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Paper 52
Entered: January 25, 2016

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 IPR2014-01204
Patent 8,386,114 B2

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

CLEMENTS, *Administrative Patent Judge*.

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

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 requesting *inter partes* review of claims 2, 4, 5, 12, 13, 17, 30, 33, 35, 42, 45, 47, and 51–61 of U.S. Patent No. 8,386,114 B2 (Ex. 1001, "the '114 patent"). Paper 1 ("Pet."). Magna Electronics, Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). On January 28, 2015, we instituted an *inter partes* review of claims 12, 13, 51, 56, 57, and 59–61 ("the instituted claims") of the '114 patent on certain grounds of unpatentability alleged in the Petition. Paper 13 ("Dec. to Inst.").

After institution of trial, Patent Owner filed a Patent Owner Response (Paper 29, "PO Resp.") to which Petitioner filed a Reply (Paper 31, "Pet. Reply"). Patent Owner filed a Motion to Exclude (Paper 33), which Petitioner opposed (Paper 43). Patent Owner filed a Reply to Petitioner's Opposition to its Motion to Exclude. Paper 45.

Oral hearing was held on October 1, 2015.[1]

The Board has jurisdiction under 35 U.S.C. § 6(c). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Petitioner has shown, by a preponderance of the evidence, that claims 51, 56, 57, and 59–61 of the '114 patent are unpatentable, but has not shown, by a preponderance of the evidence, that claims 12 and 13 of the '114 patent are unpatentable. Patent Owner's Motion to Exclude is denied.

[1] A transcript of the oral hearing is included in the record as Paper 48 ("Tr.").

A. Related Proceedings

Petitioner and Patent Owner indicate that the '114 patent is involved in *Magna Electronics Inc., v. Valeo, Inc*., No. 2:13-cv-11376-DRG (filed on Mar. 28, 2013) (E.D. Mich.). Pet. 5; Paper 5, 2.

Also, the '114 patent was the subject of IPR2014-00222 (the "222 IPR"). In a Final Written Decision dated May 28, 2015, we determined that claims 1, 3, 6, 8–11, 14–16, 18–29, 31, 32, 34, 36–41, 44, 46, and 48–50 are unpatentable as obvious. *Valeo North America, Inc., et al. v. Magna Electronics, Inc.* (PTAB May 28, 2015) (Paper 55). On July 30, 2015, Patent Owner filed a notice of appeal in the 222 IPR. 222IPR, Paper 56.

The Petition challenges claims that were challenged in, but for which trial was not instituted, in the 222 IPR.

B. The '114 Patent

The '114 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, 1:23–28. 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 1:34–38. Such known systems statistically analyzed all of the pixels in a pixelated image. *Id.* at 1:53–56. 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 1:65–2:5. In addition, prior art warning systems may result in many intended maneuvers causing a warning. *Id.* at 2:24–29. As a result, the driver may begin to ignore the warnings. *Id.* at 2:30–31.

To address these issues, the '114 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 2:40–49. The system uses an edge detection algorithm to detect edges of objects in the captured images. *Id*. at 2:49–56. 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 2:56–60. The system processes the detected edges within the subset of image data to determine whether they are part of a vehicle. *Id.* at 2:60–64. 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 2:65–3:3.

Figure 1 is reproduced below.

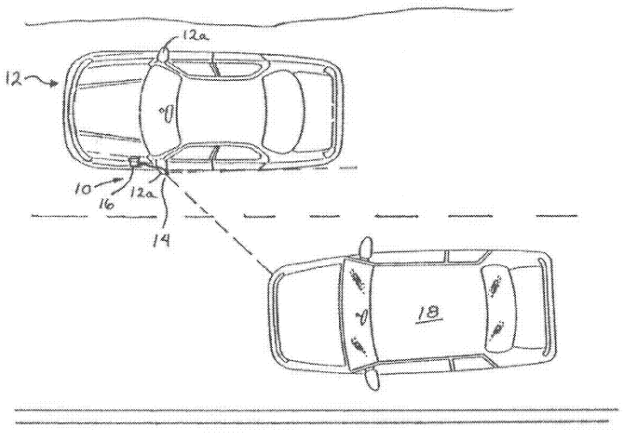

FIG. 1

Figure 1 depicts an overhead view of a vehicle incorporating the object detection system of the invention described in the '114 patent. *Id.* at 4:10–11. 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 4:50–54. 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 4:54–60. Control 16 further may be 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 4:60–63.

Side object detection works based on the edges detected. *Id.* at 9:16. Horizontal edges are used to detect and track vehicles. *Id.* at 9:17. Vertical edges are used to detect vehicles close to the camera and passing vehicles. *Id.* at 9:22–24. Vehicle identification may be based on the shadow created by a vehicle. *Id.* at 9:25–26. The shadow of the subject or "host" vehicle may be detected as a target vehicle if the host shadow is extended in the zone of area of interest alongside the host vehicle, as may happen in the morning or evening. *Id.* at 10:43–47.

Figure 14 is reproduced below.

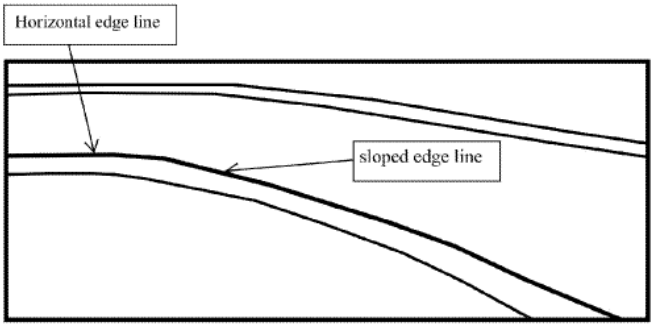

FIG. 14

Figure 14 is a representation of a captured image showing the shadow of the vehicle in the area adjacent to the vehicle. *Id.* at 4:37–38. The host shadow consists of a straight horizontal edge and an edge line with some slope. *Id.* at 10:47–49. The '114 patent discloses a series of steps to process the image to remove or ignore the host shadow. *Id.* at 10:50–67. The '114 patent further discloses a bicycle detection process. *Id.* at 11:10–12:33, Fig. 15. The '114 patent further discloses a headlight detection process. *Id.* at 14:4–55, Figs. 16–20.

C. Illustrative Claim

Of the challenged claims, claim 51 is independent. Claim 51 is reproduced below:

> 51. An imaging system for detecting objects exterior of a vehicle, said imaging system comprising:
>
> an imaging device comprising a CMOS array of photo-sensing pixels, wherein said imaging device is part of an exterior rearview mirror assembly that attaches at a side of a vehicle equipped with said imaging system, and wherein said imaging device captures image data;
>
> wherein, with said exterior rearview mirror assembly attached at the side of the equipped vehicle, said imaging device has a field of view rearward of said exterior rearview mirror

assembly in a direction towards the rear of the equipped vehicle, forward of said exterior rearview mirror assembly in a direction towards the front of the equipped vehicle and sideward of said exterior rearview mirror assembly in a direction away from the side of the equipped vehicle at which said exterior rearview mirror assembly is attached;

a control for processing image data captured by said imaging device;

wherein, responsive at least in part to said processing of captured image data by said control, said control determines objects of interest present in the field of view of said imaging device;

wherein objects of interest determined to be present in the field of view of said imaging device comprise at least one of (i) a vehicle that is at least one of rearward of the equipped vehicle and sideward of the equipped vehicle, (ii) a headlight of a vehicle that is at least one of rearward of the equipped vehicle and sideward of the equipped vehicle, (iii) a bicycle that is at least one of rearward of the equipped vehicle and sideward of the equipped vehicle, and (iv) a bicycle rider that is at least one of rearward of the equipped vehicle and sideward of the equipped vehicle;

wherein, responsive at least in part to said processing of captured image data by said control, a driver of the equipped vehicle is alerted to a hazardous condition; and

wherein a video display screen is located in the interior cabin of the equipped vehicle and is viewable by the driver of the equipped vehicle, and wherein images are displayed by said video display screen that are derived, at least in part, from image data captured by said imaging device.

Ex. 1001, 22:18–60.

D. Prior Art Supporting Instituted Challenges

Petitioner relies upon the following references:

Gutta	U.S. 6,424,273 B1	July 23, 2002	Ex. 1002
Saito ("Nissan")[2]	JP 2004-1658	Jan. 8, 2004	Ex. 1003
Alberto Broggi, et al., *Multi-Resolution Vehicle Detection Using Artificial Vision*, 2004 IEEE INTELLIGENT VEHICLE SYMP. 310 (June 14–17, 2004) ("Broggi")			Ex. 1005
Fogg ("Gentex")	U.S. 2004/0164228 A1	Aug. 26, 2004	Ex. 1007
Bos	U.S. 6,313,454 B1	Nov. 6, 2001	Ex. 1009
Imoto	U.S. 7,605,856 B2	Oct. 20, 2009	Ex. 1014

E. The Instituted Grounds of Unpatentability

We instituted *inter partes* review on the following grounds:

References	**Basis**	**Claim(s) Challenged**
Gutta, Nissan, Broggi, and Bos	§ 103	12 and 13
Gutta, Nissan, and Imoto	§ 103	51, 59, 60, and 61
Gutta, Nissan, Imoto, and Gentex	§ 103	56
Gutta, Nissan, Imoto, and Bos	§ 103	57

II. MOTION TO EXCLUDE

A. Introduction

As mentioned above, Patent Owner filed a Motion to Exclude certain exhibits. Paper 33 ("Mot."). Petitioner filed an Opposition to the Motion (Paper 43, "Opp."), and Patent Owner filed a Reply to the Opposition (Paper 45, "Opp. Reply"). For the following reasons, Patent Owner's motion is *denied*.

[2] Nissan is a Japanese language document. Ex. 1004. Unless indicated otherwise, all citations to Nissan in this decision will refer to its certified English language translation. Ex. 1003.

B. Procedure[3]

Patent Owner's Motion to Exclude Evidence addresses the following exhibits:

Title	Exhibit Number
Broggi	Ex. 1005
First Frahm Declaration	Ex. 1013
First Grenier Declaration[4]	Ex. 1025
Second Grenier Declaration[5]	Ex. 1026
Butler Declaration	Ex. 1027
Second Frahm Declaration	Ex. 1028
Springrobot Article	Ex. 1029
Springrobot Abstract	Ex. 1030
Third Frahm Declaration	Ex. 1032

Before addressing the admissibility of each exhibit, we detail the four sets of objections involved as well as a related Motion to Submit Supplemental Information. The exhibits at issue were submitted with papers, served as supplemental evidence, and/or submitted as supplemental information as detailed below.

1. First Set of Objections

The Decision to Institute was entered on January 28, 2015, and Patent Owner's first set of objections was timely served on February 11, 2015. *See* Dec. to Inst. 1; Ex. 2010, 6. Patent Owner objected to "the totality of Exhibit 1005," which included both Broggi[6] and a Declaration of Gerard P.

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[3] Prior to May 19, 2015, objections were required to be served, and after this date objections are required to be filed. *See* Amendments to the Rules of Practice for Trial Before the Patent Trial and Appeal Board, 80 Fed. Reg. 28,561–566 (May 19, 2015); 37 C.F.R. § 42.64.

[4] Dated June 30, 2014.

[5] Dated July 25, 2014.

[6] By "Broggi" we mean the article titled *Multi-Resolution Vehicle Detection*

Grenier, and to paragraph 113 of the First Frahm Declaration (Exhibit 1013). *See* Ex. 2010, 1–5. Each of these exhibits was submitted with the Petition.

On February 25, 2015, Petitioner timely served as supplemental evidence the Second Grenier Declaration, the Butler Declaration, the Second Frahm Declaration, the Springrobot Article, the Springrobot Abstract, and the Declaration of Alberto Broggi.[7] *See* Ex. 1033, 2–3.

On February 26, 2015, Petitioner requested authorization to file a motion to submit as supplemental information the documents served on February 25, 2015, and we authorized the filing of the motion on March 4, 2015. Paper 15 (Order authorizing Petitioner's Motion), 3–4. In our Order, we also authorized Petitioner to re-file Broggi as corrected Exhibit 1005 and to re-file First Grenier Declaration as Exhibit 1025, which Petitioner did on March 6, 2015. *Id.*; Paper 16 (Petitioner's notice).

Consequently, Patent Owner's first set of objections covers: Broggi (corrected Ex. 1005), paragraph 113 of the First Frahm Declaration (Ex. 1013), and the First Grenier Declaration (Ex. 1025).

2. Second Set of Objections

On March 4, 2015, Patent Owner objected to the Second Grenier Declaration, the Butler Declaration, the Second Frahm Declaration, the Springrobot Article, the Springrobot Abstract, and the Broggi Declaration[8].

Using Artificial Vision identified above.

[7] Petitioner's response to Patent Owner's objections refers to this evidence as Exhibits 1026, 1027, 1028, 1029, 1030, and 1031, respectively. *See* Ex. 1033, 2–3. At the time this paper was served, however, the evidence had not yet been filed as an exhibit in PRPS.

[8] Although Patent Owner objected to the Broggi Declaration (Exhibit 1031) in its second set of objections, it does not seek exclusion of Exhibit 1031 in

See Ex. 2011; Mot. 1. At this time, the Declarations, article, and abstract were supplemental evidence, not evidence. Our rules provide for objections to evidence, but do not provide for objections to supplemental evidence. *See* 37 C.F.R. § 42.64. Consequently, Patent Owner did not make an effective objection to the Second Grenier Declaration, the Butler Declaration, the Second Frahm Declaration, the Springrobot Article, the Springrobot Abstract, and the Broggi Declaration.

a. Motion to Submit Supplemental Information

On March 10, 2015, Petitioner filed its Motion to File Supplemental Information, directed to the documents served on February 25, 2015, which Petitioner filed as Exhibits 1026–1031. Paper 19. Patent Owner filed an Opposition (Paper 21), to which Petitioner filed a Reply (Paper 24). On April 10, 2015, we granted Petitioner's Motion. Paper 26. As a result, Exhibits 1026–1031 became evidence in this proceeding on April 10, 2015.

After these exhibits became evidence, Patent Owner never renewed its second set of objections to the exhibits. As a result, Patent Owner never made an effective objection to the Second Grenier Declaration, the Butler Declaration, the Second Frahm Declaration, the Springrobot Article, the Springrobot Abstract, and the Broggi Declaration.

3. Third Set of Objections

On July 30, 2015, Patent Owner objected to the Declaration of Dr.-Ing. Jan-Michael Frahm In Support Of Petitioner's Reply (Exhibit 1032, "Third Frahm Declaration"), and specifically to paragraphs 3 and 4. Paper 32. Petitioner did not submit supplemental evidence in response to this set

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its Motion to Exclude. *See* Mot.

of objections. *See* Mot. 2; *see generally* Opp. (making no mention of any evidence served in response to these objections).

4. Summary

In the first and third sets of objections, Patent Owner effectively objected to: Broggi (corrected Ex. 1005), the first Frahm Declaration (Ex.1013), the first Grenier Declaration (Ex. 1025), and paragraphs 3 and 4 of the Third Frahm Declaration (Ex. 1032).

Patent Owner's second set of objections, regarding what became the Second Grenier Declaration (Ex. 1026), the Butler Declaration (Ex. 1027), the Second Frahm Declaration (Ex. 1028), the Springrobot Article (Ex. 1029), the Springrobot Abstract (Ex. 1030), and the Broggi Declaration (Ex. 1031), was not effective because, at the time Patent Owner objected, those documents were supplemental evidence, not evidence, and our rules provide for objections only to evidence. Because Patent Owner did not timely object to these Declarations after they became evidence,[9] Patent Owner did not preserve its right to move to exclude Exhibits 1026–1031. We, therefore, deny Patent Owner's Motion to Exclude as to Exhibits 1026–1030.[10]

C. Analysis

Patent Owner preserved the first and third sets of objections by filing its Motion to Exclude Exhibits 1005, 1013, 1025, and 1032. *See* Mot. 1–2; 37 C.F.R. § 42.64(c). With the exceptions noted below, Patent Owner's motion identifies and explains the objections. Mot. 2–15; 37 C.F.R.

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[9] These documents became evidence on April 10, 2015. Paper 26.
[10] Although Patent Owner objected to the Broggi Declaration (Exhibit 1031) in its second set of objections, it does not seek exclusion of Exhibit 1031 in its Motion to Exclude. *See* Paper 33.

§ 42.64(c). As the moving party, Patent Owner bears the burden of proof. *See* 37 C.F.R. § 42.20(c). We address the exhibits in chronological order of their filing.

1. Third Frahm Declaration (Ex. 1032)

As explained above, the Third Frahm Declaration was submitted with Petitioner's Reply, and was effectively objected to in Patent Owner's third set of objections.

a. Admissibility

Patent Owner seeks to exclude paragraphs 3 and 4 of the Third Frahm Declaration. Mot. 14–15. Specifically, Petitioner contends that these paragraphs are irrelevant under Federal Rule of Evidence (FRE) 402 because Dr. Frahm did not attend the June 2004 symposium.[11] *Id.*; Opp. 12–14; *see also* Paper 32 (Patent Owner's third set of objections based, in part, on FRE 402).

The premise of Patent Owner's argument is that evidence that is not based on personal knowledge is not relevant. Personal knowledge is not a necessary condition of relevance. Rather, evidence is relevant if it has any tendency to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining this case. *See* FRE 401.

Further, Patent Owner contends that Dr. Frahm's testimony is not based on personal knowledge in that he did not attend the symposium in question. However, Dr. Frahm's testimony does not allege attendance at the

[11] Here, and throughout, we take this as an assertion that the evidence at issue is not relevant as defined by FRE 401 and, therefore, is inadmissible under FRE 402.

symposium. In the paragraphs at issue, Dr. Frahm testifies that he has: regularly attended Institute of Electrical and Electronics Engineers (IEEE) conferences, chaired a conference having IEEE published proceedings, and observed IEEE publication practices. Ex. 1032 ¶ 3; *see also* Ex. 1025 ¶ 1 (IEEE abbreviation). Dr. Frahm's observation is that IEEE's practice is that the date of the conference is the publication date of the article or paper involved. *Id.* In light of this, Dr. Frahm concludes that Broggi was published and publically accessible at the June 2004 Symposium as is indicated on the face of the document. Ex. 1032 ¶ 4; Ex. 1005. In light of this, Patent Owner's contention that Dr. Frahm's testimony should be excluded because he lacks personal knowledge is not persuasive.

The Third Frahm Declaration is relevant in that it makes publication of Broggi (Ex. 1005) at the Symposium, a fact of consequence in this proceeding, more probable than without this evidence.

Consequently, Patent Owner has not persuaded us that paragraphs 3 and 4 of the Third Frahm Declaration are inadmissible under FRE 402.

b. Limitation on Use

Although we do not exclude the Third Frahm Declaration, it may not be considered with regard to the admissibility of Broggi (Ex. 1005).

Patent Owner's first set of objections objected to Broggi (Ex. 1005), and that was Petitioner's opportunity to submit evidence in support of the admissibility of Broggi. Petitioner's Reply may respond only to arguments raised in Patent Owner's Response. 37 C.F.R. § 42.23(a). Patent Owner's Response may not properly argue the admissibility of Broggi (Ex. 1005) because such an argument may be raised only in a motion to exclude. *See*

37 C.F.R. § 42.64. For that reason, arguments and evidence supporting the admissibility of Broggi (Ex. 1005) are not proper in Petitioner's Reply.

Despite this, paragraphs 3 and 4 of the Third Frahm Declaration properly respond to the argument in Patent Owner's Response regarding the sufficiency of proof that Broggi is prior art under 35 U.S.C. § 102(a). Whether Broggi is a "printed publication" is a separate issue from its admissibility under the Federal Rules of Evidence. *See* Opp. 12–14; PO Resp. 13–14.

c. Conclusion

Accordingly, we deny Patent Owner's Motion to Exclude paragraphs 3 and 4 of the Third Declaration of Dr. Frahm (Ex. 1032). We consider the Third Declaration of Dr. Frahm in determining whether Broggi (Ex. 1005) is prior art under 35 U.S.C. § 102(a), but not in determining whether Broggi should be excluded.

2. First Grenier Declaration (Ex. 1025)

As explained above, the First Grenier Declaration was submitted with the Petition, and was effectively objected to in Patent Owner's first set of objections.

Patent Owner contends that the First Grenier Declaration is irrelevant under Federal Rule of Evidence ("FRE") 401, and is inadmissible hearsay under FRE 802. Mot. 5–6; Opp. 6–7; *see also* Ex. 2010, 4–5 (objecting based on FREs 401 and 802).

a. Relevance

Patent Owner contends that the First Grenier Declaration provides "no evidence of any publication date whatsoever." Mot. 5. Rather, according to Patent Owner, presentation at the June 2004 symposium is not a publication

and likewise, registration with the U.S. Copyright Office is not a publication. *Id.* Similarly, Patent Owner contends that the Declaration provides only that: "(1) Broggi was published in 'Intelligent Vehicles Symposium, 2004 IEEE'; and (2) the date of the conference was 14-17 June 2004." Opp. Reply at 3–4.

The premise of Patent Owner's argument is that evidence must establish a fact sufficiently in order to be relevant. Such argument is not proper in a motion to exclude, which is for challenging the admissibility of evidence, not for challenging its sufficiency. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,767 (August 14, 2012) (stating that a motion to exclude may not be used to challenge the sufficiency of the evidence to prove a particular fact).

Furthermore, we disagree with Patent Owner's characterization of the Declaration as providing "no evidence whatsoever" of publication. *See* Mot. 5. To the contrary, for example, Mr. Grenier states that "[c]opies of the conference proceedings were made available to attendees of the conference." Ex. 1025 ¶ 6. This evidence is relevant in that it tends to make publication of Broggi at the conference more probable than if this evidence was not considered.

Patent Owner has not persuaded us that the First Grenier Declaration is inadmissible under FRE 402.

b. Hearsay

Patent Owner contends that the First Grenier Declaration fails to establish a publication date based on the IEEE records. Mot. 5–6. Specifically, Patent Owner states:

> The first Grenier Declaration fails to establish any publication date on the basis of Mr. Grenier's reliance on IEEE business records. The records themselves, attached as "Exhibit A" to the declaration, provide no support for a June 14-17, 2004 publication. Thus, any business record exception for Mr. Grenier's statements does not extend to his statements regarding a June 14-17, 2004 publication date.

Id. This argument, like the prior argument, is unpersuasive because, while styled as an argument about hearsay, it is actually directed to the sufficiency of the evidence. Mr. Grenier's testimony in this proceeding is not an "out of court statement" because it is testimony before the Board in this proceeding and the declarant is subject to cross-examination. The record attached to the first Grenier Declaration indicates that the article titled "Multi-resolution Vehicle Detection using Artificial Vision" by Broggi, et al. was:

> **Published in:**
> Intelligent Vehicles Symposium, 2004 IEEE
>
> **Date of Conference:**
> 14-17 June 2004

Ex. 1025, 3. To the extent Patent Owner is arguing that those statements in the record, and Mr. Grenier's testimony about those statements, are hearsay, we agree with Petitioner that such statements fall within the hearsay exception enumerated in FRE 803(6), and that Mr. Grenier's testimony about those statements are excepted as the testimony of a custodian of those records under FRE 803(6)(D). Patent Owner has not shown, under FRE 803(6)(E), that either the record or circumstances of preparation indicate a lack of trustworthiness.

Patent Owner has not persuaded us that the First Grenier Declaration is inadmissible under FRE 802.

c. Conclusion

Accordingly, we deny Patent Owner's Motion to Exclude the First Grenier Declaration (Ex. 1025). We consider the First Grenier Declaration on the merits and with regard to the admissibility of Broggi (Ex. 1005).

3. First Frahm Declaration (Ex. 1013)

As explained above, the First Frahm Declaration was submitted with the Petition.

Patent Owner argues that paragraph 113 of the First Frahm Declaration is irrelevant under FRE 402 and should be excluded. Mot. 4; Opp. Reply 3; *see also* Ex. 2010, 4 (objecting based on FRE 402).[12] Specifically, Patent Owner asserts that this paragraph is irrelevant because Dr. Frahm did not attend the symposium and therefore cannot know that an actual publication took place. Mot. 4; Opp. Reply 3.

The paragraph at issue follows:

> The Broggi article (Pet. Ex. 1005) is a publication that dates back to June 14-17, 2004 and was presented at the 2004 IEEE Intelligent Vehicles Symposium. I understand that Broggi is prior art to the '114 patent at least under § 102(a) because it [was] published within one year before the earliest filing date of the '114 patent.

Ex. 1013 ¶ 113. Our analysis here parallels that of the Third Frahm Declaration above.

[12] Patent Owner also objected under FRE 901, but did not preserve that objection by including it in the Motion to Exclude. *See* Ex. 2010, 3; 37 C.F.R. § 42.64(c).

Specifically, we agree with Petitioner that Dr. Frahm need not have personal knowledge in order for this evidence to be relevant.[13] Opp. 5–6. Personal knowledge is not a necessary condition of relevance. The proper inquiry is whether the evidence has any tendency to make a fact more or less probable than it would be without the evidence and the fact is of consequence in determining this case. *See* FRE 401.

Further, Patent Owner contends that Dr. Frahm's testimony is not based on personal knowledge in that he did not attend the symposium in question. However, Dr. Frahm's testimony does not allege attendance at the symposium.

Dr. Frahm's statement that Broggi was presented at the June 2014 conference tends to make it more probable that Broggi was presented at the conference. This is true even though Dr. Frahm was not in attendance at the symposium.

Patent Owner has not persuaded us that the First Frahm Declaration is inadmissible under FRE 402. Accordingly, we deny Patent Owner's Motion to Exclude paragraph 113 of the First Frahm Declaration (Ex. 1013).

We consider paragraph 113 of the First Frahm Declaration on the merits and with regard to the admissibility of Broggi (Ex. 1005).

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[13] Patent Owner's citation to *EMC Corp., et al. v. PersonalWeb Tech., LLC*, IPR2013-00082, slip op. at 60 (PTAB, May 15, 2014) (Paper 83) is not helpful to our determination here because there the Board dealt with authentication while here we deal with relevance. *See* Opp. Reply 3 (pointing out this distinction).

4. Broggi (Ex. 1005)

As explained above, Broggi (Ex. 1005) was submitted with the Petition. Patent Owner contends that Broggi is irrelevant under Federal Rule of Evidence ("FRE") 402, and not authenticated under FRE 901. Mot. 2–4; Opp. Reply 1–2; Ex. 2010 (objecting under FREs 402 and 901).

a. Relevance

Regarding relevance, Patent Owner contends that Petitioner has failed to establish that Broggi was published or made publically accessible prior to the December 23, 2004, priority date of the '114 patent. Mot. 2–3. Patent Owner argues that, because Broggi has not been shown to be prior art, it is not relevant to the proceeding. *Id.* at 3. According to Patent Owner, consideration of Broggi would "severely prejudice" Patent Owner. *Id.*

As an initial matter, Patent Owner's contention that consideration of Broggi would "severely prejudice" Patent Owner implies that Broggi should be excluded under FRE 403. To the extent that Patent Owner is making such an assertion, it is unpersuasive. Patent Owner did not object to Broggi based on FRE 403 and, consequently, cannot properly make a motion on that basis. *See* Ex. 2010, 2–3. Furthermore, Patent Owner does not explain cogently how the probative value of Broggi is outweighed by one of the dangers enumerated in FRE 403.

Here, as with other exhibits, Patent Owner's argument is unpersuasive because it challenges the sufficiency of the evidence rather than the admissibility.

Turning to the exhibit in question, the upper left hand corner of the first page states: "2004 IEEE Intelligent Vehicles Symposium, University of

Parma, Parma, Italy, June 14–17, 2004," and the lower left hand corner indicates "© 2004 IEEE." Ex. 1005, 1.

Broggi tends to make Petitioner's contention that Broggi is prior art more probably than it would be without this evidence. *See* Pet. 9.

Patent Owner has not persuaded us that Broggi is inadmissible under FRE 402.

b. Authentication

Patent Owner's objection regarding authentication follows:

> Magna further objects to the totality of Exhibit 1005 under FRE 901. This exhibit is referred to by Valeo as "Broggi," but includes the attached Declaration of Gerard P. Grenier which is **not** part of the Broggi article. Valeo's exhibit list does not address this issue, and confuses the record by implying that the Grenier Declaration is somehow part and parcel of Broggi, when it is demonstrably not.

Ex. 2010, 3 (emphasis original). As explained above, this objection has been resolved because corrected Exhibit 1005 does not include the First Grenier Declaration (now Exhibit 1025).

In its Motion to Exclude, Patent Owner asserts that Broggi (Ex. 1005) is not properly authenticated under FRE 901 because Dr. Frahm's statement is insufficient to authenticate Broggi. Mot. 3–4. This was not the basis, however, for Patent Owner's initial objection to Broggi (Ex. 1005) under FRE 901. *See* Ex. 2010, 3. We, therefore, do not consider this argument in Patent Owner's Motion to Exclude.

c. Other Exhibits

As stated above, the First and the Third Frahm Declarations (Ex. 1013 and Ex. 1032, respectively) and the First Grenier Declaration (Ex. 1025) may be considered regarding the admissibility of Broggi (Ex. 1005). To the

extent that Patent Owner challenges the authenticity of Broggi (Ex. 1005), each of these exhibits contains information consistent with Broggi. Consequently, these exhibits tend to show that Broggi is what Petitioner contends it to be. *See* Ex. 1013 ¶ 113; Ex. 1032 ¶¶ 3, 4; Ex. 1025 ¶¶ 1–9, page 3.

d. Conclusion

We determine that Patent Owner has not met its burden of proof to establish that Broggi (Ex. 1005) is inadmissible under a Federal Rule of Evidence. *See* 37 C.F.R. §§ 42.20(c), 42.62(a).

D. Conclusion

Patent Owner's Motion to Exclude is denied.

III. ANALYSIS

A. Claim Construction

In an inter partes review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see also In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1275–79 (Fed. Cir. 2015) ("Congress implicitly approved the broadest reasonable interpretation standard in enacting the AIA," and "the standard was properly adopted by PTO regulation."). Under the broadest reasonable interpretation, claim terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

In the Decision to Institute we determined that neither "algorithmically processes captured image data to a reduced data set" nor "target zone" required express construction. Dec. to Inst. 14–15. Neither party disputes our determination or proposes additional terms for construction.

B. Whether Broggi (Ex. 1005) is Prior Art

1. Introduction

In an *inter partes* review, a ground of unpatentability cannot be based upon a public use or a sale; rather, the ground must be based upon prior art in the form of a patent or a printed publication. 35 U.S.C. § 311(b); 35 U.S.C. § 102. The determination of whether a particular reference qualifies as a prior art printed publication "involves a case-by-case inquiry into the facts and circumstances surrounding the reference's disclosure to members of the public." *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). Neither distribution nor indexing is a necessary condition for being a "printed publication;" rather, the key inquiry is whether or not a reference has been made "publically accessible." *Id.* at 1348.

The parties do not dispute that the critical date of the '114 patent is December 23, 2004. Ex. 1001, 2 (60).

2. Petitioner's Evidence

Petitioner argues that Broggi is prior art under 35 U.S.C. § 102(a) because it was published at the IEEE Intelligent Vehicles Symposium at the University of Parma, in Parma Italy, on June 14–17, 2004. Pet. 9; Ex. 1005.

As explained above, Broggi (Ex. 1005) is an article[14] by Alberto Broggi et al., titled "Multi-Resolution Vehicle Detection using Artificial Vision." Ex. 1005, 1. The top of the first page of the Article includes the following information:

> 2004 IEEE Intelligent Vehicles Symposium
> University of Parma
> Parma, Italy • June 14–17, 2004

Ex. 1005, 1. This information suggests that the Article was available at the Symposium.

The first page of Broggi includes the annotation "© 2004 IEEE." We acknowledge that a copyright date alone is not sufficient to establish public accessibility. *See In re Lister*, 583 F.3d 1307, 1311 (Fed. Cir. 2009). We also acknowledge that this copyright was not registered until January 4, 2005, after the critical date of the '114 patent. *See* Ex. 1026 ¶ 9b. Despite this, the copyright date of 2004 is consistent with the contention that Broggi was presented at the Symposium.

Notably, Broggi is not marked with any limitations regarding dissemination.

In his first Declaration, Dr. Frahm states, "[t]he Broggi article (Pet. Ex. 1005) is a publication that published on June 14-17, 2004, and was presented at the 2004 IEEE Intelligent Vehicles Symposium." Ex. 1013 ¶ 113.

Dr. Frahm elaborates in his Third Declaration, stating:

> As a person who regularly reviews scholarly articles, including IEEE publications such as the Broggi article, and as someone who regularly attends conferences, I believe that Broggi

[14] We sometimes refer to Broggi (Ex. 1006) as "the Article."

> published when the document indicates on its face that it was published (i.e., in June 14-17, 2004). Having chaired a conference with IEEE published proceedings, I have firsthand knowledge of IEEE's general publication practices. Further, all IEEE conferences that I have attended, the papers presented were made publicly available at the conference. The common practice for the IEEE is that the date of the conference is the publication date of the articles/papers presented. Dr. Turk has failed to provide any evidence that this is not the case in the instant proceeding, where the Broggi article was presented at an IEEE symposium on June 14-17, 2004. I have organized IEEE based proceedings, and as a general practice, IEEE sets deadlines for the specific purpose of making articles publicly available at the time of the conference.

Ex. 1032 ¶ 3.

In light of this, Dr. Frahm's opinion that IEEE articles, such as Broggi, are published as indicated on the face of the article is supported by an underlying factual basis. *See* Pet. Reply 4–5; Ex. 1032 ¶ 3.

Mr. Grenier is the Senior Director of Publishing Technologies for IEEE. Ex. 1026 ¶ 1. Mr. Grenier, as a neutral and uncompensated third party, confirms certain information regarding Broggi. *Id.* ¶¶ 2, 4–5. In particular, Mr. Grenier provides the following information:

> The Article was published by IEEE <u>as part of the conference proceedings on the date of the conference.</u> Copies of the conference proceedings were made available to attendees of the conference. The Article is currently available for public download from the IEEE digital library, IEEE Xplore (www.ieeexplore.ieee.org).
>
> . . .
>
> IEEE's records confirm the following:
>
> a) "Multi-Resolution Vehicle Detection using Artificial Vision" was <u>published and</u> presented at the 2004 IEEE Intelligent Vehicles Symposium which occurred June 14–17, 2004.

Ex. 1026 ¶¶ 6, 9 (emphasis added).[15]

Attached to the Second Grenier Declaration are true and correct copies of the Article, and an Abstract of the Article. Ex. 1026, 3, 4–8 (respectively). The attached Article is the same as Exhibit 1005. As noted above, the Abstract includes the following annotations

> **Published in:**
> Intelligent Vehicles Symposium, 2004 IEEE
>
> **Date of Conference:**
> 14-17 June 2004

Id. at 3.

Mr. Butler is the Office Manager of the Internet Archive. Ex. 1027 ¶ 1. Mr. Butler explains that the Internet Archive's "Wayback Machine" archives files by URL (website address) at various dates and visitors may recall these archived files by available dates. *Id.* at ¶ 3. If visitors click on a link on an archived page, the Wayback Machine will serve the archived file with the closest available date to the page upon which the link appeared and was clicked. *Id.*

Attached to the Butler Declaration[16] is a download of the website "http://www.ce.unipr.it/people/broggi/publications/" archived on April 10, 2004.[17] Ex. 1027, 3–15. No entry corresponding to the Broggi Article was

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[15] Portions of the Second Grenier Declaration not included in the First Grenier Declaration are underlined. *Compare* Ex. 1026 *with* Ex. 1025.
[16] Mr. Butler certifies that the attached printouts are true and accurate copies of Internet Archive records. Ex. 1027 ¶ 6.
[17] *See* Ex. 1027 ¶ 5 (explaining download date format and that the URL footer is the web page downloaded from), 3–15 (copy of downloaded information).

available at that time. A download of the same website archived on October 12, 2004, includes the following entry:

- Alberto Broggi, Pietro Cerri, and Pier Claudio Antonello, **Multi-Resolution Vehicle Detection using Artificial Vision**, In *Procs. IEEE Intelligent Vehicles Symposium 2004*, pages 310-314, Parma, Italy, June 2004.
  Download the paper in PDF format.

See Ex. 1027, 16 (Broggi annotation is the first entry), 16–28 (entire download). This abstract shows an article title, authors, Symposium name, page numbers, date, and location all consistent with Broggi (Ex. 1005). *Id.* at 16.

The Butler Declaration and attached records indicate that the Broggi Article referenced was posted to a public website between April 10, 2004, and October 12, 2004, and may be accessed by selecting the link at the bottom of the entry. *Id.*

3. Patent Owner Arguments

Patent Owner argues that Petitioner has failed to satisfy its burden that Broggi is prior art. PO Resp. 10–26. In support of this argument, Patent Owner cites a case for the proposition that a party seeking to invalidate a patent must do so by clear and convincing evidence. *Id.* at 12 (citing *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1326 (Fed. Cir. 2004)). In an *inter partes* review, however, a Petitioner must prove unpatentability by a preponderance of the evidence, not by clear and convincing evidence. *See* 35 U.S.C. § 316(e).

We further analyze Patent Owner's arguments by exhibit.

a. Broggi (Ex. 1005)

Patent Owner contends that Broggi provides "no definitive evidence to support that the paper was published at or prior to the conference." PO Resp. 13 (citing the Declaration of Dr. Matthew A. Turk (Ex. 2008) ¶¶ 26–

27). Dr. Turk echoes this contention. Ex. 2008 ¶¶ 26–27. Dr. Turk elaborates that academic conferences sometimes provide the manuscripts of presented papers months after the actual conference dates, or sometimes drafts are made available with an indication that the finished paper will be provided in the future. *Id.* at ¶ 27.

At best, Patent Owner's argument presents no contradictory evidence and makes only the conclusory assertion that the information on the first page of Broggi is not definitive. Patent Owner argues as if Broggi (Ex. 1005) itself must definitively establish that it is prior art as a printed publication. Such is not the case. Petitioner relies upon other evidence as well, and Patent Owner's contention here does not address the evidence as a whole. Further, Dr. Turk mentions that there are possibilities other than publication at the conference, such as subsequent publication or publication of a draft, but Dr. Turk does not provide the facts or data underlying that opinion. *See* 42 C.F.R. § 42.65(a). For example, Dr. Turk does not state that he frequently attends such conferences or has otherwise obtained experience or knowledge supporting his assertion.

b. First and Second Frahm Declarations (Exs. 1013, 1032)

To a degree, Patent Owner argues admissibility rather than addressing the sufficiency of the evidence. *See, e.g.*, PO Resp. 13 (contending that Petitioner "attempts to authenticate" Broggi's publication, and that Dr. Frahm lacks personal knowledge). As explained above, admissibility is properly challenged in a Motion to Exclude Evidence and the Patent Owner's response is the proper vehicle to challenge the sufficiency of evidence.

Although the First Frahm Declaration does not establish the basis of Dr. Frahm's opinion that Broggi was published as Petitioner contends, Dr. Frahm's Third Declaration does so. *See* Ex. 1013 ¶ 113; Ex. 1032 ¶¶ 3–4. Specifically, as explained above, Dr. Frahm's Third Declaration establishes that Dr. Frahm has personal knowledge of IEEE publication procedures. Based upon this knowledge, Dr. Frahm opines that Broggi was published as indicated.

c. First and Second Grenier Declarations (Ex. 1025; Ex. 1026)

Regarding the First Grenier Declaration, Patent Owner contends that it does not provide "any evidence" that the Article was published as Petitioner contends. PO Resp. 14–15. Patent Owner highlights that Mr. Grenier did not attend the Symposium and, therefore, did not personally observe such things as: how many people attended, the qualifications of attendees, whether the Article was available, or when it was first available for public download. *Id.* (citing various portions of the Deposition of Mr. Grenier (Ex. 2009)). Patent Owner adds that presentation is not publication, and that the First Grenier Declaration does not provide evidence of "publication."[18] PO Resp. 14–15 (citing Ex. 2009, 11:17–19).

Regarding the Second Grenier Declaration, Patent Owner contends that it does not remedy the shortcomings of the First Grenier Declaration, similarly stating that the attached printout provides "no evidence whatsoever." PO Resp. 17. Patent Owner adds that Mr. Grenier's statement

[18] Patent Owner also argues that the copyright registration date of January 4, 2005, is after the critical date of the '114 patent. *Id.* at 15. Petitioner does not rely upon the copyright registration as proof of public accessibility, and for that reason this argument is inapposite. *See* Pet. 9.

is "unsupported by any IEEE record," and has "no tendency" to make the publication date of Broggi more probably. *Id*.

Patent Owner's arguments are not persuasive for several reasons. First, Patent Owner again argues admissibility rather than addressing the sufficiency of the evidence. *See, e.g.*, PO Resp. 16–17 (arguing that Mr. Grenier's statement is "unsupported by any IEEE record," (suggestive of hearsay) and has "no tendency" to make the publication date of Broggi more probably (suggestive of relevance)). Second, Patent Owner's characterization of the Declarations as not providing "any evidence" and "no evidence whatsoever" (*see id.* at 14–17) are contradicted by our analysis above that the Declarations are relevant. Such an extreme characterization is both inaccurate and does not address persuasively the merits of the evidence.

Third, Patent Owner's assertion that Mr. Grenier's Declarations are not based on personal observation is not persuasive because Mr. Grenier does not profess to have knowledge based on personal attendance at the Symposium. Rather, Mr. Grenier provides information as an IEEE representative familiar with IEEE records. *See* Ex. 1025 ¶¶ 1–2; Ex. 1026 ¶¶ 1–2. Mr. Grenier's lack of personal attendance at the Symposium does not cast any doubt on the veracity of Mr. Grenier's Declarations.

Fourth, Patent Owner's contention that presentation is not publication and that the First Grenier Declaration does not provide evidence of publication is unpersuasive. PO Resp. 14 (citing Ex. 2009, 11:17–19). The cited portion of the Deposition of Mr. Grenier indicates only that Mr. Grenier did not personally attend the symposium. This contention is unconvincing for the reasons given above. Further, contrary to Patent Owner's contention, the Declarations do provide evidence of publication.

Specifically, the First Grenier Declaration states explicitly that the Broggi Article was "published by IEEE," and the Second Declaration goes on to add that it was published "as part of the conference proceedings on the date of the conference." *See* Ex. 1025 ¶ 6; Ex. 1026 ¶ 6.

Fifth, we disagree with Patent Owner's characterization of Mr. Grenier as not knowing if copies of the Broggi Article were available at the Symposium. PO Resp. 14–15 (citing Ex. 2009, 12:3–7). This evidence must be considered in the context of the deposition and the Declarations. In Mr. Grenier's deposition, Patent Owner asks a series of questions regarding Mr. Grenier's personal attendance at, and observation of, the Symposium. *See* Ex. 2009, 11:17–12:11. In this context, Mr. Grenier's reply that he does not know if copies were available at the Symposium means that he did not view such an event. Mr. Grenier's First Declaration supports this interpretation, stating that copies of the conference proceedings were made available to attendees of the conference. Ex. 1025 ¶ 6. In his Second Declaration, Mr. Grenier clarifies by adding that the Broggi Article was published as part of the conference proceedings *on the date of the conference*. Ex. 1026 ¶ 6. In light of this, we determine that although Mr. Grenier did not observe that copies of the Broggi Article were available to attendees at the conference, he knows that such availability is indicated by IEEE records.

d. Butler Declaration

Patent Owner makes numerous arguments regarding the Butler Declaration.

Two of Patent Owner's arguments relate to the admissibility of the Butler Declaration. *See, e.g.*, PO Resp. 18 ("the Butler Declaration fails to

authenticate," "the Butler Declaration has no probative value"). Such arguments belong in a Motion to Exclude, not in Patent Owner's Response. Also repeated here is Patent Owner's assertion that the Declaration "fails to present ***any*** evidence." *Id.* (emphasis original). As explained before, such a characterization is both inaccurate, and does not persuasively address the merits of the evidence.

Patent Owner argues that neither the Declaration nor the attached webpages establish that Broggi was accessible from the webpage shown at page 16 of Exhibit 1027. PO Resp. 18. According to Patent Owner, the most that is shown is that the text on page 16 of Exhibit 1027 was available on October 12, 2004. For the reasons that follow, we disagree.

As explained above, the Declaration shows that an abstract of an article having the same title, authors, Symposium name, page numbers, date, and location as Broggi (Ex. 1005) was posted to a public website between April 4, 2004, and October 12, 2004. We add that, significantly, the Wayback Machine archives are public and Patent Owner could have submitted evidence to the contrary in the Patent Owner's Response if they so desired.[19] *See* Ex. 1027 ¶ 2 (noting that the archives give free access to the general public).

Patent Owner argues that we should give no weight to the Butler Declaration because Petitioner fails to state the relevance of this evidence as required by 37 C.F.R. § 42.104(b)(5). PO Resp. 18–19. This rule applies to the Petition and is not relevant to Exhibit 1027, which was not submitted

[19] The Second Grenier Declaration was served on February 25, 2015, and the Patent Owner's Response was filed on April 23, 2015. *See* Ex. 1033, 5; Paper 23, 1 (changing due date of Patent Owner response);

with the Petition. *See* 37 C.F.R. § 42.104 (titled "Content of petition"). Furthermore, Petitioner explained the relevance of this Exhibit. *See* Ex. 1033, 3 (Petitioner's response to Patent Owner's first set of objections); Paper 19 (Petitioner's Motion to File Supplemental Information); Pet. Reply 6–8.

Patent Owner contends that changing from alleging a June 2004 publication date to an October 2004 publication date prejudices Patent Owner because, under 35 U.S.C. § 102(a), a Patent Owner may antedate a reference. PO Resp. 19. Petitioner does not allege that October 2004 is the publication date; rather, Petitioner contends that availability online in October 2004 is corroboration of, or further evidence of, availability in June 2004. Tr. 17–18 ("certainly we are not trying to shift the publication date"); *see also* Tr. 31–33 (more detailed explanation). For that reason, Patent Owner's argument is not persuasive. Furthermore, we agree with Petitioner that availability online no later than October 2004 is consistent with publication of Broggi at the Symposium. *See* Pet. Reply 6–8.

4. Summary

Broggi is a printed article titled "Multi-Resolution Vehicle Detection using Artificial Vision." The first page makes reference to the 2004 IEEE Intelligent Vehicles Symposium held at the University of Parma in Parma Italy on June 14–17, 2004, and includes a copyright date of 2004 that is consistent with this information. Broggi is not marked with any limitations regarding dissemination.

Dr. Frahm, as a person who has chaired an IEEE conference and regularly attended IEEE conferences, states that it is his experience that

IEEE papers, such as Broggi, that are presented are made publically available at that conference as is indicated on the face of the paper.

Although he did not attend the Symposium, the Senior Director of Publishing Technologies for IEEE, Mr. Grenier, states that IEEE records indicate that Broggi was published and presented as part of the proceedings on the date of the Symposium.

The Office Manager of the Internet Archive, Mr. Butler, provides records that indicate that Broggi was posted to a public website no later than October 12, 2004.

All of this information is consistent with Petitioner's contention that Broggi was publically accessible at the Symposium.

Patent Owner argues that Petitioner's showing is deficient. As discussed above, however, these arguments are not persuasive. Patent Owner does not present evidence that persuasively casts doubt on Petitioner's showing. Patent Owner's expert, Dr. Turk, opines that Petitioner's showing is not definitive but, in contrast to Dr. Frahm's opinion, Dr. Turk does not provide the underlying facts or data that led to his opinion.

We determine that Petitioner has shown, by a preponderance of the evidence, that Broggi (Ex. 1005) was sufficiently accessible to the public interested in the art by being available to attendees of the IEEE Intelligent Vehicles Symposium at the University of Parma, in Parma, Italy, on June 14–17, 2004. Consequently, Broggi is prior art under 35 U.S.C. § 102(a) because it was accessible to the public interested in the art before the critical date of the '114 patent.

C. Level of Ordinary Skill in the Art

Patent Owner argues that Petitioner fails to resolve the level of ordinary skill in the art, and for that reason Petitioner's obviousness analysis is fatally deficient. PO Resp. 26–28.

Petitioner's expert, Dr. Frahm, provided testimony regarding the level of skill in the art. *See* Ex. 1013 ¶¶ 43–48. Although the level of skill in the art is not discussed in the Petition, Dr. Frahm acknowledged that obviousness is viewed from the perspective of a person of ordinary skill in the art, and applied that standard to his evaluations. *Id.* at ¶¶ 28–29. That is, Dr. Frahm's evaluations of the grounds of unpatentability based on obviousness is based on the perspective of a person of ordinary skill in the art at the time of the claimed invention, and this analysis is cited and explained in the Petition.

Patent Owner's contention is unpersuasive, in part, because it does not address the merits of the level of skill in the art provided. The significance of the level of ordinary skill in the art is the role it plays in an obviousness analysis. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) ("[T]he level of skill in the art is a prism or lens through which a judge, jury, or the Board views the prior art and the claimed invention."); *Ryko Mfg. Co. v. Nu-Star, Inc*., 950 F.2d 714, 718 (Fed. Cir. 1991) ("The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry."). Patent Owner's assertion fails to address how the level of skill in the art impacted the obviousness analysis.

D. Claims 12 and 13 – Obviousness over Gutta, Nissan, Broggi, and Bos

Petitioner contends that claims 12 and 13 are unpatentable under 35 U.S.C. § 103(a) as obvious over Gutta, Nissan, Broggi, and Bos. Pet. 33–37. For the reasons explained below, Petitioner has not established this assertion by a preponderance of the evidence.

1. Gutta (Exhibit 1002)

Gutta describes a vehicular vision system to aid a driver of a vehicle to determine whether it is safe to change lanes. Ex. 1002, Abstract.

Figure 2 is reproduced below.

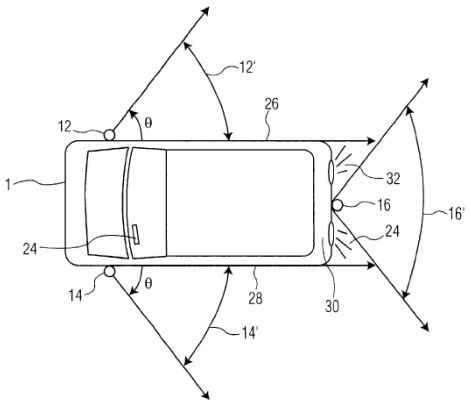

FIG. 2

Figure 2 depicts an overhead view of cameras on a vehicle having the vehicular vision system of Gutta. *Id.* at 2:20–22. Vehicular system 10 includes first and second side image cameras 12 and 14, rear image camera 16, distance determiner 18, and object identifier 20. *Id.* at 2:29–32. First and second side image cameras 12 and 14 are placed preferably on, e.g., passenger side and driver side front portions of the vehicle, respectively, such that rearward and sideward fields of view 12' and 14' are obtained for both sides of vehicle 1. *Id.* at 2:55–60. Rear image camera 16 is placed preferably on rear portion 30 of vehicle 1 with its field of view oriented such

that a rearward view from vehicle 1 is obtained. *Id.* at 3:1–3. Rear image camera 16 preferably has a field of view that results in only very small areas 32 and 34 behind the vehicle not being visible to either rear image camera 16 or first and second side image cameras 12 and 14. *Id.* at 3:3–7. Images generated by cameras 12, 14, and 16 are provided to image processor 22, which processes the image signals generated by the cameras and provides processed image signals to display 24 for viewing by the driver, to distance determiner 18, and to object identifier 20. *Id.* at 3:14–19, 23–27. Object identifier 20 identifies the type of objects observed by the camera, preferably by the well-known methods of extraction and classification. *Id.* at 3:34–40, 51–56. The identification may be as simple as saying that the object is a car, bus, motorcycle, sport utility, minivan, or truck. *Id.* at 3:56–58.

Figure 3 is reproduced below.

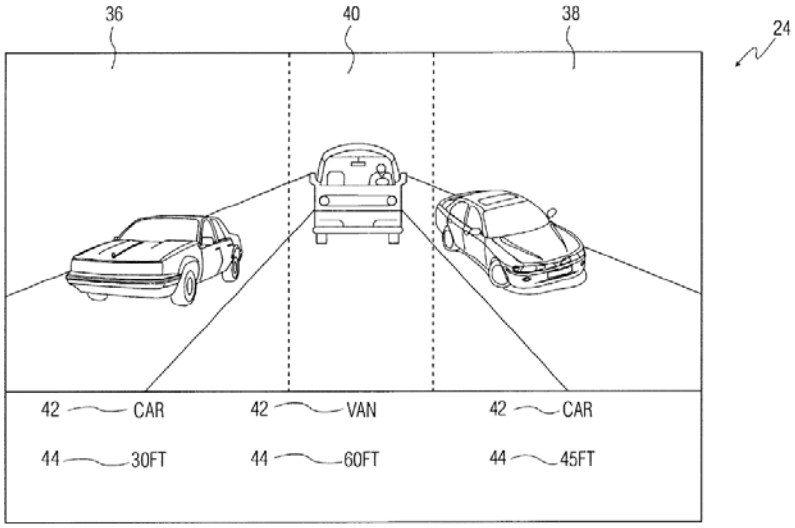

FIG. 3

Figure 3 is an exemplary display according to Gutta. *Id.* at 2:23–24. As depicted in Figure 3, display device 24 displays a composite image that includes: (1) visual representations 36, 38, and 40 of the fields of view 12', 14', and 16' of cameras 12, 14, and 16, respectively; (2) notations 42 as to

each type of object identified; and (3) indications 44 of the distance between the object and vehicle 1. *Id.* at 4:24–32. Based on the information provided by the cameras, object identifier, and distance determiner, the system can provide the driver with an indication that it is now safe to change lanes to the left or right in response to the driver activating the turn signal. *Id.* at 5:22–27.

2. Nissan (Exhibit 1003)

Nissan describes a vehicle-mounted camera optical axis misalignment detection device that detects optical axis misalignment in a vehicle-mounted camera that is mounted on a vehicle and captures images of an area around the vehicle. Ex. 1003 ¶ 1. Vehicle-mounted system 30 includes vehicle-mounted camera 2 that is built in to a left hand door mirror of the vehicle. *Id.* at ¶ 32. Vehicle-mounted camera 2 captures an image of a position that is a blind spot for the driver at the front left of the car near the left fender. *Id.* Specifically, vehicle-mounted camera 2 is mounted on the car such that a left turn signal provided to the side of the car is visible, so as to capture images including the left turn signal. *Id.* Vehicle-mounted system 30 displays this image to display 3, thereby providing the driver with driving support when, for example, making a left turn. *Id.*

3. Broggi (Exhibit 1005)

Broggi describes a vehicle detection system using a single camera. Ex. 1005, Abstract. The system is based on the search for areas with high vertical symmetry in multi-resolution images. *Id.* Symmetry is computed using different sized boxes centered on all the columns of the interest areas. *Id.* All the columns with high symmetry are analyzed to get the width of detected objects. *Id.* Horizontal edges are examined to find the base of the

vehicle in the individuated area. *Id.* The aim is to find horizontal lines located below an area with sufficient amount of edges. *Id.* The algorithm deletes all the bounding boxes which are too large, too small, or too far from the camera in order to decrease the number of false positives. *Id.* All the results found in different interest areas are mixed together and the overlapping bounding boxes are localized and managed in order to delete false positives. *Id.*

An interesting column is defined as having a high symmetry in: (i) the image that contains the result of Sobel binarization; or (ii) the image that contains the AND between symmetry of horizontal and vertical edges. *Id.* at 4. A columnwise histogram is then used to locate candidate columns. *Id.* In correspondence to these columns the vertical edges symmetry is checked to obtain the expected vehicle width. *Id.* More specifically, if a high value of symmetry is present for small widths too, it means that the algorithm has detected a small object; in this case the column is discarded. *Id.*

Figure 5 is reproduced below:

Fig. 5. Vertical edges symmetry: the horizontal axis represents the position of symmetry axis while the vertical axis represents the width of the symmetry box (small on the top and large on the bottom of the image).

Figure 5 shows an example of discarding a column in which the leftmost peak is discarded because it presents a high symmetry value also for small widths. *Id.* In contrast, the rightmost peak presents an appreciable symmetry value only for widths above a certain size. *Id.*

4. Bos (Exhibit 1009)

Bos describes rain sensor system 16' that includes illumination source 38 to provide illumination to sampling area 48 of window 19. Ex. 1009, 8:63–66. Bos describes how rain sensor system 16' operates in a "passive mode" in "daytime light conditions" and "in an active mode at night lighting conditions." *Id.* at 10:51–57. Specifically, rain sensor system 16' includes control 40' that includes ambient light logic function 54 to determine the level of ambient light present on window 19 and switch rain sensor system 16' between a passive mode, where illumination source 38 is not used, when light present on window 19 is provided by ambient light, and an active mode, where illumination source 38 is activated by illumination source control 55, and patterns are illuminated on windshield 19 by illumination source 38 and received by imaging array 36. *Id*. at 9:66–10:8; Fig. 6.

5. Petitioner's Contentions

Claim 12 depends from independent claim 1. Petitioner contends that Gutta, Nissan, and Broggi teach the limitations of independent claim 1. Pet. 36 (citing *id.* at 25–29). Petitioner also explains that a person of ordinary skill in the art would have been motivated to combine Gutta, Nissan, and Broggi because "the system in Gutta measures distances in the 3D world, and it would have been clear to a person of skill in the relevant art that the system taught by Gutta and extended by Nissan and Broggi would require a camera calibration to provide the disclosed distance measurement." Pet. 24 (citing Ex. 1013 ¶¶ 170–194; Ex. 1012, 17, 19), 36 (incorporating analysis with respect to claim 2).

Claim 12 recites "wherein said control is operable in a daytime mode and a nighttime mode." Petitioner contends Bos teaches the limitations of

claim 12. Pet. 36. Bos teaches a "passive mode" for "daytime light conditions" and an "active mode at night lighting conditions." Ex. 1009, 10:51–57. Petitioner explains that a person of ordinary skill in the art would have been motivated "to make the vision system of Gutta as robust as possible," and "given that Gutta operates at all times of the day, it would have been entirely predictable to enhance the vision system of Gutta to monitor ambient lighting and illumination for day vs. night object detection as taught by Bos." Pet. 31–35 (citing Ex. 1013 ¶¶ 209–214).

Claim 13 depends from dependent claim 12, and recites "wherein said control switches between said daytime mode and said nighttime mode in response to an ambient light level at the equipped vehicle." Petitioner cites Bos's teaching of "ambient light logic function 54 to determine the level of ambient light present on window 19" to control whether rain sensor system 16' is in passive (daytime) mode or active (nighttime) mode. Pet. 36 (quoting Ex. 1009, 9:66–10:1).

6. Patent Owner's Arguments

Patent Owner argues that Broggi does not disclose "edges that are not indicative of objects of interest are substantially ignored," as recited in claim 1. PO Resp. 33–39.

Independent claim 1, from which claims 12 and 13 depend, recites "edges that are not indicative of objects of interest are substantially ignored." Petitioner relies upon Broggi's identification of interesting columns, its computation of symmetry, and its discarding of false positives. Pet. 29 (citing Ex. 1005, 311–312). Patent Owner argues that neither Broggi's interesting columns nor its filters teach the claim language. PO Resp. 36–38.

We explain how Broggi operates and then analyze Petitioner's contentions. Broggi discloses a four part algorithm: (1) vertical symmetry computation, (2) interesting column identification, (3) bounding boxes generation, and (4) position and size filtering. Ex. 1005 ¶ III.[20] The algorithm considers three interest areas in order to speed up execution (reduce processing requirements). *Id.* at ¶ III.A.

In step 1 (vertical symmetry computation), Broggi attempts to find all vertical and horizontal edges using a Sobel operator, then three images are built, symmetry for every column of the images is computed, and from horizontal and vertical edges symmetry images, a new image is created. *Id.* at ¶ III.B.

In step 2 (interesting column identification), Broggi searches with the new image for interesting columns (columns with high symmetry in one of two respects). *Id.* at ¶ III.B.–C. Then a columnwise histogram is used to locate candidate columns and the vertical edge symmetry of these candidate columns is checked. *Id.* at ¶ III.C. In this check, small widths having high values of symmetry, which correspond to small objects, are discarded. *Id.*

In step 3 (bounding boxes generation), the width of a bounding box is determined for each peak in vertical edges symmetry image that survives the filters of step 2. *Id*. at ¶ III.D. The box base is located based upon the horizontal edge of the shadow under the car. *Id.*

In step 4 (position and size filtering), because not all the boxes detected boxes in step 3 are correct, the boxes are filtered, to include

[20] At times we cite to paragraph numbers instead of page numbers of this Exhibit to be more specific.

application of a filter that removes boxes that are too small and probably do not identify a vehicle. *Id.* at ¶ III.E.

Claim 1 requires substantially ignoring detected edges that have a specified characteristic (i.e., those not indicative of an object of interest). Petitioner's contention is flawed both with regard to what is ignored (detected edges), and with regard to the specified characteristic. We address these issues in turn.

First, in light of our explanation above, Broggi does not ignore detected edges; rather, Broggi ignores vertical edge symmetry of candidate columns (*see* step 2). Broggi detects edges, but this process is separate from ignoring (discarding) small objects. Specifically, the detected edges are used to create images, within these images symmetry for every column of these images in computed, from this a new image is created, within this new image columns having high symmetry are identified, a columnwise histogram is used to locate candidate columns, and then based on vertical edge symmetry of these candidate columns, small widths are ignored. Petitioner does not explain persuasively how ignoring small widths—indicated from vertical edge symmetry of candidate columns—corresponds to ignoring detected edges as claimed. *See* Pet. 29.

Second, regarding the specified characteristic, Petitioner contends that a small object, as indicated by a small width having high vertical edge symmetry, corresponds to something not indicative of "an object of interest," as claimed. We are not persuaded, however, that Broggi's small objects are not "objects of interest," as claimed. *See* Pet. 29. The '114 patent describes detecting "a vehicle *or* other object of interest." Ex. 1001, 2:47–48 (emphasis added); *see also id.* at 2:59–60 ("where a vehicle or

object of interest is likely to be present"). In the context of the '114 patent, an "object of interest" encompasses things *other* than a vehicle. In contrast, Broggi is concerned with detecting only vehicles. *See* Ex. 1005, Abstract ("[t]his paper describes a vehicle detection system"), ¶ II. ("[t]he goal is to detect all vehicles in the scene"), ¶ III.E. (boxes that are too large or too small probably do not identify a vehicle and are discarded). Because the '114 patent uses "object of interest" to mean non-vehicles, and because Broggi teaches filtering *everything* except vehicles, Broggi does not teach substantially ignoring *only* those edges "not indicative of objects of interest," as recited in independent claim 1, from which claims 12 and 13 depend.

7. Conclusion

For the foregoing reasons, we conclude that Petitioner has not demonstrated, by a preponderance of the evidence, that claims 12 and 13 are unpatentable as obvious over Gutta, Nissan, Broggi, and Bos.

E. Claims 51 and 59–61 – Obviousness over Gutta, Nissan, and Imoto

Petitioner argues that claims 51 and 59–61 are unpatentable under 35 U.S.C. § 103(a) as obvious over Gutta, Nissan, and Imoto. Pet. 43–49, 58–60. For the reasons explained below, Petitioner has established this assertion by a preponderance of the evidence.

1. Imoto (Exhibit 1014)

Imoto describes a camera unit with a forward, rearward, and sideward field of view. Ex. 1014, 15:20–28. Figures 18 and 19 are reproduced below.

FIG. 18

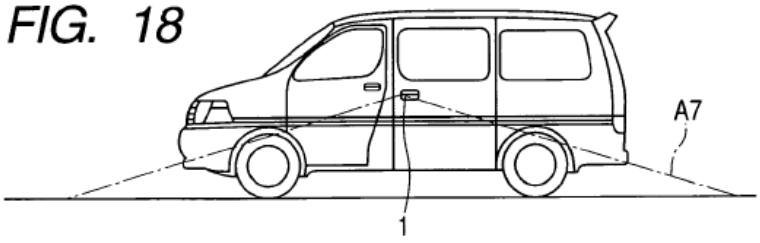

FIG. 19

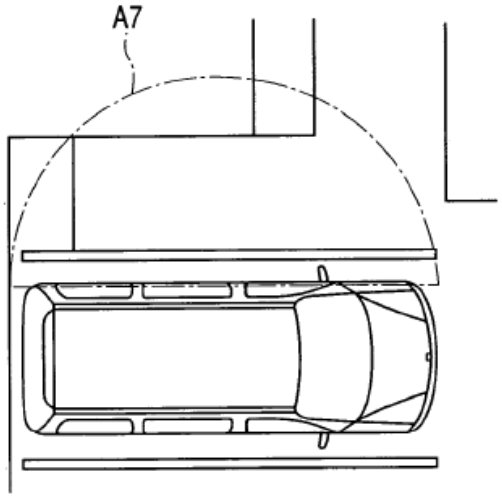

Figure 18 depicts camera unit 1 installed in the side of the vehicle with a field of view A7. *Id.* at 15:10–19. Figure 19 depicts an overhead view of field of view A7. *Id.* at 15:20–28. As can be seen, camera unit 1 has a field of view forward, sideward, and rearward of the vehicle.

2. Petitioner's Contentions

The limitations of independent claim 51 are substantially similar to the limitations of claim 1, but are narrower in two respects.[21] First, whereas claim 1 requires that said imaging device have a field of view "*at least one* of rearward . . . and sideward" (emphasis added), claim 51 requires that it

[21] Claim 51 also omits two limitations recited in claim 1: (1) "said control utilizes edge detection in processing captured image data;" and (2) "in determining objects of interest present in the field of view of said imaging device, edges that are not indicative of objects of interest are substantially ignored in order to at least one of (a) reduce processing requirements and (b) reduce false signals."

have a field of view "rearward . . . , forward . . . *and* sideward" (emphasis added). Petitioner relies upon Imoto for teaching a single imaging device with a forward, rearward, and sideward field of view. Pet. 46 (citing Ex. 1014, 15:20–28, Figs. 19, 20). Petitioner contends that a person of ordinary skill in the art would have combined Gutta and Nissan with Imoto in order "to capture as much of a vehicle's surroundings as possible with a single imaging device, so as to reduce the overall cost of the cameras mounted on the vehicle." Pet. 44 (citing Ex. 1013 ¶¶ 224–241). We are persuaded that Petitioner's citations support Petitioner's contentions.

Second, independent claim 51, unlike claim 1, recites "a video display screen is located in the interior cabin of the equipped vehicle and is viewable by the driver of the equipped vehicle, and wherein images are displayed by said video display screen that are derived, at least in part, from image data captured by said imaging device." Petitioner relies upon Gutta's teaching of a single display positioned proximate the driver's forward field of view inside the vehicle. Pet. 47 (citing Ex. 1002, Fig. 3, 2:49–60, 4:40–60). We are persuaded that Petitioner's citations support Petitioner's contentions.

For the remaining limitations, which are substantially similar to the limitations of claim 1, Petitioner relies upon its contentions that the combination of Gutta and Nissan teach those limitations. Pet. 23–29 (analysis of claim 1), 45–47 (referring to analysis of claim 1). We are persuaded that Petitioner's citations support Petitioner's contentions.

Dependent claim 59 depends from independent claim 51, and recites "wherein at least one of . . . (c) the driver of the equipped vehicle is alerted that an object of interest is determined to be present in the field of view of said imaging device." Petitioner relies upon Gutta's teaching of providing an indication to the driver when it is safe or unsafe to change lanes. Pet. 58–60;

Ex. 1002, Fig. 3, 3:28–31, 5:22–31. We are persuaded that Petitioner's citations support Petitioner's contentions.

Dependent claim 60 depends from independent claim 51 and recites:

> wherein the driver of the equipped vehicle is alerted that an object of interest is determined to be present sideward 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 of interest is determined to be present.

Petitioner relies upon the same teaching in Gutta as it does for claim 59. Pet. 47–48. We are persuaded that Petitioner's citations support Petitioner's contentions.

Claim 61 depends from claim 51 and recites:

> wherein a portion of the side of the equipped vehicle is present in the field of view of said imaging device, and wherein at least one of (a) said control determines that said portion of the equipped vehicle is not an object of interest, and (b) said portion of the equipped vehicle comprises at least a portion of the side of the equipped vehicle at which said exterior rearview mirror assembly is mounted when attached at the side of the vehicle.

Petitioner contends that Nissan teaches part (b) because Nissan's "vehicle-mounted camera 2 is mounted on the car such that a left turn signal provided to the side of the car is visible" and "the actual image of the left front of the car is captured when the left turn signal is on." Pet. 48–49 (quoting Ex. 1004 ¶¶ 32, 49. We are persuaded that Petitioner's citations support Petitioner's contentions.

3. Patent Owner's Arguments

Patent Owner argues that (1) Petitioner's proffered reason to combine Gutta, Nissan, and Imoto is insufficient (PO Resp. 41–43); and (2) the proposed combination would have rendered Gutta unsuitable for its intended purpose (*id.* at 43–45).

a. Reason to Combine

Patent Owner argues, for example, that "Valeo's purported motivation for combining these three references is nothing more than a summary of the claimed elements," that "Valeo provides no analysis as to how the cost is reduced," and that Imoto's wide-angle camera "may have actually been *more expensive* than Gutta's multi-camera system." *Id.* at 42–43.

Petitioner counters that the reason to combine is discussed in the Petition, that Gutta teaches the use of fewer than three cameras, and that Imoto's lens system couples with a standard camera, such as those in Gutta, and would therefore allow for simplification. Pet. Reply 19–20.

We determine that Petitioner has articulated sufficiently a reason to combine Gutta, Nissan, and Imoto. Pet. 44 (citing Ex. 1013 ¶¶ 224–241). Gutta explicitly contemplates replacing three cameras with "one or two specifically positioned cameras" (Ex. 1002, 5:20–21) and we credit Dr. Frahm's testimony that it would have been within the skill of a person having ordinary skill in the art to achieve the use of less than three cameras by modifying Gutta's camera to use the wide angle lens system taught in Imoto (*see, e.g.*, Ex. 1013 ¶ 225).

b. Unsatisfactory for its Intended Purpose

Patent Owner also argues that combining Gutta, Nissan, and Imoto would have rendered Gutta unsatisfactory for its intended purpose by decreasing Gutta's field of view. PO Resp. 43–45. According to Patent Owner, "an entire side of the vehicle would be removed from the field of view according to the proposed combination." *Id.* at 45 (citing Ex. 2008 (Turk Decl.) ¶ 67).

Petitioner replies that Gutta explicitly contemplates the proposed combination when it states that "a single camera with a very large field of view and properly positioned on the vehicle could substitute for the side and rearview cameras." Pet. Reply 21 (quoting Ex. 1002, 5:2–4).

We agree with Petitioner. Patent Owner asserts that the combination "would not meet Gutta's caveat that 'one or two specifically positioned cameras could ***provide the required coverage***'" (PO Resp. 44)(emphasis original), but does not explain persuasively why it would not. Patent Owner cites to paragraph 65 of Dr. Turk's Declaration, but that testimony merely echoes the Patent Owner Response. Gutta explicitly teaches that "while three cameras are described in the preferred embodiment, one or two specifically positioned cameras could provide the required coverage." Ex. 1002, 5:19–21. Petitioner proposes the use of Imoto's wide angle lens system in imaging devices positioned in exterior rearview mirrors to give them a forward, sideward, and rearward field of view. Pet. 44. Given all three fields of view, we are not persuaded that Gutta's "required coverage" would not be provided by the proposed combination.

To the extent that Patent Owner is arguing that the proposed combination would not work without at least a second imaging device in the exterior rearview mirror on the other side of the vehicle, that argument is unpersuasive because the proposed combination is directed to what is claimed—i.e., an imaging system *comprising* an imaging device. Neither the claim nor the proposed combination preclude the use of additional imaging devices in other positions on the vehicle.

4. Conclusion

Petitioner has demonstrated, by a preponderance of the evidence, claims 51 and 59–61 are unpatentable as obvious over Gutta, Nissan, and Imoto.

F. Claim 56 – Obviousness over Gutta, Nissan, Imoto, and Gentex

Petitioner argues that claims 51 and 56 are unpatentable under 35 U.S.C. § 103(a) as obvious over Gutta, Nissan, Imoto, and Gentex. Pet. 53–56. For the reasons explained below, Petitioner has established this assertion by a preponderance of the evidence.

1. Gentex (Ex. 1007)

Gentex describes automatic vehicle exterior light control systems that detect related images generally forward of a controlled vehicle. Ex. 1007 ¶ 5. Gentex discloses mounting image sensors to detect for headlights of oncoming vehicles and taillights of leading vehicles. *Id.* at ¶ 33.

2. Petitioner's Contentions

Dependent claim 56 depends from independent claim 51. Petitioner repeats its analysis with respect to claim 51 in Section VII.E of the Petition (ground based upon Gutta, Nissan, and Imoto). Pet. 54–56. We are persuaded by that analysis for the reasons discussed above.

Dependent claim 56 recites "wherein said control distinguishes a headlight from other light sources present in the field of view of said imaging device." Petitioner incorporates all support cited with respect to independent claim 51 and with respect to claim 5. Pet. 56. For claim 5, Petitioner relies upon Gentex's teaching of an image sensor mounted in a location to "allow for detection of headlights 116 of oncoming vehicles 115 and

taillights 111 of leading vehicles 110 within the glare zone 108 associated with the controlled vehicle." Pet. 32–33 (quoting Ex. 1007 ¶ 33). We are persuaded that Petitioner's citations support Petitioner's contentions.

3. Patent Owner's Arguments

Patent Owner argues that (1) Petitioner's proffered reason to combine Gutta, Nissan, Imoto, and Gentex is insufficient (PO Resp. 46–48); and (2) Gentex does not "distinguish[] a headlight from other light sources present in the field of view of said imaging device," as recited in claim 56 (*id.* at 48–50).

a. Reason to Combine

Patent Owner argues "Valeo does not explain how or why [Gentex's teachings] would 'enhance' Gutta's system," that Valeo's citation to Dr. Frahm's Declaration is an improper incorporation by reference, and that Dr. Frahm's testimony is inconsistent. PO Resp. 45–46.

Petitioner replies that the reason to combine is addressed in the Petition, that Gutta explicitly teaches the use of "any number of well-known methods" for object extraction and classification, and that Gentex's method for detecting headlights as among those well-known methods. Pet. Reply 22. Petitioner adds that both Gentex and Gutta are directed to solving the same problem, i.e., driver safety. *Id.*

We determine that Petitioner has articulated sufficiently a reason to combine Gutta, Nissan, Imoto, and Gentex. Pet. 53–54 (citing Ex. 1013 ¶¶ 268–271). Gutta explicitly contemplates the use of "well-known methods" (Ex. 1002, 3:36–40), Gentex provides evidence that headlight detection methods were known, and we credit Dr. Frahm's testimony that a person of ordinary skill in the art would have been motivated to modify

Gutta's detection of "objects of interest" to include headlight detection, as taught by Gentex (*see, e.g.*, Ex. 1013 ¶¶ 200–204, 269–270).

b. Distinguishing a Headlight from Other Light Sources

Patent Owner argues that Gentex's control does not "distinguish[] a headlight from other light sources" because it does not distinguish between headlights and taillights. PO Resp. 48–50. Petitioner replies that Gentex does distinguish between headlights and taillights. Pet. Reply 23–24 (citing Ex. 1007, Fig. 18, Fig. 19, ¶ 84.

We agree with Petitioner. Gentex describes the data shown in Figure 18 as "a summary of data relating to detected taillights of leading vehicles during actual operation," and describes Figure 19 as "a summary of data relating to detected headlights of oncoming vehicles." Ex. 1007 ¶ 84. We credit the testimony of Dr. Frahm that the generation of this data implies that the system can distinguish between a detected taillight and a detected headlight. Ex. 1032 ¶ 30.

4. Conclusion

Petitioner has demonstrated, by a preponderance of the evidence, that claim 56 is unpatentable as obvious over Gutta, Nissan, Imoto, and Gentex.

G. Claim 57 –
Obviousness over Gutta, Nissan, Imoto, and Bos

Petitioner argues that claim 57 is unpatentable under 35 U.S.C. § 103(a) as obvious over Gutta, Nissan, Imoto, and Bos. Pet. 56–57. For the reasons explained below, Petitioner has established this assertion by a preponderance of the evidence.

1. Petitioner's Contentions

Dependent claim 57 depends from independent claim 51. Petitioner incorporates all support cited with respect to claim 51 in Section VII.E of the Petition (ground based upon Gutta, Nissan, and Imoto). Pet. 57. We are persuaded by that analysis for the reasons discussed above.

Dependent claim 57 recites "wherein said control is operable in a daytime mode and a nighttime mode, and wherein said control switches between said daytime mode and said nighttime mode in response to an ambient light level at the equipped vehicle." Petitioner incorporates all support cited with respect to independent claim 51 and with respect to dependent claims 12 and 13. Pet. 57. For claims 12 and 13, Petitioner relies upon Bos's teaching of of "ambient light logic function 54 to determine the level of ambient light present on window 19" to control whether rain sensor system 16' is in passive (daytime) mode or active (nighttime) mode. Pet. 36–37 (quoting Ex. 1009, 9:65–10:6, 10:51–57). We are persuaded that Petitioner's citations support Petitioner's contentions.

2. Patent Owner's Arguments

Patent Owner argues that (1) Petitioner fails to articulate sufficient rationale to combine Gutta, Nissan, Imoto, and Bos (PO Resp. 50–52); (2) Petitioner's ground is based on hindsight (*id.* at 52); and (3) the control of Bos does not operate in two different modes—i.e., the recited "daytime mode and a nighttime mode"—required by claim 57 (*id.* at 53; *see also id.* at 39–41). We analyze these arguments in turn.

a. Reason to Combine

Patent Owner argues that Petitioner provides only a conclusory reference to a rationale discussed in a different ground of unpatentability

without explaining how it applies to this ground, and that the citation to Dr. Frahm's Declaration is an improper incorporation by reference. PO Resp. 50–52. Petitioner replies that the reason to combine is addressed in the Petition. Pet. Reply 24.

We agree with Petitioner. The Petition states:

> The rationale for combining Gutta and Bos is provided in ground of unpatentability C, above. Given the rationale above, it also would have been obvious to combine Gutta, Nissan, Imoto, and Bos to employ adaptability to changing conditions in the vision system of Gutta using a camera with a wide-angle lens installed on a side mirror of the vehicle of Gutta. Ex. 1013 at ¶¶272-275.

Pet. 57. Paragraph 274 of Dr. Frahm's Declaration refers back to paragraphs 209–214, where he discusses "us[ing] the ambient light level as the trigger for the image processor of Gutta to switch between daytime mode and nighttime mode." Ex. 1013 ¶ 212. Thus, Petitioner has articulated sufficiently how a person of ordinary skill in the art would have combined Bos's illumination sensor with the vehicle vision system of Gutta.

b. Hindsight

Patent Owner refers back to its arguments with respect to claims 12 and 13 (PO Resp. 52), where it contends that Petitioner's ground is based upon impermissible hindsight because "[Petitioner] does not articulate how Gutta's control would operate any differently in a 'day mode' and a 'night mode,'" and because "[Petitioner] fails to reconcile differences between Gutta and Bos that would have been important to a [person of ordinary skill in the art]" (*id.* at 32).

Petitioner refers back to its arguments with respect to claims 12 and 13 (Pet. Reply 25), where it replies that "it would have been common sense," and cites the Third Frahm Declaration for "additional explanation of

how Gutta's control would operate in a 'day mode' and a 'nighttime mode'" (*id.* at 16 (citing Pet. 35; Ex. 1013 ¶¶ 209–14; Ex. 1032 ¶ 10)).

In this regard, we credit the testimony of Dr. Frahm that it would have been within the skill of a person having ordinary skill in the art "to address the different algorithmic challenges existing during 'nighttime' and 'daytime' by selecting between different approaches depending on the illumination of the surroundings of the vehicle." Ex. 1032 ¶ 10 (citation omitted). Apart from criticizing Petitioner, the only affirmative testimony offered by Dr. Turk on this point is his testimony that "[a] POSA would not have sought to use Bos's system, which focuses on a very small target area, with Gutta's vision system designed to capture as much of the vehicle's surroundings as possible." Ex. 2008 ¶ 45. Considering the arguments and evidence from both parties, we are not persuaded that the small target area of Bos's illumination sensor, which would be used only to determine whether the illumination level outside the vehicle corresponds to "daytime" or "nighttime," is inconsistent with Gutta's cameras having a large field of view.

c. "Daytime Mode and a Nighttime Mode"

Patent Owner refers back to its arguments with respect to claims 12 and 13 (PO Resp. 53), where it contends that argues that the control of Bos does not operate any differently in its "active mode" than it does in its "passive mode" because the only difference between those modes is whether the illumination source is on (active mode) or off (passive mode) (*id.* at 40–41).

Petitioner refers back to its arguments with respect to claims 12 and 13 (Pet. Reply 25), where it replies that Bos explicitly equates "passive

mode" with "daytime light conditions" and "active mode" with "night lighting conditions," and argues that "while the passive and active modes in Bos may refer to the illumination source being on or off, that is ***not*** how each mode chosen; rather, the choice of mode triggers the illumination source" (*id.* at 18–19 (citing Ex. 1009, 10:8–14, 10:52–57)).

We are not persuaded by Patent Owner's argument that Bos does not teach the *control* switching between nighttime and daytime modes. Claim 57 recites that "said control is operable in a daytime mode and a nighttime mode," but does not require the control to behave differently in one mode versus the other. Bos teaches two modes—one for daytime lighting conditions and the other for night lighting conditions—in which its control is operable and teaches that the control includes "ambient light logic function 54 to determine the level of ambient light present on window 19 and switch rain sensor system 16' between a passive mode . . . and an active mode." (Ex. 1009, 9:65-10:8). Accordingly, we are persuaded that Bos teaches the recited limitation.

3. Conclusion

Petitioner has demonstrated, by a preponderance of the evidence, that claim 57 is unpatentable as obvious over Gutta, Nissan, Imoto, and Bos.

IV. CONCLUSION

Petitioner has shown, by a preponderance of the evidence, that the instituted claims of the '114 patent are unpatentable under 35 U.S.C. § 103.

V. ORDER

Accordingly, it is

ORDERED that claims 51, 56, 57, and 59–61 of the ’114 patent have been shown, by a preponderance of the evidence, to be unpatentable;

FURTHER ORDERED that claims 12 and 13 of the ’114 patent have not been shown, by a preponderance of the evidence, to be unpatentable;

FURTHER ORDERED that Patent Owner’s Motion to Exclude is *denied*; and

FURTHER ORDERED that, because this is a Final Written Decision, the 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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