system can also record data on vehicle operation. (*Id*., 7:34-45.)

This was not new at the time of the '149. 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 (EX1009) ("**Petrik**") discloses a system complementary to Arshad, using a "smart card" similar to Arshad's "transponder." The "smart card"

communicates with Petrik's "in-vehicle monitoring unit," which is used to control vehicle operation. (Petrik, Abstract, [0016]-[0026].) GPS location and speed data is recorded, and violations of restrictions trigger warnings or 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 wirelessly provides "ident indicium" (*e.g.*, token or card, biometric samples); (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 "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 also includes a vehicle "operations log." (*Id*., 12:1-5, 15:42-47.)

These references, alone and with additional prior art, invalidate the '149.

II. MANDATORY NOTICES

A. Real Parties-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

Assignee-of-record The Phelan Group, LLC ("**PO**") asserted the '149 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.

PO also asserted the '149 in the following proceedings which have been dismissed or stayed:

- *Phelan Group, LLC v. Toyota Motor Corp.*, No. 2-23-cv-00093 (E.D. Tex.), filed March 7, 2023, dismissed with prejudice;
- *The Phelan Group, LLC v. Kia Corp.*, No. 2-23-cv-00094 (E.D. Tex.), filed March 7, 2023, dismissed with prejudice;
- *The Phelan Group, LLC v. Honda Motor Co.*, No. 2-23-cv-00606 (E.D. Tex.), filed December 15, 2023, dismissed with prejudice;
- *Phelan Group, LLC v. State Farm Mutual Automobile Insurance Co.*, Case No. 2-23-cv-00611 (E.D. Tex.), filed December 18, 2023, stayed based on notice of settlement;

Petitioner has also filed *inter partes* reviews against the following patents which are in the same patent family as the '149:

- *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

Lead counsel is Celine Crowson (Reg. 40,357). Backup counsel are Joe Raffetto (Reg. 66,218) and Scott Hughes (Reg. 68,385). Service information is as follows:

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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 '149 is available for *inter partes* review and it is not barred or estopped from requesting 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**, 4-12, and 17-18	103
1b	Arshad-Petrik in view of Karsten	3	103
1c	Arshad-Petrik in view of Murphy	10	103
1d	Arshad-Petrik in view of Siwinski	13, 14	103
1e	Arshad-Petrik in view of Wu	16	103
1f	Arshad-Petrik in view of Kudo	2, 15	103
1g	Arshad-Petrik in view of Victor	2	103
1h	Arshad-Petrik in view of Victor and Kudo	15	103

Ground	References	Claims	Basis
2a	Murphy	**1**, 8, 11-12, 17-18	102/103
2b	Murphy in view of Arshad	**1**, 4-8, 11-12, 17-18	103
2c	Murphy (alone or with Arshad) in view of Karsten	3	103
2d	Murphy (alone or with Arshad) in view of Petrik	9-10	103
2e	Murphy (alone or with Arshad) in view of Siwinski	13-14	103
2f	Murphy (alone or with Arshad) in view of Wu	16	103
2g	Murphy (alone or with Arshad) in view of Kudo	2, 15	103
2h	Murphy (alone or with Arshad) in view of Victor	2	103
2i	Murphy (alone or with Arshad) in view of Victor and Kudo	15	103

VI. ’149 OVERVIEW

The ’149 relates to a “driver authentication and safety system” for “monitoring and controlling vehicle usage.” (’149, Abstract.) A “vehicle owner” creates an “operating profile” for “high-risk drivers.” (*Id.*, 2:26-30, 6:41-53, 5:53-63.) The profile, which can include restrictions like allowable “speed,” “location,”

or “hours of operation,” is enforced by a “master control unit” and associated “slave control unit.” (*Id*., 5:64-67, 6:41-53, Fig. 6, Cls. 1, 17.)

Drivers authenticate themselves via a “wireless identification and data logging module.” (*Id*., 7:22-33, 6:47-53, Cl. 1, 2:52-56.) Once authenticated, the system monitors vehicle operation, *e.g.*, using GPS “time of day, speed and location,” and compares this to the driver’s profile. (*Id*., 2:57-57, 10:1-7, Cl. 1.) If the driver violates her profile, the system provides feedback by generating “alarm signals.” (*Id*., 7:46-63, 2:35-45.)

The ’149 was filed August 20, 2014, as a continuation-in-part of US9,045,101, which is a continuation of US8,417,415, and purportedly claims priority to US61/077,568, filed July 2, 2008.[1] The ’149 received one Office Action, in which Claims 1-18 were rejected for lacking antecedent basis. (EX1002, 65.) Upon correction, the claims were allowed. (*Id*., 93, 103-04.) No prior art rejections were made. (*Id*., 65, 103-04.)

VII. CLAIM CONSTRUCTION AND POSITA DEFINITION

A. Claim Construction

[1] All prior art herein predates this. Petitioner reserves the right to challenge this date in other proceedings, however, as all ’149 claims are not entitled to this priority date.

Unless indicated, all claim terms are given their ordinary and customary meaning as understood by one of ordinary skill in the art ("**POSITA**") and the prosecution history pertaining to the '149. 37 C.F.R. § 42.100(b).

B. POSITA

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**"), ¶23.) 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

C. Ground 1a – Arshad in view of Petrik Renders Obvious Claims 1, 4-12, and 17-18

Arshad in view of Petrik renders obvious Claims 1, 4-12, and 17-18. (Ehsani, ¶¶39-87.) 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, ¶¶39-63.)

1[pre]: ***A driver authentication and monitoring system, comprising:***

Arshad discloses Claim 1[pre]. (Ehsani, ¶¶40-41.)

Arshad controls "access" to "[f]leet vehicles." (Arshad, Abstract, [0005], [0008]-[0009], [0033].) A driver's "transponder 20" transmits data to an in-vehicle system to "uniquely ***identify*** the person carrying the transponder." (*Id*., [0033], [0019], [0012], Cl. 7.) After authenticating the driver, "***monitoring*** controller 38" monitors vehicle operation, "determines whether the operator is authorized" to take certain actions, and responds to unauthorized actions with "alert message[s]" or disablement of systems. (*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, ¶¶42-46.)

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].)

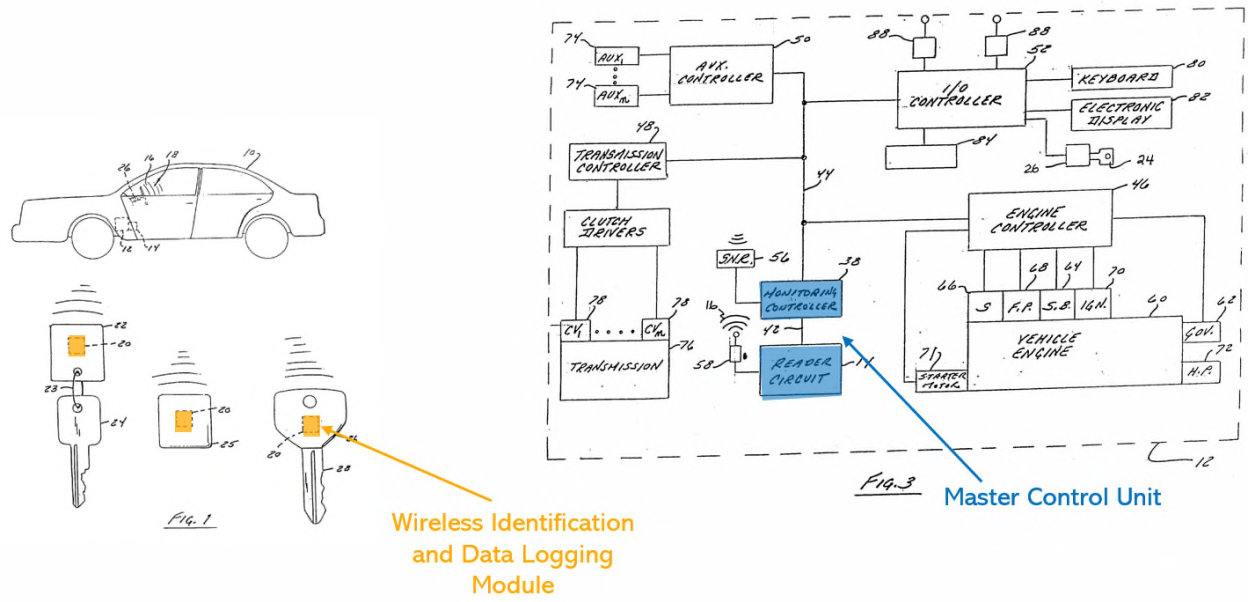
Third, each transponder has an "identification number stored in its memory microcontroller." (*Id.*, [0033].)

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

Arshad discloses Claim 1[B]. (Ehsani, ¶¶47-50.)

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 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 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 GPS module providing at least location and speed information in association with movement of said motor vehicle;***

Arshad-Petrik renders obvious Claim 1[C]. (Ehsani, ¶¶51-54.)

Arshad includes "satellite navigation receiver 56" (*e.g.*, "GPS module"), which provides controller 38 "data indicative of the vehicle's current location." (Arshad, [0029], [0073], Fig. 3.)

Additionally, it would have been obvious for such GPS module to provide speed information. (Ehsani, ¶¶53-54.) Petrik, in the same field, discloses a "GPS based" system with an "in-vehicle monitoring unit" for authenticating drivers, 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" to provide 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, 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 provide speed and location, as this would simply be use of a known component for its intended

function. (Ehsani, ¶¶53-54.) 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 recording vehicle operation data associated with a use of said motor vehicle by said at least one driver comprising at least said location and speed information from said GPS module; and***

Arshad-Petrik renders obvious Claim 1[D]. (Ehsani, ¶¶55-57.)

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 recording 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 in transponder 20, as well as in controller 38's memory. (Ehsani, ¶¶56-57.) A POSITA would have

understood this would provide a log of operational and infraction data that could not be manipulated by the driver. (*Id*.)

1[E]: ***a slave control unit in said motor vehicle and in communication with said master control unit, said slave control unit configured to receive commands from said master control unit and to generate an alarm signal if said at least one driver violates said operating profile unique to said at least one driver thereby providing feedback about said vehicle usage;***

Arshad discloses Claim 1[E]. (Ehsani, ¶¶58-61.)

First, Arshad discloses a "slave control unit" in the vehicle in communication 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":

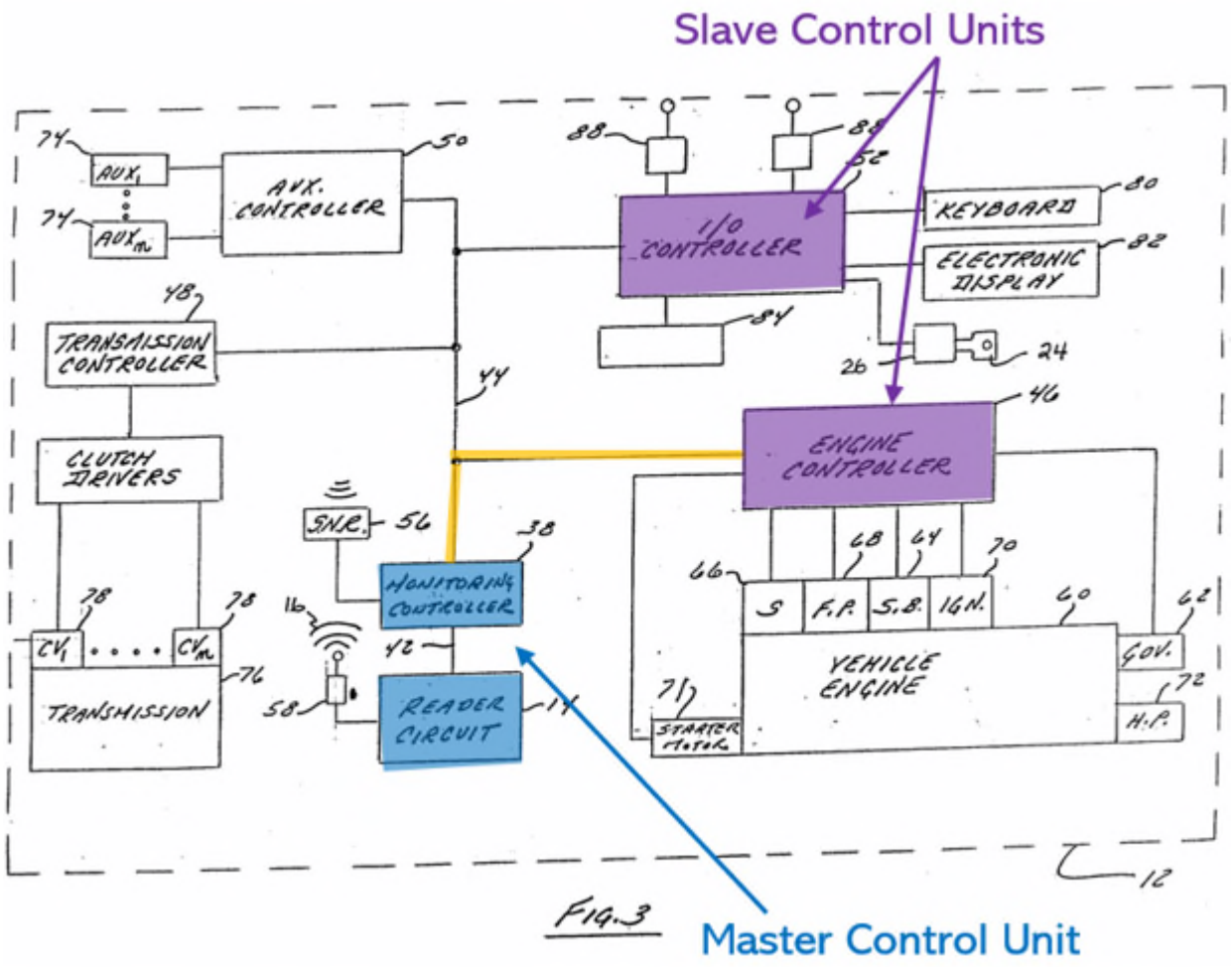


FIG. 3

(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, thereby providing feedback about vehicle usage. 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 is instructed to display "an alert message" indicating the limit being approach or 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 permits said at least one driver to operate said vehicle within said operating profile if said master control unit receives at least one of a unique identification code to permit said at least one driver to operate said vehicle within said operating profile and said at least one driver has not violated said operating profile.***

Arshad discloses Claim 1[F]. (Ehsani, ¶¶62-63.)

Arshad's controller 38 and reader 14 receive a "unique identification code" permitting the driver to operate the vehicle within her profile when she has not violated it. Each transponder stores an "***identification number***" to "***uniquely***

[2] The '149 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." ('149, 7:45-63.)

identify" the driver carrying it, which is sent to reader 14 to authenticate and establish communication sessions with particular transponders. (*Id*., [0032]-[0034].) Once a driver is authenticated, *see* Claim 1[B], controller 38 accesses the operational limits profile and permits operation within these limits.

Controller 38 will not allow vehicle operation "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 takes actions like shutting down vehicle subsystems or displaying a message indicating what limit has been exceeded. (*Id*.) *See also* Claims 1[B], 1[E].

2. Dependent Claims

a. Claim 4

Arshad-Petrik renders obvious Claim 4. (Ehsani, ¶64.)

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

b. Claim 5

Arshad-Petrik renders obvious Claim 5. (Ehsani, ¶65.)

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].

c. Claim 6

Arshad-Petrik renders obvious Claim 6. (Ehsani, ¶¶66-69.)

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, ¶¶68-69.) 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, ¶¶68-69.) 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, ¶¶68-69.)

d. Claim 7

Arshad-Petrik renders obvious Claim 7. (Ehsani, ¶¶70-72.)

First, data stored in Arshad's transponder may be downloaded to "controller 38 for processing" and displayed on "display 82," which has "a region for ***displaying alphanumeric messages***" to "display a plurality of different messages indicating the data stored in transponder 20 as well as information regarding the status of the vehicle." (Arshad, [0033]-[0034], [0056]-[0057].) And, Petrik discloses "vehicle location, vehicle speeds, speeding offen[s]es, distance covered etc." are stored on both smart cards and the in-vehicle units' memory, and a POSITA would have been motivated to record such infractions on Arshad's transponder. *See* Claim 6. It would have been obvious to a POSITA to modify Arshad's transponder in view of Petrik to present both vehicle performance and infraction data stored in the transponder on display 82, as this would notify the driver of prior performance and infractions upon restarting of the vehicle. (Arshad, [0033]-[0034], [0056]-[0061]; Petrik, [0009], [0024]-0025]; Ehsani, ¶¶71-72.)

Second, a POSITA would have been motivated to have Arshad's transponder "present" its vehicle operations and infractions data when read at locations such as a fleet dispatch or Command Center. (Arshad, [0009]-[0013]; Petrik, [0009], [0016], [0026]-[0033]; Ehsani, ¶¶71-72.) A POSITA would have been motivated for Arshad's transponder to present such performance and infraction data to a fleet

management computer or police computer when, for example, a driver attempts to dispute violations. (Ehsani, ¶¶71-72.)

e. Claim 8

Arshad-Petrik renders obvious Claim 8. (*Id.*, ¶¶73-74.)

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 indicative 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, ¶¶73-74.)

f. Claim 9

Arshad-Petrik renders obvious Claim 9. (Ehsani, ¶¶75-78.)

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, ¶¶77-78.) 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, ¶¶77-78.) This would further Arshad's fleet management goals, as managers would be provided with information regarding how safely their drivers are driving. (Ehsani, ¶¶77-78.) 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.*)

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.*) 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.*)

g. Claim 10

Arshad-Petrik renders obvious Claim 10. (Ehsani, ¶¶79-80.)

Arshad's controller 38 "determine[s]" operating limits received from the transponder, such as "geographical area in which the vehicle may only be operated" (*e.g.*, geo-fence limits), "maximum speed of authorized operation" (*e.g.*, maximum speed limits), and "allowed times and dates of operation," such as specific hours or dates of allowed operation (*e.g.*, time-of-day limits). (Arshad, [0011]-[0013], [0026], [0057]-[0060].)

It would have been obvious to combine Arshad's speed and geo-fence limits with its time-of-day limits. (Ehsani, ¶¶79-80.) A POSITA would have understood allowed geographic area or maximum speed could vary with allowed "dates" or "time of day." (*Id.*) For example, the geographic region could be limited to areas the driver is supposed to be working during the day and to a different area at night. (*Id.*) A POSITA would have understood that maximum speed could be greater during the day, when visibility is better, and reduced at night. (*Id.*)

h. Claims 11-12

Arshad-Petrik renders obvious Claims 11-12. (Ehsani, ¶¶81-83.)

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, ¶¶82-83.) A POSITA would have understood this would allow fleet managers to view real-time vehicle operation and violations data, improving safety and flexibility. (*Id.*) 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 17

Arshad-Petrik renders obvious Claim 17. (Ehsani, ¶84.)

Arshad's "operating 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), and (iii) "allowed times and dates of operation" and hours of authorized use and engine operation (*i.e.*, allowable hours of operation). (Arshad, [0011]-[0013], [0026], [0043]-[0045], [0057]-[0059], [0072]-[0074].)

j. Claim 18

Arshad-Petrik renders obvious Claim 18. (Ehsani, ¶¶85-87.)

Arshad monitors whether a driver is operating within her profile, and, if she violates it, 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 driver violates her 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, ¶¶86-87.) 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 drivers in real-time and take action if necessary. (*Id.*)

D. <u>Ground 1b</u> – Arshad-Petrik in View of Karsten Renders Obvious Claim 3

Karsten is US2004/0239510 (EX1009), published December 2, 2004, and is prior art under pre-AIA §102(b).

Arshad-Petrik in view of Karsten renders obvious Claim 3. (Ehsani, ¶¶88-95.)

Karsten, in the same field as Arshad-Petrik, discloses providing a driver impairment and identification device that prevents vehicle operation "when an operator's breath alcohol concentration is above a predetermined threshold limit or when the operator's identity is not verified." (Karsten, Abstract, [0011], [0043]-[0045], [0027]-[0029], [0017], Figs. 1-2.)

Karsten discloses a "breath alcohol detection device" that senses "breath alcohol content (BrAC)" and provides this to an "interlock microprocessor 610." (*Id*., [0006], [0012]-[0014], [0042]-[0043].) The "interlock microprocessor" is part of an "ignition interlock apparatus 150" which can "generat[e] an enable signal" or a "disable signal" to the ignition via a "relay." (*Id*., [0017], [0028], [0043]-[0044], Figs. 1-2.) If the BrAC exceeds a limit, "the vehicle is not permitted to start." (*Id*., [0042]-[0043].) Similarly, if the driver's identity is unverified, the vehicle is prevented from starting. (*Id.*, [0026]-[0030], [0037]-[0043].)

It would have been obvious to include Karsten's breath alcohol detection device in Arshad-Petrik. (Ehsani, ¶¶91-95.) This would have been the simple addition of a known component—a breathalyzer—into a similar vehicle system for achieving its intended purpose. (*Id*.) Arshad was ready for such modification, and a POSITA would have had a reasonable expectation of success in implementing it in Arshad-Petrik. (*Id.*) Arshad's slave control unit (*e.g.*, engine controller 46) already receives and analyzes inputs from sensors and sends signals controlling engine

components based on the inputs. (*Id.*) Like Karsten's "interlock microprocessor," Arshad's engine controller and can "enable" or "disable" the engine's ignition and starting motor "under computer control," and it would have been obvious to connect a breathalyzer to engine controller 46, allowing it to "disable" the starting motor and ignition if the driver's impairment was above the limit. (*Id.*) Further, it would have been obvious for Arshad's I/O controller to display results of the breathalyzer. (*Id.*)

E. Ground 1c – Arshad-Petrik in View of Murphy Renders Obvious Claim 10

Murphy issued May 1, 2001, and is prior art under pre-AIA §102(b).

Arshad-Petrik in view of Murphy renders obvious Claim 10. (Ehsani, ¶¶96-101.)

Arshad's controller 38 determines operating limits regarding maximum speed, allowed geographic areas (geofence limits), and hours of operation. *See* Ground 1a, Claim 10.

Additionally, Murphy, in the same field, discloses a controller (*e.g.*¸ master control unit) that determines "whether the vehicle present location and/or speed are within permitted ranges ***corresponding to the permitted time interval***." (Murphy, Abstract, 2:46-53, 5:13-28, 12:16-27, 15:8-31.) That is, Murphy discloses allowable vehicle speed and location (*e.g.*, geofence) being variable based on the time of day. (Ehsani, ¶¶99-101.) *See also* Ground 2d, Claim 10.

It would have been obvious to combine both speed and geo-fence limits as determined by Arshad's controller with time-of-day limits, as Murphy teaches. (Ehsani, ¶¶99-101.) Arshad's controller already implements these operating limits, and their integration according to time-of-day would further enhance safety and efficiency, allowing fleet managers to provide different geographic and speed limits based on where drivers should be at different times. (*Id.*)

F. Ground 1d – 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, ¶¶102-08.)

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 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, ¶¶105-08.)

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.*, ¶¶106-08.) 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, ¶¶107-08.) 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.*) Now, however, "monitoring controller" 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.*)

G. Ground 1e – Arshad-Petrik in View of Wu Renders Obvious Claim 16

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

Arshad-Petrik in view of Wu renders obvious Claims 16. (Ehsani, ¶¶109-18.) Each of the well-known components recited in Claim 16 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, ¶¶112-14.) 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, ¶¶112-14.)

Arshad's slave control unit includes a "starter relay module." (*Id.*, ¶115.) 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, ¶115.)

Arshad's slave control unit includes a "definable relay module." (Ehsani, ¶116.) 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, ¶116.) 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, ¶116.) 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, ¶117.) 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, ¶118.) 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, ¶118.)

H. Ground 1f – Arshad-Petrik in View of Kudo Renders Obvious Claims 2 and 15

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, ¶¶119-25.)

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 proximity sensors, head movement sensors, and eye movement sensors," in the form of a "stereo camera 3" comprised of left and right CCD cameras that provide information to "image recognition unit 4" to determine the proximity (or distance) to preceding vehicles and other objects. (*Id.*, [0021]-[0028].) Information, including vehicle

speed, steering wheel angle, yaw rate, and distances to preceding vehicles and other objects, is input to "control unit 5." (*Id.*, [0022]-[0025].)

Control unit 5 uses this information to alert the driver by automatically controlling acceleration, deceleration, and steering and by issuing an "alarm." (*Id.*, [0027]-[0034], Figs. 1-2, 5, 7A-7B].) When determining whether to issue an alarm, Kudo detects "interrupting vehicles" or "obstacles" ahead of the equipped vehicle. (*Id.*, [0027]-[0028], [0034]-[0035], [0039]-[0056].) The controller then determines whether any detected vehicles/objects are within an "alarm area," and if so, issues an alarm by providing a message on "display 14," issuing a voice message, and vibrating the steering wheel. (*Id.*, [0033]-[0045], [0053]-[0056], [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 proximity sensors, and use the proximity data to generate alerts, as Kudo teaches. (Ehsani, ¶¶122-25.) A POSITA would have been motivated to include such cameras in Arshad-Petrik to determine the 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 CCD stereo cameras to Arshad-Petrik would have simply been the use of a known

component for its intended purpose, allowing Arshad-Petrik to take into account proximity to other vehicles/objects when alerting the driver and controlling speed. (Ehsani, ¶¶122-25.)

A POSITA would have known to implement Kudo's proximity sensors and generating of alerts in Arshad-Petrik in the same manner as Arshad-Petrik's other sensors are used. (Ehsani, ¶¶123-25.) 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 proximity sensors, when in Arshad, would likewise provide signals to engine controller 46 and/or IO controller 52 so either could determine if a driving condition requiring a warning exists and then have monitoring controller 38 alert the driver if needed. (Ehsani, ¶¶123-25.)

A POSITA would have been motivated to have engine controller or I/O controller send proximity data to monitoring controller 38, so that it can take into account all vehicle operation information when issuing commands and deciding whether and how to alert the driver. (Ehsani, ¶¶124-25.) Having engine controller 46 or I/O controller send such a signal 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].)

A POSITA would have also had a reasonable expectation of success, as Arshad and Petrik have engine controllers, similar to Kudo's controllers, that are used to control vehicle speed, and a POSITA would have found it obvious to sensing and determinations related to braking and steering control as well. (Ehsani, ¶¶124-25.) *See* Ground 1f, Claim 15.

2. Claim 15

Arshad-Petrik in view of Kudo renders obvious Claim 15. (Ehsani, ¶¶126-28.)

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].) *See* Ground 1f, Claim 2.

It would have been obvious to modify Arshad-Petrik to include steering, braking, and acceleration control modules, as Kudo teaches, and have them receive commands 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. (Ehsani, ¶¶127-28.) A POSITA would have understood such commands 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 or alter vehicle direction. (*Id.*, ¶¶127-28.) 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.*)

I. Ground 1g – Arshad-Petrik in View of Victor Renders Obvious Claim 2

Victor is US2003/0181822 (EX1013), published September 25, 2003, and is prior art under pre-AIA §102(b).

Arshad-Petrik in view of Victor renders obvious Claim 2. (Ehsani, ¶¶129-37.)

Victor discloses a system for monitoring "physiological behavior" and issuing alerts when a driver is inattentive. (Victor, Abstract, [0026]-[0029], [0032]-[0035], [0048], Fig. 2, Cls. 1-2, 4.) Victor includes transducers, including sensors for measuring a driver's "eye movement," "eye-gaze direction," "eye-closure" and blinking, "head movement," and head position/orientation. (*Id.*, Abstract, [0026]-[0029], [0048], [0060], Fig. 2, Cls. 1-2, 4.) Victor further includes sensors detecting the "traffic environment" around the vehicle, including "proximity detection means." (*Id.*, [0060]-[0063], Cl. 12.)

Victor's alerts can be visual warnings like "displayed icons," audible warnings, and driver-stimulation warnings like vibrations. (*Id.*, [0032]-[0044].) Victor can also vary "collision" and "lane change" warnings based on whether the driver is "attentive." (*Id.*, [0026], [0060]-[0063], Figs.12-13, Cl. 13.) Victor provides continuous feedback regarding driver attentiveness and stores "post-trip feedback" files accessible by fleet managers. (*Id.*, [0053]-[0056].)

It would have been obvious to a POSITA to include Victor's eye and head movement and proximity sensors in Arshad and have them provide signals to Arshad's engine controller 46 (*e.g.*, slave control unit) to determine if the signals are indicative of a condition requiring a warning and to signal monitoring controller 38 (*e.g.*, master control unit) to alert said driver. (Ehsani, ¶¶133-37.) Engine controller 46 is already configured to receive information from numerous sensors, and can analyze received sensor information to determine if actions are required. (Arshad, [0046]-[0050], [0074].) Thus, it would been obvious for it to monitor data from Victor's sensors, and signal the monitoring controller if action may be required. (Ehsani, ¶¶133-37.) This would have simply been providing additional information (driver attentiveness or potential collisions) that is similar to information already provided (engine operating information) in the same manner by transmitting it over bus 44. (*Id.*) In fact, driver attentiveness or potential collisions are the type of data monitoring controller 38 would consider, as "[c]ontroller 38" constantly monitors

data from other controllers, including data "indicative" of "events" or "error conditions experienced" by the controllers. (*Id*., [0042], [0069]-[0074].) This would simply be the use of known components for their intended purpose to increase driver safety and monitor fleet vehicle operation. (Ehsani, ¶¶133-37.)

Just as Arshad alerts the driver when limits are approached or exceeded, it could also warn the driver or control vehicle operation, as Victor teaches, based on driver behavior and proximity sensing. (*Id.*) By monitoring driver attentiveness and proximity to other vehicles, Arshad's operation limitations could be adjusted to make driving safer. (*Id.*) For example, where Arshad's engine controller determines the driver is inattentive or in close proximity to another vehicle, Arshad could reduce limits like maximum speed or instruct the engine controller to slow or disable the vehicle. (*Id*.)

A POSITA would have been motivated to have engine controller 46 send data regarding driver attentiveness and proximity to other vehicles to monitoring controller 38, so that it can take into account all vehicle operation information when issuing commands. (*Id.*, ¶¶135-37.) Where the driver is determined to be drowsy or not looking at the road, or where a collision with another vehicle becomes more imminent, engine controller 46 can alert monitoring controller 38 of this and wait for a command on what action to take. (*Id.*) Moreover, sending these signals to the engine controller for initial determinations would have been at least obvious to try,

as Arshad's all have inputs and processing and can send information back to monitoring controller 38 for consideration. (*Id.*) Having engine controller 46 send such a signal to monitoring controller 38 would also be consistent with Arshad's approach of keeping controllers in "constant communication with each other" and allowing monitoring controller 38 to assess "priority" when determining which actions to take. (*Id.*)

J. Ground 1h – Arshad-Petrik-Victor in View of Kudo Renders Obvious Claim 15

Arshad-Petrik-Victor in view of Kudo renders obvious Claim 15. (Ehsani, ¶138.)

Arshad-Petrik-Victor renders obvious Claim 2, and for the additional limitations of Claim 15, it would have been obvious for the same above to further modify Arshad to include steering control, braking control, and acceleration control modules, as Kudo teaches. *See* Ground 1f, Claim 15.

K. Ground 2a – Murphy Anticipates and Renders Obvious Claims 1, 8, 11-12, and 17-18

Murphy anticipates or renders obvious Claims 1, 8, 11-12, and 17-18. (Ehsani, ¶¶139-78.)

1. Independent Claim 1

Murphy anticipates and renders obvious Claim 1. (*Id.*, ¶¶142-70.)

1[pre]: ***A driver authentication and monitoring system, comprising:***

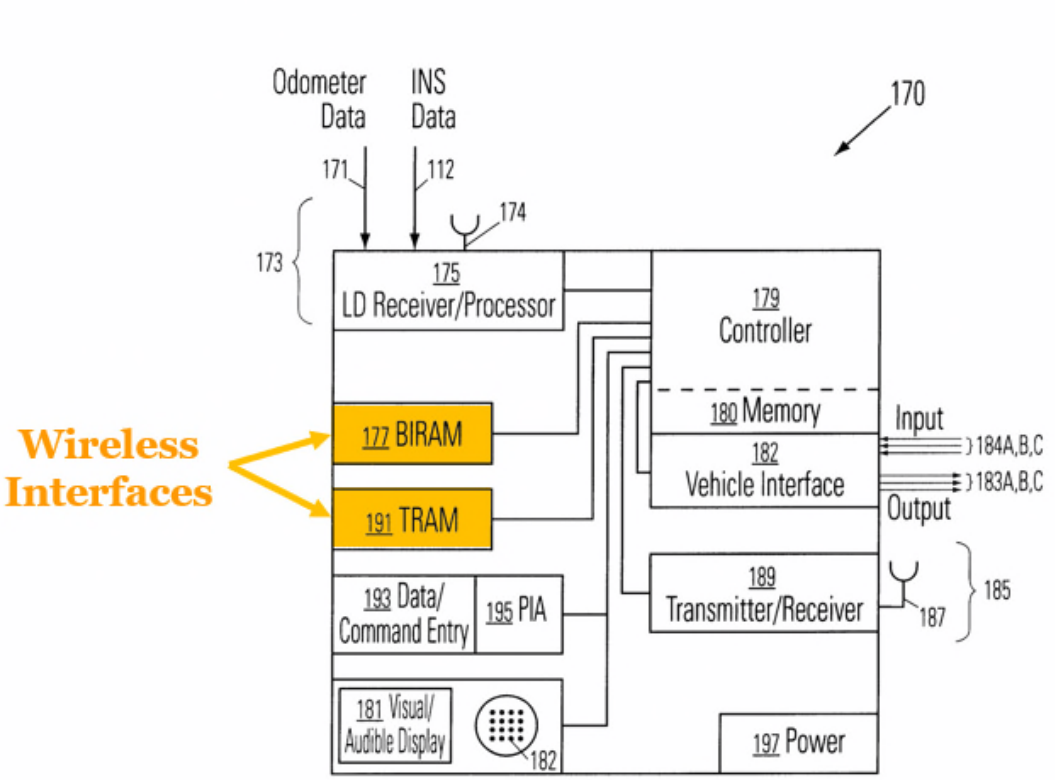
Murphy discloses Claim 1[pre]. (*Id.*, ¶143.)

Murphy discloses "[a] ***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*. (Murph, Abstract, 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, ¶¶144-47.)

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).

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,

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

rather than inserted, are contactless and thus "wireless." (Ehsani, ¶¶145-47.) 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; 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

[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.

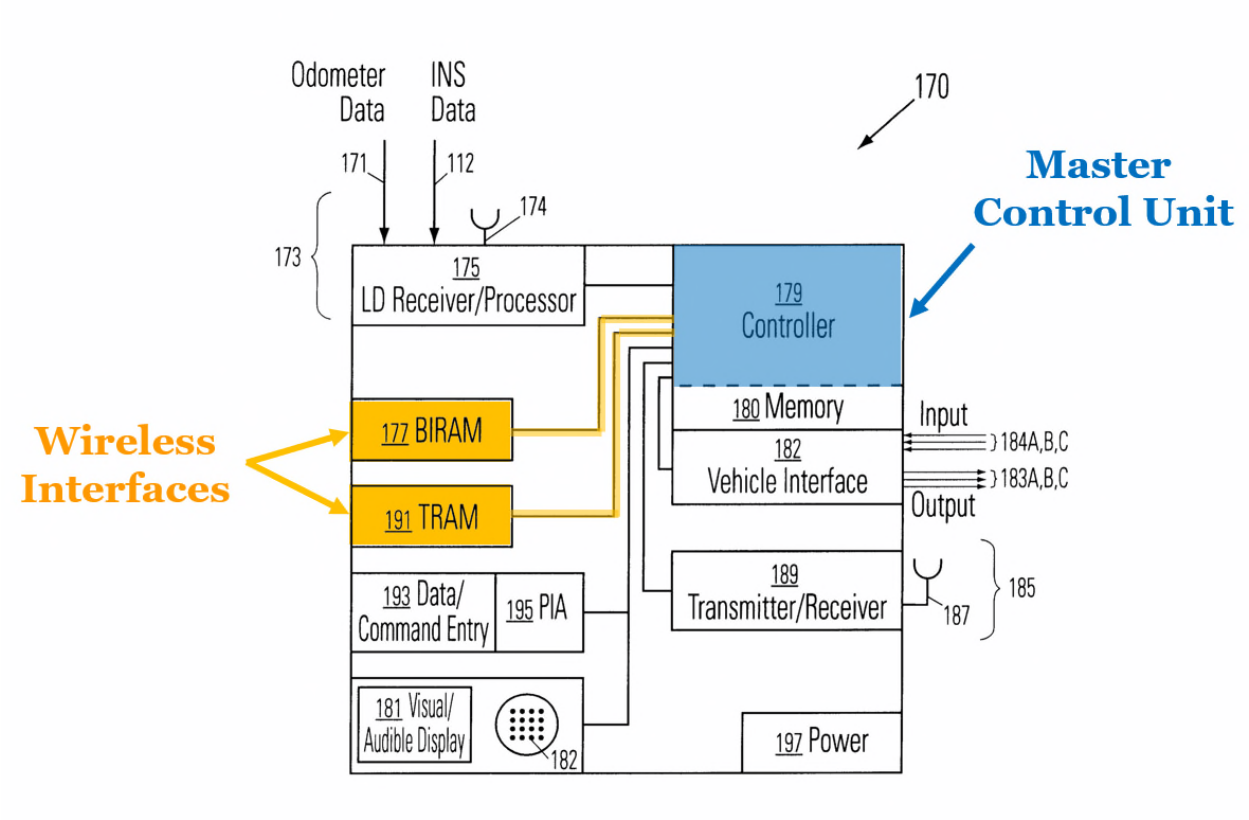
[5] Murphy incorporates Fishbine by reference and makes clear that Fishbine is part of Murphy's disclosure. (Murphy, 17:63-19:2.) *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000); *Viken Detection Corp. v. Am. Sci. and Eng'g, Inc.*, No. IPR2022-00027, Paper 12 at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

recorder," enabling the images to be displayed by the apparatus and wirelessly transmitted to another device for identity verification. (*Id.*; Ehsani, ¶¶146-47.) 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 motor vehicle for wirelessly authenticating at least one driver via said wireless driver identification and data logging module and associating an operating profile with said at least one driver;***

Murphy discloses and renders obvious Claim 1[B]. (Ehsani, ¶¶148-54.)

"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:



(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 "[***d]ifferent 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.)

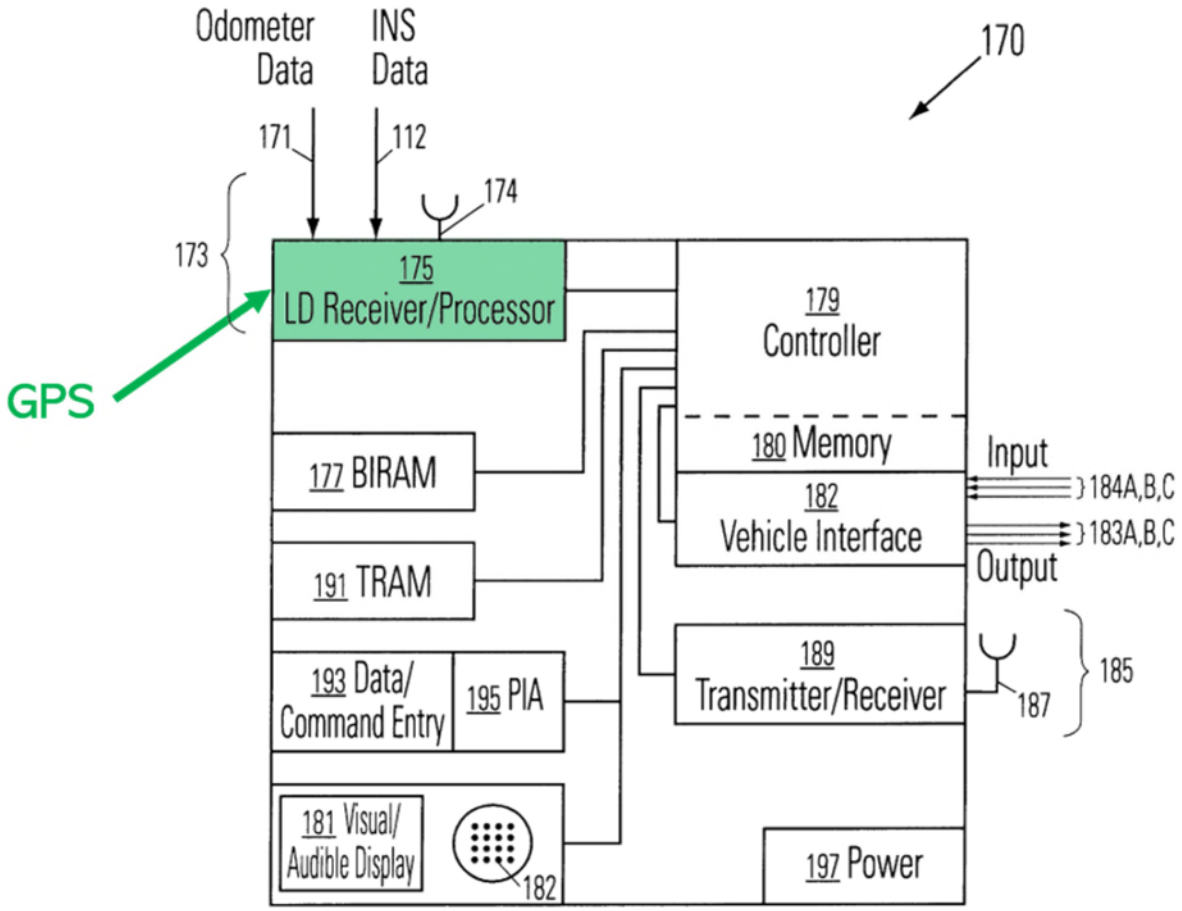
After authenticating a driver, Murphy accesses her profile and permits her to operate the vehicle in accordance with it. Specifically, when "[ident] indicum is satisfactorily presented and analyzed, the system allows operation of the vehicle" but will monitor "whether the vehicle location and/or speed 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 GPS module providing at least location and speed information in association with movement of said motor vehicle;***

Murphy discloses Claim 1[C]. (Ehsani, ¶¶155-56.)

Murphy includes a "location determination (LD) module" that is "part of an LD system, ***such as GPS***," and "***determines*** the ***present location, present speed***…

of the vehicle." (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 recording vehicle operation data associated with a use of said motor vehicle by said at least one driver comprising at least said location and speed information from said GPS module; and***

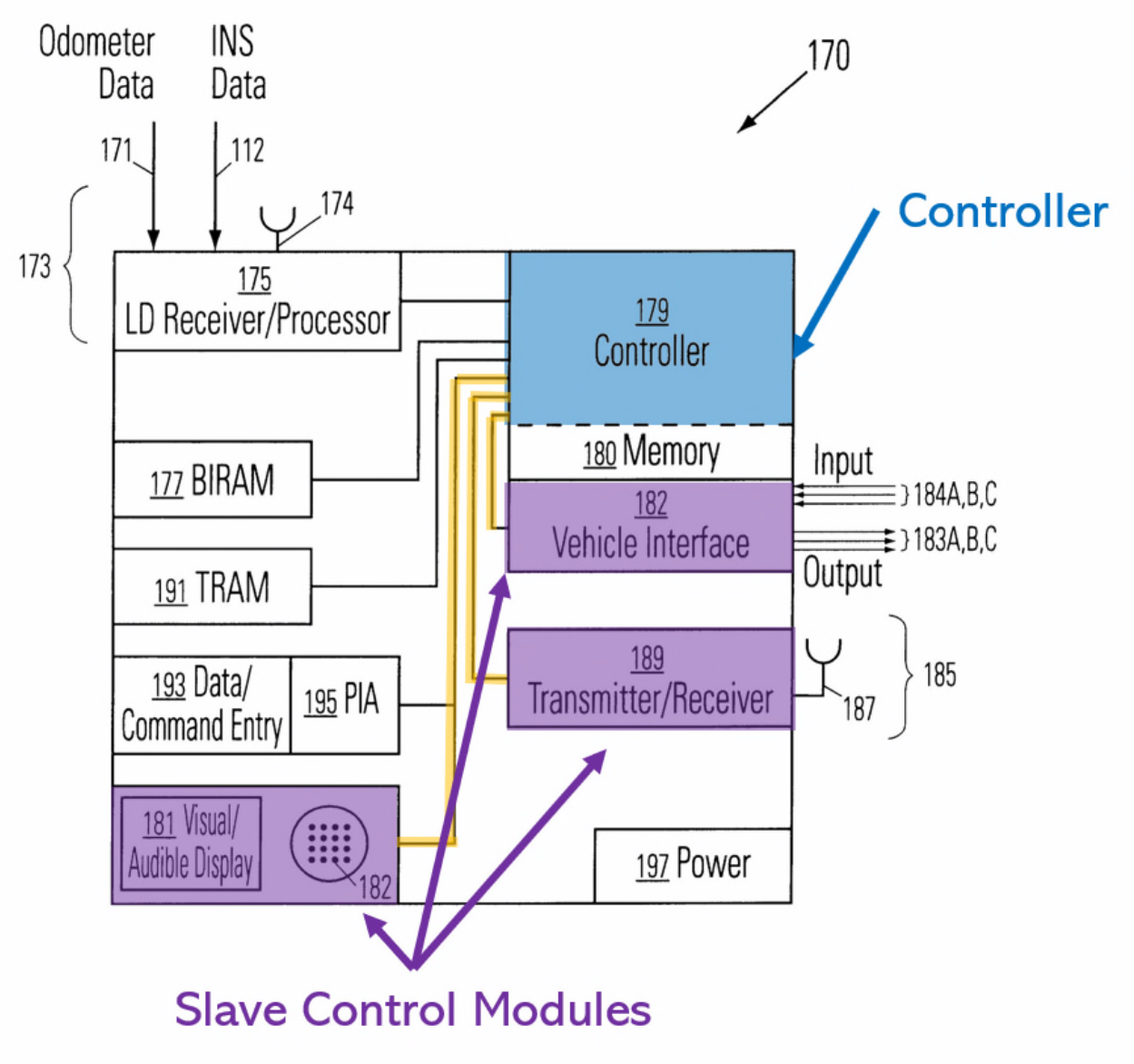
Murphy discloses Claim 1[D]. (Ehsani, ¶¶157-60.)

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 motor vehicle and in communication with said master control unit, said slave control unit configured to receive commands from said master control unit and to generate an alarm signal if said at least one driver violates said operating profile unique to said at least one driver thereby providing feedback about said vehicle usage;***

Murphy discloses Claim 1[E]. (Ehsani, ¶¶161-65.)

Murphy includes "slave control units" that (b) are in communication with and receive commands from the controller and (b) generate "alarm signals" if the driver violates her profile, providing feedback. Murphy has numerous "modules" in communication 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"—thereby providing feedback. (*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…," providing feedback. (*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, providing feedback to personnel at the remote facility. (*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 permits said at least one driver to operate said vehicle within said operating profile if said master control unit receives at least one of a unique identification code to permit said at least one driver to operate said vehicle within said operating profile and said at least one driver has not violated said operating profile.***

Murphy discloses Claim 1[F]. (Ehsani, ¶¶166-69.)

Murphy's controller receives a "unique identification code" that allows drivers to operate the vehicle using their "operating profile." For example, the token (used with the TRAM) can be "***specific to the person*** who presents" it; has "built

into it a ***circuit or pre-programmed information*** in a storage medium that imposes selected restrictions on operation of the vehicle and/or ***that identifies the token holder***"; and may rely upon "digitized data" that is "***encoded*** or encrypted" and stored in its memory. (*Id.*, 6:55-7:14, 2:33-34, 14:46-54, Cl. 38.) Similarly, the BIRAM can receive "***samples*** of an ***ident indicium***" unique to the driver, such as, a "fingerprint," "facial scan," and "voice sample." (*Id.*, Abstract, Cl. 37, 2:20-45, 4:39-5:28, 6:46-54, 15:55-16:28, 16:50-17:2, 17:63-18:19, 7:15-24.)[6]

Once the controller authenticates the driver using this information, *see* Claims 1[A]-1[B], it permits her to operate the vehicle in accordance with her 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

[6] After its identifier module receives "ident indicium" from the BIRAM, TRAM, or PIA, Murphy transmits "ident information, ***or a representation thereof***," to the controller for comparison. (Murphy, 15:9-21.)

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 driver is not operating within her profile, then "vehicle operation is temporarily disabled, or a coded alarm signal is transmitted, or other appropriate control actions are taken," such as reducing vehicle speed. (*Id.*, Abstract, 5:29-60, Fig. 2, 13:53-14:17.) *See* Claim 1[E].

2. Dependent Claims

a. Claim 8

Murphy anticipates and renders obvious Claim 8. (Ehsani, ¶¶170-71.)

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].

b. Claims 11-12

Murphy anticipates and renders obvious Claim 11-12. (Ehsani, ¶¶172-73.)

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) 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.

c. Claim 17

Murphy anticipates and renders obvious Claim 17. (Ehsani, ¶¶174-75.)

Murphy's profiles include "***parameters for vehicle operation,*** including restrictions on (a) "selected maximum speed" (*i.e.*, maximum allowable speed), (b) "selected geographic region" and "specific routes" (*i.e.*, allowable locations), and (c) "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].

d. Claim 18

Murphy anticipates and renders obvious Claim 18. (Ehsani, ¶¶176-77.)

Murphy monitors whether a driver is operating in accordance with her 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.

L. Ground 2b – Murphy in View of Arshad Renders Obvious Claims 1, 4-8, 11-12, and 17-18

Murphy-Arshad renders obvious Claims 1, 4-5, 8, 11-12, and 17-18. (Ehsani, ¶¶178-87.)

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, ¶¶179-81.) 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, ¶¶180-81.) 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, ¶182.)

Murphy, as modified by Arshad to include an RFID transponder and corresponding reader, renders obvious wirelessly loading a driver's 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, ¶¶183-86.)

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 driver operates the vehicle 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 driver 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 driver 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 2b, Claims 1, 4.

Regarding Claim 7, Murphy as modified by Arshad includes an RFID transponder having stored thereon driver performance and infraction data. *See* Ground 2b, Claim 6. Such transponder is configured to present, or send, the performance and infraction data to any RFID reader device, including for later review and analysis outside of the vehicle. (Ehsani, ¶186.) *See* Ground 1a, Claim 7.

4. Claims 8, 11-12, 17-18

Murphy-Arshad renders obvious Claims 8, 11-12, 17-18. (Ehsani, ¶187.) *See* Ground 2a, Claims 8, 11-12, 17-18.

M. Ground 2c – Murphy (Alone or with Arshad) in View of Karsten Renders Obvious Claim 3

Murphy (alone or with Arshad) in view of Karsten renders obvious Claim 2. (Ehsani, ¶¶188-93.)

Karsten discloses providing a "breath alcohol detection device" and "interlock processor" that "prevents operation of a vehicle when an operator's breath alcohol concentration is above a predetermined threshold limit or when the operator's identity is not verified." *See* Ground 1b, Claim 3.

It would have been obvious to include this in Murphy. (Ehsani, ¶¶190-93.) This would have been the simple addition of a known component—a breathalyzer—into a similar system for its intended purpose—enhancing driver safety by preventing intoxicated drivers from starting a vehicle. (*Id.*) Murphy was ready for such modification, and a POSITA would have had a reasonable expectation of success in implementing Karsten's breath alcohol detection sensor in Murphy. (*Id.*)

Indeed, Murphy's "interface module" is connected to myriad components via input and output terminals and can take action based on sensors indicating activity. (Murphy, 13:65-14:17.) If the interface module detects use of "vehicle components (doors, ignition, alarm system, vehicle cargo, accessories, etc.) whose activation may indicate that someone is preparing to drive the vehicle," it can "activate a driver interrogation sequence." (*Id.*) Similarly, the interface module can send signals to components for "controlling or restricting operation of the vehicle." (*Id.*)

A POSITA would have been motivated to modify Murphy to connect Karsten's breathalyzer to Murphy's interface module, or "slave control unit," allowing it to prevent the "driver interrogation sequence" (and thus vehicle) from being activated or to "disable" the engine, in each case if the driver's impairment was above the prescribed limit, as taught by Karsten. (Ehsani, ¶¶192-93.) Doing so would prevent intoxicated driving, promoting driver monitoring and safety objectives. (*Id.*)

N. Ground 2d – Murphy (Alone or With Arshad) in view of Petrik Renders Obvious Claims 9-10

Murphy (alone or with Arshad) in view of Petrik renders obvious Claims 9-10. (Ehsani, ¶¶194-98.)

1. Claim 9

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, ¶¶195-97.)

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, ¶¶195-97.) 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, ¶¶196-97.)

2. Claim 10

Murphy's controller defines a maximum speed and geofence for a driver based on time-of-day. (Ehsani, ¶198.) It determines "whether the vehicle present location and/or speed are within permitted ranges ***corresponding to the permitted time interval***." (Murphy, Abstract, 2:46-53, 5:13-28, 12:16-27, 15:8-31.) For example, a teen may only be allowed to drive between home and school, at a maximum speed of no more than 35mph, in the morning, and then separately allowed to drive outside of this region, up to 55mph, in the evenings to go to work. (Ehsani, ¶198.)

O. <u>Ground 2e</u> – 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, ¶¶199-204.)

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 1d, 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, ¶¶201-04.) 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.*)

Moreover, controlling these would not impact Murphy's functioning—which continue to control vehicle operation as before—only now Murphy would further control cellphone and Internet usage, as taught by Siwinski. (*Id.*) 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.*)

P. <u>Ground 2f</u> – Murphy (Alone or With Arshad) in View of Wu Renders Obvious Claim 16

Murphy (alone or with Arshad) in view of Wu renders obvious Claim 16. (Ehsani, ¶¶205-12.)

Murphy discloses and renders obvious its slave control unit including a "slave microcontroller." (Ehsani, ¶206.) 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, ¶206.)

Murphy discloses and renders obvious its slave control unit including an "alarm synthesizer." (*Id.*, ¶207.) 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, ¶207.) 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, ¶207.) 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, ¶207.)

Murphy in view Wu discloses and renders obvious its slave control unit including a "power regulator module." (Ehsani, ¶¶208-10.) 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, ¶¶208-10.) 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, ¶¶208-10.)

Murphy in view of Wu discloses and renders obvious its slave control unit including a "starter relay module." (Ehsani, ¶211.) 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, ¶211.) 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, ¶212.) 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, ¶212.) 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, ¶212.)

Q. Ground 2g – Murphy (Alone or with Arshad) in View of Kudo Renders Obvious Claims 2 and 15

Murphy (alone or with Arshad) in view of Kudo renders obvious Claim 2. (Ehsani, ¶¶213-22.)

1. Claim 2

Kudo, in the same field as Murphy, discloses including a plurality of transducers in a vehicle, including proximity sensors like left and right CCD cameras, and using data from them to generate alerts. *See* Ground 1f, Claim 2.

It would have been obvious to modify Murphy to include such proximity sensors and use the data from them to generate alerts, as taught by Kudo. (Ehsani, ¶¶214-19.) *See* Ground 1f, Claim 2. Murphy, like Kudo, senses vehicle speed and controls components to maintain a desired speed. (Murphy, 5:29-60.) A POSITA would have understood that adding Kudo's CCD stereo cameras would have been the use of a known component for its intended purpose, allowing Murphy to take into account proximity to other vehicles/objects when alerting the driver and controlling speed. (Ehsani, ¶¶214-19.)

Moreover, a POSITA would have known Kudo's proximity sensors and generating of alerts based on data therefrom could be implemented in Murphy in the same manner as other sensors included in Murphy and used to generate alerts. (*Id.*, ¶¶215-19.) 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.) As such, Kudo's 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 have Murphy's controller

(*e.g.*, master control unit) alert the driver if needed. (Ehsani, ¶¶215-19.) This would have simply been providing additional information (distance to other vehicles and objects) that is similar to information already provided in the same manner. (*Id*.)

A POSITA would have been motivated to have the interface module send data to Murphy's controller regarding proximity to other vehicles, 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*.) 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, ¶¶216-19.) 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, ¶¶220-22.)

Kudo discloses steering, control, an acceleration control modules. *See* Ground 1f, Claim 15.

It would have been obvious to modify Murphy to include such modules, as taught by Kudo, having them receive commands from Murphy's controller (*e.g.*, master control unit) to provide for automatic cruise control in a manner that maintains a safe distance when following a preceding vehicle and to avoid obstacles. (Ehsani, ¶¶221-22.) *See* Ground 1f, Claim 15. A POSITA would have understood such commands could be sent from the controller (directly or through the interface module) to throttle, braking, and steering control modules as taught by Kudo to reduce or increase vehicle speed or alter vehicle direction. (Ehsani, ¶¶221-22.) 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.*) 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.*)

R. <u>Ground 2h</u> – Murphy (Alone or with Arshad) in View of Victor Renders Obvious Claim 2

Murphy (alone or with Arshad) in view of Victor renders obvious Claim 2. (Ehsani, ¶¶223-28.)

Victor includes a plurality of transducers—including sensors for (a) measuring driver "eye movement," "eye-gaze direction," "eye-closure" and blinking amounts, "head movement," and head position and orientation and (b) to detect the "traffic environment" around the vehicle—and issues alerts based on this sensor information, like "displayed icons," audible warnings, and driver-stimulation warnings like vibrations. *See* Ground 1h, Claim 2.

It would have been obvious to a POSITA to include Victor's eye movement, head movement, and proximity sensors in Murphy and have them provide signals to Murphy's interface module (*e.g.*, slave control unit) to determine if the signals are indicative of a driving condition that may require a warning and to signal the controller (*e.g.*, master control unit) to potentially alert the driver. (Ehsani, ¶¶225-28.) Murphy's interface module is already configured to receive information from numerous components regarding vehicle operation and can analyze received information to determine if any actions are required. (*Id.*)Thus, it would have been obvious for the interface module to monitor the data from Victor's sensors and signal the controller if action may be required. (*Id.*) This would have simply been providing additional information (driver attentiveness or potential collisions) that is similar to information already provided in the same manner. (*Id.*)

Just as Murphy alerts the driver when operational limits are approached or exceeded, it could also warn the driver or control vehicle operation, as taught by Victor, based on driver behavior and proximity sensing. (*Id.*) By monitoring driver attentiveness and proximity to other vehicles as taught by Victor, Murphy's driver operation limitations could be adjusted to make driving safer. (*Id.*) For example, where Murphy's interface module determines the driver is inattentive or is in close proximity to another vehicle, Murphy could reduce operational limits like maximum speed or instruct the engine controller to slow or disable the vehicle or reduce engine speed. (*Id*.)

A POSITA would have been motivated to have the interface module send data regarding driver attentiveness and proximity to other vehicles to Murphy's controller, so that it can receive this feedback and take into account vehicle operation information when issuing commands. (*Id.*, ¶¶226-28.) For example, where the driver is determined to be drowsy or not looking at the road, or where a collision with a preceding vehicle is becomes more imminent, the interface module can alert Murphy's controller of this occurrence and then wait for a command on what action to take. (*Id.*, [0043]-[0045], [0072], [0074].)

S. <u>Ground 2i</u> – Murphy (Alone or with Arshad) in View of Victor and Kudo Renders Obvious Claim 15

Murphy (alone or with Arshad) in view of Victor and Kudo renders obvious Claim 2. (Ehsani, ¶229.)

For the reasons above, it would have been obvious to modify Murphy to include steering, braking, and acceleration control modules, as taught by Kudo. *See* Ground 2g, Claim 15.

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).

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 1-18 of the '149 should be found unpatentable over the prior art.

Dated: May 9, 2025

Respectfully submitted,

/s/ Celine Jimenez Crowson

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TABLE OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 9,493,149 ("**'149 Patent**")
1002	File History for the '149 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 2003/0189482 A1 ("**Arshad**")
1008	U.S. Patent Application Publication 2007/0168125 A1 ("**Petrik**")
1009	U.S. Patent Application Publication 2004/0239510 A1 ("**Karsten**")
1010	U.S. Patent Application Publication 2002/0141600 A1 ("**Siwinski**")
1011	U.S. Patent Application Publication 2008/0114501 A1 ("**Wu**")
1012	U.S. Patent Application Publication 2007/0069873 A1 ("**Kudo**")
1013	U.S. Patent Application Publication 2003/0181822 A1 ("**Victor**")
1014	U.S. Patent No. 5,222,152 ("**Fishbine**")

Appendix A

Claim	Limitations
Independent Claim 1	[pre] A driver authentication and monitoring system, comprising:
	[A] a wireless identification and data logging module;
	[B] a master control unit in a motor vehicle for wirelessly authenticating at least one driver via said wireless driver identification and data logging module and associating an operating profile with said at least one driver;
	[C] a GPS module providing at least location and speed information in association with movement of said motor vehicle;
	[D] a data logging device recording vehicle operation data associated with a use of said motor vehicle by said at least one driver comprising at least said location and speed information from said GPS module; and
	[E] a slave control unit in said motor vehicle and in communication with said master control unit, said slave control unit configured to receive commands from said master control unit and to generate an alarm signal if said at least one driver violates said operating profile unique to said at least one driver thereby providing feedback about said vehicle usage;
	[F] wherein said master control unit permits said at least one driver to operate said vehicle within said operating profile if said master control unit receives at least one of a unique identification code to permit said at least one driver to operate said vehicle within said operating profile and said at least one driver has not violated said operating profile.
Claim 2	The driver authentication and monitoring system of claim 1 further comprising: a plurality of transducers comprising at least one of proximity sensors, head movement sensors, and eye movement sensors wherein said transducers send signals to said slave control unit and 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 to alert said driver.
Claim 3	The driver authentication and monitoring system of claim 1 further comprising: an impairment sensor wherein said slave control unit receives signals from impairment sensor and prevents said motor vehicle from starting when said transducer senses driver a driver impairment above a prescribed limit.
Claim 4	The driver authentication and monitoring system of claim 1 further comprising configuring said wireless identification and data logging module as 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 driver authentication device of claim 4 wherein said wireless identification and data logging module is further configured to wirelessly load said operating profile for said at least one driver into said master control unit.
Claim 6	The driver authentication device of claim 4 wherein said wireless identification and data logging module is further configured to wirelessly receive driver specific vehicle performance and infraction data from said master control unit.
Claim 7	The driver authentication device of claim 6 wherein said wireless identification and data logging module is further configured to present said driver specific vehicle performance and infraction data.
Claim 8	The driver authentication device of claim 1 wherein said master control unit is further configured for wirelessly receiving data indicative of a speed of said motor vehicle, a location of said motor vehicle, and a time of day from at least one of: a WIFI source; an RF source; a Bluetooth source; and a smart-road network source.
Claim 9	The driver authentication device of claim 8 wherein said master control is configured for wirelessly receiving data indicative of a speed limit associated with a road said motor vehicle is currently

	traveling on from at least one of: a WIFI source; an RF source; a Bluetooth source; and a smart-road network source.
Claim 10	The driver authentication device of claim 9 wherein said master control is configured to define a maximum speed limit and a geo-fence limit for said at least one driver according to said time of day.
Claim 11	The driver authentication module of claim 1 further comprising an alarm module configured to wirelessly receive data from at least one of said master controller, said slave controller, 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 driver authentication module 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 driver authentication device of claim 1 further comprising a phone governor module configured to receive at least one instruction from said master control unit said instructions comprising at least one of: restricting calls on said at least one driver's cellular telephone; powering off said at least one driver's cellular telephone; and disabling text messaging on said at least one driver's cellular telephone.
Claim 14	The driver authentication device of claim 1 further comprising an Internet governor module configured to disables all integrated in-vehicle Internet related applications when said vehicle is in operation.
Claim 15	The driver authentication device of claim 2 further comprising a steering control module, a braking control module, and an acceleration control module configured to receive at least one instruction from said master control unit said instructions comprising at least one of: reducing said vehicles speed; increasing said vehicles speed; and altering said vehicles direction.

Claim 16	The driver authentication and monitoring 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 17	The driver authentication and monitoring system of claim 1, wherein said operating profile comprises at least one operating parameter including at least one of: a maximum allowable vehicle speed; an allowable vehicle location; allowable hours of operation; and a seatbelt usage.
Claim 18	The driver authentication and monitoring system of claim 1 wherein said slave control unit generates an alarm signal for remotely alerting said authorized user when said at least one driver violates said operating profile.

CERTIFICATE OF COMPLIANCE

The undersigned hereby certifies that the foregoing Petition for *Inter Partes* Review contains 13,561 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 9, 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:

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