DOCKET NO.: 2211726–00136US1
Filed on behalf of Unified Patents Inc.
By: David L. Cavanaugh, Reg. No. 36,476
Michael Van Handel, Reg. No. 68,292
Wilmer Cutler Pickering Hale and Dorr LLP
1875 Pennsylvania Ave., NW
Washington, DC 20006
Tel: (202) 663-6000
Email: David.Cavanaugh@wilmerhale.com

Jonathan Stroud, Reg. No. 72,518
Ashraf Fawzy, Reg. No. 67,914
Unified Patents Inc.
1875 Connecticut Ave. NW, Floor 10
Washington, D.C., 20009
Tel: (202) 805-8931
Email: jonathan@unifiedpatents.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS INC.
Petitioner

v.

AUTOLOXER LLC

IPR2017-01271
Patent 7,084,735

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 7,084,735
CHALLENGING CLAIMS 1–3, 5, 6, and 28
UNDER 35 U.S.C. § 312 AND 37 C.F.R. § 42.104

TABLE OF CONTENTS

I. MANDATORY NOTICES

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Unified Patents Inc. ("Unified" or "Petitioner") certifies that Unified is the real party-in-interest, and further certifies that no other party exercised control or could exercise control over Unified's participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial. In this regard, Unified has submitted voluntary discovery. *See* Petitioner's Voluntary Interrogatory Responses (EX1012).

B. Related Matters

U.S. Pat. No. 7,084,735 ("'735 patent") (EX1001) is owned by Autoloxer LLC ("Patent Owner"). Between October 3, 2014 and August 24, 2016, Autoloxer filed lawsuits asserting the '735 patent against numerous defendants, including (by common names) OnStar, Tyco Integrated Security, Atlas Copco Drilling Solutions, Liebherr Cranes, Manitou Americas, Sandvik Mining & Construction, Yanmar America, Caterpillar, Bobcat, Deere, and Ford. Prior to being assigned to Autoloxer, the '735 patent was assigned to Remote Vehicle Technologies LLC. Remote Vehicle Technologies LLC asserted the '735 patent against Hyundai Motor America. All these litigations have been dismissed, as indicated in the table below.

Case Caption	Case Number	District	Case Filed	Status
Autoloxer LLC v. OnStar, LLC	2:16–cv–00935	EDTX	August 24, 2016	Dismissed, January 18,

				2017
Autoloxer LLC v. Tyco Integrated Security LLC	2:16–cv–00936	EDTX	August 24, 2016	Dismissed, December 5, 2016
Autoloxer LLC v. Atlas Copco Drilling Solutions LLC	2:16–cv–00139	EDTX	February 16, 2016	Dismissed, May 24, 2016
Autoloxer LLC v. Liebherr Cranes, Inc.	2:16–cv–00140	EDTX	February 16, 2016	Dismissed, May 13, 2016
Autoloxer LLC v. Manitou Americas, Inc.	2:16–cv–00141	EDTX	February 16, 2016	Dismissed, January 19, 2016
Autoloxer LLC v. Sandvik Mining and Construction USA, LLC	2:16–cv–00142	EDTX	February 16, 2016	Dismissed, August 10, 2016
Autoloxer LLC v. Yanmar America Corporation	2:16–cv–00143	EDTX	February 16, 2016	Dismissed, January 19, 2017
Autoloxer LLC v. Caterpillar Inc.	2:15–cv–01628	EDTX	October 6, 2015	Dismissed, January 25, 2016
Autoloxer LLC v. Clark Equipment Company d/b/a Bobcat Company	2:15–cv–01629	EDTX	October 6, 2015	Dismissed, January 12, 2016
Autoloxer LLC v. Deere & Company	2:15–cv–01630	EDTX	October 6, 2015	Dismissed, January 7, 2016
Autoloxer LLC v. Ford Motor Company	2:14–cv–00931	EDTX	October 3, 2014	Dismissed, October 19, 2015
Remote Vehicle Technologies, LLC v. Hyundai Motor America, Inc.	6:11–cv–00392	EDTX	August 1, 2011	Dismissed, June 11, 2012

C. Counsel

Lead Counsel: David L. Cavanaugh (Registration No. 36,476)

Backup Counsel: Jonathan Stroud (Registration No. 72,518)

Backup Counsel: Michael Van Handel (Registration No. 68,292)

Backup Counsel: Ashraf Fawzy (Registration No. 67,914)

D. Service Information, Email, Hand Delivery, and Postal

Unifed consents to electronic service at david.cavanaugh@wilmerhale.com and jonathan@unifiedpatents.com. Petitioner can be reached at Wilmer, Cutler, Pickering, Hale and Dorr, LLP, 1875 Pennsylvania Ave., NW Washington, DC 20006 and (202) 663-6000, Fax: 202-663-6363 and Unified Patents Inc., 1875 Connecticut Ave. NW, Floor 10, Washington, D.C., 20009, (650) 999-0899.

II. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies pursuant to Rule 42.104(a) that the patent for which review is sought is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

III. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Pursuant to Rules 42.22(a)(1) and 42.104(b)(1)–(2), Petitioner challenges claims 1–3, 5, 6, and 28 of the ’735 patent.

A. Prior Art Patents and Printed Publications

The following references are pertinent to the grounds of unpatentability explained below: [1]

1. U.S. Patent No. 6,253,143 (filed January 26, 1999; issued June 26, 2001) ("*Silvernagle*") (EX1002)), which is prior art under 35 U.S.C. § 102(b).
2. U.S. Patent No. 5,839,534 (filed March 1, 1995; issued November 24, 1998) ("*Chakraborty*") (EX1003)), which is prior art under 35 U.S.C. § 102(b).

B. Grounds for Challenge

This Petition, supported by the declaration of Robert Leale ("Leale Declaration" or "Leale" (EX1004)), requests cancellation of challenged claims 1–3, 5, 6, and 28 as unpatentable under 35 U.S.C. § 103. *See* 35 U.S.C. § 314(a).

IV. TECHNOLOGY BACKGROUND

The Leale Declaration discusses technology described in this Petition in greater detail, specifically the concepts of vehicle network systems (*see* Leale ¶¶ 17-18 (EX1004)), electronic control units (*see* Leale at ¶¶ 19-20 (EX1004)), and other vehicle electronic sensors (*see* Leale ¶¶ 21 (EX1004)).

V. OVERVIEW OF THE '735 PATENT

A. Summary of the Alleged Invention

The '735 patent concedes that, prior to its filing date, vehicle network communication protocols already existed for transmitting commands to limit engine

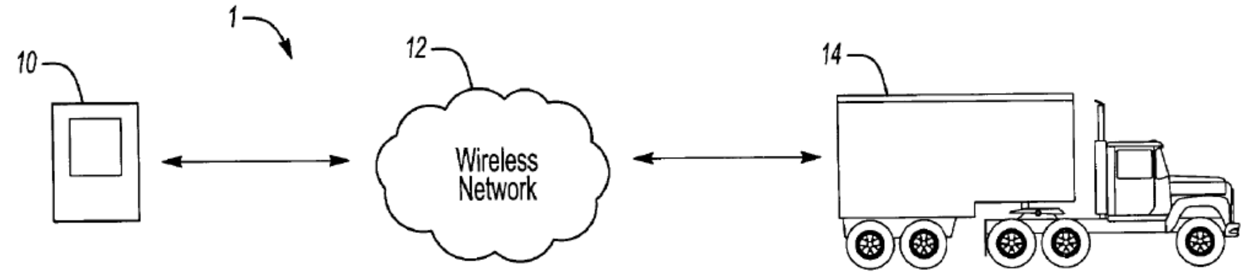
---

[1] The '735 patent issued from an application filed prior to enactment of the America Invents Act ("AIA"). Accordingly, pre-AIA statutory framework applies.

speed and torque rating of a vehicle. ’735 patent, 3:62–65, 4:10–14 (EX1001). For example, the SAE J1922 control link standard defined a command code that could be issued over the SAE J1922 control link to limit engine speed and torque rating of a vehicle, and specified that the command code be transmitted at least every 250 milliseconds to maintain a maximum vehicle speed. ’735 patent at 3:62–65; 4:10–13 (EX1001); Leale ¶ 22 (EX1004).

The ’735 patent alleges that its disclosure relates to a new system for limiting the operational performance of a vehicle. ’735 patent, 1:29–31 (EX1001). The ’735 describes a system where remotely issued vehicle limitation control signals are received wirelessly by a device on a vehicle. ’735 patent, 1:29–36 (EX1001). A performance characteristic of the vehicle is then limited based on the received signal. ’735 patent, 1:36–38. The ’735 patent argues that this system makes it possible for a vehicle owner or operator to limit the operational performance characteristics of their vehicle. ’735 patent at 1:11–25. For example, a vehicle’s operational performance can be controlled to minimize the negative effects of a security breach in the vehicle, or to minimize an owner’s safety concerns when employees are driving their vehicles. *Id.*; Leale ¶ 23 (EX1004).

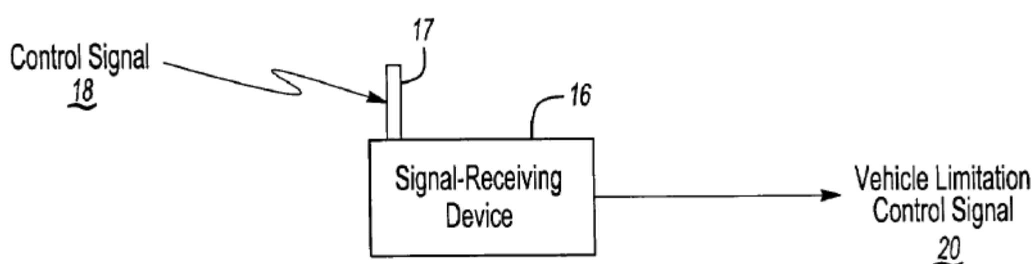
As one example of the environment in which the system operates, illustrated in FIG. 1 below, the ’735 patent discloses a command device 10, a wireless network 12, and a vehicle 14.



'735 patent, FIG. 1 (EX1001).

Command device 10 can be used by an operator to issue a vehicle limitation control signal over wireless network 12. '735 patent, 2:12–20, 2:23–25 (EX1001). Command device 10 could be one of many different types of electronic devices, such as a computer, personal digital assistant (PDA), wireless phone, or pager. '735 patent, 2:16–20 (EX1001). The control signal causes vehicle 14 to enter a vehicle limitation mode. '735 patent, 2:20–23 (EX1001). In vehicle limitation mode, a performance characteristic of vehicle 14, such as its maximum speed, is limited. '735 patent, 2:20–23 (EX1001); Leale ¶ 24 (EX1004).

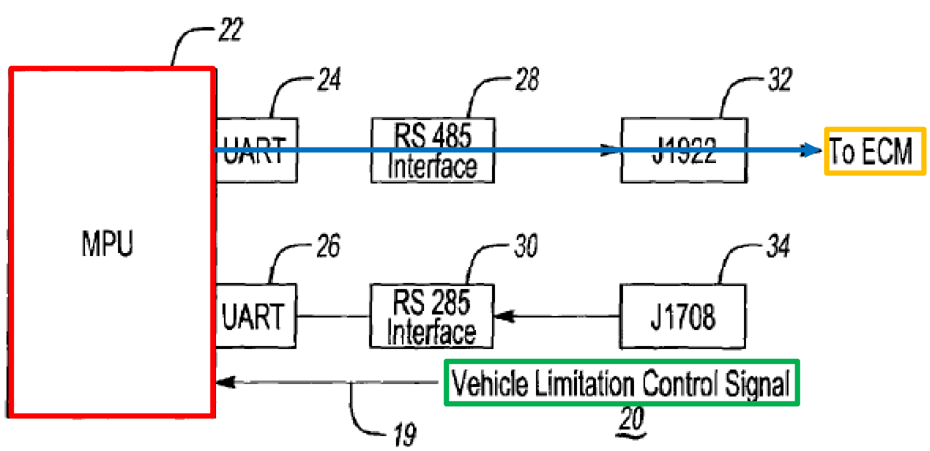
As illustrated in FIG. 2 below, a signal-receiving device 16 mounted on the vehicle receives the control signal from the command device and transmits a vehicle limitation control signal.



’735 patent, FIG. 2 (EX1001).

The signal-receiving device transmits the vehicle limitation control signal to a control circuit or control module within the vehicle to limit an operational characteristic of the vehicle. ’735 patent, 3:28–35 (EX1001); Leale ¶ 25 (EX1004).

One example of the system within the vehicle for limiting the operational characteristic is illustrated in annotated FIG. 3 below. The vehicle limitation control signal (illustrated in green) is sent to a microprocessor (MPU) (illustrated in red), and causes the MPU to initiate a vehicle limitation mode. ’735 patent, 3:42–61 (EX1001). The MPU can initiate the vehicle limitation mode by, for example, issuing commands to an Engine Control Module (ECM) (illustrated in orange). ’735 patent, 3:57–61 (EX1001); Leale ¶ 26 (EX1004).



’735 patent, FIG. 3 (EX1001) (Annotated).

The MPU can also limit the vehicle’s operational characteristics by, for example, modifying a pulse-width modulated (PWM) signal input to a pulse-width modulated throttle (’735 patent, 4:58–5:5, 8:9–37 (EX1001)), or modifying a voltage input to a resistive throttle (’735 patent, 4:58–67, 7:58–8:8 (EX1001)). Leale ¶ 26 (EX1004).

The ’735 patent also discloses that a vehicle limitation flag is stored to indicate whether the vehicle is in limitation mode. ’735 patent, 4:17–35 (EX1001). In one embodiment, this flag can be a binary indicator. ’735 patent, 4:18–19 (EX1001). When the vehicle limitation flag indicates that the MPU has received an active vehicle limitation signal, the MPU limits an operational characteristic of the vehicle by issuing a command to an ECM or otherwise modifying an input to a vehicle component. ’735 patent, 4:7–45, 7:4–38 (EX1001); Leale ¶ 27 (EX1004).

But as the cited prior art demonstrates, at the time of the alleged invention, the purported new system for limiting the operational performance of a vehicle was well-known. At least the primary references of *Silvernagle* (EX1002) and *Chakraborty* (EX1003) and the combinations discussed here show clearly that claims 1–3, 5, 6, and 28 are unpatentable as obvious. Leale ¶ 28 (EX1004).

B. Level of Ordinary Skill in the Art

A person of ordinary skill in the art (“POSA”) for the ’735 patent would have had at least a Bachelor’s Degree in electrical engineering, computer science, or a related subject or the equivalent and one year of experience working with vehicle network systems, or at least three years of experience working with vehicle network systems. Leale ¶ 29 (EX1004).

C. Prosecution History

The ’735 patent includes 33 claims, and corresponds to U.S. Patent Application No. 10/229,757 (“’757 application”), which was filed August 28, 2002. The Patent Office initially issued a Restriction Requirement, requiring Applicant to elect either group 1, which included claims 1–19 and 31–39, or group 2, which included claims 20–30. *See* File History (“FH”) of ’757 application, Restriction Requirement of August 25, 2004 at 2 (EX1005). In response, Applicant elected group 1. *See* FH of ’757 application, Response to Restriction Requirement of November 26, 2004 (EX1006).

The Patent Office then issued an Office Action (“OA”) rejecting claims 1–6, 8, 10, 13–16, 18, 19, 31, 32, and 34–39 under 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a), and indicating that dependent claims 7, 9, 11–12, 17, and 33 contained allowable subject matter. *See* FH of ’757 application, Non-Final Office Action of March 30, 2005 (EX1007).

In response, Applicant amended the claims, and argued that the cited references did not teach or suggest “i) being operable to control the vehicle, in response to a stimulus originating from a location local to the vehicle, to an first operational performance characteristic of the vehicle (e.g., to a first speed of the vehicle), and (ii) being operable to limit, in response to the control signal, the control of the vehicle to a second operational performance characteristic (e.g., a second speed) despite the stimulus being operable to cause the vehicle to attain the first operational performance characteristic." *See* FH of '757 application, Response of September 16, 2005 (EX1008). Applicant also added new independent claims 41–46 that included language based on dependent claims 7, 9, 11–12, 17, and 33. *Id*.

The Patent Office then issued a Final OA, which introduced two new references (U.S. Patent No. 6,166,658 ("*Testa*") and U.S. Patent No. 6,876,914 ("*Dubois*"), again rejected claims 1–6, 8, 10, 13–16, 18, 19, 31, 32, and 34–39 under 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a), and again indicated that claims 7, 9, 11–12, 17, and 33 contained allowable subject matter. *See* FH of '757 application, OA of November 29, 2005 (EX1009). The Final OA also allowed claims 41–46. *Id*.

In response, Applicant amended claim 1 to incorporate the subject matter of claim 7, and amended claim 31 to incorporate the subject matter of claim 33. *See* FH of '757 application, Response of January 30, 2006 (EX1010). The Patent Office then issued a Notice of Allowance. *See* FH of '757 application, Notice of Allowance of February 13, 2006 (EX1011).

While the Examiner did not provide any reasons for allowance, the Examiner had previously indicated that claim 7 was allowable because the prior art failed to suggest:

> "said second controller is further configured to (i) transmit to said first controller, responsive to said control signal, a vehicle limitation

command message to place said vehicle in a vehicle limitation mode, and (ii) cause a vehicle limitation flag to be stored in non-volatile memory, and wherein said vehicle limitation flag is indicative [of] maintaining said vehicle in a said vehicle limitation mode."

See FH of '757 application, Final OA of November 29, 2005 at 10 (EX1009). However, as further described herein, these elements were well-known at the time of the alleged invention.

VI. CLAIM CONSTRUCTION

Claim terms of an unexpired patent in *inter partes* review are given the "broadest reasonable construction in light of the specification." 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1279–81 (Fed. Cir. 2015), *aff'd sub nom. Cuozzo Speed Techs., LLC v. Lee*, No. 15–446, slip op. 20 (U.S. June 20, 2016). Any claim that lacks a definition in the specification is therefore given a broad interpretation.[2] *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). Under the broadest reasonable interpretation standard,

---

[2] Petitioner applies the "broadest reasonable interpretation" standard as required by the governing regulations. 37 C.F.R. § 42.100(b). Petitioner reserves the right to pursue different constructions in a district court, where a different standard is applicable.

claim terms are given their ordinary and customary meaning, as they would be understood by one of ordinary skill in the art, in the context of the disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definition for a claim term must be set forth in the specification with "reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

The following proposes constructions and offers support for those constructions. Any claim terms not included should be given their broadest reasonable interpretation in light of the specification, as commonly understood by those of ordinary skill in the art. Should the Patent Owner, to avoid the prior art, contend that a claim term has a construction different from its broadest reasonable interpretation, the appropriate course is for the Patent Owner to seek to amend the claim to expressly correspond to its contentions in this proceeding. *See* 77 Fed. Reg. 48764 (Aug. 14, 2012).

A. "command message"

The term "command message" should be interpreted to mean a signal that orders something to occur. The '735 patent does not define a "command message." At best, the '735 patent discusses transmission of a "command code" that limits the maximum speed of the vehicle. '735 patent 4:41–44 (EX1001); Leale ¶ 38 (EX1004).

The proposed construction is consistent with the specification of the '735 patent, and with the ordinary use of the terms "command" and "message." *See* Definition (1) of "command," IBM Dictionary of Computing, 1994, 116 (defining a "command" as "An order for an action to take place") (EX1014); *see also* Definition (5) of "command," The IEEE 100 Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, 2000, 193 (defining a "command" as "A pulse, signal, or set of signals initiating one step in the performance of a controlled operation") (EX1013); Definition (3) of "message," IBM Dictionary of Computing, 1994, 428 (defining a "message" as "A communication sent from a person or program to another person or program") (EX1014); Definition (3) of "message," The IEEE 100 Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, 2000, 687 (defining a "message" as "A value or set of values representing an interface event between functions. The term as used here is intended to be very primitive, not implying a particular structure or interface protocol unless modified by an appropriate adjective (like transaction-initiation message). A message can be arbitrarily simple (a signal) or complicated") (EX1013); Leale ¶ 39 (EX1004).

B. "flag"

The term "flag" should be interpreted to mean an indicator used to indicate a condition. The '735 patent does not define "flag." The '735 patent describes a "vehicle limitation flag." '735 patent, 4:17–18 (EX1001). The '735 patent does not limit the flag to a binary indicator. ’735 patent 4:18–20 (“The J1922 vehicle limitation flag is preferably a binary indicator that stores whether or not the vehicle is in limitation mode”) (emphasis added) (EX1001); Leale ¶ 40 (EX1004).

The proposed construction is consistent with the specification of the ’735 patent, and with the ordinary use of the term “flag.” *See* Definition (1) of “flag,” Microsoft Press Computer Dictionary, Third Edition, 1997, 198 (defining a “flag” as “Broadly, a marker of some type used by a computer in processing or interpreting information; a signal indicating the existence of status of a particular condition”) (EX1024); Leale ¶ 41 (EX1004).

VII. THE CHALLENGED CLAIMS ARE UNPATENTABLE

Challenged claims 1-3, 5, 6, and 28 recite and claim features that were known in the art prior to the earliest priority date of the ’735 patent, and are obvious in view of the prior art. Leale, ¶ 42 (EX1004).

A. Standard Vehicle Network Protocols Provided for Transmission of Vehicle Limitation Command Messages Long Before the Priority Date of the ’735 Patent

When the application that led to the ’735 patent was filed, there was nothing new or inventive about transmitting a command message across a vehicle network to control an operational characteristic of a vehicle. This concept had been known and widely used since at least over a decade before the priority date of the ’735 patent. Leale ¶ 43 (EX1004).

For example, the version of the SAE J1922 control link standard issued in 1989 provided standard messages for communicating between electronic controls for an engine, transmission, antilock braking system (ABS)/traction system, and a retarder system. *See* SAE J1922, Powertrain Control Interface for Electronic Controls Used in Medium and Heavy Duty Diesel On-Highway Vehicle Applications ("SAE J1922"), December 1989 at 1 (EX1015). These messages included a transmission to powertrain message that provided for engine speed or engine torque control. SAE J1922 at 7 (EX1015). SAE J1922 specified that, in Mode 01, the engine functioned as a speed regulator with the transmission providing a speed command in bytes 2 and 3 of the transmission to powertrain message. SAE J1922 at 7, 8 (EX1015). In Mode 10, the engine functions as a torque regulator with the transmission providing a torque command in byte 3 of the message, with byte 2 of the message being omitted. SAE J1922 at 7, 8 (EX1015). In Mode 11, the transmission commands an engine speed upper limit in byte 2 of the message, and commands an engine torque limit in byte 3 of the message. SAE J1922 at 7, 8 (EX1015). The SAE J1922 standard further specified that, for Modes 01, 10, and 11, the transmission to powertrain message should be broadcast every 0.025 seconds. SAE J1922 at 7 (EX1015). In the absence of this broadcast message, the engine would default to Mode 00 after a predetermined length of time. SAE J1922 at 8 (EX1015); Leale ¶ 44 (EX1004).

Use of the SAE J1922 standard engine speed and torque limiting control mode messages to control the speed of a vehicle was well-known before the priority date of the ’735 patent. For example, *Chakraborty* discloses implementing an intelligent cruise control system by transmitting engine speed control mode or engine speed and torque limiting control mode messages of the SAE J1922 standard to an engine control module. *Chakraborty*, Abstract (EX1003). *Chakraborty* discloses that electronically controlled internal-combustion engines were well established in 1995, and that standards, such as SAE J1922 and SAE J1939 provided for control modes of these electronically controlled engines. *Chakraborty*, 1:56-2:18 (EX1003). *Chakraborty* describes that, in a normal mode, engine fueling was controlled based primarily on input received from the vehicle operator, typically via the accelerator pedal. *Chakraborty*, 2:18-21 (EX1003). In speed control mode, engine fueling was controlled to maintain a substantially constant engine speed. *Chakraborty*, 2:23-25 (EX1003). In torque control mode, a substantially constant engine output torque was provided regardless of engine speed and vehicle speed. *Chakraborty*, 2:25-28 (EX1003). In speed and torque limit control mode, an upper limit on engine speed and/or engine output torque was provided. *Chakraborty*, 2:28-29 (EX1003); Leale ¶ 45 (EX1004).

B. Wirelessly Transmitting Command Messages to a Vehicle for Controlling the Speed of the Vehicle was Known Long Before the Priority Date of the ’735 Patent

There was nothing new or inventive about wirelessly transmitting a command message to control a vehicle's speed at the time that the '735 patent was filed. This concept had been widely discussed in patent publications and papers well before the priority date of the '735 patent. Leale ¶ 46 (EX1004).

For example, *Silvernagle*, which was published in June 2001, discloses transmitting programmable parameters, such as limits on engine speed, ground speed, and acceleration, from a handheld programmer unit to a vehicle control unit on a vehicle over an infrared connection. *Silvernagle*, 5:23-33, 5:62-6:7 (EX1002). As further discussed herein, *Silvernagle* discloses providing a modified tachometer signal to an electronic ignition system based on the programmable parameters to control an engine speed, ground speed, or acceleration. *Silvernagle*, 4:62-12 (EX1002); Leale ¶ 47 (EX1004).

Several additional patent publications disclosed the concept of wirelessly transmitting command messages for controlling a speed of a vehicle well before the priority date of the '735 patent. These patent publications contemplated transmitting these messages over a variety of different transmission media. *See, e.g.*, US 2001/0003808 to Jeon et al. ("*Jeon*"), published June 14, 2001, at ¶¶ [0023]-[0025] (disclosing transmission of speed control signals to vehicles with wireless radio frequency communications) (EX1016); *see also* US 6,052,644 to Murakami et al. ("*Murakami*"), issued April 18, 2000, at 24:11-17, 25:45-66 (disclosing transmission of speed control commands from a base station to a vehicle over a wireless radio connection) (EX1017); US 5,769,051 to Bayron et al. ("*Bayron*"), issued June 23, 1998, at 2:38-45, 2:54-58 (disclosing transmission of speed control commands via a wireless optical or radio communications link) (EX1018); US 6,772,061 to Berthiaume et al., filed August 20, 2001, issue August 3, 2004, at 4:18-31, 5:39-42 (disclosing transmission of speed control commands via a wireless optical or radio frequency data link) (EX1019); Leale ¶ 48 (EX1004).

Projects in Europe and Asia involving wireless controlling of vehicle speed existed before the priority date of the '735 patent. For example, the UK External Vehicle Speed Control (EVSC) project studied and proposed a strategy for implementing Intelligent Speed Adaptation (ISA) in the UK. *See* "Implementing Intelligent Speed Adaptation in the UK: Recommendations of the EVSC Project" to Carsten et al., 2000, at 2-4, 6 (discussing mandatory maximum speed control by transmission of speed control commands from Dedicated Short Range Communication (DSRC) beacons to a vehicle's engine control unit (ECU)) (EX1020); *see also* "Intelligent Speed Adaptation: The Best Collision Avoidance System?" to Carsten et al., 2001, at 1-2, 4, 5 (discussing transmission of speed control commands over DSRC that limited vehicle speed through ignition retardation and fuel starvation) (EX1021); "External Vehicle Speed Control, Phase I Results, Executive Summary," to Carsten et al., 1998, at 6, 10 (discussing a UK project for transmission of speed control commands over DSRC and a Swedish project for transmission of speed control commands from roadside beacons, and providing a proposed architecture for a full EVSC system) (EX1022). Similarly, projects in Asia were focused on controlling a vehicle's speed based on roadside-to-vehicle radio frequency (RF) commands. *See* "Speed Adaptation System for Vehicles using RF Communication" to Song et al., 2000, at 1-3 (disclosing automatic control of a vehicle acceleration pedal based on commands received from a roadside RF transmitter) (EX1023); Leale ¶ 49 (EX1004).

VIII. SPECIFIC GROUNDS FOR PETITION

Pursuant to Rule 42.104(b)(4)–(5), the following sections (as confirmed in Leale ¶¶ 50-120 (EX1004)) detail the grounds of unpatentability, the limitations of the challenged claims of the '735 patent, and how these claims were therefore obvious in view of the prior art.

A. Ground I: Claims 1–3, 5, and 28 are obvious over *Silvernagle* and *Chakraborty*

U.S. Patent No. 6,253,143 ("*Silvernagle*") was not considered in the prosecution of the '735 patent. Therefore, the Examiner was not aware of the highly relevant disclosure of *Silvernagle* when the '757 application was examined.

U.S. Patent No. 5,839,534 ("*Chakraborty*") was applied by the Examiner as a secondary reference in combination with U.S. Patent Nos. 5,717,387 ("*Suman*") and 5,429,089 ("*Thornberg*"). *See* FH of '757 application, OA of March 30, 2005, 5–8

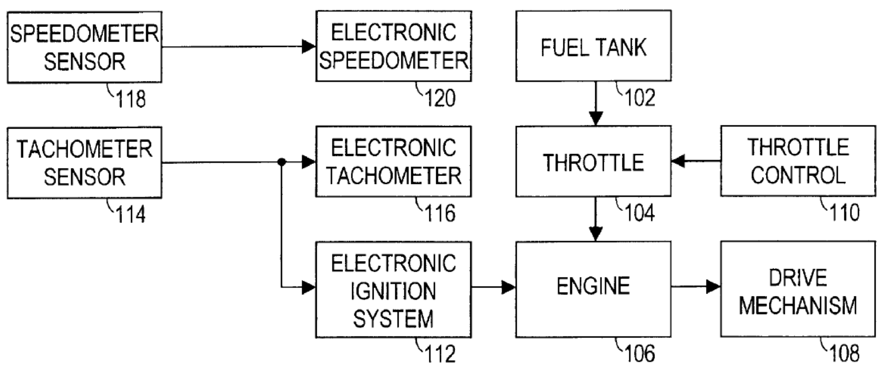
(EX1007). In response, Applicant argued that *Chakraborty* did not remedy the deficiencies of *Suman* and *Thornberg* with respect to claim 1. *See* FH of '757 application, Response of September 16, 2005, 23–24 (EX1008). *Chakraborty* was also applied by the Examiner as a secondary reference in combination with U.S. Patent No. 6,166,658 ("*Testa*"). *See* FH of '757 application, OA of November 29, 2005, 6–8 (EX1009). In response, Applicant amended claim 1 to incorporate the subject matter of dependent claim 7, which had been identified by the Examiner as containing allowable subject matter. *See* FH of '757 application, Response of January 30, 2006, 12 (EX1010).

Notably, Applicant never contested the Examiner's allegations that *Chakraborty* taught certain elements of dependent claims 4-6, 13-16, 19, 32, 35, 36, 38, and 39. *See* FH of '757 application, Response of September 16, 2005 (EX1008); *see also* FH of '757 application, Response of January 30, 2006 (EX1010). For example, Applicant never argued that *Chakraborty* does not teach or suggest a "controller . . . configured to transmit a vehicle limitation command message over an SAE J1922 data link to an ECM of [a vehicle]," as alleged by the Examiner. *See* FH of '757 application, OA of March 30, 2005, 6 (EX1007); *see also* FH of '757 application, OA of November 29, 2005, 7 (EX1009). As further discussed in greater detail below, the disclosure of *Chakraborty* remains highly relevant to the claims of the '735 patent. This is particularly true when *Chakraborty* is considered in view of

Silvernagle, which was not before the Examiner when the '757 application was examined.[3]

1. *Overview of* Silvernagle

Silvernagle discloses modifying a prior art configuration of an engine system, such that a vehicle's engine speed or ground speed can be limited. Figure 2 below illustrates a prior art configuration of an engine system, according to *Silvernagle*.

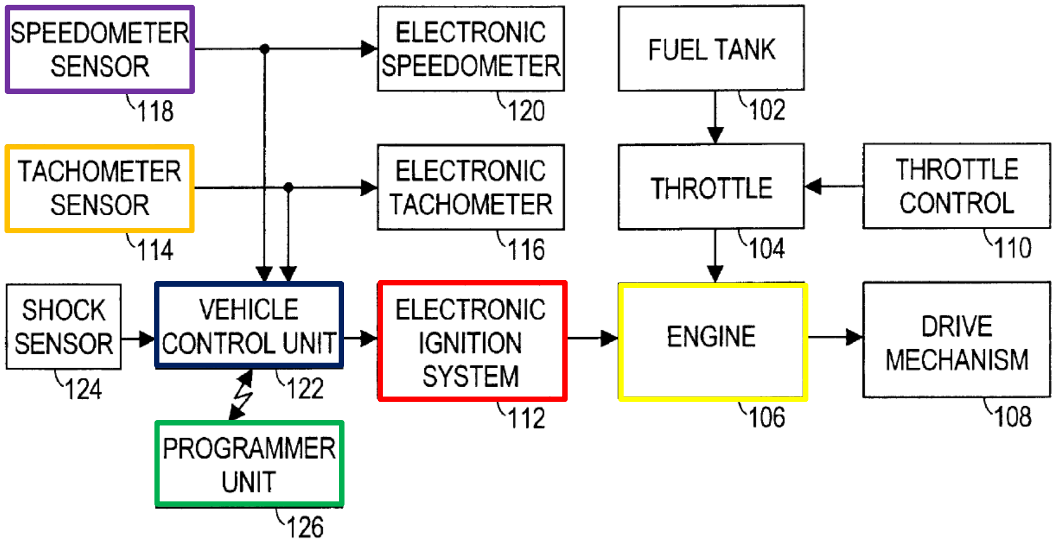


[3] *Silvernagle* discloses storing ground speed or engine speed limit parameters in a nonvolatile storage. *Silvernagle*, 5:23–24, 6:1–7 (EX1002). None of *Suman* or *Testa* disclosed this feature. For at least this reason, *Silvernagle* is not redundant to *Suman* or *Testa* as applied during examination. *See Baker Hughes Incorporated et al. v. Packers Plus Energy Services, Inc.*, Case IPR2016-01506, Paper 19 (Decision to Institute), at 8–9 (PTAB February 9, 2017) (deciding to institute where the secondary references were the same in two proceedings, but the primary references were different, the primary references having merit for different reasons).

***Silvernagle*, FIG. 2 (EX1002).**

In the prior art configuration, a fuel tank 102 is coupled to provide fuel to an engine 106 via a throttle 104. *Silvernagle*, 3:26–29 (EX1002). Engine 106 converts an amount of fuel into power to drive a vehicle drive mechanism 108 based on the vehicle operator's use of throttle control 110. *Silvernagle*, 3:29–33 (EX1002). The conversion of fuel into drive power depends upon timed ignition pulses from electronic ignition system 112. *Silvernagle*, 3:35–37 (EX1002). To provide these ignition pulses, electronic ignition system 112 relies on a signal from tachometer sensor 114, which provides a signal indicative of engine speed. *Silvernagle*, 3:37–40 (EX1002). The tachometer signal is an electronic pulse train (e.g., a repetitive series of voltage pulses) which is indicative of the position of a corresponding engine element. *Silvernagle*, 3:40–45 (EX1002); Leale ¶ 51 (EX1004).

As depicted in annotated Figure 3 below, *Silvernagle* discloses modifying the prior art engine configuration by inserting a vehicle control unit between the tachometer sensor and the electronic ignition system. The modified system includes a tachometer sensor (outlined in orange), a speedometer sensor (outlined in purple), a vehicle control unit (outlined in blue), a programmer unit (outlined in green), an electronic ignition system (outlined in red), and an engine (outlined in yellow).



***Silvernagle*, FIG. 3 (EX1002) (Annotated).**

In the modified configuration, the vehicle control unit receives speedometer signals from the speedometer, and receives tachometer signals from the tachometer. *Silvernagle*, 3:64–4:1 (EX1002); Leale ¶ 52 (EX1004).

A handheld programmer unit is used for programming operation parameters into the vehicle control unit over an infrared connection. *Silvernagle*, 4:11–13, 5:47–53 (EX1002). The operation parameters can include limits on engine speed, ground speed, and acceleration. *Silvernagle*, 6:1–2 (EX1002). Once received, the operation parameters are stored in a nonvolatile memory in the vehicle control unit. *Silvernagle*, 5:23–25 (EX1002); Leale ¶ 53 (EX1004).

Once operation parameters have been stored, the vehicle control unit determines whether to modify the tachometer signal it receives from the tachometer sensor based on a current engine speed or ground speed. *Silvernagle*, 1:52–57

(EX1002). When the current engine speed or ground speed does not exceed a predetermined limit set by one of the operation parameters, the vehicle control unit passes the tachometer signal to the electronic ignition system. *Silvernagle*, 4:65–5:2 (EX1002). However, when the current engine speed or ground speed does exceed a predetermined limit set by one of the operation parameters, the vehicle control unit asserts a suppress signal and blocks pulses in the tachometer signal, thereby fooling the electronic ignition system into firing less than would otherwise be expected. *Silvernagle*, 5:2–7 (EX1002). Thus, by modifying the tachometer signal, the vehicle control unit limits the engine speed and ground speed of the vehicle, so that they do not exceed a pre-stored value. *Silvernagle*, 1:46–2:6 (EX1002); Leale ¶ 54 (EX1004).

2. *Claim 1 is obvious in view of* Silvernagle *and* Chakraborty

a) "[a] system for limiting performance of a vehicle"

As discussed above in Section VIII.A.1, *Silvernagle* describes modifying a prior art configuration of an engine to limit a vehicle's engine speed or ground speed. In this prior art configuration, a fuel tank provides fuel to the vehicle's engine via a throttle. *Silvernagle*, 3:28–29 (EX1002). The amount of fuel provided to the engine depends on control of a throttle by a vehicle operator. *Silvernagle*, 3:29–33 (EX1002). The engine converts the fuel into drive power based on timed ignition pulses from an electronic ignition system. *Silvernagle*, 3:35–37 (EX1002). The electronic ignition system provides the pulses based on an electronic pulse train signal (e.g., a repetitive series of voltage pulses) received from a tachometer sensor. *Silvernagle*, 3:37–46 (EX1002); Leale ¶¶ 56, 57 (EX1004).

Silvernagle describes modifying the prior art engine configuration by coupling a vehicle control unit between the tachometer sensor and the electronic ignition system. *Silvernagle*, 1:42–44 (EX1002). The vehicle control unit determines the vehicle's engine speed from the tachometer sensor (*Silvernagle*, 3:37–40 (EX1002)), and determines the vehicle's ground speed from a speedometer sensor. (*Silvernagle*, 1:44–46 (EX1002)). A handheld programmer unit is used to program various operation parameters into the vehicle control unit. *Silvernagle*, 4:11–13, FIG. 3 (EX1002). The parameters may include, for example, limits on engine speed (e.g., rpm of 3500), ground speed (e.g., speed limit of 15), and/or acceleration (e.g., acceleration limit of 5). *Silvernagle*, 6:1–7, 6:52–57 (EX1002); Leale ¶¶ 56, 58 (EX1004).

When a programmed engine speed or ground speed is not exceeded, the vehicle control unit sends the tachometer signal it receives to the electronic ignition system, so that the vehicle is fully responsive to the operator's control of the throttle. *Silvernagle*, 4:65–5:2 (EX1002). However, when the engine speed or ground speed exceeds a programmed limit, the vehicle control unit modifies the tachometer signal by removing pulses from the signal. *Silvernagle*, 1:52–57 (EX1002). The modified signal is then sent from the vehicle control unit to the electronic ignition system, which fools the electronic ignition system into not firing. *Silvernagle*, 5:2–6 (EX1002). This reduces the power produced by the engine and limits the vehicle's engine speed and ground speed. *Silvernagle*, 5:5–7 (EX1002); Leale ¶¶ 56, 59 (EX1004).

b) "a first controller located aboard said vehicle and configured to control, in accordance with a stimulus originating from a location local to the vehicle, to a first operational performance characteristic"

Silvernagle discloses an electronic ignition system 112 located on the vehicle. *Silvernagle*, FIGs. 1, 3 (EX1002). When a programmed engine speed or ground speed limit has not been exceeded, the vehicle control unit passes a tachometer signal it receives from a tachometer sensor to the electronic ignition system. *Silvernagle*, 4:62–5:2 (EX1002). The tachometer sensor can be, for example, a Hall effect sensor located near a crankshaft, a magneto, or a camshaft in the engine, and the tachometer signal can be an electronic pulse train (e.g., a repetitive series of voltage pulses). *Silvernagle*, 3:40–46 (EX1002). Thus, the tachometer signal is a "stimulus originating from a location local to the vehicle." Leale ¶¶ 60, 61 (EX1004).

The electronic ignition system uses the received signal to provide timed ignition pulses to the engine. *Silvernagle*, 3:37–40 (EX1002). The engine uses these timed ignition pulses to convert an amount of fuel into drive power. *Silvernagle*, 3:35–37 (EX1002). Thus, the electronic ignition system controls the conversion of fuel by the engine based on the tachometer sensor to maintain a desired engine speed or ground speed, and is a "first controller located aboard said vehicle and configured to control, in accordance with a stimulus originating from a location local to the vehicle, to a first operational performance characteristic." Leale ¶¶ 60, 62 (EX1004).

c) "a command device located remotely from the vehicle and configured to send a control signal via a wireless communication network"

Silvernagle discloses a handheld programming unit for programming operational parameters, such as an engine speed limit and a ground speed limit, into the vehicle control unit. *Silvernagle*, Abstract, 4:11–13, 5:33–6:7 FIG. 5 (EX1002). The handheld programming unit sends commands and parameter settings to the vehicle control unit over an infrared (wireless) connection. *Silvernagle*, 5:43–53 (EX1002). Thus, the handheld programming unit sends commands and operational parameters (is a "command device" "configured to send a control signal") via an infrared connection (a "wireless communication network"). The handheld programming unit is not wired to the vehicle control unit, and is thus "located remotely from the vehicle." The handheld unit can be used to transport information received from the vehicle to a central computer system for archiving and more extensive analysis. *Silvernagle*, 2:18-24 (EX1002). Thus, the handheld unit can be located even more remotely from the vehicle when transporting information for archiving. Leale ¶¶ 63, 64 (EX1004).

d) "a receiving device located aboard said vehicle and configured to receive said control signal"

Silvernagle discloses that a handheld programmer unit is used to program various operation parameters into the vehicle control unit. *Silvernagle*, 4:11–13, FIG. 3 (EX1002). The microcontroller of the vehicle control unit is coupled to infrared port logic, which receives commands and parameter settings (e.g., engine speed limit, ground speed limit, acceleration limit) from the handheld programmer unit. *Silvernagle*, 5:23–33, FIGs. 4, 5. (EX1002). Thus, the vehicle control unit and its infrared port logic are a "receiving device located aboard said vehicle and configured to receive said control signal." Leale ¶¶ 65, 66 (EX1004).

e) "a second controller located aboard the vehicle and configured to limit, in response to said control signal, said control of said vehicle to a second operational performance characteristic when said stimulus indicates to said first controller to control said vehicle to the first operational performance characteristic"

Silvernagle discloses a vehicle control unit located on the vehicle. *Silvernagle*, FIG. 4 (EX1002). Operational parameters, such as engine speed limits and ground speed limits, are stored in the vehicle control unit based on commands and parameter settings ("control signal") received from a handheld programmer unit. *Silvernagle*, 5:23–33, 6:1–7 (EX1002); Leale ¶¶ 67, 68 (EX1004).

The vehicle control unit monitors signals received from the tachometer sensor and the speedometer sensor and determines whether the engine speed or ground speed has exceeded a limit set by one of the operational parameters. *Silvernagle*, 1:52–62, 3:66–4:4 (EX1002). If the engine speed or ground speed has exceeded one of these pre-set limits, the vehicle control unit asserts a suppression signal, which blocks pulses in the tachometer signal and fools the electronic ignition system into not firing, thereby reducing the power produced by the engine. *Silvernagle*, 5:2–15 (EX1002); Leale ¶¶ 67, 69 (EX1004).

Thus, despite the tachometer signal indicating a first engine speed to the electronic ignition system representative of a desired engine speed or ground speed ("said stimulus indicat[ing] to said first controller to control said vehicle to the first operational performance characteristic"), when the engine speed or ground speed exceeds the pre-set limit, the vehicle control unit ("second controller") limits the firing of the electronic ignition system to an amount representative of a second engine speed or second ground speed ("limits said control of said vehicle to a second operational performance characteristic") by suppressing pulses of the tachometer signal before the tachometer signal is sent to the electronic ignition system. Leale ¶¶ 67, 70 (EX1004).

f) "wherein said second controller is further configured to (i) transmit to said first controller, responsive to said control signal, a vehicle limitation command message to place said vehicle in a vehicle limitation mode"

Silvernagle discloses that, when an engine speed or ground speed exceeds a pre-set limit set by the handheld programmer unit ("responsive to said control signal"), an output signal module within the vehicle control unit produces a modified tachometer signal ("vehicle limitation command message"). *Silvernagle*, 1:52–2:6 (EX1002). The modified tachometer signal is sent to the electronic ignition system ("transmit[ted] to said first controller" from "said second controller"), causing the electronic ignition system to provide fewer ignition pulses to the engine and thereby reducing engine power ("plac[ing] said vehicle in a vehicle limitation mode"). *Silvernagle*, 1:52–2:6 (EX1002); Leale ¶¶ 71, 72 (EX1004).

g) "[wherein said second controller is further configured to] cause a vehicle limitation flag to be stored in non-volatile memory"

Silvernagle discloses that programmable parameters can be received from a handheld programmer unit over an infrared connection. *Silvernagle*, 5:26–33, 5:46–53, 5:62–66 (EX1002). The programmable parameters can include, for example, a limit on engine speed, a limit on ground speed, or a limit on acceleration ("a vehicle limitation flag"). *Silvernagle*, 6:1–7 (EX1002). *Silvernagle* further discloses that the parameters received from the handheld programmer unit are stored in a nonvolatile memory within the vehicle control unit. *Silvernagle*, 5:23–33; Leale ¶¶ 73, 74 (EX1004).

h) "wherein said vehicle limitation flag is indicative of maintaining said vehicle in said vehicle limitation mode"

Silvernagle discloses storing a limit on engine speed, a limit on ground speed, or a limit on acceleration ("a vehicle limitation flag") in nonvolatile memory of the vehicle control unit. *Silvernagle*, 5:23–33, 5:62–6:7 (EX1002). The vehicle control unit performs a software loop as shown in FIG. 6. *Silvernagle*, 6:8–11 (EX1002); Leale ¶¶ 75, 76 (EX1004).

As shown in FIG. 6, whenever a tachometer pulse is detected from the tachometer sensor, the vehicle control unit checks a KILLCOUNT variable to determine whether the tachometer pulse should be suppressed. *Silvernagle*, 6:58–7:3 (EX1002). If the KILLCOUNT variable is greater than zero, the vehicle control unit suppresses the tachometer pulse, decrements the KILLCOUNT variable, and proceeds to step 214, where the loop resets and starts again. *Silvernagle*, 7:3–6, FIG. 6 (EX1002). If the KILLCOUNT variable is zero, the vehicle control unit compares a calculated RPM with the programmed engine speed limit. *Silvernagle*, 7:6–8 (EX1002). If the programmed engine speed limit has not been exceeded, the vehicle control unit proceeds to step 214, where the loop resets and starts again. *Silvernagle*, 7:8–9 (EX1002). If the programmed engine speed has been exceeded, the vehicle control unit sets the KILLCOUNT to a positive value before proceeding to step 214. *Silvernagle*, 7:8–15 (EX1002); Leale ¶¶ 75, 77 (EX1004).

Similarly, if a speedometer pulse is received, the vehicle control unit compares a calculated speed with a programmed ground speed limit. *Silvernagle*, 7:16–28 (EX1002). If the limit has not been exceeded, the vehicle control unit proceeds to step 214, where the loop resets and starts again. *Silvernagle*, 7:28–30 (EX1002). If the limit has been exceeded, the vehicle control unit sets the

KILLCOUNT to a positive value in step 238 before proceeding to step 214. *Silvernagle*, 7:29–35 (EX1002); Leale ¶¶ 75, 78 (EX1004).

As discussed above, the software loop in the vehicle control unit continues to check a programmed engine speed limit and a programmed ground speed limit as the software loop repeats over time. The programmed engine speed and ground speed limits are therefore "indicative of maintaining said vehicle in said vehicle limitation mode." Leale ¶¶ 75, 79 (EX1004).

i) "first controller" and "second controller is configured to (i) transmit to said first controller . . . a vehicle limitation command message to place said vehicle in a vehicle limitation mode"

To the extent a narrow interpretation of either of the terms "first controller" or "second controller is configured to (i) transmit to said first controller . . . a vehicle limitation command message to place said vehicle in a vehicle limitation mode" is taken, and to the extent one might argue that the electronic ignition system of *Silvernagle* is not a controller, or that the modified tachometer signal of *Silvernagle* is not a vehicle limitation command message to place the vehicle in a vehicle limitation mode, these features were all well-known at the time of the alleged invention. Leale ¶ 80 (EX1004).

For example, *Chakraborty* discloses a system for implementing an intelligent cruise control on a vehicle using standard engine control modes. *Chakraborty*, Abstract (EX1003). The system includes an electronic control module (ECM) which controls an engine. *Chakraborty*, 4:57–59 (EX1003). The ECM contains logic rules implemented in a programmed microprocessor to effect control of various vehicle systems and subsystems. *Chakraborty*, 8:17–20 (EX1003). The ECM communicates with a variety of sensors, such as an electronic accelerator pedal sensor (APS), and controls the engine based on signals from these sensors. *Chakraborty*, 7:6–11, 11:31–40 (EX1003); Leale ¶ 81 (EX1004).

Chakraborty discloses and teaches to one of ordinary skill that, at the time it was filed in 1995, electronically controlled internal-combustion engines were well-established in the art and had been used in various types of vehicles, such as heavy-duty tractor semi-trailer vehicles. *Chakraborty*, 1:56–59 (EX1003). *Chakraborty* discloses that SAE J1922 was a particularly interesting standard for providing electronic engine control for vehicles. *Chakraborty*, 2:4–10 (EX1003); Leale ¶ 82 (EX1004).

The SAE J1922 standard defined various control modes for electronically controlled engines, including a normal mode, a speed control mode, a torque control mode, and a speed and torque control mode. *Chakraborty*, 2:15–18 (EX1003). In normal mode, engine fueling was controlled based primarily on input received from the vehicle operator, typically via an accelerator pedal. *Chakraborty*, 2:18–21 (EX1003). In speed control mode, engine fueling was controlled to maintain a substantially constant engine speed. *Chakraborty*, 2:23–25 (EX1003). In torque control mode, a substantially constant engine output torque (as a percentage of total available torque) was effected regardless of engine speed and vehicle speed. *Chakraborty*, 2:25–28 (EX1003). In speed and torque limit control mode, an upper limit was imposed on engine speed and/or engine output torque. *Chakraborty*, 2:28–29 (EX1003). Override modes could be used to override the current operating mode and command the engine to operate at a particular engine speed or engine output torque. *Chakraborty*, 2:30–32 (EX1003). The control mode was based on commands received by the engine controller, which could be generated by various other vehicle systems or subsystems or by the vehicle operator. *Chakraborty*, 2:32–42 (EX1003); Leale ¶ 83 (EX1004).

Silvernagle and *Chakraborty* are each directed to systems designed to control speed of a vehicle. For example, both *Silvernagle* and *Chakraborty* are designed to limit the speed of a vehicle to an upper limit. To a POSA at the time of the alleged invention, it would have been obvious to modify *Silvernagle* in light of the teachings of *Chakraborty* to include an ECM that receives signals from various sensors and subsystems over a standardized vehicle network protocol. Leale ¶ 84 (EX1004). It would have further been obvious to a POSA at the time of the alleged invention to modify the vehicle control unit of *Silvernagle* to transmit a control mode message in accordance with the SAE J1922 standard to an ECM, in light of the teachings of *Chakraborty*. Leale ¶ 84 (EX1004).

Given the similarities in structure, objectives, and operation between *Silvernagle* and *Chakraborty*, a POSA would have been motivated to implement *Chakraborty*'s technique of using an ECM and a standardized vehicle network protocol to communicate signals between various sensors, vehicle subsystems (such as the vehicle control unit of *Silvernagle*), and an ECM, and to control an engine accordingly, in order to provide a variety of enhanced features and conveniences based on increased computational speeds and standardized vehicle networks that had become available. Leale ¶ 85 (EX1004); *see also Chakraborty*, 1:12–30. A POSA would also have been motivated to implement *Chakraborty*'s technique of using an ECM to receive signals over standardized vehicle networks to provide greater customization flexibility, by allowing standardized components from different manufacturers to be integrated together in a vehicle communications network. Leale ¶ 85 (EX1004); *see also Chakraborty*, 1:18–30 (EX1004).

Modifying *Silvernagle* to include an ECM that communicates with vehicle sensors and subsystems over a standardized network protocol, such as SAE J1922, and modifying the vehicle control unit of *Silvernagle* to send control mode messages to the ECM to control engine speed using SAE J1922, would have been within the abilities of a POSA and could be accomplished with a high chance of success. Leale ¶ 86 (EX1004).

3. *Claim 2 is obvious in view of* Silvernagle *and* Chakraborty

Claim 2 depends from claim 1.

a) "wherein said first operational performance characteristic is a first speed of said vehicle, and wherein said second operational performance characteristic is a second speed of said vehicle, and wherein said second speed is less than said first speed"

As discussed above, *Silvernagle* discloses detecting when a ground speed ("first operational performance characteristic is a first speed of said vehicle") has exceeded a predetermined limit. *Silvernagle*, 1:52–57 (EX1002). When the ground speed has exceeded the predetermined limit, the vehicle control unit suppresses tachometer pulses from a tachometer sensor to get the vehicle under the predetermined limit ("second operational performance characteristic is a second speed of said vehicle" where "said second speed is less than said first speed"). *Silvernagle*, 1:58–2:3 (EX1002). The number of consecutive tachometer pulses that are suppressed can depend on the margin by which the predetermined ground speed limit has been exceeded. *Silvernagle*, 2:4–6 (EX1002). A software loop in the vehicle control unit continually checks to see whether the ground speed is over the predetermined limit while the vehicle operates, and continually suppresses tachometer signals when the ground speed is over the predetermined limit. *Silvernagle*, FIG. 6 (EX1002); Leale ¶¶ 89, 90 (EX1004).

4. *Claim 3 is obvious in view of* Silvernagle *and* Chakraborty

Claim 3 depends from claim 1.

a) "wherein said command device comprises a device selected from a group of devices consisting of (i) a computer; (ii) a personal digital assistant; (iii) a wireless telephone; and (iv) a pager"

Silvernagle discloses a handheld programmer unit for programming operational parameters of the vehicle control unit. *Silvernagle*, 5:62–66 (EX1002). The handheld unit includes a microcontroller that executes software stored in a nonvolatile memory in response to input from the operator of the handheld programmer unit. *Silvernagle*, 5:44–62 (EX1002). Thus, the handheld programmer unit is a computer. Leale ¶¶ 93, 94 (EX1004).

5. *Claim 5 is obvious in view of* Silvernagle *and* Chakraborty

Claim 5 depends from claim 1.

a) "wherein said first controller is an electronic–control module (ECM) of said vehicle, and wherein the second controller is configured to transmit, responsive to said control signal, a vehicle limitation command message to the ECM via an SAE J1922 data link"

As discussed above in Section VIII.A.2.i, to a POSA at the time of the alleged invention, it would have been obvious to modify *Silvernagle* to include an ECM that receives signals from various sensors and subsystems over a standardized vehicle network protocol, in light of the teachings of *Chakraborty*. Section VIII.A.2.i; Leale ¶ 97 (EX1004). It would have further been obvious to a POSA at the time of the alleged invention to modify the vehicle control unit of *Silvernagle* to transmit a control mode message in accordance with the SAE J1922 standard to an ECM, in light of the teachings of *Chakraborty*. Section VIII.A.2.i; Leale ¶ 97 (EX1004).

6. *Claim 28 is obvious in view of* Silvernagle *and* Chakraborty

a) "[a] system for limiting performance of a vehicle"

As discussed above in Section VIII.A.2.a, *Silvernagle* discloses "[a] system for limiting performance of a vehicle." Section VIII.A.2.a; Leale ¶¶ 99, 100 (EX1004).

b) "a command device located remote from said vehicle and configured to send a control signal via a wireless communication network"

As discussed above in Section VIII.A.2.c, *Silvernagle* discloses "a command device located remotely from the vehicle and configured to send a control signal via a wireless communication network." VIII.A.2.c; Leale ¶¶ 101, 102 (EX1004).

c) "a receiving device located aboard said vehicle and configured to receive said control signal"

As discussed above in Section VIII.A.2.d, *Silvernagle* discloses "a receiving device located aboard said vehicle and configured to receive said control signal." VIII.A.2.d; Leale ¶¶ 103, 104 (EX1004).

d) "a controller configured to (i) transmit, responsive to said control signal, a vehicle limitation command message to place said vehicle in a vehicle limitation mode, wherein said vehicle limitation command message is transmitted via an SAE J1922 data link to an electronic-control module of the vehicle"

As discussed above in Section VIII.A.2.f, *Silvernagle* discloses a "controller" "configured to (i) transmit" "responsive to said control signal, a vehicle limitation command message to place said vehicle in a vehicle limitation mode." VII.A.2.f; Leale ¶ 105 (EX1004).

To the extent a narrow interpretation of the term "controller configured to (i) transmit . . . a vehicle limitation command message to place said vehicle in a vehicle limitation mode" is taken, and to the extent one might argue that the modified tachometer signal of *Silvernagle* is not a vehicle limitation command message that is transmitted via an SAE J1922 data link to an electronic-control module of the vehicle," these features were well-known at the time of the alleged invention. Leale ¶ 106 (EX1004).

For example, *Chakraborty* discloses a system for implementing an intelligent cruise control on a vehicle using standard engine control modes. *Chakraborty*, Abstract (EX1003). The system includes an electronic control module (ECM) which controls an engine. *Chakraborty*, 4:57–59 (EX1003). The ECM contains logic rules implemented in a programmed microprocessor to effect control of various vehicle systems and subsystems. *Chakraborty*, 8:17–20 (EX1003). The ECM communicates with a variety of sensors, such as an electronic accelerator pedal sensor (APS), and controls the engine based on signals from these sensors. *Chakraborty*, 7:6–11, 11:31–40 (EX1003); Leale ¶ 107 (EX1004).

Chakraborty discloses that, at the time it was filed in 1995, electronically controlled internal-combustion engines were well-established in the art and had been used in various types of vehicles, such as heavy-duty tractor semi-trailer vehicles. *Chakraborty*, 1:56–59 (EX1003). *Chakraborty* discloses that a particularly interesting standard for providing electronic engine control for vehicles included the SAE J1922 standard. *Chakraborty*, 2:4–10 (EX1003); Leale ¶ 108 (EX1004).

The SAE J1922 standard defined various control modes for electronically controlled engines, including a normal mode, a speed control mode, a torque control mode, and a speed and torque control mode. *Chakraborty*, 2:15–18 (EX1003). In normal mode, engine fueling was controlled based primarily on input received from the vehicle operator, typically via an accelerator pedal. *Chakraborty*, 2:18–21 (EX1003). In speed control mode, engine fueling was controlled to maintain a substantially constant engine speed. *Chakraborty*, 2:23–25 (EX1003). In torque control mode, a substantially constant engine output torque (as a percentage of total available torque) was effected regardless of engine speed and vehicle speed. *Chakraborty*, 2:25–28 (EX1003). In speed and torque limit control mode, an upper limit was imposed on engine speed and/or engine output torque. *Chakraborty*, 2:28–29 (EX1003). Override modes could be used to override the current operating mode and command the engine to operate at a particular engine speed or engine output torque. *Chakraborty*, 2:30–32 (EX1003). The control mode was based on commands received by the engine controller, which could be generated by various other vehicle systems or subsystems or by the vehicle operator. *Chakraborty*, 2:32–42 (EX1003); Leale ¶ 109 (EX1004).

Silvernagle and *Chakraborty* are each directed to systems designed to control speed of a vehicle. For example, both *Silvernagle* and *Chakraborty* are designed to limit the speed of a vehicle to an upper limit. To a POSA at the time of the alleged invention, it would have been obvious to modify *Silvernagle* to include an ECM that receives signals from various sensors and subsystems over a standardized vehicle network protocol, in light of the teachings of *Chakraborty*. Leale ¶ 110 (EX1004). It would have further been obvious to a POSA at the time of the alleged invention to modify the vehicle control unit of *Silvernagle* to transmit a control mode message in accordance with the SAE J1922 standard to an ECM, in light of the teachings of *Chakraborty*. Leale ¶ 110 (EX1004).

Given the similarities in structure, objectives, and operation between *Silvernagle* and *Chakraborty*, a POSA would have been motivated to implement *Chakraborty*'s technique of using an ECM and a standardized vehicle network protocol to communicate signals between various sensors, vehicle subsystems (such as the vehicle control unit of *Silvernagle*), and an ECM, and to control an engine accordingly, in order to provide a variety of enhanced features and conveniences based on increased computational speeds and standardized vehicle networks that had become available. Leale ¶ 111 (EX1004); *see also Chakraborty*, 1:12–30. A POSA would also have been motivated to implement *Chakraborty*'s technique of using an ECM to receive signals over a standardized vehicle network to provide greater customization flexibility by allowing components from different manufacturers to be integrated together in vehicle communications network. Leale ¶ 111 (EX1004); *see also Chakraborty*, 1:18–30 (EX1004).

Modifying *Silvernagle* to include an ECM that communicates with vehicle sensors and subsystems over standardized network protocols, and modifying the vehicle control unit of *Silvernagle* to send control mode messages to the ECM to control engine speed, would have been within the abilities of a POSA and could be accomplished with a high chance of success. Leale ¶ 112 (EX1004).

e) "[a controller configured to] (ii) cause a vehicle limitation flag to be stored in non-volatile memory, wherein said vehicle limitation flag is indicative of maintaining said vehicle in the vehicle limitation mode"

As discussed above in Sections VIII.A.2.g and VIII.A.2.h, *Silvernagle* discloses a "controller" "configured to" "cause a vehicle limitation flag to be stored in non-volatile memory," "wherein said vehicle limitation flag is indicative of maintaining said vehicle in said vehicle limitation mode." Sections VIII.A.2.g, VIII.A.2.h; Leale ¶¶ 113, 114 (EX1004).

B. Ground II: Claim 6 is obvious in view of *Silvernagle*, *Chakraborty*, and *Applicant Admitted Prior Art*

1. *Claim 6 is obvious in view of* Silvernagle, Chakraborty, *and* Applicant Admitted Prior Art

Claim 6 depends from claim 5, which depends from claim 1.

a) "wherein said second controller is configured to transmit said vehicle limitation command message at least once every 250 ms"

As discussed in Sections VIII.A.2.i and VIII.5.a, to a POSA at the time of the alleged invention, it would have been obvious to modify *Silvernagle* to include an ECM that receives signals from various sensors and subsystems over a standardized vehicle network protocol, in light of the teachings of *Chakraborty*. Sections VIII.A.2.i, VIII.A.5.a; Leale ¶ 118 (EX1004). It would have further been obvious to a POSA at the time of the alleged invention to modify the vehicle control unit of *Silvernagle* to transmit a control mode message in accordance with the SAE J1922 standard to an ECM, in light of the teachings of *Chakraborty*. Sections VIII.A.2.i, VIII.A.5.a; Leale ¶ 118 (EX1004).

To the extent *Silvernagle* and *Chakraborty* do not teach or suggest transmitted a vehicle limitation command message at least once every 250 milliseconds, this feature was well-known at the time of the alleged invention. Leale ¶ 119 (EX1004).

For example, Applicant's Admitted Prior Art discloses that "the J1922 standard recites that a speed limit command code be transmitted at least every 250 ms to maintain a maximum vehicle speed in place." '735 patent at 4:10–13 (EX1001). To a POSA at the time of the alleged invention, it would have been obvious to modify the combination of *Silvernagle* and *Chakraborty* to transmit a speed limit command code at least every 250 milliseconds, in light of the disclosure of the '735 patent indicating that this feature was part of the J1922 standard at the time of filing. Leale ¶ 120 (EX1004). A POSA would have been motivated to transmit the speed limit command code at least every 250 milliseconds, as discussed in the ’735 patent, to conform with the standard and ensure that a maximum vehicle speed is maintained in place. Leale ¶ 120 (EX1004); ’735 patent at 4:10–13 (EX1001).

IX. CONCLUSION

The challenged claims of the ’735 patent recites are unpatentable. The Petitioner requests institution of an *inter partes* review to cancel these claims.

Respectfully Submitted,

/David L. Cavanaugh/

David L. Cavanaugh
Registration No. 36,476

Jonathan Stroud
Registration No. 72,518

Michael Van Handel
Registration No. 68,292

Ashraf Fawzy
Registration No. 67,914

Table of Exhibits for U.S. Patent 7,084,735 Petition for *Inter Partes* Review

Exhibit	Description
1001	U.S. Patent No. 7,084,735
1002	U.S. Patent No. 6,253,143 ("*Silvernagle*") (filed on January 26, 1999, issued on June 26, 2001)
1003	U.S. Patent No. 5,839,534 ("*Chakraborty*") (filed on March 1, 1995, issued November 24, 1998)
1004	Declaration of Robert Leale
1005	File History, '757 application, Restriction Requirement (08/25/2004)
1006	File History, '757 application, Response to Restriction Requirement (11/26/2004)
1007	File History, '757 application, Office Action (03/30/2005)
1008	File History, '757 application, Response to Office Action (09/16/2005)
1009	File History, '757 application, Final Office Action (11/29/2005)
1010	File History, 757 application, Response to Final Office Action (02/02/2006)
1011	File History, '757 application, Notice of Allowance (02/13/2006)
1012	Petitioner's Voluntary Interrogatory Responses
1013	Definitions of "command" and "message," The IEEE 100 Authoritative Dictionary of IEEE Standards Terms, Seventh Edition, 2000
1014	Definitions of "command" and "message," IBM Dictionary of Computing, 1994
1015	SAE J1922, "Powertrain Control Interface for Electronic Controls Used in Medium and Heavy Duty Diesel On-Highway Vehicle Applications," December 1989
1016	U.S. Patent Application Publication No. 2001/0003808 ("*Jeon*") (filed on November 30, 2000, published on June 14, 2001)
1017	U.S. Patent No. 6,052,644 ("*Murakami*") (filed on June 26, 1997, issued April 18, 2000)
1018	U.S. Patent No. 5,769,051 ("*Bayron*") (filed on May 29, 1996, issued June 23, 1998)

1019	U.S. Patent No. 6,772,061 ("*Berthiaume*") (filed on August 20, 2001, issued August 3, 2004)
1020	Carsten et al., "Implementing Intelligent Speed Adaptation in the UK: Recommendations of the EVSC Project," 2000
1021	Carsten et al., "Intelligent Speed Adaptation: The Best Collision Avoidance System?," 2001
1022	Carsten et al., "External Vehicle Speed Control, Phase I Results, Executive Summary," June 1998
1023	Song et al., "Speed Adaptation System for Vehicles Using RF Communication," June 12-15, 2000
1024	Definition of "flag," Microsoft Press Computer Dictionary, Third Edition, 1997

CERTIFICATE UNDER 37 CFR § 42.24(d)

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 9,271 which is less than the 14,000 words allowed under 37 CFR § 42.24(a)(i).

Respectfully submitted,

Dated: April 13, 2017

/Michael Van Handel/
Michael Van Handel
Reg. No. 68,292

Wilmer Cutler Pickering Hale and Dorr LLP
1875 Pennsylvania Ave., NW
Washington, DC 20006
Tel: (202) 663–6000

CERTIFICATE OF SERVICE

I hereby certify that on April 13, 2017, I caused a true and correct copy of the foregoing materials:

- Petition for Inter Partes Review of U.S. Patent No. 7,084,735 Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104
- Exhibit List
- Exhibits for Petition for Inter Partes Review of U.S. Patent No. 7,084,735 (EX1001–EX1024)
- Power of Attorney
- Word Count Certification Under 37 CFR § 42.24(d)
- Fee Authorization Form

to be served via Federal Express on the following correspondent of record as listed on PAIR:

Hershkovitz and Associates, PLLC
2845 Duke Street
Alexandria VA 22314

/Michael Van Handel/
Michael Van Handel
Reg. No. 68,292