

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MAGIC LEAP, INC.,
Petitioner,

v.

PERCEPT TECHNOLOGIES INC.,
Patent Owner.

IPR2023-00494
Patent 9,010,929 B2

Before KRISTEN L. DROESCH, GEORGE R. HOSKINS, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

HOSKINS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims¹ Unpatentable
35 U.S.C. § 318(a)

¹ As discussed further below, after the Petition challenged claims 1–11, 15, 17, and 22 of the '929 patent, Patent Owner disclaimed claims 7, 9, 10, and 15. We now determine the remaining challenged claims 1–6, 8, 11, 17, and 22 are unpatentable.

I. INTRODUCTION

Magic Leap, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 for *inter partes* review of U.S. Patent No. 9,010,929 B2 (Ex. 1001, “the ’929 patent”), claims 1–11, 15, 17, and 22.

After the Petition was filed, Percept Technologies Inc. (“Patent Owner”) filed a Statutory Disclaimer of claims 7, 9, 10, and 15. *See* Ex. 2002. We issued an Institution Decision (Paper 10, “Inst. Dec.”) instituting review as to the remaining claims 1–6, 8, 11, 17, and 22 (“the Challenged Claims”). *See* Inst. Dec. 2, 6–9, 29.

Patent Owner then filed a Patent Owner Response (Paper 12, “PO Resp.”) to the Petition in defense of the Challenged Claims. Petitioner filed a Reply (Paper 13, “Pet. Reply”) to the Patent Owner Response. Patent Owner filed a Sur-reply (Paper 14, “PO Sur-reply”) to the Reply.

An oral hearing was held on May 8, 2024. A transcript of the hearing has been entered into the record (Paper 20, “Tr.”).

We have jurisdiction under 35 U.S.C. § 6(b)(4) and § 318(a). This Decision is a final written decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the Challenged Claims of the ’929 patent. We determine Petitioner has shown by a preponderance of the evidence that the Challenged Claims are unpatentable.

II. BACKGROUND

A. *Real Parties-in-Interest and Related Proceedings*

Petitioner and Patent Owner are the only real parties-in-interest for this proceeding. *See* Pet. 75; Paper 4.

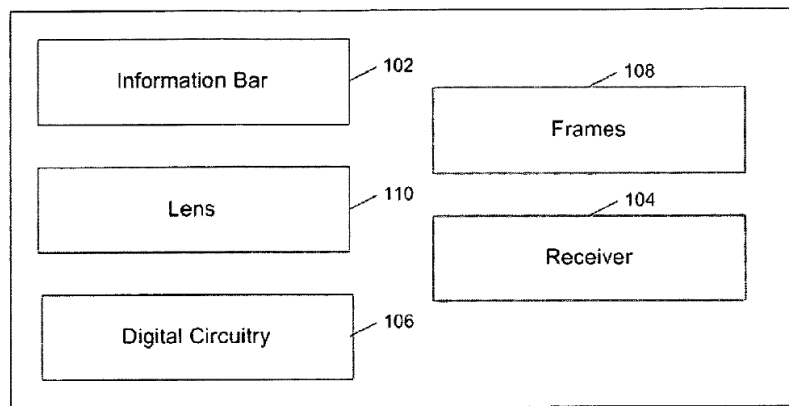
Petitioner identifies IPR2023-00495 as a related proceeding, because in that case Petitioner has challenged U.S. Patent No. 8,696,113 B2, which issued from a continuation-in-part application of the '929 patent. *See* Pet. 75–76; Ex. 1001, code (21) (the '929 patent issued from U.S. App. No. 13/739,929); IPR2023-00495, Ex. 1001, 1:4–9 (U.S. Patent No. 8,696,113 B2 is a continuation-in-part of U.S. App. No. 13/739,929).

The parties identify one district court litigation involving the '929 patent: *Percept Technologies Inc. v. Magic Leap, Inc.*, Case No. 1:22-cv-00025-RGA (D. Del.) (“the District Court Action”). *See* Pet. 75; Paper 4. The District Court Action is stayed as requested by both parties and ordered by the Court, pending final resolution (including any appeals) of this case and IPR2023-00495. *See* District Court Action, Dkt. Nos. 71–72.

B. The '929 Patent

The '929 patent is titled “Digital Eyewear.” Ex. 1001, code (54). It provides eyewear that “includes circuitry within the frame member for enhancing the use of the eyewear” in “a variety of ways.” *Id.* at code (57), 2:21–24. Such enhancements include: (1) media focal enhancements, which further the eyewear’s intended purpose of using imaging techniques to improve the user’s vision; (2) telecommunications enhancements, which integrate the eyewear with a telecommunication device such as a cell phone; and (3) entertainment enhancements, which integrate the eyewear with an entertainment device such as an MP3 player or a radio. *See id.* at code (57), 2:23–33.

Figure 1 (reproduced below) is a diagram that illustrates media focals eyewear 100. *See id.* at 1:63, 2:39–40.



100

Fig. 1

'929 Patent Figure 1.

Figure 1 diagrammatically illustrates media focal eyewear 100 including information bar 102, receiver 104, digital circuitry 106, frames 108, and lens 110. *See id.* at 2:39–42.

Digital circuitry 106 can be placed within frames 108. *See id.* at 2:45–47, 3:15–20. Circuitry 106 enhances the user's vision using imaging techniques and data from a digital camera (not shown in Figure 1) placed within the eyewear. *See id.* at 2:25–27, 2:42–45, 3:4–20. In one example, circuitry 106 includes “a zoom feature circuit to allow for the use of the eyewear as binoculars . . . for the user to see objects more closely.” *Id.* at 3:7–10.

“[T]here may be eye or pressure sensors on the eyewear that will activate the binocular circuitry in the glasses,” including “[e]ye movement sensors . . . used to activate and control the binocular glasses.” *Id.* at 3:10–14, 3:20–25. In this way “an activity of the eye itself would control the activity of the media focal,” and “for example, if the idea was to zoom

the image, the eye would blink twice” or perhaps “squint[.]” *Id.* at 3:36–43. The eye sensors can detect “changes in the pupil and iris” of the wearer to implement this functionality. *Id.* at 3:40–43.

Circuitry 106 also provides information bar 102 across lens 110, to display information to the user, including for example a stock ticker, song titles or lyrics, or a telephone number. *See id.* at 2:55–65 (Fig. 2), 4:45–50.

C. The Challenged Claims of the '929 Patent

The '929 patent lists twenty-two claims. *See* Ex. 1001, 5:55–8:38. The Challenged Claims are independent claims 1, 8, 11, 17, and 22, and dependent claims 2–6 which each depend directly from claim 1.

Claim 1 is illustrative of the Challenged Claims, and it recites:

1. Eyewear comprising:
a frame member;
a lens;
circuitry within the frame member for enhancing the use of the eyewear; and
an eye sensor coupled to the frame member, the eye sensor activating the circuitry responsive to eye motion of a user;
wherein an information bar is provided on the lens.

Id. at 5:57–64 (final line break added).

D. Asserted Prior Art

Petitioner relies on the following two prior art references in asserting the Challenged Claims of the '929 patent are unpatentable. *See* Pet. 5–6.

Name	Reference	Pub. Date	Exhibit No.
Mann '895	CA 2,362,895 A1	Dec. 26, 2002	1005
Pemer	US 2005/0281440 A1	Dec. 22, 2005	1006

E. Asserted Ground

Petitioner asserts the Challenged Claims of the '929 patent are unpatentable as having been obvious under 35 U.S.C. § 103(a)² over Mann '895 and Perner. *See* Pet. 6.

F. Testimonial Evidence

Petitioner relies on the proffered expert testimony of Joseph J. LaViola, Jr., Ph.D. (Exhibits 1003, 1004, and 1016). Patent Owner does not rely on opposing expert witness testimony.

III. PETITIONER'S CHALLENGE

Petitioner argues the Challenged Claims of the '929 patent are unpatentable as having been obvious over Mann '895 and Perner. *See* Pet. 6, 7–23, 30–33, 39–41, 42–46. Patent Owner opposes. *See* PO Resp. *generally*. We have reviewed the record, and we conclude a preponderance of the evidence supports Petitioner's assertions as to all of the Challenged Claims, for the following reasons.

A. Statement of Law

1. Petitioner's Burden of Proof

Petitioner bears the burden of proving unpatentability of the Challenged Claims, and this burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d

² The '929 patent issued from an application filed in January 2013. *See* Ex. 1001, code (22). Therefore, the first-inventor-to-file provisions of the Leahy-Smith America Invents Act (Pub. L. No. 112-29, 125 Stat. 284 (2011)), which took effect in March 2013, do not apply here.

1375, 1378 (Fed. Cir. 2015). Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

2. *Law of Obviousness*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations of nonobviousness, if placed at issue which has not happened here. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. *Level of Ordinary Skill in the Art*

Petitioner contends a person of ordinary skill in the art pertaining to the ’929 patent “would have had a B.S. degree and a Masters degree in Computer Science, Computer Engineering, Electrical Engineering, Physics, or an equivalent field, as well as one to two years of academic or industry experience in wearable electronic devices or comparable industry experience.” Pet. 3 (citing Ex. 1003 ¶121).

Prior to institution, Patent Owner had argued that the Petition fails to establish, sufficiently to justify institution, the level of ordinary skill in the art. *See* Inst. Dec. 10–11. We disagreed. *See id.* at 11–14.

Now, after institution, Patent Owner does not challenge the Petition’s formulation of ordinary skill, or address the level of ordinary skill at all. *See* PO Resp. *generally*. Accordingly, we maintain our determination in the Institution Decision that Petitioner’s formulation of ordinary skill is supported persuasively by the testimony of Dr. LaViola, and is consistent with the level of skill reflected in the ’929 patent and the prior art of record. We therefore apply Petitioner’s formulation in our analysis below.

C. Claim Construction

We interpret the ’929 patent claims “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). This “includ[es] construing the claim[s] in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*

Each of the Challenged Claims recites an “eye sensor activating the circuitry responsive to eye motion of a user.” Ex. 1001, 5:62–64 (claim 1), 6:22–24 (claim 8), 6:53–55 (claim 11), 8:1–3 (claim 17), 8:36–38 (claim 22). We will refer to this limitation as the “Eye Sensor Limitation.” The parties dispute the proper claim construction of the Eye Sensor Limitation, as discussed below.

Other than the Eye Sensor Limitation, and based on the arguments and evidence presented in the record before us, we conclude no explicit

construction of any claim term is needed to resolve the parties' controversy.³ *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

1. *The Petition*

In the Petition, Petitioner argues no claim construction of the Eye Sensor Limitation is necessary because "the challenged claims are [unpatentable] under any reasonable interpretation of the claims." Pet. 4. Petitioner also notes that, in the District Court Action, the parties have disputed the proper construction of the Eye Sensor Limitation. *See id.* at 3–5 (citing Exs. 1008–1011); Paper 6 (Petitioner's Updated Mandatory Notices, providing Ex. 1015).⁴ In particular, Petitioner's proposed construction was "the eye sensor making the inactive circuitry become active, in response to eye motion of a user," whereas Patent Owner's proposed construction was

³ Petitioner argues no other claim constructions are necessary in this proceeding. *See* Pet. 4. Petitioner also summarizes the parties' respective positions in the District Court Action as to the construction of "media focals," "lens," "cell phone," and "MP3 player." *See id.* at 3–5 & nn.2–4. Patent Owner does not proffer any explicit claim constructions apart from the Eye Sensor Limitation, or address Petitioner's summary of the District Court Action. *See* PO Resp. 3–9. We need not construe "media focals," "lens," "cell phone," or "MP3 player" in order to resolve the parties' disputes as to whether the Challenged Claims would have been obvious over the prior art at issue in this proceeding (i.e., Mann '895 and Perner).

⁴ When citing to Exhibits 1008–1011 and 1015, we refer to the page numbering added by Petitioner at the bottom right corner of each page.

“plain and ordinary meaning.” Pet. 5; *see* Ex. 1008, 15–16 (Patent Owner’s opening argument); Ex. 1009, 13–15 (Petitioner’s opposing argument); Ex. 1010, 11–13 (Patent Owner’s reply argument). The District Court adopted the “[p]lain and ordinary meaning” of the Eye Sensor Limitation, without specifying what that meaning might be. Ex. 1015, 1.

2. *The Institution Decision*

Prior to institution, Patent Owner urged us to adopt the District Court’s plain and ordinary meaning construction of the Eye Sensor Limitation. *See* Inst. Dec. 14; Paper 9 (Preliminary Response), 3–6. Like the District Court, Patent Owner did not specify what that meaning might be. *See* Paper 9, 3–6. In the Institution Decision, we did not explicitly construe the Eye Sensor Limitation because (1) the record at that time did not present any actual disputes to resolve, and (2) we discerned no need for an explicit construction in the context of deciding whether to institute review based on Petitioner’s obviousness combination of Mann ’895 and Perner. *See* Inst. Dec. 14–15.

3. *The Patent Owner Response*

Patent Owner now argues that the Institution Decision did, in fact, construe the Eye Sensor Limitation implicitly, when applying claim 1 to Mann ’895 and Perner. *See* PO Resp. 5–6 (citing Inst. Dec. 23–24). Patent Owner urges that it would be “legal error” for us not to construe the Eye Sensor Limitation explicitly in this Decision, because its meaning “is ‘in controversy’ inasmuch as the parties disagree as to whether” the combination of Mann ’895 and Perner teach or suggest that limitation. *Id.* at

6–7 (citing *HTC Corp. v. Cellular Commc'ns Equip., LLC*, 877 F.3d 1361, 1367 (Fed. Cir. 2017)).

Patent Owner argues the plain and ordinary meaning of the “responsive to” term in the Eye Sensor Limitation is that the eye sensor must activate the circuitry “*in reaction to* eye motion, for that is what the word ‘responsive’ means.” *Id.* at 7–8. Patent Owner adds: “To be *responsive to something* is to react or answer quickly in relation to that something,” and “[i]t implies that someone or something reacts or adapts appropriately or in a specific way when influenced or affected by a particular stimulus, situation, or input,” such that the “notion of temporal immediacy and action, cause and effect if you will, is inherent in the term.” *Id.* at 8.

Patent Owner asserts the ’929 patent specification “provides some guidance” here, in stating that “[e]ye movement sensors . . . could be used to activate and control the binocular glasses,” and that it is “possible to detect facial and eye movements (squinting, for example), as well as changes in the pupil and iris.” Ex. 1001, 3:23–25, 3:40–43; *see* PO Resp. 7; *see also* PO Resp. 3 (further citing Ex. 1001, 3:20–25). Patent Owner argues these passages establish that “the ‘eye motion’ recited in the claims is actual movement of the eye and not merely ‘changes in the pupil and iris’ and is also distinct from facial movements.” PO Resp. 7. Patent Owner also asserts the specification does not define the Eye Sensor Limitation to have any meaning other than its plain and ordinary meaning, so we should apply that meaning. *See id.* at 8–9 (citing *Ancora Techs., Inc. v. Apple, Inc.*, 744 F.3d 732, 734 (Fed. Cir. 2014)).

Patent Owner also asserts, in opposition to the Institution’s Decision’s preliminary finding that Perner “discloses an iris scanner that is *responsive*

to eye motion of a user, because Perner's user authentication algorithm *relies on* motion of the user's eye" (Inst. Dec. 23–24 (emphases added)), that "mere *reliance* upon eye motion [is not] sufficient to demonstrate activation '*responsive to*' eye motion" (PO Resp. 18). In support, Patent Owner explains that "reliance and responsiveness are two very different concepts that involve different aspects of interaction or dependence." PO Resp. 20. In particular, "[r]eliance implies dependence upon something for support or assistance," according to Patent Owner. *Id.* at 20–21. Responsiveness, by contrast, allegedly "means a reaction or adaptation to something" and further "implies a dynamic relationship in which one thing changes, adjusts, or responds to changing conditions or stimuli." *Id.*

4. *The Petitioner Reply*

Petitioner replies that Patent Owner's argument "improperly sidesteps the claim construction process under the guise of clarifying the plain and ordinary meaning of 'responsive to'" and "offers no evidence whatsoever to support [Patent Owner's] self-serving version of the claims." Pet. Reply 2; *id.* at 5.

Petitioner agrees with Patent Owner's position that we should apply the plain and ordinary meaning of the term "responsive to" in this Decision, because Patent Owner did not provide any special meaning for that claim term in the '929 patent specification. *See* Pet. Reply 3. However, Petitioner disagrees with Patent Owner as to what the plain and ordinary meaning of "responsive to" is. *See id.* at 3–4. In Petitioner's view, "the Board need not construe terms that are not in controversy such as where the parties agree on applying plain and ordinary meaning to the terms," so we should "decline to

provide an explicit construction” of the Eye Sensor Limitation in this Decision as we did in the Institution Decision, “given that Patent Owner has not provided any rebuttal evidence.” *Id.* (citing Inst. Dec. 15; *Realtime Data*, 912 F.3d at 1375; *Nidec Motor Corp. v Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)); *see id.* at 5–6 (“**First**” and “**Second**”) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

Petitioner next argues Patent Owner’s proffered plain and ordinary meaning should be rejected because “Patent Owner offers no evidentiary support,” such as documentary evidence or expert testimony, for its position as to “what that meaning would be to the *ordinary artisan* after reading the entire [’929] patent.” Pet. Reply 6–7 (“**Third**”), 8 (lines 6–11).

Petitioner then summarizes various phrases utilized in the Patent Owner Response, in the section on claim construction (PO Resp. 3–9) and in the section analyzing the combination of Mann ’895 and Perner (*id.* at 9–24), which Petitioner characterizes as unsupported “glosses” on the plain and ordinary meaning of the “responsive to” term in the Eye Sensor Limitation. *See* Pet. Reply 7–9. These phrases include “react or answer quickly in relation to”; “one thing cannot be ‘responsive to’ another ‘unless it is a reaction to that other’”; “temporal immediacy and action, cause and effect”; “that someone or something ‘reacts or adapts appropriately or in a specific way when influenced or affected by a particular stimulus, situation, or input’”; “‘mere *reliance* upon eye motion’ is not ‘sufficient to demonstrate activation “responsive to”’”; “a reaction or adaptation to something in a way that acknowledges that thing’s presence or influence”; and “responsiveness

implies ‘a dynamic relationship in which one thing changes, adjusts, or responds to changing conditions or stimuli, typically external factors.’” *Id.* at 7–8 (citations omitted). Petitioner asserts these glosses are not supported by the ’929 patent specification disclosures cited by Patent Owner, which do “not disclose, let alone limit, in what ways the eye movement sensors are responsive to eye movement.” *Id.* at 8–9 (citing Ex. 1001, 3:23–25, 3:40–43; Ex. 1016 ¶¶ 22–23).

Petitioner further submits the Reply Declaration of Dr. LaViola, in which he testifies that a person of ordinary skill in the art “would not have applied any specialized meaning to ‘responsive to’ and instead would recognize the term having a widely understood meaning: an eye sensor that is ‘responsive to’ a thing (*e.g.*, eye motion) responds to that thing.” Pet. Reply 9–14 (citing Ex. 1016 ¶¶ 8, 24–39). Petitioner asserts this testimony is supported by “contemporary dictionaries as to the commonly understood meaning of ‘responsive to,’” which also demonstrate Patent Owner’s claim construction is flawed. *Id.* at 10–14 (citing Ex. 1001, 3:23–27, 5:32–39; Ex. 1017, 1935; Ex. 1018, 1486).

5. *The Patent Owner Sur-Reply*

Patent Owner replies that the Board is not required to accept Dr. LaViola’s testimony, despite the lack of contrary expert witness testimony on behalf of Patent Owner, “especially where, as here, that testimony is at odds with the meaning of the claims.” PO Sur-reply 1 (citing *Phillips*, 415 F.3d at 1318; *Homeland Housewares, LLC v. Whirlpool Corp.*, 865 F.3d 1372, 1378 (Fed. Cir. 2017)). Patent Owner also argues the parties’ dispute concerning construction of the Eye Sensor Limitation is

“easily understandable without the need for expert explanatory testimony,” so “testimony from a technical expert is not a prerequisite for establishing any proposition.” *Id.* at 1–2 (citing *Centricut, LLC v. The Esab Group, Inc.*, 390 F.3d 1361, 1369 (Fed. Cir. 2004)). In particular, according to Patent Owner, “eye movement is what the circuitry reacts to (e.g., whether to activate and control binocular glasses, take pictures via a digital camera, or control digital media),” and “at this level of detail, such things are not so difficult to understand as to require expert testimony to make them clearer.” *Id.* at 3–5 (citing Ex. 1001, 3:20–43, 5:62–64 (claim 1); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1242 (Fed. Cir. 2010)).

Patent Owner also asserts “there appears to be no meaningful dispute regarding the meaning of” the Eye Sensor Limitation, as requiring that the “circuitry must be activated *in reaction to* the eye motion.” *Id.* at 2–3, 6–8 (citing PO Resp. 1; Ex. 1016 ¶¶ 25–26, 35; Ex. 1017, 1935 (“responsive” defs. #1, #3; “respond” verb def. #3; “response” def. #1); Ex. 1018, 1486 (“response” defs. #1, #2, #3; “responsive” defs. #1, #2)). Patent Owner maintains this “cannot be left unsaid” in our Decision, because “absent a claim construction the Board cannot make a final determination concerning the patentability of the challenged claims.” *Id.* at 5 (section title modified) (citing *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361–62 (Fed. Cir. 2008)). Patent Owner adds that “it is not sufficient . . . to simply say that the claims should be given their ‘plain and ordinary meaning’” in this case, because although this “may indicate *how* the claims are to be understood[,] it does not specify *what* the claims mean.” *Id.* at 6 (citing *O2*, 521 F.3d at 1361).

Patent Owner further argues it “is not proposing that the plain and ordinary meaning of ‘responsive to’ be somehow revised to suit a new or special definition,” because “[u]nderstanding that the phrase ‘responsive to’ means ‘in reaction to’ is certainly not providing the term a new or special definition.” *Id.* at 6–7.

Patent Owner finally faults Petitioner’s claim construction (“an eye sensor that is ‘responsive to’ a thing (*e.g.*, eye motion) responds to that thing” (Pet. Reply 14)) as “offer[ing] no help whatsoever in understanding the meaning of these claims.” PO Sur-reply 8. Patent Owner asserts that “[t]o say that something is responsive if it responds is entirely circular and does not make the claim limitations any clearer.” *Id.* at 8, 11–12.

6. *Analysis and Conclusion*

As is clear from the summary of the parties’ arguments above, the parties dispute the plain and ordinary meaning of the term “responsive to” in the Eye Sensor Limitation reciting an “eye sensor activating the circuitry *responsive to* eye motion of a user.” Ex. 1001, 5:62–64 (emphases added).

Patent Owner’s core claim construction position(s) is or are that the term “responsive to” should be construed to mean “in reaction to” or having a “cause and effect.” PO Resp. 7–8. It is not clear whether Patent Owner equates those two proposals. *See, e.g., id.* Therefore, we consider each proposal separately. Then we address Patent Owner’s ancillary assertions as to the meaning of “responsive to” in the claims.

(i) *“Responsive To” As Meaning “Cause and Affect”*

First, we address Patent Owner’s contention that the claim term “responsive to” requires a *cause and effect* relationship between eye motion

of the user and activating the eyewear circuitry. We reject this contention for the following reasons.

The only intrinsic evidence cited by Patent Owner to support the contention, apart from the claim language itself, is the following '929 patent specification disclosures. First:

The circuitry 106 in the device could be, for example, eye sensors which could be pressure sensors, capacitive sensors or some other type of sensor for allowing the eyes to direct the activities. Eye movement sensors, for example, could be used to activate and control the binocular glasses. Similarly, a digital camera could be put on the glasses that would allow the same kinds of technology to take pictures by the person directly.

Ex. 1001, 3:20–27 (cited at PO Resp. 3, 7; PO Sur-reply 3). And:

[I]n a preferred embodiment a method for sensing and controlling the digital media could be implemented in a variety of ways. For example, an activity of the eye itself would control the activity of the media focal. So, for example, if the idea was to zoom the image, the eye would blink twice. It would also be possible to detect facial and eye movements (squinting, for example), as well as changes in the pupil and iris.

Ex. 1001, 3:36–43 (cited at PO Resp. 7; PO Sur-reply 3–4). These disclosures reflect that eye movement sensors may be used to “activate” (a term found in the claims, “activating”) and “control” (a term not found in the claims) the circuitry of the eyewear.

To the extent these disclosures reflect a *cause and effect* relationship between eye movement and activation of circuitry, however, they do so in a permissive rather than a limiting fashion. That is, such a relationship is described as an “example” that “could be used” in “a preferred embodiment,” rather than a definitional or otherwise limiting description of

the claim term “responsive to.” *See, e.g.*, PO Resp. 8 (“[T]he patentee did not provide the term any other or exceptional meaning in the specification of the ’929 patent.”); Tr. 25:21–26:9 (Patent Owner’s counsel admitting it would be “improper” to cite the ’929 patent specification as “limit[ing] the claim”). We discern nothing in these disclosures that would limit the claimed response to require a cause and effect relationship. We must be careful not to read a particular embodiment appearing in the specification into the claim if the claim language is broader than the embodiment. *See Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004) (“particular embodiments appearing in the written description will not be used to limit claim language that has broader effect”); *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993) (“[L]imitations are not to be read into the claims from the specification.”).

Patent Owner’s reliance on dictionary definitions of the word “responsive” and its analogues fares no better. Patent Owner cites definitions of the word “responsive” as meaning “giving or serving as an answer: constituting a response or made in response to something”; or “readily inclined to respond or react appropriately or sympathetically to influences, suggestions, impressions”; or “[a]nswering or replying; responding”; or “[r]eadily reacting to suggestions, influences, appeals, or efforts.” Ex. 1017, 1935 (defs. #1, #3); Ex. 1018, 1486 (defs. #1, #2) (example phrases omitted); *see* PO Sur-reply 2–3, 7. Patent Owner also cites definitions of the word “respond” as meaning “to show some reaction to a force or stimulus: react in response: to react favorably in response.” Ex. 1017, 1935 (verb def. #3) (example phrases omitted); *see* PO Sur-reply 2–3, 7. Patent Owner further cites definitions of the word “response” as

meaning “an act or action of responding (as by an answer)”; “[t]he act of responding”; or “[a] reply or an answer”; or “[a] reaction, as that of an organism, to a specific stimulus.” Ex. 1017, 1935 (def. #1); Ex. 1018, 1486 (defs. #1, #2, #3); *see* PO Sur-reply 7. As with the ’929 patent specification discussed above, we discern nothing in these definitions that would limit the claimed response to require a *cause and effect* relationship, specifically, which Patent Owner seeks to impose here. *See, e.g.*, Tr. 26:9–27:14 (Patent Owner’s counsel’s oral argument concerning dictionary definitions).

Thus, we reject Patent Owner’s contention that the claim term “responsive to” requires a *cause and effect* relationship between eye motion of the user and activating the eyewear circuitry.

(ii) “*Responsive To*” As Meaning “*In Reaction To*”

Next, we address Patent Owner’s contention that the claim term “responsive to” requires that the activation of the eyewear circuitry occurs *in reaction to* eye motion of the user. We find that some of the dictionary definitions cited by Patent Owner appear to equate the two terms “response” and “reaction.” *See supra* Section III.C.6(i).

However, for reasons provided below in Section III.F.4(ii), we find Perner discloses an eye sensor that authenticates a user responsive to eye motion of the user, even applying Patent Owner’s construction that equates a “response” to a “reaction.” Therefore, we are able to resolve the question of obviousness over Mann ’895 and Perner without deciding whether the claim term “responsive to” *requires* that activating eyewear circuitry occurs in reaction to eye motion of the user and thereby *excludes* responses that might

not be considered a “reaction.” *See Realtime Data*, 912 F.3d at 1375. As a result, we do not reach this claim construction issue.

(iii) *Patent Owner’s Ancillary Assertions*

Finally, we address Patent Owner’s ancillary assertions as to the meaning of the claim term “responsive to.” For example, Patent Owner asserts there is a difference between being “responsive to” something and being *reliant on* something. *See, e.g.*, PO Resp. 18 (line 14)–19 (line 11), 20 (line 10)–21 (line 8). Patent Owner also asserts “responsive to” means to react or answer *quickly* with *temporal immediacy*. *See, e.g., id.* at 8, 19–20. We reject these contentions as mere attorney argument, which are unsupported by citation to intrinsic or extrinsic evidence.

(iv) *Conclusion*

We reject Patent Owner’s contention that the claim term “responsive to” requires a *cause and effect* relationship between eye motion of the user and activating eyewear circuitry. We need not and so we do not address the scope of this term any further in this Decision.

D. *Summary of Mann ’895*

Mann ’895 discloses eyeglasses including a built-in computer information display that maintains an ordinary appearance of the eyeglasses. *See* Ex. 1005, 1 (Abstract), 2 (Field of Invention).⁵ Figure 1 (reproduced

⁵ When citing to Exhibit 1005, we follow the convention used by both parties, and refer to the native page numbering at the bottom center of each page. *See, e.g.*, Pet. 7–9; PO Resp. 11.

below) is a diagram depicting a pair of eyeglasses, illustrating the principles and components of the disclosed invention. *See id.* at 7:18–19, 8:21.

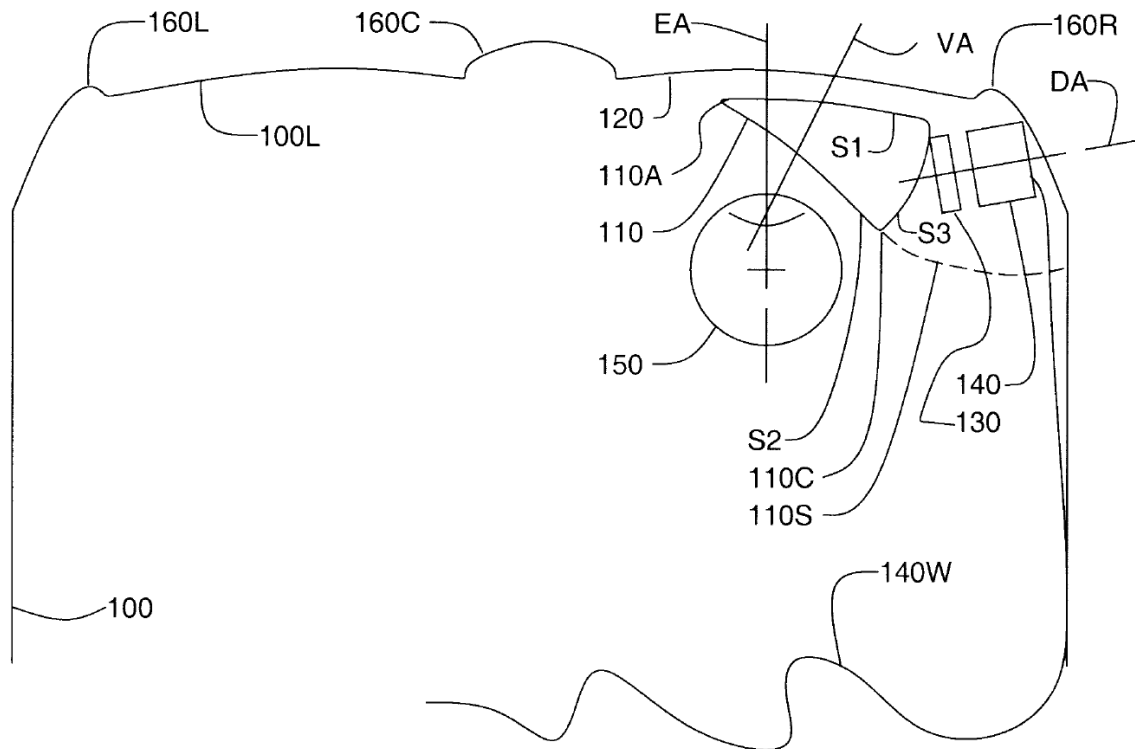


FIG. 1
Mann '895 Figure 1.

Figure 1 illustrates a pair of eyeglasses including frame 100; two lenses 100L; optics 110 and display element 130 disposed on the right side of frame 100; three cameras 160L, 160C, and 160R disposed along the forward-facing portion of frame 100; and wiring 140W. *See id.* at 8:21–25, 9:22–10:15; *see also id.* at Fig. 3 (front view of eyeglass frame 330 with two lenses 340), 14:18–26. Figure 1 additionally shows the user's right eye 150. *See id.* at 8:26–27.

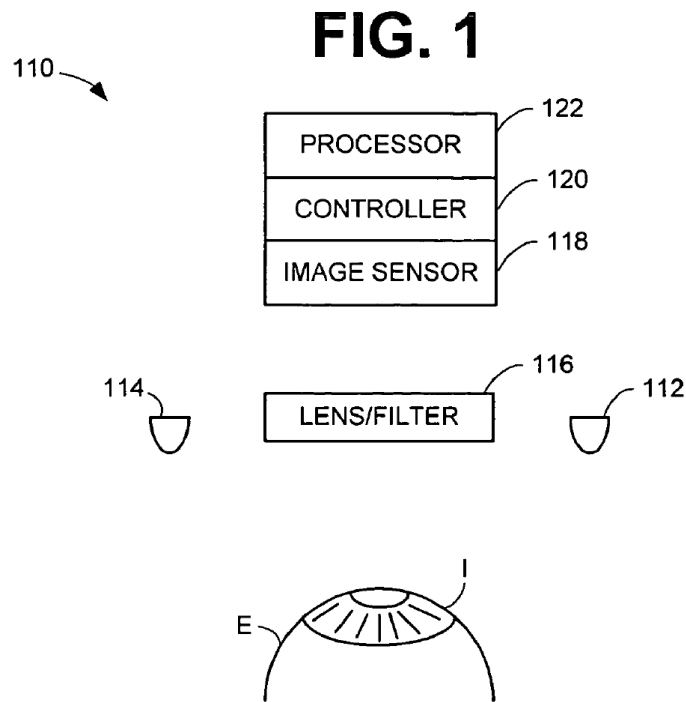
Display element 130 generates an image, and transmits the image through optics 110 to be viewed by the user, as represented by the user's right eye 150 in Figure 1. *See id.* at 8:26–27, 9:1–2, 10:2–6.

Wiring 140W connects to a pocket-sized computer carried by the user to control display element 130, or “[a]lternatively the computer may be built into the eyeglass frames” along with various other electronic elements such as cameras 160L, 160C, and 160R. *Id.* at 10:7–15. In this way, the eyeglasses can present “a computer mediated reality environment” to the user, via display element 130 and optics 110. *Id.* at 11:15–16, 16:17–24. Thus, Mann ’895 “provide[s] a wearable eyeglass based device allowing the wearer to view data, such as from the screen of a wearable computer (wearcomp) system but where the device appears to others to be simply a pair of ordinary eyeglasses.” *Id.* at 4:6–9, 5:6–8, 5:20–21. Further: “An important aspect of the invention, when combined with a camera, is the capability of the apparatus to mediate (augment, and to a limited extent diminish, or otherwise alter) the visual perception of reality.” *Id.* at 4:21–23.

The eyeglasses may further employ “a sight license feature” — that is, “a license to see.” *Id.* at 11:21–23. “For example, a retinal or iris scanner in the eyeglasses may license the eyeglasses to provide sight to the [licensed] wearer, but not to others who might steal the eyeglasses.” *Id.* at 11:23–25.

E. Summary of Perner

Perner discloses an iris feature detector. *See* Ex. 1006, codes (54) and (57). Figure 1, reproduced below, illustrates an exemplary iris feature detector 110. *See id.* ¶¶ 9, 17.



Pemer Figure 1.

Figure 1 illustrates iris feature detector 110 comprising a reflexive eye movement source (i.e., first and second light sources 112 and 114), optics 116, image sensor 118, controller 120, and processor 122. *Id.* ¶ 17. Figure 1 also illustrates one eye E of a subject to be interrogated by detector 110, including its iris I. *Id.* ¶¶ 17, 22.

Detector 110 operates in the following manner. Controller 120 causes first light source 112 to illuminate, whereby the subject's eye is drawn to and fixates on first light source 112. *See id.* ¶¶ 19, 29. Then, controller 120 simultaneously turns off first light source 112 and turns on second light source 114, causing the subject's eye to be drawn to and fixate on second light source 114. *See id.* ¶¶ 20, 30. During that eye movement, controller 120 causes image sensor 118 to capture two images of the eye “very rapidly,” whereby “only the eye” moves in-between the two images, not background features such as the subject's eye lashes. *Id.* ¶¶ 20–22,

28–30. Processor 122 determines differences between the first and second images to “yield[] a pattern of edges of shapes (the iris) contained in the eye,” which is sufficiently “unique to an individual” that the edge pattern can “be used to identify or authenticate the subject” by matching the detected pattern to a database of reference patterns. *Id.* ¶¶ 24–26, 32, 35, 57. If the subject is authenticated, then the subject is “granted certain privileges” such as “access allowed.” *Id.* ¶¶ 35, 59.

According to Perner, the foregoing process “does not require complex processing such as registration of the iris, extracting the iris from the background, artifact removal, etc.” thereby “result[ing] in faster detection of iris features, as well as faster processing for identification and authentication” versus previously known iris feature detectors. *Id.* ¶ 25; *see also id.* ¶¶ 1–5, 57 (discussing how Perner improves on prior art devices in this regard).

F. Claim 1

Petitioner argues and Dr. LaViola testifies that claim 1 is unpatentable as having been obvious over Mann ’895 and Perner. *See* Pet. 7–19; Ex. 1003 ¶¶ 35–61. Patent Owner opposes, focusing on the Eye Sensor Limitation. *See* PO Resp. 11–23. We discuss the parties’ opposing contentions on an element-by-element basis.

1. “Eyewear comprising:”

Petitioner assumes the preamble of claim 1 is limiting, and argues Mann ’895 discloses an eyewear apparatus. *See* Pet. 10–11 (citing Ex. 1005, Fig. 3, 4:6–9); Ex. 1003 ¶ 46. We find this contention, which Patent Owner does not oppose, is supported by a preponderance of the evidence. In particular, Mann ’895 “provide[s] a wearable eyeglass based device

allowing the wearer to view data . . . but where the device appears to others to be simply a pair of ordinary eyeglasses.” Ex. 1005, 4:6–9, Figs. 1 and 3.

2. *“a frame member” and “a lens”*

Petitioner argues the eyewear of Mann ’895 includes a frame member and a lens. *See* Pet. 11–12 (citing Ex. 1005, Fig. 1, 8:21–25); Ex. 1003 ¶¶ 47–49. We find this contention, which Patent Owner does not oppose, is supported by a preponderance of the evidence. In particular, Figure 1 of Mann ’895 illustrates “a pair of eyeglasses, having temple side pieces of frame 100 with frames that support eyeglass lenses 100L.” Ex. 1005, 8:21–22, Fig. 1.

3. *“circuitry within the frame member for enhancing the use of the eyewear”*

Petitioner argues the eyewear of Mann ’895 includes circuitry within the frame member for enhancing the use of the eyewear. *See* Pet. 12–13 (citing Ex. 1005, 4:6–9, 6:27–7:1, 10:8–11); Ex. 1003 ¶ 50. We find this contention, which Patent Owner does not oppose, is supported by a preponderance of the evidence. In particular, Mann ’895 “provide[s] a wearable eyeglass based device allowing the wearer to view data, such as from the screen of a wearable computer (wearcomp) system.” Ex. 1005, 4:6–9, Figs. 1 and 3. Mann ’895 further discloses “a viewscreen in the eyeglasses provides an electronic viewfinder connected to the output of [a] camera also concealed in the eyeglass frames” so the wearer can see “meta information such as that determined by an object recognition program that might, for example, recognize faces of people in the picture and remind the wearer who it is that the wearer wanted to photograph” or is currently

viewing. *Id.* at 6:24–7:10. In addition, in one embodiment, this functionality is provided by a “computer . . . built into the eyeglass frames.” *Id.* at 10:7–11.

4. “an eye sensor coupled to the frame member, the eye sensor activating the circuitry responsive to eye motion of a user”

Petitioner argues Mann ’895 in view of Perner meets the Eye Sensor Limitation of claim 1. *See* Pet. 13; Ex. 1003 ¶ 51. Patent Owner opposes. *See* PO Resp. 11–23. For the following reasons, we conclude Petitioner’s contentions are supported by a preponderance of the evidence, despite Patent Owner’s opposition.

(i) *Mann’s Eye Sensor*

Petitioner argues and Dr. LaViola testifies that the eyewear of Mann ’895 includes a retinal or iris scanner to implement Mann’s sight license feature, and such scanners “are examples of eye sensors that scan and detect components of the human eye” such as the retina or the iris. Pet. 13–14 (citing Ex. 1005, 11:21–25); Ex. 1003 ¶ 51. Petitioner and Dr. LaViola conclude “[t]he retinal or iris scanner in the eyeglasses in Mann ’895 thus meets the claimed *eye sensor coupled to the frame member.*” Pet. 14; Ex. 1003 ¶ 51. Petitioner and Dr. LaViola further assert the eye sensor of Mann ’895 “is *activating the circuitry*” per claim 1, because the eye sensor is used to implement Mann’s sight license feature, which “enable[s] the eyeglasses to operate” by providing sight to a licensed wearer but not to others. Pet. 14 (quoting Ex. 1005, 11:23–25); Ex. 1003 ¶ 52.

In response, Patent Owner notes correctly that Petitioner “offers no specific allegation as to how Mann ’895 alone can be read to teach an eye sensor that activates circuitry *responsive to eye motion of a user*” per the Eye Sensor Limitation. PO Resp. 12. Patent Owner asserts this is “because no such teaching exists in Mann ’895.” *Id.* at 12–13 (citing Ex. 1005, 11:23–25; Inst. Dec. 22).

Petitioner replies that “[a]s the Petition explains, it is not Mann ’895, but the ***combined*** teachings of Mann ’895 and Perner that meet” the “responsive to eye motion” requirement of the Eye Sensor Limitation. Pet. Reply 15 (citing Pet. 14–17; Inst. Dec. 23). Further according to Petitioner, “Patent Owner cannot show nonobviousness by attacking the references individually.” *Id.* (citing Inst. Dec. 23 (citing *In re Merck & Co.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986))).

Thus, it is undisputed that Mann ’895 discloses an “iris scanner in the eyeglasses” (Ex. 1005, 11:23) — that is, “an eye sensor coupled to the frame member” per claim 1. It is further undisputed that Mann’s iris scanner “license[s] the eyeglasses to provide sight to the [licensed] wearer, but not to others who might steal the eyeglasses” — that is, Mann’s iris scanner activates the eyewear circuitry per claim 1. *Id.* at 11:21–25.

However, Petitioner does not rely on Mann ’895 as disclosing its iris scanner activates its circuitry “*responsive to eye motion of the user*” per the Eye Sensor Limitation (emphasis added). *See, e.g.*, PO Sur-reply 9–10 (acknowledging this aspect of Petitioner’s case). For that claim requirement, Petitioner relies on Perner, as we discuss next.

(ii) *Pemer's Eye Sensor*

(a) *The Petition*

Petitioner argues Pemer discloses an eye sensor that is responsive to eye motion of the user. *See* Pet. 14–15; Ex. 1003 ¶ 53. Petitioner particularly asserts “Pemer discloses an iris feature detector with which sequential iris images are captured in response to a user’s ‘rapid eye motion.’” Pet. 14 (quoting Ex. 1006 ¶ 6); Ex. 1003 ¶ 53. According to Petitioner, Pemer determines an edge pattern based on these iris images, and Pemer uses the edge pattern to authenticate a user. Pet. 14–15 (citing Ex. 1006, Fig. 2, ¶¶ 24–27); Ex. 1003 ¶ 53. Petitioner concludes Pemer’s user authentication is “analogous to Mann ’895’s iris scanner providing the sight license to authorized users.” Pet. 15; Ex. 1003 ¶ 53.

(b) *The Patent Owner Response*

Patent Owner responds that “Pemer is clear: the iris feature detector *causes*, rather than *reacts to*, eye movement,” so Pemer does not disclose activating circuitry “responsive to eye motion of a user” per claim 1. PO Resp. 14–15. Patent Owner relies on Pemer’s use of “a pair of light sources 112, 114 (collectively referred to as a reflexive eye movement source)” that are turned on and off in a coordinated fashion to cause the subject’s eye E to move, in order to gather images of the subject’s iris I to authenticate the subject. *Id.* at 13–14 (citing Ex. 1006, code (57), Fig. 1, ¶¶ 6, 9, 17, 24–26, 29, 30, 32, 35, 57, 59); *id.* at 15–18 (citing Ex. 1006 ¶¶ 4, 6, 19–21, 25, 32, 35). Therefore, Patent Owner concludes, Petitioner’s combination of Mann ’895 and Pemer does not lead to the invention of claim 1, because Pemer’s iris feature detector 110 “*causes eye motion of a*

user” rather than “being *responsive to eye motion of a user*” as claimed. *Id.* at 16, 17–18 (“those images would be obtained by [Pemer’s] iris feature detector *causing* (**not** reacting or responding to) eye motion”), 18–20, 21–22.

Further according to Patent Owner: “Pemer’s iris feature detector does not grant (or deny) any permissions in response to” the eye movement caused by lights 112 and 114, but rather “permissions are granted (or not) responsive to the results of subsequent image comparisons.” *Id.* at 17, 22 (citing Ex. 1006 ¶ 35). That is, in Patent Owner’s view, Pemer “rel[ies] on the use of a ‘biometric password’ to authorize (or not) certain privileges,” so in Petitioner’s combination of Mann ’895 and Pemer a biometric password controls whether a sight license is granted, “not something else” such as the eye motion recited in claim 1. *Id.* Specifically, in Pemer, user authentication “is determined according to a comparison between an ‘edge pattern’ derived from images captured by the iris feature detector and reference images in a database.” *Id.* at 18–19 (citing Ex. 1006 ¶ 35). Patent Owner concludes that “[w]hile the eye motion in Pemer may be needed in order for the initial images to be obtained, it is the matching (or not) of the edge pattern obtained from those images with a reference pattern from a database that determines ‘access’ (or not).” *Id.* at 19. That is, Patent Owner concedes “other things [i.e. eye motion] have to happen prior to [Pemer’s] image comparison” to grant user authorization, but Patent Owner nonetheless contends “that does not make the outcome of the image comparison ‘responsive to’ those prior activities” because “[r]esponsiveness requires temporal immediacy and action (i.e., cause and effect) that is absent in the Mann ’895-Pemer combination.” *Id.* at 20.

Patent Owner relatedly asserts “eye motion would be irrelevant [in Perner] if the edge pattern produced by the images captured by the Perner iris feature detector did not match a reference image obtained from a database,” so “[t]here is no *responsive* connection between the eye motion and the granting of privileges as alleged” by Petitioner. PO Resp. 22.

(c) *The Petitioner Reply*

Petitioner replies that the Patent Owner Response presents “unsupported attorney argument, bereft of any record evidence” which “[u]nder Federal Circuit law . . . is insufficient to rebut a petition where, as here, the Petition is supported by expert testimony.” Pet. Reply 1 (citing *Wasica Fin. GmbH v. Cont’l Auto. Sys., Inc.*, 853 F.3d 1272 (Fed. Cir. 2017)).

Petitioner then maintains “the Petition explained how Mann ’895 in view of Perner meets the [E]ye [S]ensor [L]imitation.” Pet. Reply 15–16 (citing Pet. 9–10, 13–17; Ex. 1003 ¶¶ 51–58). In particular: “In Mann ’895, an iris scanner is used to selectively provide eyeglasses circuit functionality — a ‘sight license’ — to identified licensed users,” and “Perner discloses an improvement to iris scanners: instead of using static iris images to identify users, Perner’s iris detector instead stimulates the user’s eye motion, and uses the unique ‘edge pattern’ that results from the eye motion to authenticate the user.” *Id.* at 15–16 (citing Ex. 1005, 11; Ex. 1006, Fig. 3, ¶¶ 4, 20–25, 35, 59). Petitioner asserts “Petitioner and Patent Owner agree on relevant aspects of how the combined system would operate” — that is, the system “stimulates a user’s eye motion, and the iris detector obtains an edge pattern from images of that eye motion” for comparison to reference

images in a database, so that “permissions are granted ‘responsive to’ the image comparisons.” *Id.* at 16 (citing PO Resp. 15–22).

Petitioner argues Patent Owner’s opposition is premised on Patent Owner’s claim construction of the “responsive to” claim term, which should be rejected for reasons discussed above in Section III.C.4. *See* Pet. Reply 16–17 (citing PO Resp. 16–18; Ex. 1016 ¶¶ 21, 42). Petitioner contends that, applying Petitioner’s claim construction (“an eye sensor activating the circuitry in response to the eye motion”), Pamer’s system authenticates a user *responsive to eye motion* of the user per the Eye Sensor Limitation “by detecting the eye motion, acquiring a unique edge pattern from the eye motion, and determining, based on the edge pattern, whether to grant sight permissions to the user.” *Id.* at 17 (citing Pet. 13–17; Ex. 1003 ¶¶ 51–58; Ex. 1006 ¶ 26; Ex. 1016 ¶ 42).

Petitioner moreover contends the Institution Decision found correctly that “the fact that the eye sensor both causes *and* responds to the eye motion is consistent with the claim language.” *Id.* (citing Inst. Dec. 22–24; Ex. 1016 ¶ 43). Petitioner asserts: “To the extent Patent Owner contends that being ‘responsive to’ eye motion excludes eye sensors that also cause the eye motion, no such limitation can be discerned in” claim 1. *Id.* at 17, 18 (lines 12–15) (citing Ex. 1016 ¶ 45).

Next, Petitioner agrees with Patent Owner’s position that the Mann ’895-Pamer system “activates the sight license responsive to ‘finding or not finding a match for the edge pattern in a database’” *Id.* at 18 (quoting PO Resp. 19). Petitioner nonetheless maintains that “as described in Pamer, the eye sensor compares the unique edge pattern to the database immediately upon acquiring the edge pattern from the eye motion,” so “[t]he

eye sensor thus compares the edge pattern to the database, and activates the sight license, in response to the specific eye motion that generated the edge pattern.” *Id.* (citing Ex. 1006 ¶ 26; Ex. 1016 ¶¶ 44–45). In particular, “by plain meaning of ‘responsive to’ . . . one can be responsive to multiple events, including multiple events in sequence.” *Id.* at 18–19 (citing Ex. 1016 ¶ 45).

Thus, Petitioner’s view is that Perner’s iris feature detector satisfies the “responsive to” requirement of claim 1, because “it is the user’s eye motion that triggers the comparison of the edge pattern to the database, which in turn activates the sight license [per Mann ’895],” which “is a direct, causal, and responsive connection between the eye motion and the granting of privileges.” *Id.* at 19–22 (citing Ex. 1006, Figs. 3–4, ¶¶ 6, 26, 29–30, 32, 35; Ex. 1016 ¶¶ 47–50).

Petitioner further maintains that, even if Patent Owner’s proffered claim construction of the term “responsive to” is applied, claim 1 still is rendered obvious over Petitioner’s combination of Mann ’895 and Perner. *See id.* at 2–3, 22 (citing Ex. 1016 ¶ 51). Petitioner asserts “Patent Owner’s purported requirements of ‘temporal immediacy and action, cause and effect’ . . . are demonstrated by the relationship [in Perner] described above between the eye motion, and the eye sensor’s granting of privileges based on the ‘*just acquired*’ edge pattern of the eye motion.” *Id.* at 23 (quoting Ex. 1006 ¶ 26 (emphasis by Petitioner)) (citing PO Resp. 8, 20; Ex. 1016 ¶ 52). Further according to Petitioner, “[t]he eye motion is a cause of the effect: the granting of the sight license.” *Id.* Petitioner moreover asserts Perner also satisfies “Patent Owner’s other purported requirements” for the

“responsive to” term in the Eye Sensor Limitation. *Id.* at 24–25 (citing Ex. 1016 ¶¶ 53–54).

(d) *The Patent Owner Sur-Reply*

Patent Owner replies that “in cases such as this,” where “the technology [is] easily understandable,” “testimony from a technical expert is not a prerequisite for establishing any proposition.” PO Sur-reply 1–2, 15 (citing *Centricut*, 390 F.3d at 1369). Thus, in Patent Owner’s view, Dr. LaViola’s testimony on behalf of Petitioner is not “‘controlling’ on the matter” of obviousness, despite the lack of contrary expert witness testimony on behalf of Patent Owner. *Id.* at 2 (citing *Avia Group Int’l, Inc. v. L.A. Gear Cal., Inc.*, 853 F.2d 1557, 1564 (Fed. Cir. 1988)).

Next, Patent Owner’s Sur-reply reiterates arguments from the Patent Owner Response, as already summarized above in Section III.F.4(ii)(b). *See* PO Sur-reply 9–13.

Patent Owner further expounds on its argument that Perner’s eye sensor does not authenticate a user “responsive to” eye motion of the user, because “[i]f, for some reason, the motion of the eye did not occur, [Perner’s iris edge pattern] images would still be captured.” *Id.* at 13 (citing Ex. 1006 ¶¶ 27, 30). Patent Owner particularly asserts “[t]he command from the controller to capture the second image occurs irrespective of whether the user’s eye moves or not” and “[n]othing in Perner suggests that the command is issued only after movement is detected or that the command is otherwise connected to any eye movement.” *Id.* Patent Owner concludes the user in Perner is authenticated responsive to comparing a detected iris edge pattern with reference images in a database, and “it is *not* the user’s eye

motion that triggers” that comparison so the comparison and consequent authentication “are divorced from any eye motion.” *Id.* at 14 (citing Ex. 1006 ¶¶ 26, 35).

In reply to Petitioner’s argument “that things can be responsive to multiple events,” Patent Owner argues “it remains that to be responsive to something there must be a reaction to that thing.” *Id.* at 14 (citing Pet. Reply 18). Patent Owner then restates its view that, in Petitioner’s combination of Mann ’895 and Perner, “neither the capturing of the images nor the granting of the sight license (by virtue of producing a correct biometric password from the images) . . . is in reaction to eye motion,” because Perner’s mere “*reliance*” on causing the user’s eyes to move in order to make the authenticating iris edge pattern comparison “is not sufficient to demonstrate activation ‘*responsive to*’ eye motion, as recited in” claim 1. *Id.* at 14–15 (citing Ex. 1006 ¶ 27; Ex. 1017, 1935).

(e) *Analysis and Conclusion*

We find a preponderance of the evidence supports Petitioner’s contention that Perner discloses authenticating a user *responsive to eye motion* of the user, as follows.

First, it is undisputed that Perner’s iris feature detector causes user eye movement to gather a sequence of images of the user’s eye, particularly the iris. *See, e.g.*, Ex. 1006 ¶ 6 (“[A]n iris feature detector includes *a reflexive eye movement source*” that “*cause[s] rapid eye motion*” in order to allow a “sensor to capture first and second iris images over a time interval in which only an iris can move in the first and second images.” (emphases added)). Specifically, Perner’s detector controls two light sources 112 and 114 to

illuminate in a pre-defined sequence to cause the user's eye E to “move[] quickly and become[] fixed on” one or the other light source. *See id.* at Fig. 1, ¶¶ 19–20; *see also id.* at Fig. 3, ¶¶ 29–30.

We disagree with Patent Owner's argument that Perner's foregoing disclosures distinguish Perner's eye sensor from the invention of claim 1. Claim 1 pertinently specifies only that the eye sensor activates circuitry responsive to eye motion of a user. *See* Ex. 1001, 5:62–64. Claim 1 does not require that the eye motion must be caused by any specific agent, much less that the eye motion cannot be caused by the eye sensor employing blinking light sources to do so. *See id.*

Second, it is also undisputed that Perner's iris feature detector authenticates a user by capturing two images of the user's eye as it moves between fixating on one light source 112 or the other light source 114. *See* Ex. 1006 ¶¶ 21–22, 28–30. Specifically, Perner “determines differences between” the two images to “yield[] a pattern of edges of shapes (the iris) contained in the eye,” which is sufficiently “unique to an individual” that the edge pattern can “authenticate the subject” by matching the detected edge pattern to a database of reference patterns. *Id.* ¶¶ 24–26; *see also id.* at ¶¶ 32, 35 (describing the process illustrated in Fig. 4).

We conclude Perner's foregoing disclosures reflect performing a user authentication *responsive to eye motion* of the user, per the Eye Sensor Limitation of claim 1, as Petitioner contends. The differential edge pattern image must first be generated by *causing the user's eyes to move* in order to fixate on one or the other light source 112 or 114, before the user can be authenticated by comparing the differential edge pattern image to a database of reference patterns. *See, e.g.,* Ex. 1006 ¶ 35 (“During authentication or

identification, iris features of a subject are detected, and an edge pattern is generated. The database is searched for a reference pattern that matches the edge pattern. If a match is found, the subject is identified or granted certain privileges.”). Therefore, user authentication in Perner is both responsive to eye motion (per the plain language of the Eye Sensor Limitation), and in reaction to eye motion (per Patent Owner’s claim construction of the Eye Sensor Limitation, *see supra* Section III.C). Unless the user’s eye motion generates a differential edge pattern image that matches the database of reference patterns, there is no user authentication in Perner.

Patent Owner’s opposition that Perner’s user authentication is responsive or in reaction to *only* the image comparison (i.e., not to eye motion) is unpersuasive. Patent Owner concedes “the eye motion in Perner may be needed in order for the initial images to be obtained” for comparison to the database of reference patterns to authenticate the user. PO Resp. 19. Patent Owner’s focus on the image comparison overlooks the fact that there is no differential edge pattern image to compare in the first instance unless the user’s eye moves to generate the differential edge pattern image. For reasons provided above in Section III.C concerning claim construction, Patent Owner’s assertion that “[r]esponsiveness requires temporal immediacy and action (i.e., cause and effect) that is absent” from Perner (PO Resp. 19–20) misconstrues the scope of the Eye Sensor Limitation and relies on unclaimed subject matter. Patent Owner’s related assertions that Perner records images of the eye “irrespective of whether the user’s eye moves or not,” and that eye motion in Perner does not “trigger[]” the image comparison to authenticate the user, similarly rely on unclaimed subject matter and so are unavailing. PO Sur-reply 13–14.

Finally, we disagree with Patent Owner’s suggestion that in some instances eye motion is “irrelevant” to user authentication in Perner. PO Resp. 22; *see* PO Sur-reply 13–14; Tr. 24:7–25:6, 28:15–29:20, 33:16–34:8 (Patent Owner’s counsel’s oral argument on this point). Patent Owner relies here on Perner’s disclosure that its detector “also indicates *whether the eye (E) is alive*,” because “*if the eye (E) is not alive*, the first and second images will be the same, and an edge pattern will not be produced.” Ex. 1006 ¶ 27 (emphasis added); *see* Tr. 24:7–15, 33:16–34:8. Perner describes the details of why this is so, as follows:

The processor generates a “difference image” by taking differences between the first and second images (410). A pixel by pixel comparison may be performed. The value of a pixel in the first image is subtracted from the value of the pixel at the same spatial location in second image. Features that are stationary during the tracking interval will appear in the same location in both images. *These stationary features will be subtracted out and, therefore, will not appear in the difference image.* Features that move during the tracking interval (i.e., features of the iris) will not be at the same location in both images. Such features will appear in the difference image.

Ex. 1006 ¶ 32 (emphasis added). A person of ordinary skill in the art would have understood that if the eye is not “alive” (*id.* ¶ 27) then the eye will remain “stationary” (*id.* ¶ 32) as Perner operates its light sources 112 and 114, so the eye will “not appear in the difference image” (*id.*) at all. Patent Owner’s counsel agreed with these findings, and characterized the resulting difference image of an eye that is not alive as a “null pattern” or a “null image.” Tr. 24:9–24, 28:15–24, 33:16–34:5.

Patent Owner’s counsel argued that such a null difference image may be used to authorize a user in Perner. That is, counsel argued that when

Pemer determines “the eyes are dead,” Pemer “still does the comparison with the database” and “if there’s a match, you know, like a null pattern, I guess, produced from the dead eye . . . it’s still granted the sight license [i.e., user authorization].” Tr. 24:17–24, 33:16–34:8. In particular, according to counsel, Pemer’s two light sources 112 and 14 cause “reflective [sic ‘reflexive’]” eye movement⁶ if the eye is alive, such that an unlicensed user “can’t fake the null pattern from a dead eye, so it still works.” *Id.* at 24:24–25:6. Similarly, when asked “how is Pemer then going to use the null image to authenticate the person?”, counsel responded that “the null image would be unique to that [authorized] user” and a “thief can’t do anything to prevent his or her eye from moving” in response to Pemer’s lights sources, so the thief “wouldn’t get a null comparison image to authenticate against” such that “the null pattern would still be unique to a wearer with a dead eye.” *Id.* at 28:17–29:15.

Patent Owner’s counsel’s foregoing argument is not supported by Pemer. The Pemer disclosures cited by counsel state only that Pemer “*indicates whether the eye (E) is alive*” based on a null image resulting from lack of eye movement. Ex. 1006 ¶ 27 (emphasis added). Pemer does not disclose or suggest that a null image is used to authenticate a user. *See* Ex. 1006 ¶¶ 26, 27, 30, 35 (cited at PO Sur-reply 13–14).

Indeed, in a disclosure not cited by Patent Owner, Pemer states its “iris feature detector . . . can be used in identification and authentication systems” including “identification systems *that only respond to a live eye.*”

⁶ *See* Ex. 1006, code (57) (“An iris feature detector includes a *reflexive* eye movement source[.]” (emphasis added)); *id.* ¶¶ 6, 17 (again referring to “reflexive eye movement”).

Id. ¶ 59 (emphasis added). This disclosure has two imports here. First, in describing that Perner's detector "respond[s] to a live eye," Perner supports our finding that a person of ordinary skill in the art would have understood Perner's detector authenticates a user "responsive to" eye motion as set forth in the Eye Sensor Limitation of the '929 patent. Second, it indicates that when Perner's detector determines the eye is not alive (Ex. 1006 ¶ 27), Perner responds by denying user authorization (*id.* ¶ 59). *See also* Tr. 30:15–31:4 (Petitioner's counsel arguing that in Perner "the null pattern will not result in an edge pattern being produced, and this circuit basically there won't be an authentication of the user" which "is consistent with [Petitioner's] view of Perner"). This second finding is not sufficient on its own to satisfy the Eye Sensor Limitation, because the claims require *activating* circuitry and do not address situations when circuitry might *not* be activated. Nonetheless, it rebuts Patent Owner's counsel's argument that Perner discloses that a null difference image may be used to authorize a user.

Patent Owner's counsel's argument that a dead (i.e., non-moving) eye may in some instances be an authenticating comparison in Perner is not supported by any corroborating expert witness testimony, and simply makes no sense. A dead eye authorization would provide an exceedingly easy method to hack Perner's system by using any non-moving object. *See, e.g.,* Tr. 29:16–20 (when asked "If we have two users with, you know, eyes that don't move, won't the null patterns be the same?," Patent Owner's counsel responded "Yes, I suppose that would be a hacker situation" and "in that situation it wouldn't work.").

Thus, we conclude that in order for Perner to authenticate a user, the user's eyes must move as Perner operates its light sources 112 and 114 to

generate a differential edge pattern image for comparison to a database of reference patterns. Perner's user authentication is both responsive to eye motion of the user (per the plain language of the Eye Sensor Limitation), and in reaction to eye motion of the user (per Patent Owner's claim construction of the of the Eye Sensor Limitation).

(iii) Motivation to Modify Mann's Eye Sensor to be Responsive to Eye Motion of a User, in light of Perner, with a Reasonable Expectation of Success

Petitioner argues a person of ordinary skill in the art would have been motivated to combine Mann '895 and Perner to practice the invention of claim 1, with a reasonable expectation of success. *See* Pet. 15–17; Ex. 1003 ¶¶ 54–58. As a first motivation, Petitioner asserts “Mann '895 identifies that an *iris scanner* is used to selectively provide eyeglasses functionality to a licensed user” and “Perner invites its combination with Mann '895 by explaining how it improves on ‘conventional iris scanners’” in identification and authentication systems such as Mann's eyewear apparatus. Pet. 15–16 (citing Ex. 1005, 11:21–25; Ex. 1006 ¶¶ 4, 59); Ex. 1003 ¶ 55. As a second motivation, Petitioner asserts a person of ordinary skill in the art would have recognized this combination would “realize specific technical advantages of Perner that would improve the functionality, usability, and safety of the Mann '895 eyewear,” including computational speed and capability considerations. Pet. 16–17 (citing Ex. 1006, Fig. 2, ¶¶ 4–5, 23–25); Ex. 1003 ¶ 57; *see also* Pet. Reply 16 (asserting a person of ordinary skill in the art “would have been motivated to make the combination in order to realize [Perner's] advantages” of speed and efficiency that result from utilizing iris edge patterns) (citing Ex. 1006 ¶¶ 4, 25, 59). This would have

been “especially valuable,” according to Petitioner, “for head-worn systems, such as the eyewear of Mann ’895” in which “battery capacity and processing power are at a premium” and which “are limited by what the user can safely and ergonomically wear.” Pet. 17; Ex. 1003 ¶ 58.

Petitioner also asserts the combination could have been achieved predictably with a reasonable expectation of success, because Mann ’895 and Perner use “analogous electronic components” to implement their respective iris feature detectors, such as Mann’s programmable logic device and Perner’s controller 120 and processor 122. Pet. 16 (citing Ex. 1005, 8:14–17, 11:21–25; Ex. 1006 ¶¶ 17, 37–38); Ex. 1003 ¶ 56.

Patent Owner’s sole opposition to Petitioner’s foregoing contentions is that the combination of Mann ’895 and Perner does not result in the Eye Sensor Limitation of claim 1, because Perner’s iris feature detector does not authorize the user “responsive to eye motion of the user” as claimed. *See, e.g.*, PO Resp. 14–15, 17, 22; PO Sur-reply 10; Tr. 23:2–24:6 (beginning of Patent Owner’s counsel’s oral argument). That opposition is unavailing, for the reasons provided above in Section III.F.4(ii).

We conclude Petitioner’s asserted motivations for combining Mann ’895 and Perner to practice the invention of claim 1 with a reasonable expectation of success are supported by a preponderance of the evidence. In particular, as discussed above in Section III.F.4(i), the eyewear of Mann ’895 includes an iris scanner for activating circuitry in order to implement Mann’s sight license feature. Perner, as discussed above in Section III.F.4(ii), discloses an iris scanner that authorizes a user responsive to eye motion of the user. We determine a person of ordinary skill in the art would have been motivated with a reasonable expectation of success to

combine these disclosures such that the eyewear of Mann '895 employs an iris scanner that activates the eyewear circuitry responsive to eye motion of user, for the reasons asserted by Petitioner as summarized above in this Section which we adopt as our own.

For example, we determine now, as we did in the Institution Decision, that a person of ordinary skill in the art desiring to use the eyewear of Mann '895 would understand that “an iris scanner” was one option for implementing Mann’s sight license feature, yet Mann '895 does not provide any details concerning the structure or operation of this iris scanner. Ex. 1005, 11:21–25; *see* Inst. Dec. 26. It makes sense, therefore, that a person of ordinary skill in the art would look to other references to provide such implementation details, and would have concluded Perner’s iris scanner was a good option, because it would provide the computational advantages described in Perner and cited by Petitioner. *See, e.g.*, Ex. 1006 ¶¶ 4–5, 25; Ex. 1003 ¶¶ 54–58.

5. *“wherein an information bar is provided on the lens”*

Petitioner argues the eyewear of Mann '895 includes an information bar provided on the lens. *See* Pet. 18–19 (citing Ex. 1001, Fig. 2, 2:55–64; Ex. 1005, 5, 7, 8–9, 13, 15); Ex. 1003 ¶¶ 59–61. We find this contention, which Patent Owner does not oppose, is supported by a preponderance of the evidence. In particular, Mann '895 “provide[s] a means for a user to experience additional information overlaid on top of his or her visual field of view” such as “organizer, calendar, clock, airline information, etc.,” while maintaining “the appearance of ordinary eyeglasses.” Ex. 1005, 5:6–8, 5:20–21, 7:11–12. Thus, Figure 1 of Mann '895 illustrates a pair of

eyeglasses incorporating display element 130 and optics 110 to generate images to be viewed by the wearer. *See id.* at 8:21–9:4, 10:2–6.

Furthermore, Petitioner’s contentions that “[o]ptics 110 can be part of the lens 100L” and “in some embodiments, ‘lens 350 is optics 110,’” so Mann ’895 discloses an “information bar is provided *on the lens*” per claim 1, are supported by a preponderance of the evidence. Pet. 18–19 (citing Ex. 1005, 5, 8–9, 13, 15); *see* Ex. 1005, 8:21–9:4, 13:23–27, 15:14–21.

6. *Conclusion as to Claim 1*

Thus, based on the record presented, we conclude Petitioner has shown by a preponderance of the evidence that claim 1 is unpatentable as having been obvious over Mann ’895 and Perner.

G. *Claims 2–6, 8, 11, 17, and 22*

Petitioner provides arguments and evidence in support of its contentions that claims 2–6, 8, 11, 17, and 22 are unpatentable as having been obvious over Mann ’895 and Perner, including supporting testimony from Dr. LaViola. *See* Pet. 19–23 (claims 2–6), 30–33 (claim 8), 39–41 (claim 11), 42–46 (claims 17 and 22); Ex. 1003 ¶¶ 62–78, 101–111, 129–138, 145–161. Patent Owner does not oppose Petitioner’s contentions as to these claims, apart from arguments we have already considered above in relation to claim 1 and its Eye Sensor Limitation which is also found in the other independent claims. *See* PO Resp. 23–24. For the reasons provided above in Section III.F.4 in the context of claim 1, we conclude Patent Owner’s arguments are unavailing. We further adopt Petitioner’s additional analysis for the obviousness of claims 2–6, 8, 11, 17, and 22 as our own in

this Decision, and we accordingly conclude Petitioner has demonstrated by a preponderance of the evidence that those claims are unpatentable as having been obvious over Mann '895 and Perner.

IV. SUMMARY OF CONCLUSIONS

In summary, we determine a preponderance of the evidence establishes claims 1–6, 8, 11, 17, and 22 of the '929 patent are unpatentable, as shown in the following table:⁷

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–6, 8, 11, 17, 22	103(a)	Mann '895, Perner	1–6, 8, 11, 17, 22	

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1–6, 8, 11, 17, and 22 of the '929 patent have been proven by a preponderance of the evidence to be unpatentable; and

⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

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

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