

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BMW OF NORTH AMERICA, LLC
Petitioner,

v.

OMEGA PATENTS, LLC
Patent Owner.

IPR2021-00181
Patent 9,458,814 B2

Before KALYAN K. DESHPANDE, AMANDA F. WIEKER, and
AMBER L. HAGY, *Administrative Patent Judges*.

DESHPANDE, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. *Background*

BMW of North America, LLC (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–31 of U.S. Patent No. 9,458,814 B2 (Ex. 1001, “the ’814 patent”). Paper 1 (“Pet.”). Omega Patents, LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

On May 10, 2021, we instituted *inter partes* review of claims 1–31 of the ’814 patent. Paper 7 (“Dec.”). After institution, Patent Owner filed a Patent Owner’s Response. Paper 11 (“PO Resp.”). In response, Petitioner filed Petitioner’s Reply to Patent Owner’s Response. Paper 12 (“Pet. Reply”). Patent Owner filed a Sur-Reply to Petitioner’s Reply to Patent Owner’s Response. Paper 15 (“PO Sur-reply”).

The parties requested oral argument (Papers 16, 17), which we held by video on March 14, 2022. Paper 23 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6. In this Final Written Decision, after reviewing all relevant evidence and arguments, we determine Petitioner has met its burden of showing, by a preponderance of the evidence, that claims 1–31 of the ’814 patent are unpatentable.

B. *Related Matters*

The parties identify *Omega Patents, LLC v. Bayerische Motoren Werke AG, et al.*, No. 1:20-cv-01907-SDG (N.D. Georgia), which involves the ’814 patent, as a related matter. Pet. 99; Paper 5, 2.

C. *The ’814 Patent*

The ’814 patent, titled “Remote Start Control System for a Vehicle with a Bus Controllable Brake and Associated Methods,” issued October 4, 2016, from an application filed March 13, 2014, and claims benefit of priority under 35 U.S.C. § 119(e) to Application No. 61/792,895 filed on

March 15, 2013. Ex. 1001, codes (54), (45), (22), (60). The '814 patent discloses “a remote start control system for a vehicle that includes a data communications bus extending through the vehicle, an engine, at least one vehicle brake being selectively operable based upon a parking brake command on the data communications bus, and a vehicle climate control system operable based upon a climate control command on the data communications bus.” *Id.* at 2:63–3:4. A remote start transmitter generates a start signal. *Id.* at 3:4–6. That signal is received by a receiver of the vehicle’s remote start controller. *Id.* at 3:7–11. In response, a processor “generate[s] the parking brake command on the data communications bus to operate [] at least one vehicle brake, generate[s] the climate control command on the data communications bus to operate the climate control system, and start[s] the engine.” *Id.* at 3:13–17.

Figure 1 from the '814 patent is reproduced below:

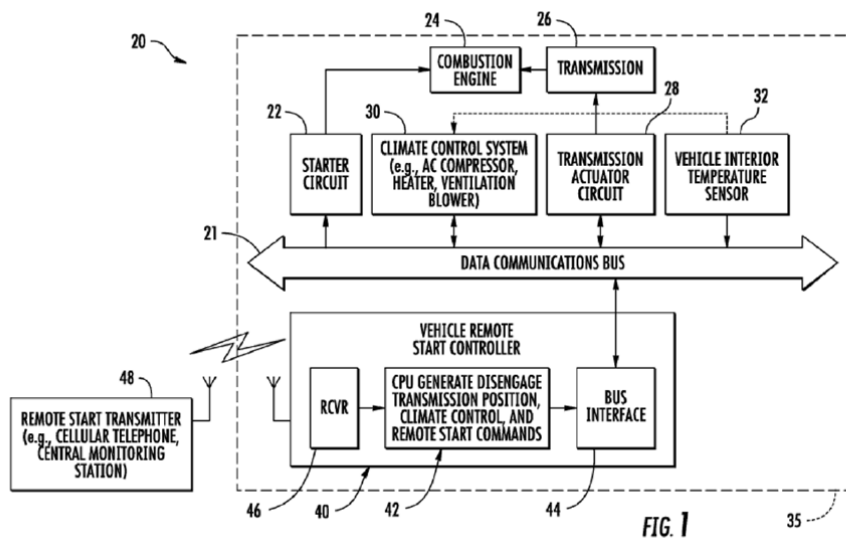


Figure 1 depicts a block diagram of remote start system 20 for vehicle 35. *Id.* at 4:59–60. Vehicle 35 includes data communications bus 21, which extends throughout the vehicle, engine 24, and transmission 26 associated

with the engine. *Id.* at 4:60–63. Starter circuit 22 is coupled to data communications bus 21 and “to the combustion engine for starting the engine, and may include both a starter and a relay or other controller, such as a powertrain controller, for starting the engine.” *Id.* at 4:65–5:2.

Transmission actuator circuit 28 is coupled to the data communications bus 21 and to transmission 26 for operating the transmission, and may include both a transmission actuator and a relay or other controller, such as a powertrain or transmission controller. *Id.* at 5:3–7. Vehicle 35 further includes vehicle remote climate control system 30, which is operable based upon a climate control command on data communication bus 21. *Id.* at 5:7–10. Vehicle remote start controller 40 includes receiver 46, and central processing unit 42 or a processor coupled to bus interface 44, which is coupled to data communication bus 21 for communications. *Id.* at 5:39–46. Receiver 46 receives a remote start signal from remote start transmitter 48, which is configured to transmit the remote start signal and is carried by a user when they are away from vehicle 35. *Id.* at 5:47–50.

D. Illustrative Claim

Petitioner challenges the patentability of claims 1–31. Claims 1, 14, and 24 are independent. Claim 1 is reproduced below:

1. A remote start control system for a vehicle comprising a data communications bus extending through the vehicle, an engine, at least one vehicle brake being selectively operable based upon a parking brake command on the data communications bus, and a vehicle climate control system operable based upon a climate control command on the data communications bus, the remote start control system comprising:

a remote start transmitter remote from the vehicle and configured to generate a remote start signal; and
a vehicle remote start controller at the vehicle and comprising

a receiver configured to receive the remote start signal from
said remote start transmitter, and
at least one processor cooperating with said receiver and
configured to, in response to the remote start signal,
generate the parking brake command on the data
communications bus to operate the at least one vehicle
brake,
generate the climate control command on the data
communications bus to operate the climate control system,
and
start the engine.

Ex. 1001, 10:9–32.

E. Instituted Grounds of Unpatentability and Evidence of Record

We instituted the instant trial based on the following grounds of
unpatentability.¹ Dec. 5–6, 44.

Claim(s) Challenged	35 U.S.C. §	References
1, 5–11, 14, 18–24, 28–31	103	Hassan ² , Birzl ³
2–4, 15–17, 25–27	103	Hassan, Birzl, Baier-Welt ⁴
12	103	Hassan, Birzl, Baier-Welt, Kim437 ⁵
13	103	Hassan, Birzl, Baier-Welt, Mauti ⁶

¹ Petitioner also relies on the Declaration of Dr. Azim Eskandarian.
Ex. 1003. Patent Owner relies on the Declaration of Joseph C.
McAlexander, III. Ex. 2011.

² US 7,650,864 B2, issued Jan. 26, 2010 (Ex. 1008, “Hassan”).

³ US 6,384,490 B1, issued May 7, 2002 (Ex. 1009, “Birzl”).

⁴ US Patent Application Publication No. US 2010/0211281 A1, published
Aug. 19, 2010 (Ex. 1012, “Baier-Welt”).

⁵ US 9,156,437 B2, issued Oct. 13, 2015 (Ex. 1013, “Kim437”).

⁶ US 9,062,617 B2, issued Jun. 23, 2015 (Ex. 1014, “Mauti”).

Claim(s) Challenged	35 U.S.C. §	References
1, 6–10, 12, 14, 19–24, 29–31 ⁷	103	Dage ⁸ , Kim323 ⁹
2–4, 15–17, 25–27	103	Dage, Kim323, Baier-Welt
5, 18, 28	103	Dage, Kim323, Hammons ¹⁰
13	103	Dage, Kim323, Baier-Welt, Mauti

The following subsections provide a brief description of the asserted prior art references.

1. Hassan

Hassan discloses “a remote starter system for a vehicle that is operable to start the vehicle ignition via a remote transmitter or key fob or the like.” Ex. 1008, 1:24–26. Hassan’s system includes a remote transmitting device to transmit a start signal, a receiver at the vehicle to receive that signal, and a processor that starts the vehicle’s ignition and, optionally, controls the vehicle’s climate control or security system. *Id.* at 1:24–41.

⁷ Despite its inclusion in the heading on page 60 of the Petition, claim 11 is not challenged under any of the grounds that rely on Dage. Tr. 33:11–17; *see also* Pet. 21–22 (identifying grounds and challenged claims, and excluding claim 11), 60–97 (failing to discuss claim 11).

⁸ US 8,096,482 B2, issued Jan. 17, 2012 (Ex. 1010, “Dage”).

⁹ Certified, English-language translation of Korean Patent KR20060072323A, published June, 28, 2006, and accompanied by a declaration of the translator and a copy of the original Korean-language document (Ex. 1011, “Kim323”).

¹⁰ US 5,791,407, issued Aug. 11, 1998 (Ex. 1015, “Hammons”).

Figure 2 illustrates a remote starter system for a vehicle and is reproduced below:

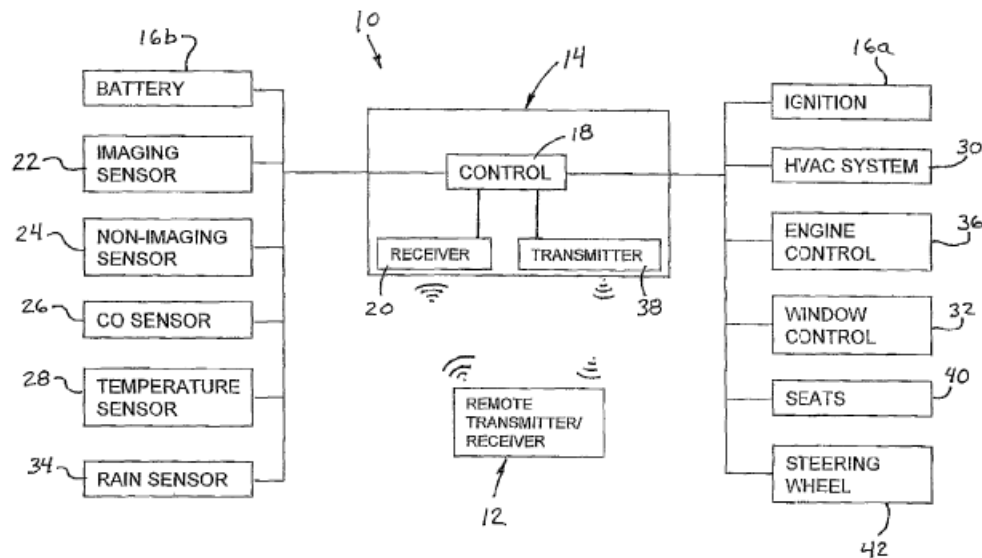


FIG. 2

Figure 2 shows remote starter control module 14 including receiver 20 and control 18, which is responsive to receiver 20. *Id.* at 2:4–6. Receiver 20 receives a signal, such as a radio frequency signal from remote transmitting unit 12. *Id.* at 2:6–8. Control 18 may be connected to “a power supply or battery 22 of the vehicle and to the vehicle ignition 24 and/or starter relay 25 and/or engine control module 26, so that the control is powered and is operable to control the vehicle ignition and/or engine control module.” *Id.* at 2:8–12. Control 18 is preferably connected to, or in communication with, a vehicle communication bus or network. *Id.* at 2:13–14. Control 18 is also operable to communicate with one or more systems of the vehicle such as engine module 26, temperature control system 28, camera 30, or the like. *Id.* at 2:14–19.

2. *Birzl*

Birzl discloses activating both a vehicle's service brake and parking brake upon imminent start of the vehicle's engine. Ex. 1009, 3:38–48. For example, imminent engine start can be discerned by receipt of a remote operating signal for unlocking or releasing a vehicle door or when it is sensed that an ignition key is rotated into the “ignition on” position. *Id.* Birzl's process requires a vehicle that includes an “engine, vehicle brake, clutch and transmission, as well as various sensors,” and “[a] control unit, [which] receives input signals from the sensors and controls the operation of the various vehicle components.” *Id.* at 3:30–37. Birzl states that the system provides the benefits of, among other things, ensuring “safety . . . by avoiding faulty operations and [] rolling away of the vehicle when [it] is started.” *Id.* at 3:4–6. Figure 2 illustrates the process performed when

starting the engine of the vehicle according to Birzl and is reproduced below:

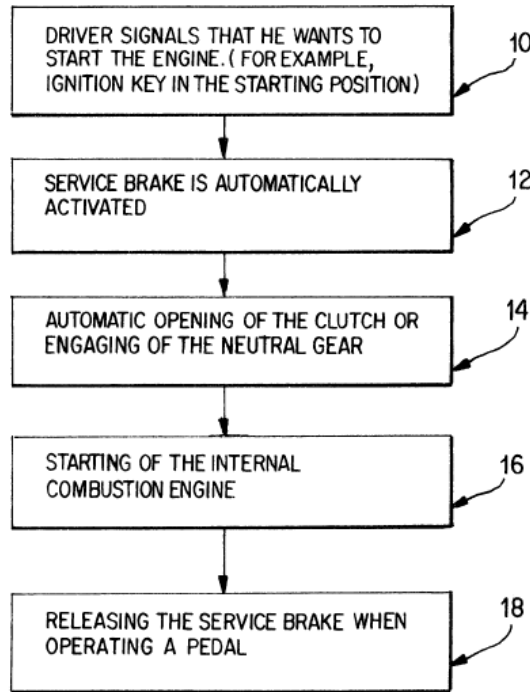


FIG. 2

Figure 2 explains an embodiment of the process of the invention. *Id.* at 3:37–38. In step 10, “it is checked whether the ignition key was rotated into the starting position (‘ignition on’ position).” *Id.* at 3:44–45. If the ignition key is rotated into the starting position, a corresponding signal is transmitted to the control unit, which draws a conclusion about an imminent start of the engine. *Id.* at 3:43–49. In step 12, the service brake is automatically activated and the clutch is automatically opened. *Id.* at 3:50–57. In step 16, the internal-combustion engine is started “which, because of the preceding measures, cannot result in an immediate movement of the vehicle.” *Id.* at 3:58–60. After step 16, “the service brake is then released in step 18 if any pedal of the vehicle, such as the accelerator pedal or the brake

pedal, is operated.” *Id.* at 3:62–65. The driver signals a ready-to-drive condition by operating these pedals. *Id.* at 3:65–67.

3. *Baier-Welt*

Baier-Welt discloses “a method for applying a parking brake of a vehicle depending on the roadway conditions, [in which] at least one electromechanical braking system has a parking brake and an operational brake function.” Ex. 1012, Abstract. Specifically, Baier-Welt describes:

[A] method for applying a parking brake of a vehicle depending on the roadway conditions, in which at least one electromechanical braking system having a parking brake function and a service brake function is provided for braking the wheels of the vehicle, in which a service brake force is generated on each wheel in order to brake the vehicle to a standstill, wherein a parking brake force can be generated on at least two wheels of the vehicle by the at least one electromechanical braking system, may comprise steps of-generating service brake forces in a stationary vehicle on at least two of the wheels, said forces having an amount corresponding to the total of the previous service brake forces applied to all wheels, testing a stopping of the vehicle, and-when the vehicle is maintained in the stop position, the amount of the service brake forces on the at least two wheels is reduced and, simultaneously, parking brake forces corresponding to the reduction in service brake forces are built up at least on the other wheels.

Id. ¶ 10.

Figure 1 illustrates a block diagram of the braking system and is reproduced below:

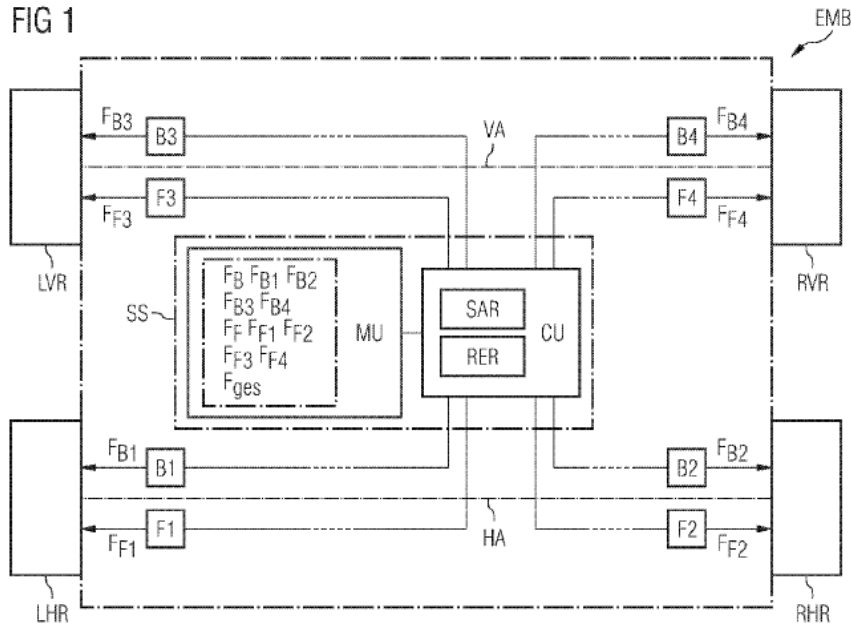


Figure 1 shows “an electromechanical braking system EMB that is integrated in a vehicle.” *Id.* ¶ 22. The vehicle comprises “a left front wheel LVR, a right front wheel RVR, a left rear wheel LHR and a right rear wheel RHR.” *Id.* The electromechanical braking system comprises an integrated control system SS, which has a connected control unit CU and memory unit MU, which provide a service brake function and a parking brake function. *Id.* ¶ 23. The electromechanical braking system can also “be formed in this connection by an electromechanical service brake system and an electromechanical parking brake system which each form constructional units that are arranged separately from each other.” *Id.* ¶ 24. The electromechanical service brake system comprises “a first to fourth service brake B1–B4 and the electromechanical parking brake system comprises at least first and second electromechanical parking brakes F1, F2, the first and

second electromechanical parking brakes F1, F2 conventionally being provided on the rear wheels LHR, RHR of the vehicle.” *Id.* ¶ 25. Baier-Welt states, “[i]n a preferred embodiment the vehicle comprises a ‘combined’ electromechanical braking system EMB in which a service brake B1–B4 and a parking brake F1–F4 are provided on both the front wheels RVR, LVR and rear wheels LHR, RHR respectively.” *Id.* ¶ 26.

4. *Kim437*

Kim437 discloses a “remote start system for a vehicle which activates a timer configured after a vehicle is remote started when a door of the vehicle is opened.” Ex. 1013, Abstract. After the timer is activated, “a fob (e.g., a keyless remote) is searched and certified once a driver’s door is closed, a brake is operated, or a predetermined time has elapsed without any operation of the vehicle.” *Id.* The vehicle is converted from a remote start mode to a normal mode once the fob is certified. *Id.* If the fob is not

certified, the remote start is terminated. *Id.* Figure 2 illustrates a block diagram of a remote starting system for a vehicle and is reproduced below:

FIG. 2

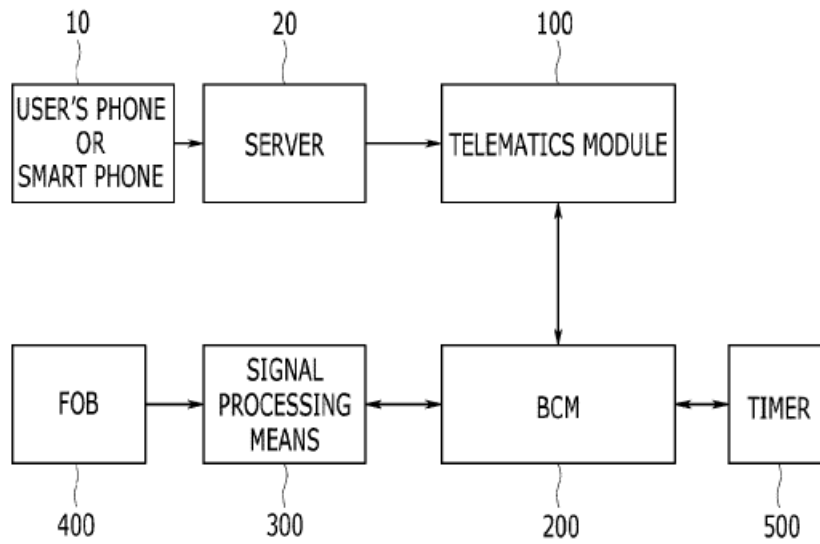


Figure 2 shows a vehicle remote starting system and includes telematics module 100, body control module 200, signal processing means 300, and timer 500. *Id.* at 3:36–40. The remote start signal is transmitted from user's terminal 10, such as a mobile phone or a smart phone, to telematics module 100 via server 20. *Id.* at 3:57–60. Telematics module 100 receives a remote start signal from a vehicle and transmits it to body control module 200. *Id.* Body control module 200 checks conditions of the vehicle and transmits the remote start signal to signal processing means 300 when the remote start signal is an appropriate remote start signal for that specific vehicle. *Id.* at 3:43–47. Body control module 200 also determines whether the vehicle is in a locked or unlocked state after initiating the remote start, and generates and transmits warning signals to signal

processing means 300. *Id.* at 4:5–8. “[S]ignal processing means 300 receives the remote start signal and checks the conditions of the vehicle and implements the remote start only when the vehicle conditions are normal.” *Id.* at 4:17–20. When the conditions are normal, signal processing means 300 implements the remote start and timer 500 begins counting when a door of the vehicle is opened after initiating start. *Id.* at 4:17–30.

5. *Mauti*

Mauti discloses “[a] method of remotely performing a vehicle autostart function when starting a vehicle engine.” Ex. 1014, Abstract. Mauti states, “[t]he method may include receiving two or more geo-boundary parameters and a time-session parameter, wherein the parameters are associated with autostarting a vehicle.” *Id.* at 1:30–33. The method may also include “determining that the vehicle and a handheld communication device (HCD) associated with the vehicle are within a geographic area defined by the geo-boundary parameters at a time defined by the time-session parameter.” *Id.* at 1:33–37.

6. *Dage*

Dage discloses a system for controlling a vehicle climate control system in response to starting an engine with a remote start operation. Ex. 1010, Abstract. The system in Dage “includes a first sensor for generating a cabin temperature signal indicative of a temperature within the vehicle” and “a controller for controlling idle speed of the engine in response to the cabin temperature signal such that the controlled idle speed enables the climate control system to achieve a desired temperature.” *Id.* at 1:54–60. Figure 1 illustrates a system for controlling climate control in a vehicle and is reproduced below:

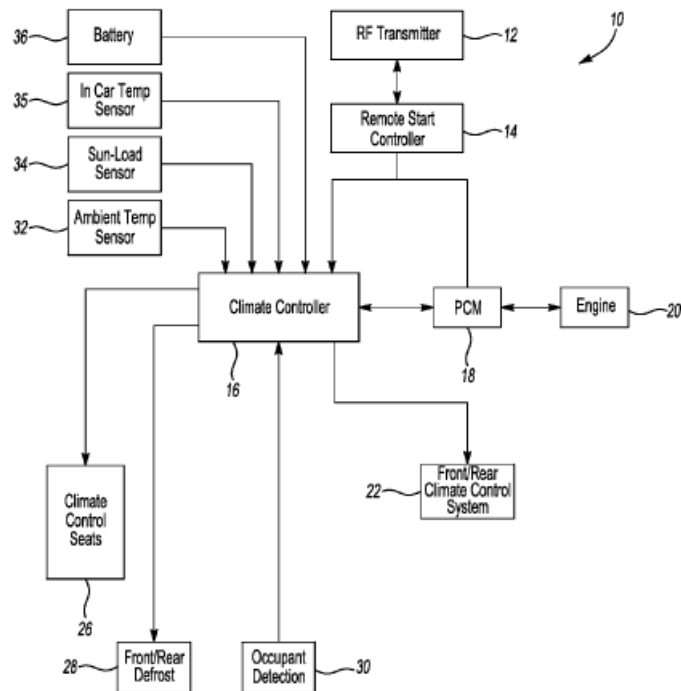


Fig-1

Figure 1 show system 10 controlling vehicle climate control with a remote start operation. *Id.* at 2:63–65. System 10 includes RF transmitter 12, remote start controller 14, climate controller 16, power train control module (PCM) 18, and engine 20. *Id.* at 2:66–3:1. Remote start controller 14, climate controller 16, and PCM 18 “may be operatively coupled to each via a data bus.” *Id.* at 3:1–3. RF transmitter 12 may be implemented as a key fob and send encrypted RF data to remote start controller 14. *Id.* at 3:7–10. In response to the RF encrypted data, remote start controller 14 may transmit a start engine command over the data bus to PCM 18, so that PCM 18 starts engine 20 of the vehicle via PCM 18, and transmit an engine start message over the data bus to climate controller 16. *Id.* at 3:10–20.

7. *Kim323*

Kim323 teaches “a method of locking and releasing a vehicle parking brake system.” Ex. 1011, 4. Specifically, Kim323 discloses “a method of locking and releasing an automotive parking brake that makes it possible, simply by a wireless manipulation, both to lock and release a parking brake and to move a shift lever.” *Id.* The parking brakes are referred to as hand brakes or side brakes and are used when the vehicle is parked or stopped, “because when the driver manually manipulates a lever that is installed to the side of the driver, the vehicle is completely fixed in position.” *Id.* Kim323 describes that it is necessary to park with the shift lever placed in a neutral position when a vehicle is parallel parking near a designated parking zone and blocking another vehicle due to limited space for parking. *Id.* If the driver forgets to place the lever in the neutral position and parks with the shift lever in the parking position and the parking brake is locked, then the driver of another vehicle seeking to exit the parking space has to go to the automobile to release the parking brake and manipulate the shift lever to the neutral position. *Id.* The method of Kim323 allows a driver to remotely lock and release the parking brake.

8. *Hammons*

Hammons discloses a vehicle heating and cooling control system, which automatically starts a vehicle to warm or cool it. Ex. 1015, 1:36–38. The vehicle includes a heating and cooling control system, which “includes a processing unit coupled to the vehicle’s ignition system, heating system, and cooling system.” *Id.* at 1:39–42. Hammons states, “[t]he processing unit may also cause the windows of the vehicle to be defrosted and cleaned by starting front and rear defrost systems and then activating the front and/or rear windshield wipers to clear the defrosted ice from the windows.” *Id.* at

1:46–50. This creates “an automatic and programmable system which starts and warms or cools a vehicle at a preselected time allowing a vehicle user to safely and quickly get on the road.” *Id.* at 1:50–54. Figure 1 illustrates a block diagram of a remote and programmable system and is illustrated below:

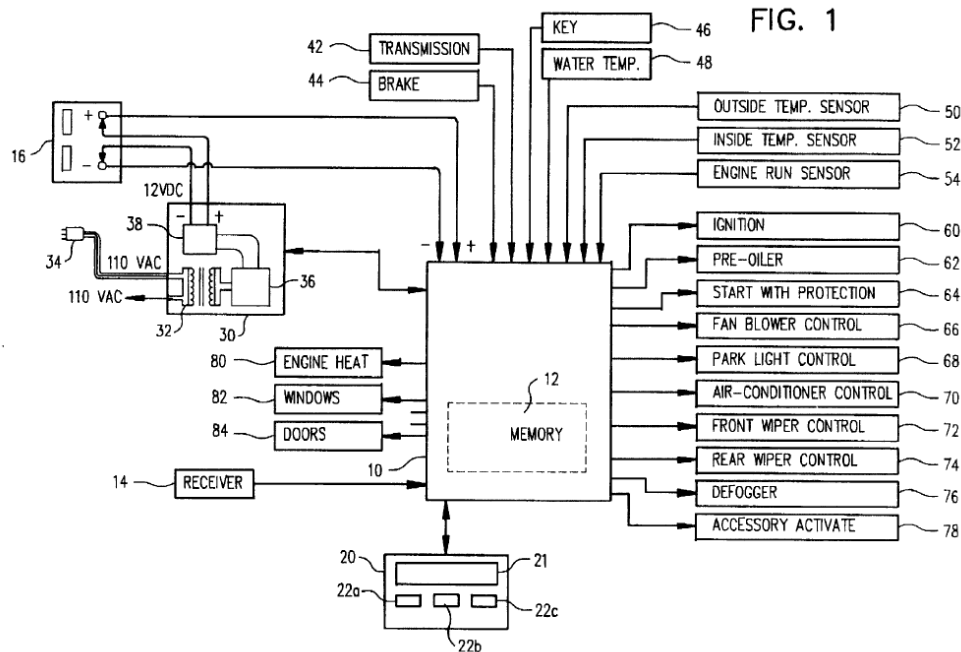


Figure 1 shows an embodiment of remotely programmable heating and cooling system 5, which is based around processing unit 10. *Id.* at 2:23–26. Processing unit 10 has memory 12 which “stores program code adapted to provide the functionality which will be discussed herein.” *Id.* at 2:28–30. Processing unit 10 is coupled to receive power from automobile battery 16 and “is programmed to operate either remotely, via receiver unit 14, or directly through control unit 20.” *Id.* at 2:38–41. Receiver unit 14 may be employed to program system 5 and is a radio-frequency remote coupled to receive signals from transmitter 90. *Id.* at 2:50–53. Transmitter 90 allows the vehicle operator to control system 5 from a distance. *Id.* at 2:54–56. Processing unit 10 is also coupled to receive control signals from outside

temperature sensor 50, inside temperature sensor 52, engine run sensor 54, transmission sensor 42, brake sensor 44, key sensor 46, and water temperature sensor 48. *Id.* at 2:63–3:2. Further, processing unit 10 is coupled to control a number of vehicle devices in a way such that they may be activated when selected by processing unit 10. *Id.* at 3:23–32. Vehicle devices may include ignition switch 60, pre-oiler 62, start with protection unit 64, fan blower control circuit 66, parking light control unit 68, air conditioner control unit 70, front wiper control unit 72, rear wiper control unit 74, defogger circuitry 76, accessory activation circuits 78, engine heat unit 80, windows 82, and doors 84. *Id.* at 3:23–29.

II. ANALYSIS

A. *Level of Ordinary Skill in the Art*

Petitioner asserts that a person of ordinary skill in the art (“POSITA”) of the ’814 patent would have either (1) “a Bachelor of Science degree in Electrical Engineering, Mechanical Engineering, or Automotive Engineering, or an equivalent field, with at least two years of academic or industry experience in the automotive industry”; or (2) “a Master of Science degree in Electrical Engineering, Mechanical Engineering, or Automotive Engineering, or an equivalent field, with at least a year of academic or industry experience in the same field.” Pet. 20–21 (citing Ex. 1003 ¶¶ 35–38). Petitioner indicates that “[w]ith more education, less experience is needed to attain an ordinary level of skill in the art. Similarly, more experience can substitute for formal education.” *Id.* at 21. Patent Owner indicates that, for the purpose of this proceeding, Petitioner’s asserted level of skill is sufficient to evaluate the Petition’s grounds. PO Resp. 12.

We also agree with and apply Petitioner’s asserted level of skill in the art because it is consistent with the problems addressed in the ’814 patent and the prior art.

B. Claim Construction

We apply the claim construction standard used to construe the claims in a civil action under 35 U.S.C. § 282(b), as articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019). Under the *Phillips* standard, claim terms must be given “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” 415 F.3d at 1313.

After reviewing the evidence and argument presented by the parties, we determine that it is not necessary to construe any claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

C. Alleged Obviousness of Claims 1, 5–11, 14, 18–24, 28–31 over Hassan and Birzl

Petitioner contends that claims 1, 5–11, 14, 18–24, and 28–31 of the ’814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan and Birzl. Pet. 22–47. For the reasons discussed below, we determine that Petitioner has demonstrated by a preponderance of the evidence that claims 1, 5–11, 14, 18–24, and 28–31 of the ’814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan and Birzl.

1. Claims 1, 14, and 24

a) Petitioner's Arguments

Independent claims 1, 14, and 24 recite substantially similar limitations and we address them together. Petitioner identifies the preamble as follows:

A remote start control system for a vehicle comprising a data communications bus extending through the vehicle, an engine, at least one vehicle brake being selectively operable based upon a parking brake command on the data communications bus, and a vehicle climate control system operable based upon a climate control command on the data communications bus, the remote start control system comprising:

Pet. 26; Ex. 1001, 10:9–15. Petitioner contends that the combination of Hassan and Birzl discloses the preamble of independent claim 1. Pet. 26–27. Petitioner argues that Hassan discloses “a transmitter, a remote start controller (comprising a receiver and control), a data communications bus, a climate control system, and an engine.” *Id.* at 27 (citing Ex. 1008, 1:24–41, Fig. 2; Ex. 1003 ¶ 93). Petitioner contends that “*Hassan* does not disclose a vehicle brake selectively operable based on a parking brake command, but *Birzl* does.” *Id.* at 28 (citing Ex. 1003 ¶ 94). Petitioner argues that Birzl discloses “a vehicle brake that consists of one or more of a service brake and parking brake.” *Id.* (citing Ex. 1009, Fig. 1).

Petitioner contends that a person with ordinary skill in the art would have combined Hassan and Birzl in order to “improve user satisfaction and safety.” *Id.* at 23 (citing Ex. 1003 ¶¶ 83–84). Petitioner argues that Hassan and Birzl disclose similar systems that involve the “dissemination of signals upon the transmission of an engine start signal.” *Id.* (citing Ex. 1003 ¶ 85). Petitioner asserts that a person with ordinary skill in the art “would have understood that vehicle brakes were fundamental, well-known components

of all motorized vehicles, and had been for decades.” *Id.* Petitioner argues that a person with ordinary skill in the art would “expect *Hassan*’s system to be easily implemented in a system with vehicle brakes and to be successful in incorporating *Birzl*’s parking brake command into *Hassan*’s remote start system.” *Id.* (citing Ex. 1003 ¶ 86). Thus, Petitioner submits that “activating the parking brake when starting the vehicle would provide the predictable result of improving safety by, for example, ‘avoiding faulty operations and a rolling away of the vehicle when [it] is started.’” *Id.* at 23–24 (quoting Ex. 1009, 3:4–6; citing Ex. 1003 ¶ 86).

Independent claim 1 also recites “a remote start transmitter remote from the vehicle and configured to generate a remote start signal.” Ex. 1001, 10:17–18. Petitioner argues that Hassan discloses a remote transmitting unit or key fob that includes “a two-way communication device that transmits signals . . . for reception by the receiver 20 of the remote starter control module 14” and further includes “user inputs or buttons 12c . . . to actuate to selectively transmit desired or appropriate command/signal,” such as a remote start command. Pet. 29 (quoting Ex. 1008, 2:20–40; citing Ex. 1008, 3:19–22, 3:28–33, Fig. 2; Ex. 1003 ¶¶ 95–96). Independent claim 1 further recites “a vehicle remote start controller at the vehicle.” Ex. 1001, 10:19. Petitioner contends that Hassan discloses “both a receiver and a processor (control), which collectively make up the claimed vehicle remote start controller at the vehicle.” *Id.* at 30 (citing Ex. 1008, 2:4–19, Fig. 2; Ex. 1003 ¶¶ 97–98).

Independent claim 1 also recites “a receiver configured to receive the remote start signal from said remote start transmitter.” Petitioner argues that Hassan discloses a receiver that is “operable to receive signals (such as RF signals via an RF receiver 12b) from a transmitter 21 of the remote starter

control.” *Id.* at 31 (quoting Ex. 1008, 2:20–27; citing Ex. 1008, 2:4–8, 2:20–40, 3:28–33, Fig. 2; Ex. 1003 ¶¶ 99–100). Independent claim 1 additionally recites “at least one processor cooperating with said receiver and configured to, in response to the remote start signal,” generate the parking and climate control commands. Ex. 1001, 10:23–25. Petitioner contends that Hassan discloses “control module 14 includes a receiver 20 and the control 18, which is responsive to receiver 20” to generate commands, and a person with ordinary skill in the art would have understood that “control 18 is cooperating with receiver 20 because it is responsive to the signals received at receiver 20 from the remote transmitter.” Pet. 32 (quoting Ex. 1008, 2:4–8; citing Ex. 1008, Fig. 2; Ex. 1003 ¶¶ 101–102).

Independent claim 1 further recites that the processor, in response to the remote start signal, is configured to “generate the parking brake command on the data communications bus to operate the at least one vehicle brake.” Ex. 1001, 10:26–28. Petitioner contends that Hassan discloses components that are “electrically connected to a vehicle based network or communication bus” that connects the “interfaces between the remote starter control module and other modules and/or sensors of the vehicle.” Pet. 33 (quoting Ex. 1008, 13:6–9, 13:62–65; citing Ex. 1008, Fig. 2). Petitioner argues that a person with ordinary skill in the art would understand that the “control generates appropriate signals for the vehicle it is controlling.” *Id.* at 34 (citing Ex. 1003 ¶¶ 103–104). Petitioner asserts that “*Hassan* does not disclose a vehicle brake controlled by a parking brake command, but *Birzl* does.” *Id.* (citing Ex. 1003 ¶ 105).

Petitioner argues that *Birzl* discloses that “[w]hen the ignition key is turned to a starting position, ‘a corresponding signal is transmitted to the control unit which draws a conclusion about an imminent start of the engine’

based on the received signal.” *Id.* at 34–35 (quoting Ex. 1009, 3:46–49; citing Ex. 1009, 2:29–35). Petitioner contends that Birzl discloses that “[i]f the control unit determines there is an imminent start of the engine, the control unit communicates with the service brake and ‘the service brake is automatically activated.’” *Id.* at 35 (citing Ex. 1009, 3:44–51). Petitioner asserts that a person with ordinary skill in the art “would have understood that the control unit generates a parking brake command because it automatically actuates a parking brake in response to a received signal from various vehicle sensors.” *Id.* (citing Ex. 1003 ¶ 106). That is, Petitioner contends that a person with ordinary skill in the art would have understood “that the control unit would have processed the signal data to determine if there was an imminent start and generated a parking brake command in response.” *Id.* Petitioner argues that a person with ordinary skill in the art would have combined “*Birzl*’s parking brake actuation into the system of *Hassan*” for the reasons discussed above. *Id.* at 36.

Independent claim 1 also recites that the processor, in response to the remote start signal, is configured to “generate the climate control command on the data communications bus to operate the climate control system.” Ex.1001, 10:29–31. Petitioner contends that Hassan discloses that the remote start system “may detect an ambient temperature at or in the vehicle and may determine whether or not the cabin temperature is to be increased or decreased.” Pet. 37 (quoting Ex. 1008, 10:17–50). Specifically, Petitioner argues that the control “monitor[s] the vehicle temperature (such as engine temperature and/or cabin temperature), and may be responsive to such temperature/temperatures being detected at or above/below threshold temperatures.” *Id.* (quoting Ex. 1008, 10:17–50). Petitioner asserts that a person with ordinary skill in the art would have understood that “the control

is generating a climate control command because, in response to a remote start signal, it first determines the cabin temperature, compares it to a threshold setting, and determines whether to heat or cool the vehicle.” *Id.* at 37–38 (citing Ex. 1008, 6:42–46, 10:17–50, 10:62–11:7; Ex. 1003 ¶¶ 109–111).

Independent claim 1 also recites that the processor, in response to the remote start signal, is configured to “start the engine.” Ex.1001, 10:32. Petitioner contends that Hassan discloses the control unit “is operable in response to the remote transmitting device 12 to activate or energize the ignition or starter relay of a vehicle” and, therefore, to start the engine. Pet. 38 (quoting Ex. 1008, 1:53–60; citing Ex. 1008, 1:24–27; Ex. 1003 ¶¶ 112–113).

b) Patent Owner’s Arguments¹¹ and Petitioner’s Reply

Patent Owner argues that claim 1 is patentable over Hassan and Birzl. PO Resp. 12–26. Specifically, Patent Owner argues that (i) the combination of Hassan and Birzl fails to teach or suggest certain elements of claim 1, and (ii) a person with ordinary skill in the art would not have combined Hassan and Birzl. *Id.*

¹¹ Also in connection with Petitioner’s obviousness ground based on Hassan and Birzl, Patent Owner presents the argument that Petitioner’s combination with Kim323 (Ex. 1011) “can only be based on improper hindsight.” PO Resp. 26–32. However, we note that this first ground relies only on the combination of Hassan and Birzl, not Kim323. Accordingly, we understand Patent Owner’s hindsight argument to be directed to Petitioner’s grounds based on Dage and Kim323, discussed *infra*.

- (i) *The combination of Hassan and Birzl would not have taught or suggested to a person with ordinary skill in the art certain elements of claim 1*

Patent Owner argues that the combination of Hassan and Birzl fails to teach or suggest certain elements of claim 1. PO Resp. 14–18. Specifically, Patent Owner argues that a person with ordinary skill in the art would have understood that the combination of Hassan and Birzl would have resulted in a system where the “parking brake is not applied in response to the remote start signal.” *Id.* at 18 (emphasis omitted). Patent Owner argues that Hassan discloses certain “sensed critical conditions” that, when met, terminate the “remote start mode.” *Id.* at 15–16. Such conditions include “insertion of the key into the ignition of the vehicle,” “unlocking the vehicle,” “detected movement,” cabin temperatures, cabin atmosphere conditions, “occupation of the driver seat,” or other unsafe conditions. *Id.* at 12–17.

Patent Owner argues, on the other hand, that Birzl discloses operating a brake before local starting of the engine. *Id.* at 17. Patent Owner argues that Birzl describes the same “sensed critical conditions” as Hassan, but discloses the “sensed critical conditions” are required to enable “local starting.” *Id.* That is, Patent Owner argues that Hassan terminates “remote start mode” when the “sensed critical conditions” are met, whereas Birzl enables “local starting” when the “sensed critical conditions” are met. Accordingly, Patent Owner argues that a person with ordinary skill in the art would not have concluded that the combination of Hassan and Birzl discloses “*in response to the remote start signal, generate the parking brake command on the data communications to operate the at least one vehicle brake,*” as required by claim 1. *Id.* at 18 (emphasis added).

Petitioner replies that Hassan discloses “remotely starting a vehicle engine in response to receiving a remote start signal” and Birzl discloses “generating a parking brake command in response to a local start signal.” Pet. Reply 3 (citing Ex. 1008, 2:20–40, 3:19–33; Ex. 1009, 2:29–35, 3:44–51). Petitioner further responds that a person with ordinary skill in the art would have modified Hassan in order to “secure against rolling away” while providing the features of remote starting and remote climate control. *Id.* (quoting Ex. 1009, 2:1; citing Ex. 1033 ¶¶ 55–57; citing Pet. 22–26). Petitioner further responds that Patent Owner’s arguments involving the “sensed critical conditions” are irrelevant because Petitioner’s challenge did not rely on Hassan’s “sensed critical conditions” and because Birzl’s “sensed critical conditions” do not contradict Hassan’s remote start. *Id.* at 4–5.

(ii) A person with ordinary skill in the art would not have combined Hassan and Birzl

Patent Owner argues that a person with ordinary skill in the art would not have turned to Birzl to “increase user satisfaction or improve safety.” PO Resp. 19. Specifically, Patent Owner argues that Hassan already considers “roll away” in safety precautions. *Id.* at 19–20; PO Sur-Reply 4–5. Patent Owner argues that Petitioner’s expert failed to identify “any number or specific occurrences of vehicle accidents [sic] crashes or investigations stemming from a rolling vehicle during a remote start operation” and asserts that “rolling away is not a ‘natural problem’ during remote engine starting.” PO Resp. 20–21 (citing Ex. 2013, 124:11–126:4; Ex. 2014 ¶ 69). Patent Owner further argues that Petitioner’s proffered “broad motivation of ‘improved safety’ is improper in this instance of vehicle operation, since such would permit almost any combination of prior

art references in hindsight.” *Id.* at 22; PO Sur-Reply 6–7. Patent Owner contends that “there are nearly unlimited ways for a POSITA [person of ordinary skill in the art] to combine *Hassan* and *Birzl* to arguably achieve ‘improved user satisfaction and safety.’” PO Resp. 25–26; PO Sur-Reply 2.

Similarly, Patent Owner contends that Petitioner’s motivation of “convenience” is insufficient. PO Resp. 24. Patent Owner specifically argues that a “POSITA would understand that a driver interested in remote starting of the engine and adjusting the climate within the vehicle ahead of her arrival at the vehicle (as in *Hassan*), would not look to a vehicle brake actuation along with *local* starting of the engine (as in *Birzl*) for some additional ‘convenience’ or to improve ‘user satisfaction.’” *Id.* at 25 (citing Ex. 2014 ¶ 80).

Petitioner replies that the Petition states “a precise combination that would have specifically mitigated the safety risk of [a] rollaway while preserving the convenience of [a] remote start.” Pet. Reply 6 (citing Ex. 1033 ¶ 64; Ex. 2013, 40:12–41:20). Petitioner argues that *Birzl* recognizes that starting the engine only after “[a]ctivation of the vehicle brake . . . prevents the vehicle from unintentionally beginning to move” and, thus, “enhances driver safety.” *Id.* at 6–7 (citing Ex. 1008, 3:4–6; Pet. 23–24; Ex. 1033 ¶ 65).

c) Analysis

As identified above, Petitioner sets forth that all of the limitations of claim 1 are taught or suggested by the combination of *Hassan* and *Birzl*. See § II.C.1.a. Petitioner further articulates reasoning based on rational underpinning to combine *Hassan* and *Birzl*. *Id.* Patent Owner, as identified in detail above, argues that (i) the combination of *Hassan* and *Birzl* would not have taught or suggested to a person with ordinary skill in the art certain

elements of claim 1, and (ii) a person with ordinary skill in the art would not have combined Hassan and Birzl. PO Resp. 14–26. We address Patent Owner’s arguments in turn.

(i) *The combination of Hassan and Birzl would not have taught or suggested to a person with ordinary skill in the art certain elements of claim 1*

As discussed above, Patent Owner argues that a person with ordinary skill in the art would have understood that the combination of Hassan and Birzl would have resulted in a system where the “parking brake is not applied in response to the remote start signal.” *See supra* § II.C.1.b.i. We disagree with Patent Owner. Petitioner relies on Hassan as disclosing “remotely starting a vehicle engine in response to receiving a remote start signal” and relies on Birzl as disclosing “generating a parking brake command in response to a local start signal.” Pet. 33–35; Pet. Reply 3 (citing Ex. 1008, 2:20–40, 3:19–33; Ex. 1009, 2:29–35, 3:44–51). We find that all of the limitations are disclosed by the combination of Hassan and Birzl in the manner identified by the Petitioner.

We disagree with Patent Owner’s argument that the combination of Hassan and Birzl does not meet the limitation “in response to the remote start signal, generating the parking brake command” because Hassan and Birzl have opposite results based on “sensed critical conditions.” PO Resp. 12–17. We agree with Petitioner that the combination of Hassan and Birzl teaches or suggests the limitation regardless of the “sensed critical conditions.” *See* Pet. Reply 4–5; *see supra* § II.C.1.b.i. That is, the combination of Hassan’s remote starting system to include Birzl’s teaching of actuating a brake command on ignition is not impacted by Patent Owner’s “sensed critical conditions” argument, which goes to whether a person of

ordinary skill in the art would have combined Hassan and Birzl. That argument is discussed in more detail below. *See infra* § II.C.1.c.ii.

(ii) *A person with ordinary skill in the art would not have combined Hassan and Birzl*

We disagree with Patent Owner’s argument that a person with ordinary skill in the art would not have turned to Birzl to “increase user satisfaction or to improve safety.” PO Resp. 19. We credit the testimony of Petitioner’s expert, Dr. Azim Eskandarian, who explains that Hassan uses an engine start signal that triggers functionality, such as the activation of the climate control system. Ex. 1003 ¶ 85; Pet. 23. Dr. Eskandarian further explains that “vehicle brakes were fundamental, well-known components of all motorized vehicles” and in Birzl, the “engine start signal triggers the generation of a signal to activate the parking brake.” Ex. 1003 ¶ 85; Pet. 23. Dr. Eskandarian also identifies that a person with ordinary skill in the art would have combined Hassan and Birzl to include the well-known safety benefits of brake actuation to a remote start system. Ex. 1003 ¶ 85; Pet. 23.

Similarly, we are not persuaded by Patent Owner’s argument that Dr. Eskandarian’s lack of knowledge of studies or industry data substantiating that rolling away is a natural problem detracts from his credible testimony of the well-known safety benefits of actuating a parking brake in response to a remote engine start signal. PO Resp. 20–21 (citing Ex. 2013, 124:11–126:4; Ex. 2014 ¶ 69). Dr. Eskandarian also explains that the combination of Hassan and Birzl would have increased the convenience of the combined system by allowing a user to use the “remote” functionality of Hassan. Ex. 1003 ¶ 87; Pet. 24.

We also disagree with Patent Owner that the motivation of “improved safety” is improperly broad, permitting “any combination of prior art

references in hindsight.” PO Resp. 22. Rather, we agree with Petitioner that the proposed combination presents “a precise combination that would have specifically mitigated the safety risk of [a] rollaway while preserving the convenience of [a] remote start.” Pet. Reply 6 (citing Ex. 1033 ¶ 64; Ex. 2013, 40:12–41:20). Accordingly, we disagree with Patent Owner that Petitioner relied on improper hindsight analysis in presenting its challenge to independent claims 1, 14, and 24.¹²

Patent Owner argues that a person with ordinary skill in the art would not have combined Hassan and Birzl to improve user satisfaction and safety, that Petitioner’s rationale for combining was improperly broad, and that the proposed combination relies on improper hindsight. *See supra* § II.C.3.b.1. We, however, determine that Petitioner’s arguments in the Petition and Reply are supported by the cited evidence and are persuasive. We are persuaded by Petitioner’s argument that Hassan’s safety features that may reduce risk of rollaway, such as terminating remote start mode if vehicle movement is detected, would have been recognized as insufficient for improving safety from rollaway by a person with ordinary skill in the art because the vehicle could already be in motion. Pet. Reply 7–9 (citing Ex. 1008, 11:57–62). Rather, a person with ordinary skill in the art would have turned to Birzl to prevent a vehicle from unintentionally beginning to move.

¹² Patent Owner raised the argument that “Petitioner started with the answer and worked backwards in an attempt to assemble the prior art to arrive at the answer” for the first time in its Sur-Reply. *See* PO Sur-Reply 6–7. Patent Owner generally cites to “[PO] Resp. 26–32” as support, but as noted above, Patent Owner only raises arguments towards the impermissible hindsight analysis based on Kim323 in those cited pages. Accordingly, we determine that Patent Owner has improperly introduced this argument for the first time on Sur-Reply.

Pet. Reply 6–7 (citing Birzl 3:4–6). Accordingly, we determine a person with ordinary skill in the art recognizing the problem of rollaway would have been motivated to combine Hassan’s remote start features with the automatic brake engagement of Birzl. Additionally, we are not persuaded that Petitioner’s argument is based on improper hindsight because we are not persuaded that Petitioner’s combination was gleaned only from the ’814 patent and addressing the problem of rollaway is well recognized within the prior art, as pointed out by Petitioner. *See id* at 11–13.

d) Conclusion

We are persuaded by Petitioner’s arguments and find they are supported by the cited evidence, and adopt Petitioner’s analysis as our own. We find Patent Owner’s arguments unavailing for the reasons discussed above. As such, we determine that Petitioner has shown by a preponderance of the evidence that claims 1, 14, and 24 are unpatentable as obvious over the combination of Hassan and Birzl.

2. Claims 5–11, 18–23, and 28–31

a) Petitioner’s Arguments

Claim 5 depends from claim 1 and recites “wherein said at least one processor is configured to start the engine after generating the parking brake command and before generating the climate control command.” Ex. 1001, 10:48–51. Claims 18 and 28 depend from independent claims 14 and 24 respectively, and recite substantially similar limitations as claim 5. Ex. 1001, 11:59–61, 12:26–59. Petitioner argues that Hassan teaches that “the controller starts the engine before activating the climate control system” and Birzl teaches “generating a parking brake command before starting the engine.” Pet. 39–40. Accordingly, Petitioner argues that the combination of Hassan and Birzl teaches this limitation.

Claim 6 depends from claim 1 and recites “wherein the vehicle comprises a vehicle interior temperature sensor; and wherein said at least one processor is configured to generate the climate control command on the data communications bus also based upon the vehicle interior temperature sensor.” Ex. 1001, 10:52–60. Claims 19 and 29 depend from independent claims 14 and 24 respectively, and recite substantially similar limitations as claim 6. Ex. 1001, 11:62–67, 12:60–64. Petitioner argues that “Hassan’s system detects the ‘ambient temperature at or in the vehicle,’ via the temperature sensor and determines whether “the cabin temperature is to be increased or decreased.” Pet. 41. Petitioner further argues that Hassan “discloses a data communications bus connecting the control and HVAC system”, and that “the control heats or cools the vehicle by controlling the HVAC system.” *Id.* According to Petitioner, a POSITA “would have understood that the climate control command is based on the temperature sensor reading because that indicates whether the controller issues a command to heat or cool the vehicle.” *Id.*

Claim 7 depends from claim 6 and recites “wherein the vehicle interior temperature sensor is coupled to the data bus for communication with said vehicle remote start controller thereover.” Ex. 1001, 10:57–60. Claim 20 depends from claim 19 and recites substantially similar limitations to claim 6. Ex. 1001, 12:1–3. Petitioner argues Hassan discloses a “vehicle interior temperature sensor . . . [and] a data communications bus,” and that “this sensor is connected to the data communication bus to communicate with the controller[.]” Pet. 42.

Claim 8 depends from claim 6 and recites “wherein the climate control system comprises an air conditioning compressor, and wherein said at least one processor is configured to generate the climate control command

to activate the air conditioning compressor when an interior temperature sensed from the vehicle interior temperature sensor is above a threshold.”

Ex. 1001, 10:61–67. Claims 21 and 30 depend from claims 19 and 29 respectively, and recite substantially similar limitations to claim 8.

Ex. 1001, 12:4–10, 12:65–67. Petitioner argues that Hassan discloses an air compressor. Pet. 43 (citing Ex. 1008 9:32–36). Petitioner further argues that Hassan’s controller “generates a climate control command to activate the HVAC system either to heat or cool the vehicle” based on “the temperature sensed by an interior temperature sensor.” *Id.* at 44.

Accordingly, Petitioner argues that a person with ordinary skill in the art would have understood that “Hassan’s processor generates a climate control command based on an interior temperature over a threshold . . . which activates the air conditioning compressor.” *Id.*

Claim 9 depends from claim 6 and recites “wherein the climate control system comprises a heater” and “wherein said at least one processor is configured to generate the climate control command to activate the heater when an interior temperature sensed from the vehicle interior temperature sensor is below a threshold.” Ex. 1001, 11:1–8. Claims 22 and 31 depend from claims 19 and 29 respectively, and recite substantially similar limitations to claim 9. Ex. 1001, 11:11–12, 13:4–5. Petitioner argues Hassan discloses a heater. Pet. 44. Petitioner further argues a person with ordinary skill in the art would have understood “Hassan’s processor generates a climate control command based on an interior temperature below a threshold . . . which activates the heater.” Pet. 45.

Claim 10 depends from claim 1 and recites “wherein the climate control system comprises a ventilation blower” and “wherein said at least one processor is configured to generate the climate control command to

activate the ventilation blower.” Ex. 1001, 11:8–12. Claim 23 depends from claim 19, and recites substantially similar limitations to claim 10. Ex. 1001, 12:11–12. Petitioner argues a person with ordinary skill in the art would have understood “the HVAC system of Hassan would include a ventilation blower in order to adjust fan speed” and “the climate control command generated by Hassan’s processor would activate or adjust the fan.” Pet. 46.

Claim 11 depends from claim 1 and recites “wherein said vehicle remote start controller comprises a multi-vehicle compatible remote start controller.” Ex. 1001, 11:13–16. Petitioner argues that Hassan’s remote start control unit “may comprise a universal start control unit or module” and may be implemented as an aftermarket system. Pet. 46–47. Petitioner further argues, a person with ordinary skill in the art would have understood Hassan to be compatible with multiple vehicles, “because it recognizes the type of vehicle and is capable of providing signals appropriate for multiple vehicle types and manufacturers.” *Id.* at 47.

b) Patent Owner’s Arguments

Patent Owner presents the same arguments towards claims 5–11, 18–23, and 28–31 that it made for claims 1, 14, and 24. *See supra* § II.C.1.b. We find Patent Owner’s arguments unavailing for the same reasons discussed above. *Id.* Patent Owner does not present any separate arguments in support of claims 5–11, 18–23, and 28–31.

c) Analysis and Conclusion

We are persuaded by Petitioner’s arguments and find they are supported by the cited evidence. Accordingly, we adopt Petitioner’s analysis as our own. We determine that Petitioner has shown by a

preponderance of the evidence that claims 5–11, 18–23, and 28–31 are unpatentable as obvious over Hassan and Birzl.

D. Alleged Obviousness of Claims 2–4, 15–17, and 25–27 over Hassan, Birzl, and Baier-Welt

Petitioner contends that claims 2–4, 15–17, and 25–27 of the '814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Hassan, Birzl, and Baier-Welt. Pet. 47–54. We determine that Petitioner has demonstrated by a preponderance of the evidence that claims 2–4, 15–17, and 25–27 of the '814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan, Birzl, and Baier-Welt.

1. Petitioner's Arguments

Claim 2 depends from independent claim 1, and recites “wherein the at least one vehicle brake comprises a plurality of vehicle brakes” and “wherein the at least one processor is configured to generate the parking brake command to operate the plurality of vehicle brakes.” Ex. 1001, 10:33–37. Claims 15 and 25 depend from claims 14 and 24 respectively, and recite substantially similar limitations to claim 2. Ex. 1001, 11:43–45, 12:41–43. Petitioner argues that the combination of Hassan and Birzl “includes a vehicle brake operable based on a parking brake command . . . [and] *Birzl* discloses service and parking brakes, but does not detail the architecture of the vehicle brake system.” Pet. 49. Petitioner argues that Baier-Welt discloses an electromechanical brake system in a vehicle that comprises parking brakes on both the front and rear wheels. *Id.* (citing Ex. 1012 ¶ 26, Fig. 1). Petitioner asserts that a person with ordinary skill in the art would have looked to Baier-Welt to incorporate multiple brakes “on multiple wheels for safety and stability.” *Id.* at 48 (citing Ex. 1003 ¶ 152). Specifically, Petitioner argues that a person of ordinary skill in the art would

have understood that “service brakes are actuated to slow a moving vehicle, whereas parking brakes are used to secure a stationary vehicle.” *Id.* (citing Ex. 1003 ¶¶ 149–152). Dr. Eskandarian explains that “electromechanical parking brakes are engaged when a vehicle is in a ‘static operating state’ to prevent the vehicle from moving.” *Id.* at 47–48 (citing Ex. 1003 ¶¶ 3, 5); Ex. 1003 ¶ 151. Petitioner argues that a person with ordinary skill in the art would have found it obvious “to incorporate the plurality of brakes of *Baier-Welt* into the *Hassan-Birzl* system to be operated in response to] the parking brake command.” *Id.* at 50–51 (citing Ex. 1003 ¶¶ 159–160).

Claim 3 is dependent on claim 1 and recites “wherein the at least one vehicle brake comprises a pair of front brakes.” Ex. 1001, 10:39–40. Claim 3 further recites “wherein the at least one processor is configured to generate the parking brake command to operate the pair of front brakes.” *Id.* at 10:40–42. Claims 16 and 26 depend from independent claims 14 and 24 respectively, and recite substantially similar limitations to claim 3. Ex. 1001, 11:48–52, 12:46–50. Petitioner argues that Baier-Welt discloses an electromechanical brake system in a vehicle that comprises parking brakes on both the front and rear wheels. Pet. 50–52. Petitioner argues that a person with ordinary skill in the art would have understood that “operating brakes in pairs on vehicles was a common practice as well for safety and stability . . . [and] operating multiple brakes improves safety by providing redundancy should one brake fail.” *Id.* at 53 (citing Ex. 1003 ¶ 166). Accordingly, Petitioner argues that a person with ordinary skill in the art “would have found it obvious to incorporate the front brakes of *Baier-Welt* into the *Hassan-Birzl* system to be operated in response to the parking brake command.” *Id.* Petitioner also argues that the combination of Hassan and Birzl “generates a parking brake command to operate a parking brake.”

Id. at 52. Petitioner asserts that “[b]ecause the claim does not restrict this element to requiring operating only the front brakes, *Baier-Welt*’s disclosure of four brakes satisfies this element.” *Id.*

Claim 4 depends from claim 1 and recites “wherein the at least one vehicle brake comprises a pair of rear brakes.” Ex. 1001, 10:43–44. Claim 4 further recites “and wherein the at least one processor is configured to operate the pair of rear brakes.” *Id.* at 10:44–47. Claims 17 and 27 depend from independent claims 14 and 24, and recite substantially similar limitations. Ex. 1001, 11:53–55, 12:51–55. Petitioner argues that *Baier-Welt* discloses an electromechanical brake system in a vehicle that comprises parking brakes on both the front and rear wheels, and that a person with ordinary skill in the art “would have found it obvious to incorporate the rear brakes of *Baier-Welt* into the *Hassan-Birzl* system.” Pet. 53–54. Petitioner also argues that “the *Hassan-Birzl* combination generates a parking brake command to operate a parking brake.” *Id.* at 51–52. Petitioner further argues that a person with ordinary skill in the art “would have found it obvious to incorporate the rear brakes of *Baier-Welt* into the *Hassan-Birzl* system to be operated in response to the parking brake command for the same reasons” discussed above with respect to the front brakes recited in claims 3, 16, and 26.

2. Patent Owner’s Arguments and Petitioner’s Reply

Patent Owner argues “a POSITA would not turn to *Baier-Welt* for the purposes of increased safety in the combined *Hassan* system and *Birzl* system” because “*Baier-Welt* addresses safety as it relates to roadway conditions, for example, when the vehicle is in motion to maintain control.” PO Resp. 33 (citing Ex. 2014 ¶ 101) (emphasis omitted). Specifically,

Patent Owner argues that “if a vehicle is in motion, then *Birzl* has failed to achieve the desired level of safety.” *Id.* (citing Ex. 2014 ¶ 101).

Patent Owner further contends that “*Baier-Welt* teaches away from combination with at least *Birzl*.” *Id.* According to Patent Owner, “*Birzl* discloses operation of a vehicle brake for securely blocking a vehicle or for securing the vehicle against rolling away before a local starting operation,” whereas “*Baier-Welt* discloses the application of a parking brake-based system on roadway conditions.” *Id.* Therefore, according to Patent Owner, a person with ordinary skill in the art would “not turn to the selective application of the parking brake based upon roadway conditions in *Baier-Welt* to selectively combine with both securing the vehicle against rolling away before a starting operation, as in *Birzl*, and the remote starting of *Hassan*.” *Id.* (emphasis omitted).

Petitioner replies that “the claims merely combine known brake actuation (*Birzl*) with known vehicle brakes (*Baier-Welt*), both performing routine functions.” Pet. Reply 14 (citing Ex. 1033 ¶¶ 85–86). Petitioner argues that the claims are not “more than the predictable use of the prior art elements according to their established functions.” *Id.* (citing *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 417 (2007)).

3. Analysis

We disagree with Patent Owner that a person with ordinary skill in the art would not have turned to *Baier-Welt*. As discussed above, Petitioner relies on *Hassan* as disclosing “remotely starting a vehicle engine in response to receiving a remote start signal” and relies on *Birzl* as disclosing “generating a parking brake command in response to a local start signal.” Pet. 33–35; Pet. Reply 3 (citing Ex. 1008, 2:20–40, 3:19–33; Ex. 1009, 2:29–35, 3:44–51); *see supra* § II.C.1.c.i. As such, the combination of

Hassan and Birzl is concerned with braking before a remote start in order to increase user safety. *See supra* § II.C.1.c.ii. Baier-Welt discloses an electromechanical brake system in a vehicle that comprises parking brakes on both the front and rear wheels. Ex. 1012 ¶ 26; Pet. 49.

We do not agree with Patent Owner that a person with ordinary skill in the art would not have considered Baier-Welt because Baier-Welt discloses the braking involved with a moving vehicle, whereas Birzl requires that a vehicle is static. PO Resp. 32–33 (citing Ex. 2014 ¶¶ 101–102). Rather, we agree with Petitioner that a person with ordinary skill in the art would have more generally “looked to other parking brake systems, like *Baier-Welt*, to understand how to implement the teachings of *Birzl*, such as using brakes on each wheel of the vehicle.” Pet. 48 (citing Ex. 1003 ¶ 153).

We also disagree with Patent Owner that Baier-Welt teaches away from Birzl because “*Birzl* discloses operation of a vehicle brake for securely blocking a vehicle or for securing the vehicle against rolling away before a local starting operation,” whereas “*Baier-Welt* discloses the application of a parking brake-based system on roadway conditions.” PO Resp. 33. A reference teaches away from the claimed invention if it criticizes, discredits, or would have discouraged a person of ordinary skill in the art from “following the path set out in the reference,” or if a person of ordinary skill “would [have been] led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); *see In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Patent Owner has not set forth persuasive evidence that Baier-Welt criticizes, discredits, or would have discouraged a person with ordinary skill in the art from combining the multiple brakes disclosed by Baier-Welt with the braking system of Birzl. As discussed above, we are persuaded by Petitioner that a person with

ordinary skill in the art would have generally looked to other braking systems in order to increase user safety.

We find unavailing Patent Owner’s argument that claims 2–4, 15–17, and 25–27 are patentable for the reasons summarized above with respect to the combination of Hassan and Birzl as to independent claims 1, 14, and 24. *See supra* § II.C.1.c.ii.

4. Conclusion

We are persuaded by Petitioner’s arguments and find they are supported by the cited evidence. Accordingly, we adopt Petitioner’s analysis as our own. Patent Owner’s arguments are unavailing for the reasons discussed above. As such, we determine that Petitioner has shown by a preponderance of the evidence that claims 2–4, 15–17, and 25–27 are unpatentable as obvious over Hassan, Birzl, and Baier-Welt.

E. Alleged Obviousness of Claim 12 over Hassan, Birzl, and Kim437

Petitioner contends that claim 12 of the ’814 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan, Birzl, and Kim437. Pet. 55–56. For the reasons discussed below, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 12 of the ’814 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan, Birzl, and Kim437.

1. Petitioner’s Arguments

Claim 12 depends from claim 1 and recites “wherein said remote start transmitter comprises a cellular telephone.” Ex. 1001, 11:16–17. Petitioner argues that Kim437 discloses “the remote start signal [is] transmitted from the terminal 10 such as a mobile phone or a smart phone.” Pet. 56 (quoting Ex. 1013, 5:11–15). Petitioner contends that a person with ordinary skill in the art would have been motivated to have a user’s smart phone as the

remote transmitter in the *Hassan-Birzl* system in order to “provide added convenience for the user who would not have to carry both a key fob and a phone.” *Id.* at 55 (citing Ex. 1003 ¶ 174). Petitioner argues that using a cellular phone as a remote transmitter was well known in the art at the time of the patent. *Id.*

2. Patent Owner’s Arguments and Petitioner’s Reply

Patent Owner contends that a person with ordinary skill in the art would not have been motivated by “added convenience for the user” when combining the mobile phone as a remote transmitter of Kim437 with the Hassan/Birzl system because “*Kim437* teaches that, in contrast to Petitioner’s expert, the user would still have to carry both the fob and phone.” PO Resp. 36 (citing Ex. 2014 ¶ 107).

Petitioner replies that Kim437 discloses that a “user may start the vehicle with only a phone” and subsequently “a user must enter the vehicle with the fob to drive the vehicle.” Pet. Reply 16 (citing Ex. 1013, 4:31–33).

3. Analysis

We agree with Petitioner. We conclude, based on the complete record, that the combination of a cellular telephone, such as a smart phone, as disclosed by Kim437, with the system of Hassan/Birzl, would have yielded predictable results, and we credit the testimony of Dr. Eskandarian that “[u]sing a cellular phone as a remote transmitter was well-known in the art at the time of the patent.” Ex. 1003 ¶¶ 174–175. We disagree with Patent Owner that requiring a fob undercuts the convenience of starting a vehicle from a cellular telephone. Pet. Reply 15 (citing Ex. 1033 ¶ 89). As explained by Dr. Eskandarian, there may be many scenarios where remotely starting a vehicle using a mobile phone provides additional convenience, such as in cold weather. Ex. 1033 ¶ 90. We discern this is so even if a user

must have both a fob and the cellular telephone to later drive the vehicle. *Id.* Accordingly, we agree with Petitioner that using a mobile phone as a remote transmitter was well-known in the art at the time of the patent and the combination of such a feature with the Hassan/Birzl system would have yielded predictable results.

We are find unavailing Patent Owner's argument that claim 12 is patentable for the reasons argued above with respect to the combination of Hassan and Birzl as to independent claims 1, 14, and 24. *See supra* § II.C.1.c.ii.

4. Conclusion

We are persuaded by Petitioner's arguments and find they are supported by the cited evidence. Accordingly, we adopt Petitioner's analysis as our own. Patent Owner's arguments are unavailing for the reasons discussed above. As such, we determine that Petitioner has shown by a preponderance of the evidence that claim 12 is unpatentable as obvious over Hassan, Birzl, and Kim437.

F. Alleged Obviousness of Claim 13 over Hassan, Birzl, and Mauti

Petitioner contends that claim 13 of the '814 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over Hassan, Birzl, and Mauti. Pet. 57–60. For the reasons discussed below, we determine that Petitioner has demonstrated by a preponderance of the evidence that claim 13 of the '814 patent is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hassan, Birzl, and Mauti.

1. Petitioner's Arguments

Claim 13 depends from claim 1 and recites “wherein said remote start transmitter comprises a central monitoring station.” Ex. 1001, 11:19–21. Petitioner argues that Mauti discloses that a vehicle enters a specific

geographic area and a call center, or central monitoring station, receives a user's indication for an "autostart event." Pet. 58–59 (citing Ex. 1014, 10:13–41). According to Petitioner, the call center then autostarts the vehicle. *Id.* at 59 (citing Ex. 1014, 10:32–41). Petitioner contends that a person with ordinary skill in the art would have been motivated to "modify the *Hassan-Birzl* system to be capable of receiving remote start commands from multiple sources as disclosed in *Mauti* to improve system versatility." *Id.* at 57 (citing Ex. 1003 ¶¶ 178–179). Petitioner explains that the improved versatility includes offering additional services such as "navigation, telephony, emergency assistance, diagnostics, infotainment, etc." *Id.* (quoting Ex. 1014, 3:23–26). Petitioner asserts that "[s]uch a modification may involve a simple substitution of *Hassan*'s receiver for *Mauti*'s more capable telematics unit." *Id.* (citing Ex. 1003 ¶ 180).

2. Patent Owner's Arguments and Petitioner's Reply

Patent Owner argues that Petitioner's rationale of "improv[ing] system versatility" is "not a technical reason to combine references and amounts to nothing more than a hollow conclusion." PO Resp. 37–38. Patent Owner contends a person with ordinary skill in the art would not have turned to *Mauti* because *Mauti*'s "telematics unit does nothing to address the deficiencies of *Hassan*, in combination with *Birzl*, whereby *Birzl*'s operations are not remote." *Id.* (citing Ex. 2014 ¶ 112). Patent Owner presents a similar argument as that presented above in support of independent claims 1, 14, and 24 – i.e., that *Birzl* has certain "sensed critical conditions" for *local* starting, and "to modify *Hassan* so that remote starting is provided by a call center . . . as in *Mauti*, would effectively make any determination of imminent local starting of the vehicle as taught by *Birzl* meaningless." *Id.* at 38 (citing Ex. 2014 ¶ 113).

Petitioner replies, as discussed above with respect to independent claims 1, 14, and 24, that Petitioner does not rely on Birzl’s “sensed critical conditions,” and that it would be a simple substitution of a known technique to incorporate Mauti’s central monitoring station into Hassan. Pet. Reply 17.

3. Analysis

We disagree with Patent Owner that a person with ordinary skill in the art would not have been motivated by enhancing the versatility of a system. *See* PO Resp. 37–38. Rather, we agree with Petitioner that a person with ordinary skill in the art would have been motivated to increase the versatility of the system by receiving remote start commands from multiple sources, such as a call center, thereby increasing the convenience of the system. *See* Pet. 57 (citing Ex. 1003 ¶¶ 178–179). We further agree with Petitioner that modifying Hassan’s receiver to include Mauti’s more capable telematics unit merely involves the simple substitution of known components. *Id.* (citing Ex. 1003 ¶¶ 180–181). Accordingly, we determine that a person with ordinary skill in the art would have found it obvious to combine the telematics unit of Mauti with the Hassan/Birzl system.

4. Conclusion

We are persuaded by Petitioner’s arguments and find they are supported by the cited evidence. Accordingly, we adopt Petitioner’s analysis as our own. Patent Owner’s arguments are unavailing for the reasons discussed above. As such, we determine that Petitioner has shown by a preponderance of the evidence that claim 13 is unpatentable as obvious over Hassan, Birzl, and Mauti.

*G. Alleged Obviousness of Claims 1–10 and 12–31 over Dage, Kim323, Baier-Welt, Hammons, and Mauti*¹³

Petitioner contends that claims 1–10 and 12–31 of the '814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over Dage, Kim323, Baier-Welt, Hammons, and Mauti. Pet. 60–97. For the reasons discussed below, we determine that Petitioner has not demonstrated by a preponderance of the evidence that claims 1–10 and 12–31 of the '814 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Dage, Kim323, Baier-Welt, Hammons, and Mauti.

Independent claim 1 recites, *inter alia*, that a processor, in response to the remote start signal, is configured to “generate the parking brake command on the data communications bus to operate the at least one vehicle brake.” Petitioner argues that the combination of Dage and Kim323 disclose this limitation. Pet. 75–78. Specifically, Petitioner argues that Dage discloses a remote start controller that generates appropriate signals for the vehicle it is controlling and transmits them over the data bus. *Id.* at 75 (citing Ex. 1010, 3:1–6, 3:11–20; Ex. 1003 ¶¶ 217–218). Petitioner asserts that “Dage does not disclose a vehicle brake controlled by a parking brake command on the communication bus, but Kim323 renders this limitation obvious.” *Id.* at 76 (citing Ex. 1003 ¶ 219). Petitioner contends that Kim323 discloses a controller that receives a wireless signal and “outputs a control signal for driving the parking brake locking/releasing actuator so as to lock the parking brake.” *Id.* at 76–77 (quoting Ex. 1010, 6–7; citing Ex. 1003 ¶ 220). Petitioner argues that “Kim323 discloses receiving a

¹³ As noted above, claim 11 is not challenged under any of the grounds that rely on Dage. Tr. 33:10–16.

‘manipulation signal’ and transmitting a ‘control signal.’” *Id.* at 77 (citing Ex. 1010, 12).

Patent Owner, in its Preliminary Response, argues that the “operation of the brake via the remote transmitter is unrelated to remote starting.” Prelim. Resp. 38 (citing Ex. 2011 ¶ 115). In our Decision instituting *inter partes* review, we agreed with Patent Owner. Dec. 42–43. We determined that independent claim 1 requires that generation of the parking brake command is *in response to the remote start signal*. *Id.* We found that Kim323 discloses that as driver presses “the brake release button (15) of a wireless operations means” (Ex. 1010, 11), the parking brake command is then generated in response to the pressing of the brake release button. *Id.* Patent Owner maintains this argument in its Patent Owner Response. PO Resp. 39–41.

Petitioner, in its Reply, argues that the combination of Dage and Kim323 is similar to the combination of Hassan and Birzl. Pet. Reply 20; *see supra* § II.C. Petitioner argues that “*Dage teaches starting a vehicle engine in response to receiving a remote start signal.*” *Id.* (citing Ex. 1010, 3:7–10, 2:66–3:3) (underlining omitted) (emphasis added). Petitioner also argues that “*Kim323 teaches generating a parking brake command in response to a remote parking brake signal.*” *Id.* (citing Ex. 1011, 6–7) (underlining omitted) (emphasis added). Petitioner explains that “[y]ou have to have both pieces that come together, the remote start signal of Dage, and the parking brake actuation in response to a remote signal of Kim323.” Tr. 15:18–20. Patent Owner responds that the adoption of “Petitioner’s rationale would require a POSA to mix and match signals from mutually exclusive prior art – that is, apply the remote braking signal in response to a remote braking command as in *Kim323* to also occur during a remote start in

response to a remote signal as in *Dage*.” PO Sur-Reply 7 (citing PO Resp. 39).

We agree with Patent Owner that the combination of *Dage* and *Kim323* fails to teach or suggest that the generation of the parking brake command is *in response to the remote start signal*. *Dage* discloses a system for controlling vehicle climate control with a remote start operation. Ex. 1010, 2:63–65; *see* Pet. 75. The system includes, among other things, a remote start controller, a climate controller, and a power-train control module, which are operatively coupled to each other via a data bus. Ex. 1010, 2:66–3:3; *see* Pet. 75. *Kim323* teaches “a method of locking and releasing an automotive parking brake system.” Ex. 1011, 8; *see* Pet. 76. *Kim323* describes a “wireless manipulation means” and “a controller that outputs a control signal for controlling” the brake pedal, a parking brake locking/releasing actuator and a shift lever actuator. Ex. 1011, 6. *Kim323* specifically discloses that “if the controller receives from the wireless manipulation means a manipulation signal for locking the parking brake, then it outputs a control signal for driving the parking brake locking/releasing actuator so as to lock the parking brake.” *Id.* at 7. That is, *Kim323* discloses generating a parking brake command in response to a signal for locking the parking brake.

Our findings are consistent with Petitioner’s positions – *Dage* discloses a remote start controller coupled to a data bus and *Kim323* discloses a controller for generating a parking brake command. Pet. 75–78; Tr. 14:3–15:23, 23:19–25:21. Petitioner’s combination is predicated on a determination that a person with ordinary skill in the art “would have found it obvious to generate *Kim323*’s parking brake command within *Dage*’s

controller, and transmit it over *Dage*'s data communications bus in response to a wireless remote start signal.” Pet. 78 (citing Ex. 1003 ¶ 221).

We, however, disagree with Petitioner that the combination of *Dage* and Kim323 discloses the generation of the parking brake command is *in response to the remote start signal*. That is, the combination of *Dage* and Kim323 fails to teach that when a remote start signal is received, a signal is sent to a brake controller, as disclosed by Kim323, to generate a brake command. While it may be possible to combine several different controllers on a data bus, there is no disclosure in the prior art that a start controller and brake controller will perform their respective functions in response to the same start signal. Dr. Eskandarian explains that “[a]t the very least, it would have been obvious to a person of ordinary skill in the art to generate a new control signal in response to a received wireless signal,” but fails to provide any further rationale or evidence that specifically a parking brake command signal is generated in response to a received remote start signal, as is required by independent claim 1. Ex. 1003 ¶ 221.

Independent claims 14 and 24 recite similar limitations as independent claim 1. Dependent claims 2–10, 12, 13, 15–23, and 25–31 incorporate this limitation by reference. Accordingly, we agree with Patent Owner that Petitioner has not demonstrated by a preponderance of the evidence that claims 1–10 and 12–31 are unpatentable under 35 U.S.C. § 103(a) as obvious over *Dage*, Kim323, Baier-Welt, Hammons, and Mauti.

III. CONCLUSION

Based on the information presented, we conclude that Petitioner has shown, by a preponderance of the evidence, that claims 1–31 of the '814 patent are unpatentable.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 5–11, 14, 18–24, 28–31	103	Hassan, Birzl	1, 5–11, 14, 18–24, 28–31	
2–4, 15–17, 25–27	103	Hassan, Birzl, Baier-Welt	2–4, 15–17, 25–27	
12	103	Hassan, Birzl, Baier-Welt, Kim437	12	
13	103	Hassan, Birzl, Baier-Welt, Mauti	13	
1, 6–10, 12, 14, 19– 24, 29–31	103	Dage, Kim323		1, 6–10, 12, 14, 19– 24, 29–31
2–4, 15–17, 25–27	103	Dage, Kim323, Baier-Welt		2–4, 15–17, 25–27
5, 18, 28	103	Dage, Kim323, Hammons		5, 18, 28
13	103	Dage, Kim323, Baier- Welt, Mauti		13
Overall Outcome			1–31	

IV. ORDER

After due consideration of the record before us, and for the foregoing reasons, it is:

ORDERED that claims 1–31 of the '814 patent are held unpatentable;

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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