

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 IPR2014-01208
Patent 7,991,522 B2

Before JAMESON LEE, PHILLIP J. KAUFFMAN, and
MATTHEW R. CLEMENTS, *Administrative Patent Judges.*

KAUFFMAN, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Valeo, North America, Inc., Valeo S.A., Valeo GmbH, Valeo Schalter und Sensoren GmbH, and Connaught Electronics Ltd. (collectively, “Petitioner”) filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 2–5, 7, 11, 12, 16–26, 28, 32–35, 37, 40, and 44–46 of U.S. Patent No. 7,991,522 B2 (Ex. 1001, “the ’522 patent”). Patent Owner, Magna Electronics, Inc., filed a timely Preliminary Response (Paper 6, “Prelim. Resp.”). After considering the record to this point in the proceeding, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to claims 2, 3, 5, 7, 11, 12, 18, 19, 21–26, 28, 32–35, 37, 40, and 44–46 of the ’522 patent, but Petitioner has not made such a demonstration with respect to claims 4, 16, 17, and 20. *See* 35 U.S.C. § 314.

II. BACKGROUND

A. *Related Proceedings*

1. *Prior Petition*

Petitioner previously filed a petition for *inter partes* review of the ’522 patent challenging claims 1–50, and we instituted with regard to claims 1, 6, 8–10, 13–15, 27, 29–31, 36, 38, 39, 41–43, and 47–50. *Valeo, Inc. v. Magna Elects., Inc.*, Case IPR2014-00221, slip op. at 2 (PTAB May 29, 2014) (Paper 13) (“the 221 Decision to Institute”).¹ Thus, the Petition at hand challenges the claims that were challenged but not instituted in the 221 IPR. Pet. 1.

¹ The 221 Decision to Institute is filed as Ex. 1004 of the proceeding at hand. We refer that proceeding in general as “the 221 IPR.”

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2. *Other Inter Partes Reviews*

The '522 patent is a continuation of application 12/764,355, now U.S. Patent No. 7,877,175 B2, which is the subject of *inter partes* reviews, also filed by Petitioner, designated IPR2014-00227 and IPR2014-01206.

Related U.S. Patent No. 8,386,114 B2 is a subsequent continuation of the application that matured into the '522 patent, and is the subject of *inter partes* reviews, also filed by Petitioner, designated IPR2014-00222 and IPR2014-01204.²

3. *Alleged Infringement*

Patent Owner asserted the '522 patent against Petitioner in *Magna Electronics Inc. v. Valeo, Inc.*, No. 2:13-cv-11376-DRG (filed on Mar. 28, 2013) (E.D. Mich.). Pet. 3; Paper 5, 2.

² U.S. Patent No. 8,386,114 B2 was also challenged in IPR2014-00223; however, the Board did not institute *inter partes* review.

B. Asserted Grounds and Prior Art

Petitioner asserts the following grounds of unpatentability under 35 U.S.C. § 103:

Claims Challenged	References
2–5, 7, 11, 12, 28, 32 – 35, 37, 40, 44–46	Nissan ³ and Hitachi ⁴
18, 21, 25, 26	Nissan, Hitachi, and Gutta ⁵
16	Nissan, Hitachi, and either Ohtsuka ⁶ or Broggi II ⁷
17	Nissan, Hitachi, and Ohtsuka
19, 23, 24	Nissan, Hitachi, and Broggi ⁸
20	Nissan, Hitachi, Sun ⁹ , and Bos ¹⁰
22	Nissan, Hitachi, and either Gutta or Breed ¹¹

³ Ex. 1002, JP 2004-1658 (Jan. 8, 2004). We refer to the English translation (Ex. 1003) throughout.

⁴ Ex. 1013, JP 2002-74339 (Mar. 15, 2002).

⁵ Ex. 1005, US 6,424,273 B1 (July 23, 2002).

⁶ Ex. 1015, US 6,570,998 (May 27, 2003).

⁷ Ex. 1009, Alberto Broggi et al., AUTOMATIC VEHICLE GUIDANCE: THE EXPERIENCE OF THE ARGO AUTONOMOUS VEHICLE (1999).

⁸ Ex. 1006, Alberto Broggi et al., *Multi-Resolution Vehicle Detection Using Artificial Vision*, 2004 IEEE INTELLIGENT VEHICLES SYMP. 310.

⁹ Ex. 1008, Zehang Sun, et al., *On-Road Vehicle Detection Using Optical Sensors: A Review*, 2004 IEEE INT’L CONF. ON INTELLIGENT TRANSP. SYS. 1.

¹⁰ Ex. 1011, US 6,313,454 (Nov. 6, 2001).

¹¹ Ex. 1014, US 2002/0005778 A1 (Jan. 17, 2002).

C. *The '522 Patent*

The '522 patent relates generally to vision or imaging systems for vehicles and, more particularly, to imaging systems that are operable to determine if a vehicle or object of interest is adjacent to, forward of, or rearward of the subject vehicle to assist the driver in changing lanes or parking the vehicle. Ex. 1001, col. 1, ll. 18–23. The prior art included many lane change aid/side object detection/lane departure warning devices or systems, and the like, that are operable to detect a vehicle, or other object, that is present next to, ahead of, or rearward of the equipped vehicle or in a lane adjacent to the equipped vehicle. *Id.* at col. 1, ll. 29–33. Such known systems statistically analyze all of the pixels in a pixelated image. *Id.* at col. 1, ll. 48–51. However, because such systems continuously analyze every pixel for every frame captured, they require expensive processing controls and computationally expensive software to continuously handle and process substantially all of the data. *Id.* at col. 1, ll. 60–67. In addition, prior art warning systems may result in a warning for many intended maneuvers. *Id.* at col. 2, ll. 19–24. As a result, the driver may begin to ignore the warnings. *Id.* at ll. 25–27.

To address these issues, the '522 patent discloses an object detection system operable to detect and/or identify a vehicle or other object of interest at the side, front, or rear of the vehicle equipped with the object detection system. *Id.* at ll. 35–44. The system uses an edge detection algorithm to detect edges of objects in the captured images. *Id.* at ll. 44–51. The system processes a subset of image data that is representative of a target zone or area of interest within the field of

view where a vehicle or object is likely to be present. *Id.* at ll. 51–55. The system processes the detected edges within the subset of image data to determine whether they are part of a vehicle. *Id.* at ll. 55–59. The system utilizes various filtering mechanisms to substantially eliminate or substantially ignore edges or pixels that are not or cannot be indicative of a vehicle or significant object to reduce the processing requirements and to reduce the possibility of false positive signals. *Id.* at ll. 60–65.

Figure 1 is reproduced below.

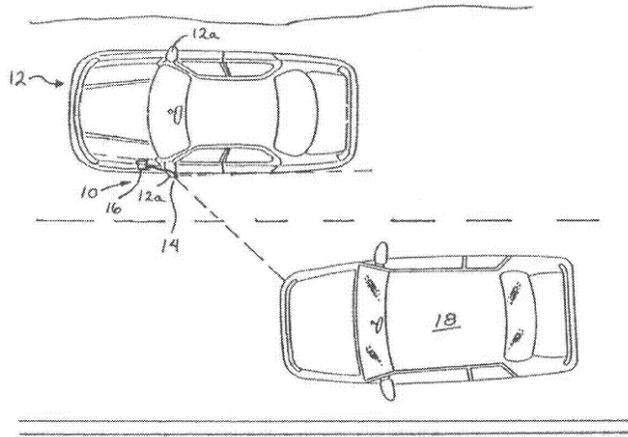


FIG. 1

Figure 1 depicts an overhead view of a vehicle incorporating the object detection system of the present invention. *Id.* at col. 4, ll. 7–8. Lane change assist or aid system 10 is positioned at vehicle 12 (such as at exterior rearview mirror 12a) and is operable to capture an image of a scene occurring sidewardly and rearwardly at or along one or both sides of vehicle 12. *Id.* at ll. 47–51. Lane change assist system 10 comprises image capture device or sensor or camera 14, which captures an image of the scene occurring toward a respective side of the vehicle 12, and control 16, which processes the captured image to

determine whether another vehicle 18 is present at the side of vehicle 12. *Id.* at ll. 51–57. Control 16 may be further operable to activate a warning indicator or display or signal device to alert the driver of vehicle 12 that another vehicle is present at the side of vehicle 12. *Id.* at ll. 57–60.

Figure 2 is reproduced below.

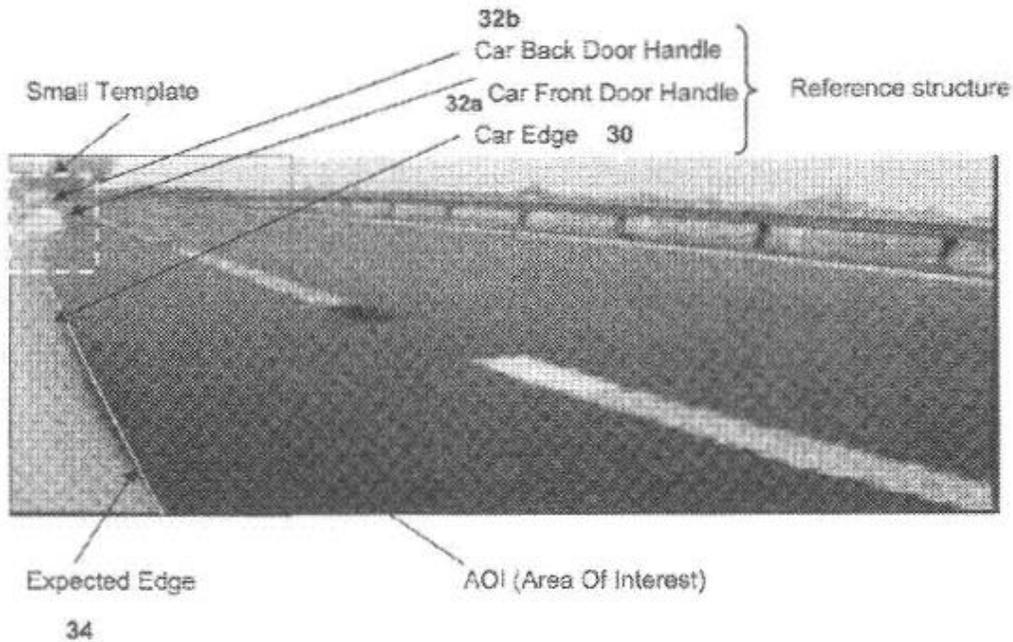


FIG. 2

Figure 2 is a representation of a captured image of a side area of a vehicle, as captured by an imaging sensor. *Id.* at col. 4, ll. 9–11. In order to verify that the camera or imaging sensor is mounted at the vehicle (such as at an exterior portion of the vehicle) within a desired tolerance limit so as to provide the desired field of view, the camera may detect the side of vehicle (30) and/or front door handle (32a) or rear door handle (32b) of the vehicle, and the control may confirm that they are in the expected location in the captured images. *Id.* at col. 6, ll. 11–19. If the control determines that the camera is not

parameters, so that the expected vehicle edges are substantially aligned with the actual or detected vehicle edges. *Id.* at ll. 47–52.

D. Illustrative Claims

Independent Claim 1 (not challenged) and its dependent claim 2 are illustrative and are reproduced below:

1. An imaging system for a vehicle, said imaging system comprising:

an imaging array sensor comprising a plurality of photo-sensing pixels, wherein said imaging array sensor is disposed at an exterior rearview mirror assembly at a side of a vehicle equipped with said imaging system;

wherein, when said imaging array sensor is disposed at the exterior rearview mirror assembly, said imaging array sensor has a field of view exterior of the equipped vehicle, and wherein said imaging array sensor is operable to capture an image exterior of the equipped vehicle;

a control for processing said captured image;

wherein said control is operable to determine that said imaging array sensor is misaligned when said imaging array sensor is disposed at the exterior rearview mirror assembly at the side of the equipped vehicle; and

wherein said control, responsive to a determination of misalignment of said imaging array sensor, is operable to at least partially compensate for the determined misalignment of said imaging array sensor.

2. The imaging system of claim 1, wherein said imaging array sensor is disposed at least partially within the exterior rearview mirror assembly at the side of the equipped vehicle.

III. CLAIM CONSTRUCTION

Our analysis here does not necessitate explicit claim construction of any term.

IV. REAL PARTIES IN INTEREST

The Petition identified five entities as the real parties in interest, including Valeo, Inc. and Valeo GmbH. Pet. 3. Patent Owner's contentions focus on Valeo, Inc. and Valeo GmbH, in support of the argument that the Petition is fatally deficient because it fails to identify all real parties in interest as required by 35 U.S.C. § 312(a)(2). Prelim. Resp. 1–3; Paper 12,¹² 1.

A. *Valeo, Inc.*

Patent Owner contends that, at the time the Petition was filed, Petitioner knew or should have known that Valeo, Inc. had ceased to exist due to merger into Valeo North America, Inc. Prelim. Resp. 3–4; Paper 12, 1. Indeed, prior to filing of the Petition, Valeo, Inc. had merged with another entity to become Valeo North America, Inc.¹³ Paper 10,¹⁴ 1–2; Ex. 1022. However, Patent Owner's arguments fail to account for the fact that Valeo North America, Inc. is the legal successor to the original entity (Valeo, Inc.). *See* Paper 10, 1–2;

¹² Paper 12 is PATENT OWNER'S RESPONSE TO PETITIONER'S BRIEF REGARDING REAL PARTIES-IN-INTEREST VALEO NORTH AMERICA, INC. AND VALEO GMBH.

¹³ The merger was effective December 31, 2013, and the Petition was filed on July 25, 2014. Ex. 1022, 1-2; Paper 1.

¹⁴ Paper 10 is PETITIONERS' BRIEF REGARDING REAL PARTIES-IN-INTEREST VALEO NORTH AMERICA, INC. AND VALEO GMBH.

Ex. 1022, 1–2; Prelim. Resp. 1–3; Paper 12, 1. The Petition was technically in error in that it named Valeo, Inc. when at that time the correct name of the entity was Valeo North America, Inc. Despite this, because Valeo North America, Inc. is the legal successor to Valeo, Inc., the Petition was correct substantively, in that it identified the real party of interest.¹⁵

B. Valeo GmbH

According to Patent Owner, prior to filing of the Petition, an entity named Valeo Holding Deutschland GmbH was renamed to, and possibly consolidated with, the original Valeo GmbH, so that it is unclear if the Valeo GmbH named in the Petition is the correct entity. Prelim. Resp. 5–6. Patent Owner’s response addresses only Valeo, Inc., and does not further address Valeo GmbH. *See* Paper 12. This suggests that Patent Owner no longer considers there to be an issue regarding identifying Valeo GmbH as a real party of interest. Despite this, out of an abundance of caution, we address the issue.

Prior to the filing of the Petition, Valeo GmbH merged into and transferred assets to Valeo Holding Deutschland GmbH.¹⁶ Paper 10,

¹⁵ Petitioner has since filed an updated mandatory notice to reflect that Valeo North America, Inc., previously Valeo, Inc., is a real party in interest. Paper 9.

¹⁶ The merger was effective January 1, 2013, and the Petition was filed on July 25, 2014.

1–2; Ex. 1023,¹⁷ 4, 10. Valeo Holding Deutschland GmbH is the legal successor to Valeo GmbH, and continues to hold the name Valeo GmbH. *Id.* Therefore, the Petition correctly identified Valeo GmbH (which is the name of Valeo Holding Deutschland GmbH) as a real party in interest.

C. Conclusion

For the foregoing reasons, we find that the Petition identifies all real parties in interest as required by 35 U.S.C. § 312(a)(2).

V. 35 U.S.C. § 325(d)

The Decision to Institute in general, and determinations under 35 U.S.C. § 325(d) in particular, are discretionary decisions.¹⁸

Patent Owner asks that the Board exercise its discretion under 35 U.S.C. § 325(d) to reject the Petition at hand because it raises

¹⁷ Exhibit 1023 includes page numbers at the top center of the page and Petitioner added exhibit page numbers to the bottom right of each page. On the tenth page of the exhibit, the correct number is at the top, but the added number (i.e. "1023-011") is incorrect. We refer to the correct numbering sequence at the top of each page.

¹⁸ *See* 35 U.S.C. § 314(a); *see generally* *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, Case IPR2013-00324, slip op. at 4 (PTAB Nov. 21, 2013) (Paper 19) ("Congress did not mandate that an *inter partes* review must be instituted under certain conditions. Rather, by stating that the Director—and by extension, the Board—*may not* institute review *unless* certain conditions are met, Congress made institution discretionary."); *see also* 35 U.S.C. § 325(d) (stating that the Director "may" take into account whether the same or substantially the same prior art or arguments previously were presented to the Office).

substantially the same arguments and prior art as raised in the 221 IPR. Prelim. Resp. 2, 7–12. In support of this argument, Patent Owner contends that the Board has held consistently that a petitioner must explain adequately why a follow-on petition is not redundant, and Petitioner has not done so in this case. Prelim. Resp. 7 (citing *Medtronic, Inc., v NuVasive, Inc.*, Case IPR2014-00487, slip op. at 7 (PTAB Sept. 11, 2014)(Paper 8)).

The citation of a single case does not demonstrate what the Board has consistently held. Also, the case cited is not precedential and does not set forth a “requirement” that a petitioner must explain adequately why a follow-on petition is not redundant. Contrary to what Patent Owner’s argument implies, there is no per se rule that a Petitioner must demonstrate how the Petition is not redundant to any prior art and argument presented to the Office. Rather, 35 U.S.C. § 325(d) is discretionary, stating only that the Board “may” consider whether the same or substantially the same prior art or arguments were previously presented to the Office.

Patent Owner also contends that that Board has held consistently that the addition of prior art and argument that are different and non-cumulative does not preclude rejecting a petition under § 325(d). Prelim. Resp. 8 (citing *Unilever, Inc. v. Procter & Gamble Co.*, Case IPR2014-00506, slip op. at 6 (PTAB July 7, 2014) (Paper 17)). However, such argument does little to demonstrate why we should exercise our discretion to reject the Petition at hand.

In support of the argument that we should reject the Petition, Patent Owner provides the following chart:¹⁹

Claims	221 IPR	Present Petition
2–5, 7, 11–12, 28, 32–35, 37, 40, and 44–46	Nissan	Nissan, Hitachi
18, 21, and 25–26	Nissan, Gutta	Nissan, Hitachi, Gutta
16	Nissan, Stam	Nissan, Hitachi, and either Ohtsuka or Broggi II
17	Nissan, Stam, Kastrinaki	Nissan, Hitachi, Ohtsuka
19	Nissan, Broggi	Nissan, Hitachi, Broggi
20	Nissan, Sun	Nissan, Hitachi, Sun, Bos
22	Nissan, Breed	Nissan, Hitachi, and either Gutta or Breed
23	Nissan, Kastrinaki	Nissan, Hitachi, Broggi
24	Nissan, Kastrinaki, Broggi	Nissan, Hitachi, Broggi

We are not persuaded that the art and arguments presented in this Petition are the same or substantially the same prior art or arguments previously presented to the Office. For example, none of the grounds of unpatentability in this Petition rely upon exactly the same combination of prior art as the grounds of unpatentability asserted against the same claims in the 221 IPR. For example, with regard to claim 2, the Petition at hand relies upon a combination of Nissan and Hitachi for disclosing correcting detected misalignment by adjusting image processing, while in contrast the prior Petition relied

¹⁹ Prelim. Resp. 10.

upon Nissan alone. 221 Decision to Institute, 14–18; Pet. 9, 20–25. This distinction is present in each ground of unpatentability of the Petition at hand.

Consequently, we decline to exercise our discretion under 35 U.S.C. § 325(d) in this case.

VI. ANALYSIS

A. Nissan and Hitachi - Claims 2–5, 7, 11, 12, 28, 32–35, 37, 40, 44–46

Petitioner asserts that claims 2–5, 7, 11, 12, 28, 32–35, 37, 40, and 44–46 are unpatentable under 35 U.S.C. § 103(a) over Nissan and Hitachi. Pet. 20–38. On the record before us, for the reasons that follow, we are persuaded there is a reasonable likelihood that Petitioner will prevail in establishing that claims 2, 5, 7, 11, 12, 28, 32–35, 37, 40, and 44–46 are unpatentable over Nissan and Hitachi. We are not so persuaded with regard to claim 4. We address all the claims subject to this ground, and then address arguments specific to certain claims.

With the exception of claim 4, Petitioner specifically alleges where each element of the claims is found in the prior art with citations by exhibit number to the specific portion of the evidence that supports the challenge. Pet. 20–38.

Regarding rationale, Patent Owner asserts that Petitioner does not explain sufficiently why a person or ordinary skill in the art would be motivated to combine Nissan with Hitachi. Prelim. Resp. 20. To the contrary, Petitioner explains that a person of ordinary skill in the art would have been motivated to replace Nissan’s physical correction

for camera position misalignment with Hitachi's image processing technique. Pet. 22 (Ex. 1010 ¶¶ 166–178); *see also* Pet. 23–38 (citations to and explanations of the references). This contention is adequately supported by the evidence provided on this record.

Claims 5, 12, 34, 35, 37, 40, 46

Claim 5 depends from claim 1 and requires that the control is operable to determine whether the imaging array sensor is aligned within a desired tolerance. Claims 12, 34, 35, 37, 40, and 46 each contain a similar requirement. Patent Owner argues that the Petition merely quotes Nissan, that the quote does not mention a tolerance, and that Nissan acts on any degree of misalignment. Prelim. Resp. 14, 32–34.

Regarding such limitation, Petitioner states that “Nissan discloses a vehicle imaging system that includes functionality to detect camera misalignment,” and quotes a portion of the reference. Pet. 26 (quoting Ex. 1003 ¶ 38). The quoted portion of the reference discloses that misalignment evaluation unit 34 compares the actual turn signal position to the where it ought to be observed and “based on the degree of misalignment therebetween” determines if optical axis misalignment has occurred. Therefore, Nissan's controller does not adjust for any degree of misalignment. Rather, adjustment is made based upon “the degree of misalignment” between the actual and intended position, implying some deviation from a standard must be exceeded for there to be an adjustment. For that reason, Patent Owner's argument is unpersuasive.

Claims 2, 28, 37, 44

Claims 2, 28, 37, and 44 each contain the limitation that the imaging array sensor comprises a plurality of photo-sensing pixels. Patent Owner argues that Petitioner has not shown that Nissan discloses an imaging array comprising photo-sensing pixels as claimed. Prelim. Resp. 28–29. Petitioner asserts that Nissan discloses a vehicle imaging system that includes vehicle-mounted camera 2 that collects image data. Pet. 22–23 (citing Ex. 1003 ¶¶ 32, 36, Fig. 6; Ex. 1010 ¶ 97). The cited portion of the Declaration of Dr.-Ing. Jan-Michael Frahm elaborates that such a camera typically has photo-sensing pixels. Ex. 1010 ¶ 97. Indeed, Nissan’s second embodiment, like the first, includes vehicle-mounted camera 2 that is comprised of a plurality of photo-sensing pixels. *See* Ex. 1003 ¶ 32 (second embodiment), ¶¶ 10, 19, 26 (first embodiment). For these reasons, Patent Owner’s argument is unpersuasive.

Claim 4

Claim 4 depends from claim 3 and requires that the imaging array sensor has a field of view exterior of the equipped vehicle that encompasses a forward field of view, and either a rearward or a sideward field of view. Regarding a forward field of view, Petitioner states that Nissan’s vehicle imaging system looks forward from the external review view mirror towards the front left of the car. Pet. 25 (citing Ex. 1003 ¶ 32). Nissan’s vehicle mounted camera 2 is built in to a left-hand door mirror of the car. Ex. 1003 ¶ 32. Although the left-hand door mirror itself is positioned on the front the vehicle, the field of view of that camera is a rear and side view from the car, not a

view forward of the vehicle as required by claim 4. *See* Ex. 1003 ¶ 32, Figs. 8(a), 8(b); Prelim Resp. 29–32. Accordingly, we are not persuaded Petitioner has made a sufficient showing that the cited references disclose the features of claim 4.

Conclusion

Having considered the Petition and Patent Owner’s Preliminary Response, we determine that Petitioner has established a reasonable likelihood of prevailing in establishing that claims 2, 3, 5, 7, 11, 12, 28, 32–35, 37, 40, and 44–46 are unpatentable under 35 U.S.C. § 103(a) over Nissan and Hitachi, and that Petitioner has not established such likelihood with regard to claim 4.

B. Nissan, Hitachi, and Gutta - Claims 18, 21, 25, 26

Petitioner asserts that claims 18, 21, 25, and 26 are unpatentable over Nissan, Hitachi, and Gutta. Pet. 38–43. On the record before us, for the reasons that follow, we are persuaded there is a reasonable likelihood that Petitioner will prevail in establishing these claims are unpatentable over Nissan, Hitachi, and Gutta.

Petitioner specifically alleges where each element of the claims is found in the prior art with citations by exhibit number to the specific portion of the evidence that supports the challenge. *Id.*

With regard to the reason for combining the references, Patent Owner argues that Petitioner’s rationale is “vague and threadbare.” Prelim. Resp. 22–23. For combining Nissan and Hitachi, Petitioner relies upon the rationale analyzed in the previous ground of unpatentability above. Pet. 39–40. With regard to the additional

modification over Gutta, Petitioner states that it would have been obvious to add Gutta's object detection system to Nissan in order to limit cognitive load on the driver. Pet. 40 (citing Ex. 1010 ¶¶ 179–194). This contention is adequately supported by the evidence provided.

Patent Owner makes an additional argument applicable to claim 21. Claim 21 depends from independent claim 1 and recites, “said control is operable to alert the driver of the equipped vehicle that an object is detected exterior to the equipped vehicle.” Patent Owner contends that Gutta discloses providing an indication that it is safe to change lanes, which is the opposite of what is required by claim 21. Prelim. Resp. 40–41. Patent Owner's contention is unpersuasive because it ignores that that the Petition also quotes and cites the portion of Gutta disclosing that the system can provide an indication to the driver on the display that it is unsafe to change lanes. *See* Pet. 41–42 (citing Ex. 1005, 5:22–31²⁰).

Having considered the Petition and Patent Owner's Preliminary Response, we determine that Petitioner has established a reasonable likelihood of prevailing in establishing that claims 18, 21, 25, and 26 are unpatentable under 35 U.S.C. § 103(a) over Nissan, Hitachi, and Gutta.

²⁰ Petitioner and Patent Owner both incorrectly cite to the disputed portion of the reference as being in Column 2 when it is actually in Column 5. *See* Pet. 41; Prelim Resp. 40; Ex. 1005 5:21–33.

C. Nissan, Hitachi, and Either Ohtsuka or Broggi II - Claim 16

Petitioner contends that claim 16 is unpatentable over Nissan, Hitachi, and either Ohtsuka or Broggi II. Pet. 43–46. On the record before us, for the reasons that follow, we are not persuaded there is a reasonable likelihood that Petitioner will prevail in establishing that these claims are unpatentable.

Claim 16 depends from claim 1 and recites, “wherein said control algorithmically processes data of said captured image to a reduced data set of said data, said control processing said reduced data set to extract information from said reduced data set.”

Petitioner asserts that it would have been obvious to modify Hitachi to include algorithmic processing as disclosed by Ohtsuka. Pet. 44. Regarding algorithmically processing data as claimed, the Petition quotes two portions of Ohtsuka. Pet. 45. The portions of Ohtsuka quoted by Petitioner describe a first embodiment that includes an imaging device and pre-processing section 2. Ex. 1007, 9:8–10. Pre-processing section 2 executes pre-processing to produce a differentiated image (i.e. an edge detection image to thereby detect an area including many horizontal and vertical edges) to detect a vehicle candidate area, which is sent to evaluating sections 3 and 5. Ex. 1007, 9:10–12, 11:61–67.²¹

For the reasons that follow, Petitioner’s obviousness analysis is unpersuasive in that it does not explain adequately how the combination of Nissan and Hitachi is modified to reach the claimed

²¹ Petitioner cites to Ex. 1007, 9:60–65, but quotes through line 67. Pet. 24.

subject matter. *See* 37 C.F.R. § 42.104(b)(4) (the petition must explain how the construed claim is unpatentable). First, Petitioner's obviousness analysis is incomplete in that it fails to state explicitly the differences between the Nissan and Hitachi combination the claimed subject matter. *See* Pet. 43–46; *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (citing with approval the four part obviousness test of *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966), that includes determining the differences between the claims at issue and the prior art).

Second, Petitioner simply quotes two portions of the reference, and does not explain persuasively the relevance of the evidence. *See* Pet. 45; 37 C.F.R. § 42.104(b)(5). For example, the claims require algorithmically processing an image data set to a reduced image data set. The cited portions of Ohtsuka do not explicitly disclose the claim terminology (i.e., algorithmically processing or a reduced data set). *See* Pet. 45 (quoting Ex. 1007, 9:8–12; 11:60–67). In support of the reason to combine the references, the Petition cites to portions of the Declaration. *See* Pet. 44 (citing Ex. 1010 ¶¶ 205–218). This citation is in support of the reason to combine, not in support of the assertion that Ohtsuka discloses algorithmically processing, as claimed. Further, the cited portion of the Declaration spans pages 72 to 77 and makes several references to other portions of the Declaration (e.g., ¶ 206 referencing ¶¶ 191–198, ¶ 211 referencing ¶ 152). *See* Ex. 1010 ¶¶ 205–218. The Petition simply cites the lengthy explanation in the Declaration and does not otherwise provide an argument or explanation. That is insufficient. *See* 37 C.F.R. § 42.104(b)(5);

37 C.F.R. § 42.6 (a)(3); *see generally Cisco Systems, Inc., v. C-Cation Techs., LLC*, Case IPR2014-00454, slip op. at 9–10 (PTAB Aug. 29, 2014) (Paper 12) (expanded panel decision explaining that arguments not made in the Petition will not be considered).

Third, to explain how the references are combined to reach the claimed subject matter, Petitioner provides the conclusory assertions that the teachings are combined, and that Ohtsuka's reduced image data set functionality is incorporated in Hitachi. Pet. 44. Petitioner has not explained cogently how Ohtsuka's algorithmic processing is incorporated into the combined Nissan and Hitachi system.

Accordingly, Petitioner has not established a reasonable likelihood of prevailing in establishing that claim 16 is unpatentable over Nissan, Hitachi, and Ohtsuka.

The alternative ground based upon Nissan, Hitachi, and Broggi II suffers from the same shortcomings. In particular, Petitioner's obviousness analysis is incomplete in that it: fails to state explicitly the differences between the Nissan and Hitachi combination and the claimed subject matter, does not explain persuasively the relevance of the evidence, and presents conclusory assertions regarding how the references are combined.²² *See* Pet. 43–46. Accordingly, Petitioner has not established a reasonable likelihood of prevailing in establishing that claim 16 is unpatentable over Nissan, Hitachi, and Broggi II.

²² We note that the Petition and Declaration of Dr.-Ing. Frahm, both cite to page 80 of Ex. 1009 (Pet. 46, Ex. 1011 ¶ 216) for support, but the exhibit does not contain that page.

D. Nissan, Hitachi, and Ohtsuka - Claim 17

Claim 17 depends from claim 16. Petitioner contends that claim 17 is unpatentable over Nissan, Hitachi, and Ohtsuka, relying upon the analysis of claim 16 in the prior ground of unpatentability. Pet. 46–48. Therefore, this ground of unpatentability suffers from the shortcomings identified in the analysis of the previous ground of unpatentability, and Petitioner has not established a reasonable likelihood of prevailing in establishing that this claim is unpatentable over the asserted ground.

E. Nissan, Hitachi, and Broggi - Claims 19, 23, 24

Dependent claims 19 and 23 depend from independent claim 1, and dependent claim 24 depends from dependent claim 19. Petitioner asserts that claims 19, 23, and 24 are unpatentable over Nissan, Hitachi, and Broggi. Pet. 49–53. On the record before us, for the reasons that follow, we are persuaded that there is a reasonable likelihood that Petitioner will prevail in establishing that these claims are unpatentable. We address an argument applicable to all the claims and then address claims 19 and 23, individually.

Patent Owner contends that Petitioner has failed to establish that Broggi qualifies as prior art under any part of 35 U.S.C. § 102. Prelim. Resp. 41. Specifically, Patent Owner contends that neither the Petition nor the Declaration of Dr.-Ing. Frahm address the question of whether Broggi was publically available as of December 23, 2004.²³

²³ Through a chain of continuations and a provisional application, this is the priority date of the '522 patent. Ex. 1001, 1.

Contrary to Patent Owner's contention, Petitioner asserts the Broggi is prior art at least under 35 U.S.C. § 102(a). Pet. 8 (citing Ex. 1010 ¶¶ 115–123). The Declaration of Dr.-Ing. Frahm states that Broggi is a publication that dates back to June 14–17, 2004, and was presented at the 2004 IEEE Intelligent Vehicles Symposium. Ex. 1010 ¶ 115. On this record, Petitioner has provided sufficient and credible evidence that Broggi is prior art.²⁴

Patent Owner makes additional arguments with regard to claims 19 and 23. Claim 19 depends from independent claim 1 and recites, “wherein said control is operable to distinguish between an object in the field of view of said imaging array sensor and a shadow of an object.”

Patent Owner reasons that Broggi does not determine whether a detected object is a shadow because Broggi merely searches for the shadow under the car in order to find the box base. Prelim. Resp. 35. Petitioner asserts, and Patent Owner's argument acknowledges, that Broggi searches for a shadow. *See* Pet. 50 (Ex. 1010 ¶ 226). The fact that Broggi subsequently utilizes the location of the shadow to locate the box base does not negate that Broggi discloses locating a shadow. Consequently, Patent Owner's argument is unpersuasive.

With regard to the additional modification over Broggi, Petitioner states that it would have been obvious to further modify the combination of Nissan and Hitachi to include shadow detection as disclosed by Broggi to lower the false positive detection rate. Pet. 50

²⁴ *See also* 221 Decision to Institute, 20 (determining that Petitioner made such a showing with regard to Broggi).

(citing Ex. 1010 ¶¶ 224–227). Patent Owner argues that Petitioner’s rationale is unsupported and merely conclusory. Prelim. Resp. 25. To the contrary, the Declaration of Dr.-Ing. Frahm supports adequately Petitioner’s reasoning. *See* Ex. 1010 ¶¶ 224–227.

Claim 23 depends from independent claim 21 and recites, “wherein said control applies an edge detection algorithm to process data of said captured image.” With regard to the additional modification over Broggi, Petitioner states that it would have been obvious to further modify the combination of Nissan and Hitachi to include edge-based object detection, as disclosed by Broggi, in order to limit the cognitive load on the driver. Pet. 50–51 (citing Ex. 1010 ¶¶ 228–232). Patent Owner argues that Petitioner’s rationale is not supported by intrinsic or extrinsic evidence. Prelim. Resp. 25–26. Petitioner’s reasoning is supported by evidence, and Patent Owner’s argument is unpersuasive because it fails to address that evidence. *See* Ex. 1010 ¶¶ 228–232.

Having considered the Petition and Patent Owner’s Preliminary Response, we determine that Petitioner has established a reasonable likelihood of prevailing in establishing that claims 19, 23, and 24 are unpatentable over Nissan, Hitachi, and Broggi.

F. Nissan, Hitachi, Sun, and Bos - Claim 20

Petitioner asserts that claim 20 is unpatentable under 35 U.S.C. § 103(a) over Nissan, Hitachi, Sun, and Bos. Pet. 53–56. On the record before us, for the reasons that follow, Petitioner has not

demonstrated a reasonable likelihood of prevailing in establishing that claim 20 is unpatentable over Nissan, Hitachi, Sun, and Bos.

Claim 20 depends from independent claim 1 and recites, “wherein said control is operable to switch between daytime and nighttime algorithms in response to ambient light levels at the equipped vehicle.”

Petition asserts that Sun discloses the need to use different algorithms during daytime and nighttime, and that Bos discloses a vehicle vision system with the ability to detect the ambient light level at the vehicle. Pet. 54–56. According to Petitioner, it would have been predictable to modify Nissan’s system to be adaptable to changing light conditions as taught by Sun in order to make it as robust as possible. Pet. 54–55.

In support of the contention that Sun discloses using different algorithms during the day and night, the Petition provides the following quotation from Sun,

Most of the cues discussed above are not helpful for night time vehicle detection — it would be difficult or impossible to detect shadows, horizontal/vertical edges, or corners in images obtained at night conditions.

Pet. 55–56 (citing Ex. 1008, 3).

The quoted portion of Sun discloses that the cues discussed above (various types of knowledge-based methods of finding candidate vehicle locations in an image) are not helpful for night time vehicle detection. *See* Ex. 1008, 2–3. The use of different algorithms for day and night, however, is not mentioned. Petitioner simply quotes the reference without providing a cogent explanation of the

relevance of the evidence (i.e., how this disclosure corresponds to day and nighttime algorithms as claimed). *See* 37 C.F.R. § 42.104(b)(5).

Elsewhere, the Petition cites to the Declaration of Dr.-Ing. Frahm in support of the contention that Sun discloses the need to use different algorithms during the day and night. Pet. 55 (citing Ex. 1010 ¶ 129). The Declaration of Dr.-Ing. Frahm repeats the portion of Sun quoted in the Petition. Ex. 1010 ¶ 129. This repetition adds nothing to Petitioner's analysis. The Declaration also states that Sun points to algorithms for day and night, such as disclosed by Cucchiara, and then quotes both a portion of Cucchiara and another portion of Sun. *Id.* (citing Ex. 1010, attachment J; Ex. 1008,²⁵ 3). The Petition does not provide an argument about or explanation of this disclosure in Cucchiara. As detailed in the ground of unpatentability over Nissan, Hitachi, and Ohtsuka analyzed above, we will not consider an argument not made in the Petition.

This ground of unpatentability is deficient for at least these reasons. Consequently, we determine that Petitioner has not established a reasonable likelihood of prevailing on the ground of unpatentability asserted against claim 20.

G. Nissan, Hitachi, and Either Gutta or Breed - Claim 22

Petitioner contends that claim 22 is unpatentable over Nissan, Hitachi, and either Gutta or Breed. Pet. 56–59. On the record before us, for the reasons that follow, we are persuaded there is a reasonable

²⁵ The Petition cites to Sun as Ex. 1005; however, Sun is Ex. 1008.

likelihood that Petitioner will prevail in establishing that claim 22 is unpatentable.

Claim 22 depends from independent claim 1 and recites, wherein said control is operable to alert the driver of the equipped vehicle that an object is detected at the side of the equipped vehicle in response to at least one of (a) the driver of the equipped vehicle actuating a turn signal toward the side of the equipped vehicle at which the object is detected, and (b) the driver of the equipped vehicle steering the equipped vehicle toward the side of the equipped vehicle at which the object is detected.

Patent Owner argues that the Petition lacks the analysis to establish a prima facie case of obviousness. Prelim. Resp. 27–28 (quoting part of a sentence found at Pet. 57).

Patent Owner's argument is a generalization that does not address effectively the merits of Petitioner's ground of unpatentability. Petitioner specifically alleges where each element of the claims is found in the prior art with citations by exhibit number to the specific portion of the evidence that supports the challenge. Pet. 56–59. With regard to the additional modification in view of Gutta, Petitioner reasons that it would have been obvious to further modify the combination of Nissan and Hitachi to take the motion direction of the car into account so that only potentially hazardous objects would be identified as disclosed by Gutta. Pet. 57–58 (citing Ex. 1010 ¶¶ 249–258). These contentions are adequately supported.

Having considered the Petition and Patent Owner's Preliminary Response, we determine that Petitioner has established a reasonable likelihood of prevailing in establishing that claim 22 is unpatentable over Nissan, Hitachi, and Gutta. We consider only the combination of

Nissan, Hitachi, and Gutta because we institute on that ground, and because Petitioner does not articulate a meaningful distinction in terms of the relative strengths and weaknesses with respect application of Gutta or Breed. *Id.*; *see also* Prelim. Resp. 47 (arguing Gutta and Breed are redundant).

VII. CONCLUSION

For the foregoing reasons, we are persuaded that the information presented in the Petition establishes that there is a reasonable likelihood that Petitioner would prevail with respect to claims 2, 3, 5, 7, 11, 12, 18, 19, 21–26, 28, 32–35, 37, 40, and 44–46 of the '522 patent, but not with respect to claims 4, 16, 17, and 20.

The Board has not made a final determination on the patentability of any challenged claims.

VIII. ORDER

For the reasons given, it is:

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 2, 3, 5, 7, 11, 12, 18, 19, 21–26, 28, 32–35, 37, 40, and 44–46 of the '522 patent on the following grounds:

- A. Claims 2, 3, 5, 7, 11, 12, 28, 32–35, 37, 40, and 44–46 under 35 U.S.C. § 103 by Nissan and Hitachi;
- B. Claims 18, 21, 25, and 26 under 35 U.S.C. § 103 by Nissan, Hitachi, and Gutta;
- C. Claims 19, 23, and 24 under 35 U.S.C. § 103 by Nissan,

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Hitachi, and Broggi; and

D. Claim 22 under 35 U.S.C. § 103 by Nissan, Hitachi, and
Gutta.

FURTHER ORDERED that no other ground of unpatentability
is authorized for this *inter partes* review; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and
37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the
trial commencing on the entry date of this decision.

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