

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALEO NORTH AMERICA, INC.; VALEO S.A;
VALEO GmbH; VALEO SCHALTER UND SENSOREN GmbH;
and CONNAUGHT ELECTRONICS LTD.,
Petitioner,

v.

MAGNA ELECTRONICS, INC.,
Patent Owner.

Case IPR2015-00251
Patent 8,676,491 B2

Before RICHARD E. RICE, JAMES A. TARTAL, and
BARBARA A. PARVIS, *Administrative Patent Judges*.

TARTAL, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

Petitioner Valeo North America, Inc., Valeo S.A., Valeo GmbH, Valeo Schalter und Sensoren GmbH, and Connaught Electronics Ltd., filed a Petition requesting an *inter partes* review of claims 1–20 of U.S. Patent No. 8,676,491 B2 (“the ’491 patent”). Paper 1 (“Pet.”). Patent Owner Magna Electronics, Inc. filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). We instituted an *inter partes* review of claims 13–15 as obvious under 35 U.S.C. § 103(a) over Lemelson,¹ Huang,² Kajimoto,³ and Toyoda.⁴ Paper 7.

After institution of trial, Patent Owner filed a Response (Paper 9, “PO Resp.”), to which Petitioner replied (Paper 10, “Reply”). Absent a request from either party, an oral hearing was not held. See Paper 16.

We have jurisdiction under 35 U.S.C. § 6(c). In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine that Petitioner has shown by a preponderance of the evidence that claims 13–15 are unpatentable.

II. BACKGROUND

A. *The ’491 Patent (Ex. 1001)*

The ’491 patent, titled “Driver Assist System for Vehicle,” issued March 18, 2014, from U.S. Application No. 14/033,963, filed September 23,

¹ U.S. Patent No. 6,553,130 B1 (“Lemelson,” Ex. 1004), issued April 22, 2003, from an application filed June 28, 1996.

² U.S. 2002/0011611 A1 (“Huang,” Ex. 1005), published January 31, 2002.

³ U.S. Patent No. 5,920,367 (“Kajimoto,” Ex. 1008), issued July 6, 1999, from an application filed October 10, 1997.

⁴ EP 1 022 903 A2 (“Toyoda,” Ex. 1006), published July 26, 2000.

2013. Ex. 1001. Petitioner contends, and Patent Owner does not dispute, that the earliest effective filing date of the '491 patent is January 22, 2002. Pet. 11–13. The '491 patent is directed to a driver assist system for a vehicle, including a camera and a video display screen viewable by a driver of the vehicle. Ex. 1001, Abstract. The video display screen displays a visual cue in conjunction with the captured image data. *Id.* During a reversing maneuver, image data from the camera is displayed to assist the driver in reversing the vehicle; and when not reversing, the display screen may display information associated with a navigational system, telematics system, or vehicle information system. *Id.* According to Patent Owner, “[t]he driver assist systems having electronically generated indicia overlaying the video image of the rearward scene described in the '491 patent were a significant advance over prior reversing systems.” PO Resp. 4 (citing Ex. 1001, 26:64–27:3); *see also* Ex. 2001 ¶¶ 6–7.

B. Illustrative Claim

Claim 13 of the '491 patent is independent and claims 14 and 15 depend from claim 13. Claims 13–15 of the '491 patent are reproduced below:

13. A driver assist system for a vehicle, said driver assist system comprising:
 - a CMOS camera disposed at a vehicle equipped with said driver assist system and having a field of view exterior of the equipped vehicle;
 - wherein said CMOS camera is mounted at the rear of the equipped vehicle;
 - a video display screen viewable by a driver of the equipped vehicle when the driver is normally operating the equipped vehicle, wherein said video display screen is operable to display images derived, at least in part, from

image data captured by said CMOS camera with a display intensity of at least about 200 candelas/sq. meter for viewing by the driver of the equipped vehicle;
wherein a visual cue is displayed by said video display screen in conjunction with display of said captured image data, said visual cue comprising an electronically-generated overlay;
wherein said visual cue at least one of (i) indicates distance to an object exterior of the equipped vehicle, (ii) indicates an intended path of travel of the equipped vehicle, (iii) indicates proximity to an object exterior of the equipped vehicle and (iv) highlights an object exterior of the equipped vehicle;
wherein, during a reversing maneuver of the equipped vehicle, image data captured by said CMOS camera is displayed by said video display screen as video images so as to assist the driver in reversing the equipped vehicle;
wherein, when a reversing maneuver of the equipped vehicle is not being executed, said display screen is operable to display information associated with at least one of (i) a navigational system, (ii) a telematics system and (iii) a vehicle information system; and
wherein said video display screen is disposed at one of (i) a windshield electronics module of the equipped vehicle, (ii) an instrument panel of the equipped vehicle and (iii) a console of the equipped vehicle.

14. The driver assist system of claim 13, wherein at least one of (a) said visual cue indicates at least one of (i) distance to an object exterior of the equipped vehicle and (ii) an intended path of travel of the equipped vehicle, and (b) said visual cue at least one of (i) highlights an object exterior of the equipped vehicle and (ii) highlights an object that the equipped vehicle is in jeopardy of colliding with.

15. The driver assist system of claim 13, wherein, responsive to detection of an object exterior of the equipped vehicle by at

least one of (i) non-visual object detection, (ii) ultrasonic object detection and (iii) image processing object detection, at least one of (a) the driver's attention is drawn to an object displayed by said video display screen and (b) said visual cue highlights an object displayed by said video display screen to draw the driver's attention to the displayed object.

Ex. 1001, 37:37–38:24.

III. ANALYSIS

A. *Claim Construction*

Only terms which are in controversy need to be construed, and then only to the extent necessary to resolve the controversy. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

1. “*at least one of*”

Petitioner contends that, as used in the '491 patent, “at least one of” a series of elements was intended to signify a disjunctive list of alternatives, not a requirement of one of each element listed. Pet. 14–17. Petitioner contrasts this interpretation of “at least one of” from that applied in *SuperGuide Corp. v. DirecTV Enter., Inc.*, 358 F.3d 870, 885–88 (Fed. Cir. 2004) (requiring “at least one of” each identified element), and supports its contention by identifying portions of the specification that make clear the listed elements are disjunctive alternatives. Pet. 15–16. Patent Owner does not address the claim term. For the reasons provided by Petitioner, we are persuaded that “at least one of” is used in the '491 patent to identify a disjunctive list of alternatives.

2. “*display intensity*”

Petitioner contends “display intensity” should be construed to mean “luminance” because the '491 patent describes values for “display intensity”

in candelas/sq. meter, the International System of Units (“SI”) units for luminance. Pet. 17. Patent Owner does not dispute Petitioner’s contention. See PO Resp. 4; Ex. 2001 ¶ 19. We agree with Petitioner that “display intensity,” as used in the ’491 patent, is synonymous with “luminance.”

3. “electronically-generated overlay”

Patent Owner contends that “electronically-generated overlay” should be construed to mean “electronically-generated indicia superimposed upon and overlaying a displayed video image.” PO Resp. 5. Patent Owner’s proposed construction does not address “electronically-generated,” therefore, we understand Patent Owner to argue that “overlay,” used as a noun, should be construed to mean “indicia superimposed upon and overlaying a displayed video image.”

Patent Owner seeks to insert “superimposed” into the claim language by arguing that there is a statement in the specification that “a distance grid can be *electronically superimposed upon the video image*.” PO Resp. 5 (quoting Ex. 1001, 27:17–26). Had Patent Owner shown there is a difference between “overlay” and “indicia superimposed,” we would not have been persuaded to adopt Patent Owner’s proposed construction because limitations are not imported into a claim from the written description. *SuperGuide*, 358 F.3d at 875 (“[t]hough understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim limitations that are not part of the claim”). In this case, however, there is no substantive dispute between the parties over the meaning of “overlay” as it relates to “superimposed.” Petitioner, in reply, proposes a construction of “overlay” as “a permanent or

temporary layer of graphic matter to be superimposed on other displayed matter.” Reply 7. Petitioner notes an ordinary and customary definition of “overlay,” as a noun, is “a transparent sheet containing graphic matter to be superimposed on another sheet.” *Id.* at 6 (quoting Ex. 1019). Thus an “overlay” and “matter to be superimposed” mean the same thing. For the foregoing reasons, to the extent Patent Owner implies any difference between “overlay” and “matter to be superimposed” by including both “superimposed upon” as well as “overlying” in its proposed construction of “overlay,” we are not persuaded. In sum, we determine that “electronically-generated overlay” does not require an express definition, and we apply its ordinary and customary meaning.

B. Obviousness Over Lemelson and Other Asserted Prior Art

Petitioner contends that claims 13–15 are unpatentable as obvious over Lemelson, Huang, Kajimoto, and Toyoda. According to Petitioner, Lemelson discloses “virtually the entirety of the claimed inventions,” but for “trivial matters of design choice.” Pet. 18. Petitioner’s contentions are supported by the Declaration of Dr. Ralph V. Wilhelm (Ex. 1011), and a second Declaration from Dr. Wilhelm filed in reply (Ex. 1018).⁵ In

⁵ According to Patent Owner, Dr. Wilhelm’s Declaration should be afforded no weight because his opinions consider whether a claim “would *more likely than not* have been obvious” to a person of ordinary skill, rather than whether the subject matter “*would have been* obvious.” PO Resp. 40–42. According to Petitioner “Dr. Wilhelm merely combined into a single statement the standard for determining obviousness (whether the claimed subject matter as a whole would have been obvious to a [person of ordinary skill in the art]) with the preponderance of the evidence (i.e., more likely than not) burden of proof applicable in this inter partes review.” Reply 2. We find no merit to Patent Owner’s contention that an expert’s testimony is

opposition to Petitioner's contentions, Patent Owner relies on the Declaration of Dr. Matthew A. Turk. Ex. 2001.

1. *Scope and Content of the Prior Art*

(a) *Lemelson (Ex. 1004)*

Lemelson, titled "Motor Vehicle Warning and Control System and Method," describes a system and method that use a camera mounted on a vehicle to scan the roadway to assist the driver of a vehicle in preventing or minimizing accidents. Ex. 1004, Abstract. An image-analyzing computer processes the video picture signals generated by the camera to generate codes that serve to identify obstacles. *Id.* A decision computer in the vehicle receives code signals from the image analyzing computer, as well as the speedometer or other sensors, to generate control signals. *Id.* The code signals may be displayed, and sound generation or warning means used to warn the driver of approaching and existing hazards. *Id.* The control signals may be used to operate the brakes and steering of the vehicle to lessen the effects of a collision. *Id.* The video camera of Lemelson is "preferably a CCD array camera." *Id.* at 6:31–32.

(b) *Huang (Ex. 1005)*

Huang, titled "CMOS Image Sensor and Method of Manufacture," describes a complementary metal-oxide-silicon (CMOS) image sensor structure. Ex. 1005, Abstract, ¶ 2. Huang states that most conventional sensors have a charge couple device (CCD) that transforms light energy into

entitled to no weight merely because his opinions discuss what, more likely than not, would have been obvious to a person of ordinary skill.

electrical signals. *Id.* ¶ 4. According to Huang, a CMOS image sensor is a substitute for a CCD and provides a lower production cost and reduced power consumption. *Id.* Huang explains that:

Most conventional image sensors have a charge couple device (CCD) that transforms light energy into electrical signals. Magnitude of the electrical signal generated normally reflects the intensity of light impinging upon the CCD. Image sensors have a broad spectrum of applications including monitors, cameras and video recorders. However, due to production cost and bulkiness of CCD, less expensive product such as a CMOS image sensor using conventional CMOS semiconductor technologies is a substitute. Besides having a lower production cost, CMOS image sensors generally have very low power consumption. Moreover, the number of components and size of a CMOS image sensor can be further reduced through higher level integration of circuits.

Ex. 1005 ¶ 4.

(c) *Kajimoto (Ex. 1008)*

Kajimoto, titled “Liquid Crystal Display Device,” describes a liquid crystal display device that provides improved visibility in a transmitting mode and reflecting mode irrespective of surrounding brightness. Ex. 1008, 3:44–47. Kajimoto states that “the liquid crystal display device of the present invention is characterized in that, preferably, luminance of the displaying surface of the liquid crystal panel is in a range of not less than 5 [candelas/sq. meter] and not more than 200 [candelas/sq. meter] when the illuminating means is lighted.” *Id.* at 15:61–65.

(d) *Toyoda (Ex. 1006)*

Toyoda, titled “Apparatus for assisting steering of vehicle when backing,” describes a camera, monitor, angle sensor, obstacle sensors, an image processing unit, a controller, and a monitor controller used to allow a

driver to refer to guidance marking on a monitor screen to easily back the vehicle to a desired position. *See* Ex. 1006, Abstract. When the vehicle shift lever is shifted to a reverse position, the monitor shows the image captured by the camera of the view from the vehicle rear. *Id.* ¶¶ 14–15.

2. *Level of Skill in the Art*

In the Petition, Petitioner refers to the Declaration of Dr. Wilhelm as providing his opinion of the level of skill of a person having ordinary skill in the art at the time of the invention. Pet. 8 (citing Ex. 1011 ¶¶ 17–21).

According to Dr. Wilhelm, a person of ordinary skill in 2002 would have had: (1) “at least a bachelor’s degree in electrical engineering, computer science, or physics, and would have had at least 2-5 years of experience with human factors for automotive design, i.e., for how humans interact with a display in a vehicle;” and (2) “a working understanding of microprocessor-driven controls for displays, actuators, and elementary decision making, and would have been comfortable working in a systems environment relating to instrumentation displays for new vehicles.” Ex. 1011 ¶¶ 20–21.

Patent Owner argues that Petitioner has failed to set forth how the claims are unpatentable because “the Petition does not resolve the level of ordinary skill in the art.” PO Resp. 26–28. We disagree.

Patent Owner fails to identify any substantive deficiency in the level of ordinary skill in the art articulated by Dr. Wilhelm, upon which the Petition relies. *See* Pet. 8. Patent Owner’s expert, Dr. Turk, states that a person of ordinary skill “would have had at least a Bachelor’s degree in electrical, electronic, or mechanical engineering, or equivalent experience, and at least two years of experience in the relevant field, such as imaging

systems for vehicles.” Ex. 2001 ¶ 12. Contrary to Patent Owner’s unsupported argument that the level of ordinary skill in the art is unresolved, Dr. Turk’s testimony is largely consistent with Dr. Wilhelm’s testimony, and Patent Owner does not argue otherwise. We further agree with Petitioner that the patentability of the claims does not turn on whether Dr. Wilhelm’s or Dr. Turk’s express identification of the level of ordinary skill is adopted. See Reply 19.

Moreover, it is well-settled that the level of ordinary skill in the art may be reflected by the prior art of record. *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). A person of ordinary skill is presumed to be aware of all pertinent prior art. *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985); *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1449–54 (Fed. Cir. 1984). We find the level of ordinary skill in the art to be evidenced by the references themselves.

3. *Differences Between the Claimed Subject Matter and the Prior Art*

(a) *Obviousness Over Lemelson, Huang, Kajimoto, and Toyoda*

Petitioner asserts that independent claim 13 and claims 14 and 15, which depend from claim 13, are unpatentable as obvious over Lemelson, Huang, Kajimoto, and Toyoda. Pet. 18–19. Petitioner contends that Lemelson discloses nearly all of the features of claims 13–15, with the only substantive difference being a camera specifically identified as a CMOS camera, as disclosed by Huang, and a video display screen specifically

identified as providing a display intensity of at least about 200 candelas/sq. meter, as disclosed by Kajimoto. *Id.* at 18. Petitioner further relies on the express teachings of Toyoda to confirm what it contends is implicit in Lemelson with regard to using the vehicle's transmission to switch the in-vehicle display to a rear-facing camera when the vehicle is put into reverse. *Id.* at 18–19. Petitioner provides a claim chart identifying how each feature of each claim is disclosed by the asserted references, with which we agree. *Id.* at 40–46.

(i) *Claim 13*

There is no dispute that Lemelson discloses a driver assist system for a vehicle, including a camera with an exterior field of view. More particularly, claim 13 requires that a “CMOS camera is mounted at the rear of the equipped vehicle.” While Lemelson preferably relies upon a CCD array camera, not a CMOS camera, there is no dispute that Huang discloses the claimed feature of a CMOS camera.

Patent Owner argues that Petitioner failed to identify a disclosure in Lemelson of a camera specifically “mounted at the rear of the equipped vehicle,” as claimed. PO Resp. 12–16, Ex. 1001, 37:42–43. Petitioner relies on Lemelson as teaching that “video scanning . . . may be . . . employed to identify and indicate distances between the controlled vehicle and objects . . . to the rear of the controlled vehicle.” Pet. 40–41. Lemelson also teaches “[m]ultiple cameras may be used for front, side and rear viewing.” Ex. 1004, 6:36–37. We find unpersuasive Patent Owner's argument that Petitioner's evidence is insufficient to show that Lemelson teaches and suggests a rearview camera mounted at the rear. We further find Patent

Owner's argument disregards the knowledge of one of ordinary skill in the art and basic common sense, which further establish the obviousness of placing a camera for "rear viewing," as disclosed by Lemelson, at the "rear of the equipped vehicle," as claimed. In an obviousness analysis, it is not necessary to find precise teachings in the prior art directed to the specific subject matter claimed because inferences and creative steps that a person of ordinary skill in the art would employ can be taken into account. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

There also is no dispute that Lemelson discloses a video display screen viewable by a driver when operating the vehicle, however, Lemelson does not expressly state that its screen has "a display intensity of at least about 200 candelas/sq. meter," as claimed. We agree with Petitioner that Kajimoto describes such a screen. *See* Pet. 21–23, 41 (citing Ex. 1008, 1:10–20, 15:61–65 (stating that "luminance of the displaying surface of the liquid crystal panel is in a range of not less than 5 [candelas/sq. meter] and not more than 200 [candelas/sq. meter] when the illuminating means is lighted")). Petitioner argues that because the claimed range and disclosed range touch or overlap, the claimed range is obvious. Pet. 23 n.6. Notwithstanding the fact that the ground raised by Petitioner is whether claim 13 is unpatentable as obvious, Patent Owner argues that "cases relating to the anticipation of ranges should actually be applied," because Petitioner argues Kajimoto expressly discloses the recited feature. PO Resp. 18–20. Because the ground is obviousness, we are not persuaded by Patent Owner that cases relating to anticipation should be applied. We also are not persuaded by Patent Owner that Kajimoto's disclosure of a display with a

luminance of “not more than 200 [candelas/sq. meter]” fails to disclose or render obvious the claimed display luminance of “at least about 200 candelas/sq. meter,” or that Kajimoto teaches away from the claimed value. *Id.* at 20–21. Simply stated, “not more than” and “at least about” 200 candelas/sq. meter both include a disclosure of the same value — 200 candelas/sq. meter. That the ’491 patent also describes higher luminance values than 200 candelas/sq. meter as “more preferably” has no bearing on what the claim language requires, and does not support the notion that Kajimoto “teaches away” from the claimed value. We also agree with Petitioner, and Patent Owner does not dispute, that the “dashboard display” of Lemelson corresponds to the claimed video display screen disposed at “an instrument panel of the equipped vehicle.” *See* Pet. 44 (quoting Ex. 1004, 5:55–56).

Claim 13 further requires a “visual cue” displayed on the video display screen “comprising an electronically-generated overlay” that, either

- (i) indicates distance to an object exterior of the equipped vehicle,
- (ii) indicates an intended path of travel of the equipped vehicle,
- (iii) indicates proximity to an object exterior of the equipped vehicle, or
- (iv) highlights an object exterior of the equipped vehicle.

Petitioner asserts, and we agree, that this feature is taught by Lemelson, which states:

The image display may include highlighting of hazards, special warning images such as flashing lights, alpha-numeric messages, distance values, speed indicators and other hazard and safety related messages. Simulated displays of symbols representing the hazard objects as well as actual video displays may also be used to enhance driver recognition of dangerous situations.

Pet. 28 (quoting Ex. 1005, 6:49–55).

Patent Owner's argument that Lemelson does not disclose that the visual cue is "an electronically-generated overlay" are not persuasive. See PO Resp. 6–12. First, Patent Owner identifies no support from the '491 patent for its proposition that "visual cue" should be read "to require the likes of guidelines or other markings," other than Dr. Turk's testimony, which is speculative, conclusory, and based on no identified information or evidence. See PO Resp. 6; Ex. 2001 ¶ 26. To the contrary, the claim language only requires that the "visual cue" be an "electronically-generated overlay," and that such an overlay includes any one of an indication of "distance to an object," "proximity to an object," or "highlights an object," in addition to "an intended path of travel." Patent Owner's proposed restriction of "electronically-generated overlay" to "guidelines or other markings" is inconsistent with the express scope of the claims. See PO Rep. 7.

Next, with regard to "an electronically-generated overlay," Patent Owner argues that Lemelson's disclosure of visual cues, including distance values, *could be* displayed separate from the video images, for example, "above or below or to the left or right." *Id.* Again, Patent Owner's argument is supported only by the speculation of Dr. Turk. See Ex. 2001 ¶ 28. Patent Owner's argument is not supported by the disclosure of Lemelson, which states that the image display may *include* distance values, and further fails to address what would have been obvious, arguing instead that any number of undisclosed configurations was possible. Additionally, Lemelson states that the "image display may include the highlighting of hazards," and "simulated displays of symbols representing the hazard

objects as well as actual video displays.” Ex. 1004, 6:49–55. Patent Owner offers no plausible reason why the highlighting, symbols, and distance information Lemelson describes as being displayed on the video display would be understood by one of ordinary skill to mean anything but that it overlays the image data. *See* Ex. 2001 ¶¶ 25–32. Nor has Patent Owner identified anything in Lemelson to suggest that the visual alerts appear on a split screen or above, below, to the left, or to the right of the image data. *See id.* Likewise, Patent Owner fails to identify anything in Lemelson to support its argument that the visual cues disclosed by Lemelson might not overlay image data because it “could mask, confuse, or obscure image data in the video images,” or because it might not be “simultaneously displayed.” *See* PO Resp. 7–8, 10. For example, Patent Owner offers no plausible explanation of how an object could be highlighted in a video image, as disclosed by Lemelson, *without* using an overlay. We find more persuasive Dr. Wilhelm’s testimony that Lemelson discloses to one of ordinary skill the claimed “electronically-generated overlay.” *See* Ex. 1018 ¶¶ 16–29.

Finally, concerning the claimed “electronically-generated overlay,” Patent Owner argues Petitioner fails to provide an explanation as to how the quoted language can be viewed as disclosing the claimed “electronically-generated overlay” feature. PO Resp. 11–12. Similarly, Patent Owner argues that Lemelson does not disclose that symbols overlay the video, and that it could be a split screen. *See id.* at 10–11. The question of obviousness is not whether Lemelson recites the exact words of the claim in the order of the claim, but what a person of ordinary skill in the art, who is also a person of ordinary creativity (*see KSR*, 550 U.S. at 421) would have appreciated

from the teachings of Lemelson. Dr. Wilhelm’s testimony supports Petitioner’s contention that Lemelson discloses to one of ordinary skill in the art the ability to graphically overlay information onto the video image displayed to the driver. *See* Ex. 1011 ¶ 34. For the reasons provided above, we agree with Petitioner that Lemelson discloses an “electronically-generated overlay,” as claimed.

As to whether the electronically-generated overlay of Lemelson indicates “distance to an object exterior of the equipped vehicle,” as claimed, Patent Owner argues, notwithstanding the fact that Lemelson is directed to a system to assist the driver of a vehicle in preventing accidents, that the “distance values” described in the “cited portions” of Lemelson could mean any of a number of other things, such as the distance traveled on a trip or the odometer mileage. PO Resp. 16–17. We find Dr. Turk’s testimony in support of Patent Owner’s argument to be unsupported and not credible because it fails to address either the disclosure of Lemelson, as a whole, or the specific disclosure in context. *See* Ex. 2001 ¶ 41. Indeed, Lemelson makes absolutely clear that it is referring to “distance to an object,” as claimed:

The preferred form of the invention provides audible and/or visual display means to cooperate in indicating to the driver of a motor vehicle both normal and hazardous road conditions ahead as well as driving variables such as distances to stationary objects, and other vehicles; the identification, direction of travel and speed of such other vehicles, and the identification of and distances to stationary or slowly moving objects such as barriers, center islands, pedestrians, parked cars poles, sharp turns in the road and other conditions.

Ex. 1004, 2:24–34. We agree with Petitioner that the discussion of “distance values” in Lemelson in the same sentence with “highlighting of hazards” and “special warning images” in the portion of Lemelson cited by Petitioner conveys to one of ordinary skill in the art that Lemelson is describing “distance to an object exterior of the equipped vehicle,” as claimed. See Reply 15–16 (citing Ex. 1018 ¶¶ 30–33).

Claim 13 also requires that “during a reversing maneuver” the video display screen displays image data captured by the rearview camera, and that when “a reversing maneuver” is not being executed, the display screen is operable to display information associated with (i) a navigational system, (ii) a telematics system, or (iii) a vehicle information system (together, the “reversing-display” feature). Petitioner contends Lemelson implicitly discloses the “reversing-display” feature, and that Toyoda further expressly confirms that such a feature was known in the art. Pet. 18–19. With regard to Lemelson, the question of obviousness does not turn on whether Lemelson recites the exact words of the claim in the order of the claim, but what a person of ordinary skill in the art, who is also a person of ordinary creativity, would have appreciated from the teachings of Lemelson. See *KSR*, 550 U.S. at 421. There is no dispute that Lemelson discloses a system that uses cameras and a display to warn a driver of hazardous conditions ahead of the vehicle (Ex. 1004, 2:14–23), as well as a system using multiple cameras for front, side, and rear viewing “to further improve hazard detection capabilities” (*id.* at 6:37–42). Lemelson also discloses that the display may be used as a navigational system. Ex. 1004, 15:45–67.

Patent Owner disputes the sufficiency of Lemelson’s disclosure with respect to a “reversing maneuver,” but fails to explain what is missing from Lemelson, or what aspect of any claimed feature would not have been obvious to one of ordinary skill in light of all that Lemelson teaches. *See* PO Resp. 39–40. We agree with Petitioner that one of ordinary skill in the art would have understood from Lemelson that, when a purpose of Lemelson is to avoid hazards, common sense dictates that the driver display would switch from other information to display image data from a rearview camera when the vehicle is operated in reverse “during a reversing maneuver,” as claimed. *See* Pet. 19; *see also* Ex. 1011 ¶¶ 42–44.

Additionally, we further agree with Petitioner that Toyota also expressly discloses operation of the display during a reversing maneuver, precisely as claimed. *See* Pet 25–26. Toyota explains:

[A] vehicle 1 has a monochrome camera 2 for capturing the view from the vehicle rear. . . . A monitor 4 for showing the image captured by the camera 2 is located in the passenger compartment of the vehicle 1. The monitor 4 is a color liquid crystal display and is also used as the monitor of a navigation system. The monitor 4 is normally used as the navigation system monitor. When a shift lever 5 is shifted to a reverse position, the monitor 4 shows the image captured by the camera 2.

Ex 1006 ¶¶ 14–15.

Patent Owner does not dispute the substance of Toyota’s disclosure, but instead argues that Petitioner “fails to explain any relationship between when the vehicle is, or is not, engaged in a “reversing maneuver.” PO Resp. 39. We see no need for further explanation to establish that “during a reversing maneuver” encompasses an operation that occurs when the vehicle is in reverse. Indeed, Patent Owner does not explain what else it could

possibly mean and fails to address what Lemelson and Toyoda actually disclose, but instead relies on an unsupported assertion that Petitioner's evidence is insufficient. To be clear, the burden is on Petitioner to show unpatentability, and, here, Petitioner has shown that the claimed features were disclosed and would have been obvious. *See* Pet. 18–19, 25–27, 42–43. Lemelson discloses a display for a driver assist system that may also be used as a navigational system. Ex. 1004, 15:45–67. Toyoda confirms that it was well known to switch the display to the rear view camera when the vehicle is operated in reverse. Ex 1006 ¶¶ 14–15. Patent Owner's conclusory argument that Petitioner's "piecemeal analysis" is insufficient does not persuasively rebut Petitioner's evidence of obviousness and the knowledge of one of ordinary skill in the art.

(ii) Claim 14

With regard to claim 14, we agree with Petitioner that Lemelson discloses a visual cue that provides "distance to an object exterior of the equipped vehicle," and that "highlights an object exterior of the equipped vehicle," as claimed. *See* Pet. 44 (citing Ex. 1004, 6:49–51). Patent Owner disputes this based on the same arguments raised with respect to claim 13, which we find not persuasive for the reasons discussed above. *See* PO Resp. 22.

(iii) Claim 15

Claim 15 further requires, among various alternatives, that "responsive to detection of an object exterior of the equipped vehicle by . . . non-visual object detection, . . . the driver's attention is drawn to an object displayed by said video display screen." We agree with Petitioner that

Lemelson discloses “non-visual object detection” (see Pet. 45 (quoting Ex. 1004, 5:67–6:8; see also *id.* at 6:5–8 “video scanning and radar or lidar scanning may be jointly employed to identify and indicate distances between the controlled vehicle and objects ahead of, to the side(s) of, and to the rear of the controlled vehicle”). We also agree with Petitioner that Lemelson further explains that various features of the image display (“highlighting of hazards,” “simulated displays of symbols”) may be used to enhance driver recognition of dangerous situations. Pet. 45–46 (quoting Ex. 1004, 6:49–55). Patent Owner argues that “[t]hese separate portions of Lemelson do not together disclose that the highlighting of hazards is responsive to non-visual object detection.” PO Resp. 23. According to Patent Owner, as supported by Dr. Turk, Lemelson discloses radar or laser range signals that can be interpreted to “determine distances between the controlled vehicle and object,” not the “detection of objects,” as claimed. *Id.* at 22–24 (citing Ex. 2001 ¶ 50). Patent Owner does not explain how the distance to an object can be determined without “detection” of the object, and we discern none. We are persuaded that Petitioner has shown that a person of ordinary skill in the art would have understood Lemelson to disclose the claimed features of “non-visual object detection” and drawing the “driver’s attention,” as claimed. See Reply 17–18; see also Ex. 1018, 35–36.

In consideration of the evidence and arguments presented in the Petition, Patent Owner’s Response, and Petitioner’s Reply regarding claims 13–15, we agree with Petitioner that the combination of Lemelson, Huang, Kajimoto, and Toyoda discloses every limitation of each of those claims as shown in the Petition. See Pet. 40–44.

(b) *Reason to Combine*

Petitioner must articulate sufficient reasoning with rational underpinnings to support the asserted combination of references. *See In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (cited with approval in *KSR*, 550 U.S. at 418). We agree with Petitioner that Lemelson discloses all of the claimed features of the challenged claims of the '491 patent other than specifically requiring that the camera be a CMOS camera, as disclosed by Huang, and that the explicit luminance value for the in-vehicle display provide a display intensity of at least about 200 candelas/sq. meter, as disclosed by Kajimoto. In this case, Petitioner's rationale for the asserted combination is not, and need not be, complex. A combination "of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." *KSR*, 550 U.S. at 401. Moreover, as noted above, in an obviousness analysis, it is not necessary to find precise teachings in the prior art directed to the specific subject matter claimed because inferences and creative steps that a person of ordinary skill in the art would employ can be taken into account. *KSR*, 550 U.S. at 418.

To the extent Patent Owner argues that Petitioner was required to provide reasons to combine different sections of Lemelson, we disagree. *See, e.g.*, PO Resp. 30. "A reference may be read for all that it teaches, including uses beyond its primary purpose." *In re Mouttet*, 686 F.3d 1322, 1331 (Fed. Cir. 2012) (citing *KSR*, 550 U.S. at 418–421). In this case, merely referring to different sections of Lemelson that address a common driver assist system does not create the need to articulate a rationale for combining those sections.

Petitioner also persuasively has shown that a rationale for using the CMOS camera of Huang in place of the CCD array camera of Lemelson is provided by Huang's disclosure that a CMOS camera is a lower cost, less bulky substitute for a CCD array camera. Pet. 20, 40; *see also* Ex. 1005 ¶ 4 (“due to production cost and bulkiness of CCD, less expensive product such as a CMOS image sensor using conventional CMOS semiconductor technologies is a substitute,” and “CMOS image sensors generally have very low power consumption”); Ex. 1011 ¶ 40 (“while Lemelson (Ex. 1004) discloses a CCD array camera, by January 2002 CMOS image sensors would have been preferred by a PHOSITA for the reasons stated in Huang (Ex. 1005) at [0004], as quoted in the claim chart”). “If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, §103 likely bars its patentability.” *KSR*, 550 U.S. at 401.

Additionally, Petitioner persuasively has shown that a rationale for using the display of Kajimoto in place of the display of Lemelson is provided by Kajimoto's disclosure that its LCD display featured, in addition to the recited luminance, light weight, and low power consumption. Pet. 21, 41; *see also* Ex. 1008, 1:10–20 (“In recent years, due to its light weight and low power consumption, a liquid crystal display device has been used in a variety of fields,” including as “an information display device for use in (a) instruments of a car”); Ex. 1011, ¶ 41 (“While Lemelson does not specifically identify the type of in-vehicle display used in the disclosed prior art driver assist system, Kajimoto (Ex. 1008) not only discloses the claimed TFT LCD, but also teaches the advantages of using such a display device as

an information display in a car. No independent self-motivation or combinatorial skill of the PHOSITA was required, as Kajimoto instructs the use of the TFT LCD display having luminance suitable for such applications in a car”).

While we agree with Petitioner that Lemelson suggests an in-vehicle display that switches to the rear-facing camera when the vehicle is in reverse, Petitioner also has shown persuasively that Toyoda provides an express disclosure of this element as a conventional feature. Pet. 19, 25–26, 42. As explained in *KSR*:

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense.

550 U.S. at 402–03. The activation of a display of a rear view camera when a vehicle is in reverse as part of a system to assist the driver of a motor vehicle in preventing accidents, as described by Lemelson, is the epitome of common sense. “A person of ordinary skill is also a person of ordinary creativity, not an automaton.” *KSR*, 550 U.S. at 421. As explained by Dr. Wilhelm, a person of ordinary skill “would only have needed to do what was already conventional and taught by Toyoda . . . in the event Lemelson itself is not viewed or understood to have actually disclosed this mode of operation of the rearward-facing camera and display when the vehicle is moving in reverse.” Ex. 1011 ¶ 42.

Patent Owner contests the sufficiency of Petitioner’s rationale, but does not provide any substantive argument or evidence against the

combinability of the asserted references, as shown by Petitioner. *See* PO Resp. 28–43. Patent Owner generically argues that Petitioner “engages in a piecemeal analysis,” “fails to examine the subject matter of the invention as a whole,” “fails to show why a [person of ordinary skill] would have combined the proposed art, and “fails to identify how the construed claims are unpatentable.” PO Resp. 28. Patent Owner also argues that Petitioner fails to articulate “how the specific references could be combined, which combination of elements can be made, or how the combination would operate to read on the challenged claims.” *Id.* at 30. Patent Owner further argues that “the claim charts must be ignored in their entirety,” that Dr. Wilhelm’s statements are conclusory, that no motivation for the combination was shown, and that there was no identification of “how the construed claims are unpatentable.” PO Resp. 32–40. Patent Owner’s arguments are repeated by Dr. Turk, but not further expanded upon or supported by persuasive evidence. *See* Ex. 2001 ¶ 57 (“The limited analysis provided by [Petitioner] is not sufficient to persuade me that all of the limitations of independent claim 13 and dependent claims 14 and 15 are disclosed or suggested by the combination of asserted references.”); *see also id.* ¶¶ 56–67.

Patent Owner’s arguments fail to address affirmatively the combination of prior art asserted, and offer no explanation, for example, of why Petitioner’s proposed simple substitution of one known element, such as the camera disclosed by Lemelson, for another known element, such as the camera disclosed by Huang, is insufficient, particularly where Petitioner has shown that the camera of Huang was a lower cost and less bulky

alternative to the camera of Lemelson. Contrary to Patent Owner's arguments, we discern no "impermissible hindsight" in the asserted combination, which relies on a combination of "familiar elements according to known methods" which yield the predictable result of improving the driver assist system of Lemelson with a preferable camera and a preferable display with sufficient luminance. *See KSR*, 550 U.S. at 401. For all of the reasons discussed above, we conclude Petitioner has provided sufficient rationale for the asserted combination of Lemelson, Huang, Kajimoto, and Toyota.

4. *Secondary Considerations of Nonobviousness*

Patent Owner offers no evidence of secondary considerations in support of nonobviousness.

C. *Conclusion*

For the foregoing reasons, after considering the Petition, Patent Owner's Response, Petitioner's Reply, and all evidence relied upon by Petitioner and Patent Owner, we are persuaded that Petitioner has shown by a preponderance of the evidence that claims 13–15 would have been obvious over Lemelson, Huang, Kajimoto, and Toyota.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 13–15 of the '491 patent are held unpatentable; and

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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