

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MAGIC LEAP, INC.,
Petitioner,

v.

PERCEPT TECHNOLOGIES INC.,
Patent Owner.

IPR2023-00495
Patent 8,696,113 B2

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

DROESCH, *Administrative Patent Judge*.

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

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, Petitioner has established by a preponderance of the evidence that claims 1–3 and 12–14 of U.S. Patent No. 8,696,113 B2 (Ex. 1001, “the ’113 Patent”) are unpatentable.

A. Procedural History

Magic Leap Inc. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–3 and 12–14 of the ’113 Patent. Paper 2 (“Pet.”). Petitioner filed a declaration of Dr. Joseph LaViola Jr. in support of the Petition. Ex. 1003. Percept Technologies Inc. (“Patent Owner”) timely filed a Preliminary Response. Paper 6 (“Prelim. Resp”). Pursuant to 35 U.S.C. § 314, we instituted trial as to all of the challenged claims and all of the grounds raised in the Petition on August 3, 2023. Paper 10 (“Dec. on Inst.”).

After institution of trial, Patent Owner filed a Response (Paper 12, “PO Resp.”), to which Petitioner filed a Reply (Paper 14, “Pet. Reply”), to which Patent Owner filed a Sur-reply (Paper 16, “PO Sur-reply”).

Oral argument was held on May 8, 2024. A transcript of the oral argument is included in the record. Paper 20.

B. Related Matters

The parties indicate the ’113 Patent is at issue in *Percept Technologies Inc. v. Magic Leap, Inc.*, No 1:22-cv-0025-RGA (D. Del.) (“related district court litigation”). See Pet. 80; Paper 4, 5.

Petitioner also identifies IPR2023-00494 as a related proceeding, because in that case Petitioner has challenged U.S. Patent No. 9,010,929, which is also asserted in the related district court litigation. *See* Pet. 80.

C. The '113 Patent (Ex. 1001)

The '113 Patent is titled “Enhanced Optical and Perceptual Digital Eyewear.” Ex. 1001, code (54). The '113 Patent discloses a wearable optics device comprising a lens and a dynamic eye tracking mechanism in communication with the lens. *See* Ex. 1001, 1:57–59, 1:65–66, 2:4–6, 2:12–14. Parameters personalized to a user can be provided based on the dynamic eye tracking. *See id.* at 1:54–56, 1:59–60. Perceptual optimization, augmented reality, and augmented reality navigation can be utilized based upon the dynamic eye tracking. *See id.* at 1:62–63, 1:66–67, 2:2–3, 2:6–7, 2:9–11, 2:14–15.

Figure 5C of the '113 Patent is reproduced below.

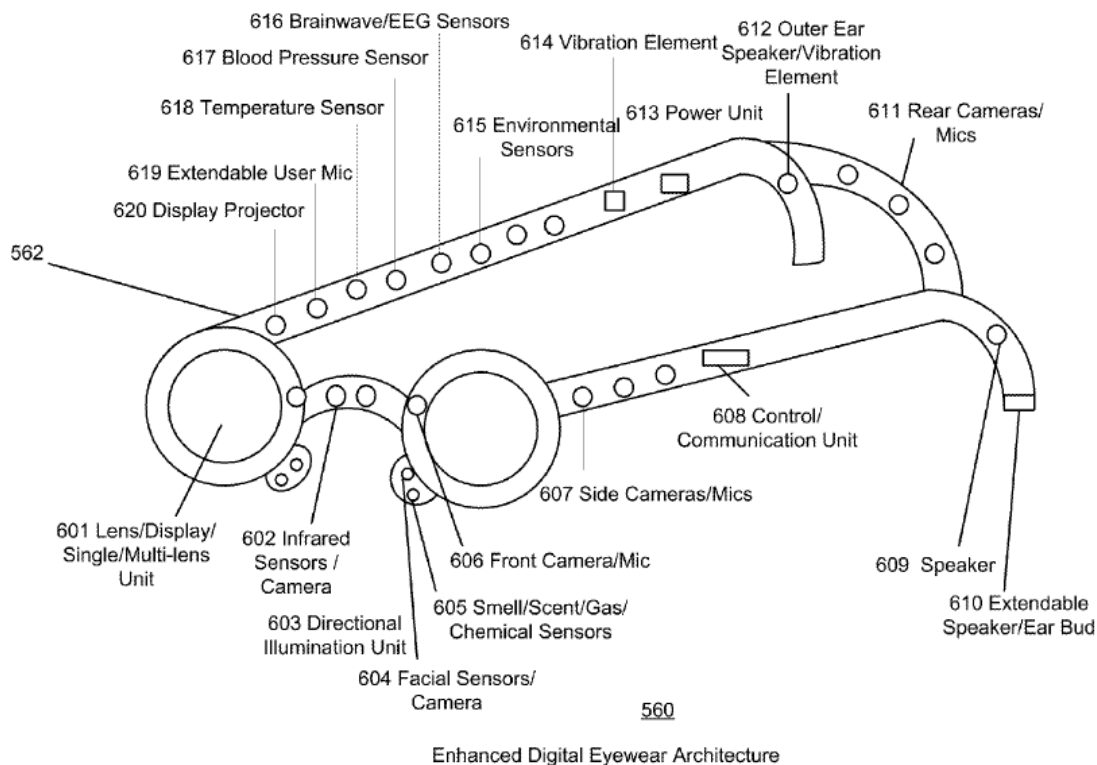


Figure 5C depicts enhanced digital eyewear architecture 560, including frames 562 and single or multi-unit lens display 601. *See* Ex. 1001, 2:30–31, 7:35–36, 7:44–46. Lens materials can include OLED, LED, transparent LED, flexible LED, crystalline, prism, holographic, polarizing, and translucent materials, as well as electrorefractive, electrodiffractive, electroreflective, and composite refractive materials, with one or more lens material layers, and passive or active display or projection based implementations. *See id.* at 6:62–67. Digital eyewear architecture 560 further includes control communication unit 608 used to control architecture 560 and power unit 613. *See id.* at 7:54–57. The iris, retina, cornea, pupil, ciliary, and lens of the eye can all be utilized singly or in combination to enable the dynamic eye tracking mechanism. *See id.* at 9:43–46, Fig. 6; *see also id.* at 7:24–26, 7:32–34, 8:51–53, 9:28–30 (discussing optical parameter measurements and optical feedback).

Figure 18 of the '113 Patent is reproduced below.

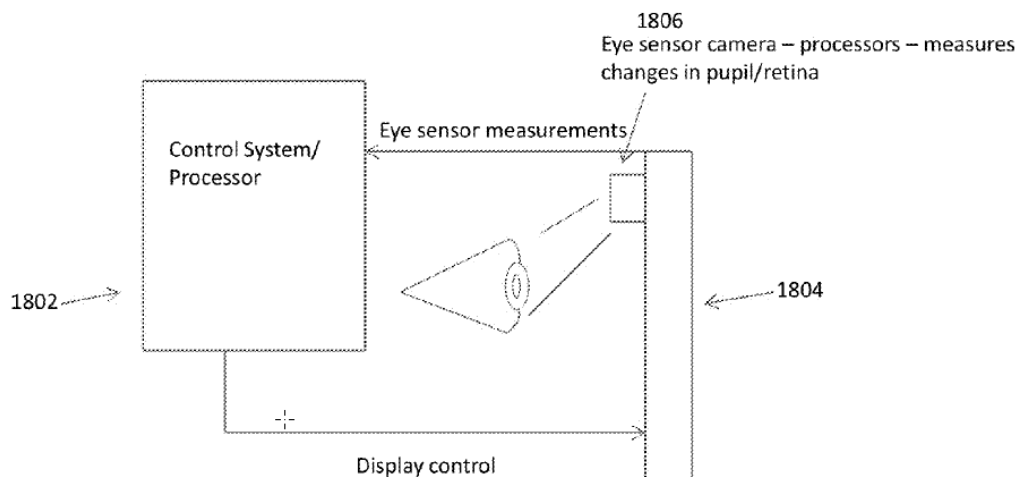


Figure 18 depicts a shading control mechanism utilizing the wearable optics device. *See* Ex. 1001, 2:59–60, 12:25–26. “[O]ne or more cameras 1806 [] measures changes in the eye (for example the pupil or the retina) and sends the information to [] processing system” 1802 which “can control a display

on [] lens 1804 to provide shading.” *Id.* at 12:28–30, *see also id.* at 8:40–60 (discussing shading control by optical parameters), 9:1–6 (discussing shading), 11:4–28, 12:62–64, Fig. 13 (discussing and depicting shading control applications), 13:26–43, Figs. 22A–22F (discussing and depicting inverse shading), 13:44–50 (discussing and depicting directional illumination).

D. Challenged Claims

Petitioner challenges claims 1–3 and 12–14 of the ’113 Patent. Claims 1 and 12 are independent and claims 2, 3, 13, and 14 depend therefrom, respectively. Claim 1 is representative and reproduced below:

1. A wearable optics device comprising:
a lens; and
a dynamic eye tracking mechanism in communication with the lens; wherein the dynamic eye tracking mechanism utilizes optical parameter measurements; wherein the optical parameter measurements include any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements; wherein an optical/perceptual parameter based operating system is utilized, wherein the wearable optics device is controlled by the optical/perceptual based operating system.

Ex. 1001, 14:22–33.

E. Asserted Patentability Challenges and Asserted Prior Art

Petitioner presents the following grounds of unpatentability (Pet. 11):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 12–14	103(a) ¹	Osterhout ²
1–3, 12–14	103(a)	Mann ’526 ³ , Vaissie ⁴

II. ANALYSIS

A. The Level of Ordinary Skill in the Art

Petitioner asserts that, based on the ’113 Patent disclosure and March 15, 2013 filing date,

a person of ordinary skill in the art (‘POSITA’) 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. 8–9 (citing Ex. 1003 ¶ 21).

Although the level of skill in the art was addressed in the Preliminary Response and the Decision on Institution (*see* Prelim. Resp. 27–30; Dec. on Inst. 6–10), Patent Owner does not address Petitioner’s definition of the level of ordinary skill in the art. *See* PO Resp. We adopt Petitioner’s definition of a person of ordinary skill in the art because it is consistent with

¹ The Leahy-Smith America Invents Act (‘AIA’), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. § 103 effective March 16, 2013. The ’113 Patent issued from an application filed before that date, so we refer to the pre-AIA version of § 103, but our findings and analysis would be the same under the current version of the statute.

² US 2011/0213664 A1, published Sept. 1, 2011 (Ex. 1005, ‘Osterhout’).

³ US 6,307,526 B1, issued Oct. 23, 2001 (Ex. 1006, ‘Mann ’526’).

⁴ US 6,433,760 B1, issued Aug. 13, 2002 (Ex. 1007, ‘Vaissie’).

the level of skill reflected by the '113 Patent Specification and the asserted prior art.

B. Claim Construction

We interpret claim terms using “the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). Under the principles set forth by our reviewing court, the “words of a claim ‘are generally given their ordinary and customary meaning,’” as would be understood by a person of ordinary skill in the art in question at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

Under *Phillips*, in determining the ordinary and customary meaning, the starting point for the analysis is the language of the claims themselves. *See Phillips*, 415 F.3d at 1314. Furthermore, “the specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips*, 415 F.3d at 1315 (quoting *Vitrionics*, 90 F.3d at 1582). Extrinsic evidence may be useful, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence. *Phillips*, 415 F.3d at 1319.

A Dynamic Eye Tracking Mechanism in Communication with the Lens

Petitioner does not initially provide claim constructions, but provides a table summarizing the claim construction positions from the related district court litigation, including the terms “dynamic eye tracking mechanism” and “lens.” *See* Pet. 9–10 (citing Exs. 1008–1011). In Response, Patent Owner notes that “[t]he Court’s order did not address the entirety of the phrase ‘a

dynamic eye tracking mechanism in communication with the lens of the wearable optics.” PO Resp. 5. Patent Owner asserts that the Board should accord the entire phrase its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention—“a dynamic eye tracking mechanism and a lens that engage in an active exchange of information with one another.” *Id.* at 5–6. According to Patent Owner, this “construction is appropriate because the phrase, as used in the ’113 patent, is readily understandable and does not require further interpretation.” *Id.* at 6. Patent Owner further points out that “the patentee did not provide any meaning beyond the plain and ordinary meaning of this phrase in the specification.” *Id.* Patent Owner concludes that “there is no clear reason to depart from the plain and ordinary meaning of this term.” *Id.* (citing *Ancora Techs. Inc. v. Apple Inc.*, 744 F.3d 732, 734 (Fed. Cir. 2014)).

Patent Owner asserts that in determining the plain and ordinary meaning, it is helpful to recognize that “in communication with” is a prepositional phrase. *See* PO Resp. 6–7 (citing Ex. 1001, 14:22–26, 15:10–13). Patent Owner posits the importance of prepositional phrases and contends that “the phrase ‘in communication with’ is expressing a relationship between the dynamic eye tracking mechanism and the lens of the wearable optics.” *Id.* at 7 (citing Ex. 1001, 14:22–25, 15:10–13); *see* PO Sur-reply 5.

More specifically, according to Patent Owner,

“in communication with,” as used in the context of the challenged claims, is indicating an active exchange of information between the dynamic eye tracking mechanism and the lens of the wearable optics. For example, the specification describes the dynamic eye tracking mechanism controlling chromatic, refractive, diffractive, transparency, and/or reflective

properties of a lens. . . . In cases such as this the lens and the dynamic eye tracking mechanism are exchanging information in order to effect a desired outcome. Such an exchange of information between the dynamic eye tracking mechanism and the lens of the wearable optics is thus the plain and ordinary meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.

PO Resp. 7–8 (citing Ex. 1001, 8:40–60; *Phillips* 415 F.3d at 1313).

In Reply, Petitioner asserts that because it is not in controversy that “in communication with” should be given its ordinary and customary meaning, the Board should decline to provide an explicit construction. *See* Pet. Reply 4 (citing PO Resp. 3, 6), 6 (citing PO Resp. 3; *Realtime Data LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019)). Petitioner asserts that Patent Owner asks the Board to nominally construe “in communication with” according to its plain and ordinary meaning, but asks the Board to then revise the plain and ordinary meaning according to a new definition supplied by Patent Owner. *See id.* at 6–7. Petitioner contends that Patent Owner: (1) makes no attempt to show that its redefinitions comply with the *Phillips* standard; and (2) does not offer evidentiary support for its position. *See id.* at 7–8. Petitioner asserts that the Board should give no weight to unsourced attorney argument that does not apply the correct legal standard. *See id.* at 8. According to Petitioner, “[g]iven Patent Owner’s statements in this proceeding, any construction other than plain and ordinary meaning is inappropriate.” *Id.* at 7. Petitioner contends that, according to Petitioner’s expert Dr. LaViola, a person of ordinary skill in the art “would recognize the term as having a widely understood meaning: sending communication to or receiving communication from.” *Id.* at 9 (citing Ex. 1024 ¶ 21).

In response to the Reply, Patent Owner contends that Petitioner's assertion as to the ordinary and customary meaning "ignores, if rewrites 'with.'" *See* PO Sur-reply 3. According to Patent Owner,

[t]o be in communication with something . . . requires some participation from each entity. If the communication is limited to one entity or the other sending information there can be no assurance that information is actually received. Only if there is some form of reply can the sender be assured that it is actually in communication *with* the intended recipient.

Id. at 3–4. Patent Owner further contends that, if the Board agrees with Petitioner that "active" should not be part of the construction, the phrase should still be understood as reciting a dynamic eye tracking mechanism and a lens that exchange information with each other. *See id.* at 5.

Also in the Reply, Petitioner contends the claim language does not recite "in *active* communication with" and that the '113 Patent Specification does not support Patent Owner's importation of "active" into the claims. *See* Pet. Reply 10. Petitioner asserts that the '133 Patent discloses some embodiments in which a lens communicates actively and discloses other embodiments in which a lens communicates passively. *See id.* (citing Ex. 1001, 6:59–67, 7:44–45, Fig. 5C; Ex. 1024 ¶ 23). Petitioner further contends that Patent Owner highlighted the same passage of the '133 Patent at column 6, lines 59 through 67 in the related district court litigation and stated that the lens is defined by the '113 Patent to include active and passive displays. *See id.* at 10–11 (citing Ex. Ex. 1001, 6:59–67, 1008, 8).

In response to this Reply argument, Patent Owner asserts that the first embodiment cited by Petitioner is not an example of a dynamic eye tracking mechanism in communication with the lens. *See* PO Sur-reply 4. According to Patent Owner, "the dynamic eye tracking mechanism is in communication

with the projector, not the lens, in this example. Causing an image to be projected on a lens is not communication with the lens as there is no information *exchange* with the lens.” *Id.* at 4. Patent Owner contends that Petitioner’s reliance on briefing in the related district court litigation is not determinative because the dispute there concerned the construction of “lens” and the Board here is asked to construe “in communication with.” *See id.* at 4–5.

As an initial matter, Patent Owner’s attorney argument proffering the ordinary and customary meaning for “a dynamic eye tracking mechanism in communication with the lens” and discussing the prepositional phrase “in communication with” is entitled to little weight. Argument of counsel cannot take the place of objective evidence. *See Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (unsworn attorney argument is not evidence). Notably, the only record evidence relied upon by Patent Owner to support its proposed ordinary and customary meaning is the language of the claims themselves and a citation to one passage of the ’113 Patent Specification. *See* PO Resp. 6–7 (citing Ex. 1001, 8:40–60, 14:22–25 (claim 1), 15:10–13 (claim 12)).

Following *Phillips*, our analysis first addresses the claim language. We find that independent claims 1 and 12 do not recite an exchange of information or an active exchange of information. *See* Ex. 1001, 14:22–39, 15:10–16:3. Turning next to the ’113 Patent Specification, Patent Owner’s citation to column 8, lines 40 through 60 discloses: (1) providing shading on a lens with one or more projectors or a polarized filter and that shading can be controlled using optical parameters; and (2) materials that can electrically control any or any combination of chromatic, refractive, diffractive, transparent, and reflective properties are utilized with the dynamic eye

tracking. *See* Ex. 1001, 8:40–60. Thus, Patent Owner’s cited passage of the ’113 Patent Specification does not discuss the dynamic eye tracking mechanism being “in communication with” the lens, let alone discuss active or two-way communication. Instead, this passage merely discloses that shading of the lenses can be controlled using optical parameters, and the materials that can control any one or a combination of properties of the wearable optical device are utilized with the dynamic eye tracking. *See id.* Patent Owner does not cite any other disclosures in the ’113 Patent Specification to support its arguments. *See* PO Resp. 6–9; PO Sur-reply 2–6. We note, however, that the ’113 Patent Specification includes language identical to the claim language, but these disclosures also fail to describe an exchange of information or an active exchange of information. *See* Ex. 1001, 1:57–59, 64–66, 2:4–6, 12–14.

For all of the foregoing reasons, we decline to adopt Patent Owner’s proposed ordinary and customary meaning for “a dynamic eye tracking mechanism in communication with the lens” because it is not supported by the claim language or the ’113 Patent Specification, and is supported only by unsworn attorney argument.

Patent Owner further asserts that the Board should provide a construction for “a dynamic eye tracking mechanism in communication with the lens of the wearable optics” in order to resolve the controversy. *See* PO Resp. 8; PO Sur-reply 2–3; *see also* PO Sur-reply 2 (“Simply stating *how* the claims should be understood without then deciding *what* that understand[ing] is, is legal error,” citing *O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361–62 (Fed. Cir. 2008)).

We do not agree with Patent Owner that a construction for the ordinary and customary meaning of “a dynamic eye tracking mechanism in

communication with the lens” should be provided. “The Board is required to construe ‘those terms . . . that are in controversy. . . only to the extent necessary to resolve the controversy.’” *Realtime*, 912 F.3d at 1375. As demonstrated in the analysis that follows in Sections II.D. and II.E., Patent Owner asserts that neither Osterhout nor the combination of Mann ’526 and Vaissie teaches or suggests “a dynamic eye tracking mechanism in communication with the lens” based only on Patent Owner’s proposed ordinary and customary meaning. Patent Owner does not challenge the sufficiency of Petitioner’s showing as to this limitation based on any other construction. *See generally* PO Resp.; PO Sur-reply. Thus, we are able to resolve the patentability controversies presented in this proceeding (that is, whether the challenged claims would have been obvious over Osterhout and over Mann ’526 and Vaissie) without construing the plain and ordinary meaning of “in communication with” apart from rejecting Patent Owner’s proposed construction.

Optical Parameter Measurements

Petitioner does not provide a claim construction for optical parameter measurements. *See* Pet. 9–10. Patent Owner asserts that “the Board should construe the term ‘measurements’ as used in the phrase ‘the dynamic eye tracking mechanism utilizes optical parameter measurements’ consistent with its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of the invention.” PO Resp. 8–9 (citing *Phillips*, 415 F.3d at 1313). According to Patent Owner, “[a] measurement is a size, length, or amount of something (e.g., as established by the act of measuring).” *Id.* at 9. Patent Owner asserts that the term measurement is used several times in the ’113 Patent Specification, “and in each instance,

consistent with the ordinary and customary meaning of the term, seems to be indicating such a determination of size or length.” *Id.*

In Reply, Petitioner asserts that “size, length, or amount of something” is wholly absent from the claims. *See* Pet. Reply 13. Petitioner contends that Patent Owner offers no evidence to support its view of its proposed plain and ordinary meaning. *See id.* According to Petitioner and its expert Dr. LaViola, “the ordinary artisan would understand ‘measurements’ to simply mean things that are measured.” *Id.* (citing Ex. 1024 ¶ 28). Petitioner argues that “[m]any things are subject to being measured—not just size or length.” *Id.* Petitioner provides examples of measurements that do not include size or length, such as a direction of a user’s eye gaze and electrooculography. *See id.* at 13–14 (citing Ex. 1024 ¶ 29). Petitioner further asserts that the ’113 Patent Specification “describes that an eye sensor ‘determines the position of the eye/pupil/retina’; the skilled artisan would understand determining the position of the eye/pupil/retina to include a measurement of that position, which is not limited to a size or length.” *Id.* at 14 (citing Ex. 1001, 11:23–24; Ex. 1024 ¶ 29). Petitioner also points out that the ’113 Patent Specification “expressly discloses measurements that are not a size, length or amount, for example, voice parameter measurement, and perceptual measurements that include smell, touch, brainwave, temperature/humidity of the user, and environmental conditions near a user.” *Id.* (citing Ex. 1001, 2:29–30, 7:30–34, Fig. 5B; Ex. 1024 ¶ 30). According to Petitioner, “[t]he skilled artisan would understand this to disclose measurements—for instance, measurements of smell, touch, brain waves, temperature, voice parameters—that are not measurements of size, length, or amount.” *Id.* (citing Ex. 1024 ¶ 30). Petitioner also asserts that Patent Owner’s new definition of

“measurements” contradicts its position in the related district court litigation. *See id.* at 15 (reproducing Ex. 1023, 5; quoting Ex. 1023, 5; citing Ex. 1022; Ex. 1023; Ex. 1024 ¶ 29).

As an initial matter, Patent Owner’s attorney argument proffering the ordinary and customary meaning for “optical parameter measurements” is entitled to little weight. Argument of counsel cannot take the place of objective evidence. *See Gemtron*, 572 F.3d at 1380. The only record evidence relied upon by Patent Owner to support its proposed ordinary and customary meaning is the language of the claims themselves and several passages of the ’113 Patent Specification. *See* PO Resp. 8–9 (citing Ex. 1001, 7:18–29, 8:51–53, 9:27–30, 10:55–61, 13:19–21).

Following *Phillips*, we first address the claim language. We find that independent claims 1 and 12 do not recite a size, length, or amount. *See* Ex. 1001, 14:22–39, 15:10–16:3. Turning next to the Specification, Patent Owner’s cited passages of the ’113 Patent Specification merely describe that optical parameter measurements can include any or a combination of ciliary, pupil, corneal, lens, iris, eye lid, and retina measurements. *See* Ex. 1001, 7:18–29, 8:51–53, 9:27–30, 10:55–61, 13:19–21. The passages of the ’113 Patent Specification cited by Patent Owner do not describe measurements in terms of size, length, or amount. Patent Owner does not cite any other disclosures in the ’113 Patent Specification to support its arguments. *See* PO Resp. 8–9.

For all of the foregoing reasons, we decline to adopt Patent Owner’s proposed ordinary and customary meaning for “optical parameter measurements” because it is not supported by the claim language or the ’113 Patent Specification, and is supported only by unsworn attorney argument. As demonstrated in the analysis that follows in Sections II.D. and II.E, we

are able to resolve the patentability controversies presented in this proceeding (that is, whether the challenged claims would have been obvious over Osterhout and over Mann '526 and Vaissie) without construing the plain and ordinary meaning of “optical parameter measurements” apart from rejecting Patent Owner’s proposed construction.

C. Principles of Law

The legal 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) when in evidence, objective evidence of nonobviousness.⁵ *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966). One seeking to establish obviousness based on more than one reference also must articulate sufficient reasoning with rational underpinnings to combine teachings. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007).

D. Patentability Challenge Based on Osterhout

1. Overview of Osterhout (Ex. 1005)

Osterhout is directed to “an interactive head-mounted eyepiece including an optical assembly through which the user views a surrounding environment and displayed content.” Ex. 1005, code (57). In some embodiments, the lens of the optical assembly can be photochromic or electrochromic, and an electrochromic lens may include integral chromic material or a chromic coating that changes opacity of at least a portion of the

⁵ The record does not include arguments or evidence regarding objective indicia of nonobviousness.

lens. *See id.* ¶ 193, Fig. 6. Activation of some portions or all portions of the chromic material may be controlled via control techniques described by Osterhout. *See id.* ¶ 193. In some embodiments, the eyepiece may

include a bi-directional optical assembly through which a user views a surrounding environment simultaneously with displayed content as transmitted through the optical assembly from an integrated image source and a processor for handling the content for display to the user and sensor information from the sensor, wherein the processor correlates the displayed content and the information from the sensor to indicate the eye's line-of-sight relative to the projected image, and uses the line-of-sight information relative to the projected image, plus a user command indication, to invoke an action.

Ex. 1005 ¶ 45. The line of sight information is communicated to the processor as command instructions. *See id.* ¶ 46.

In some embodiments, the eyepiece can determine where the user is gazing, or the motion of the user's eye by tracking the eye through reflected light off the user's eye which is used to help correlate the user's line of sight with respect to a projected image, a camera view, and the external environment, and used in control techniques described by Osterhout. *See* Ex. 1005 ¶ 301. Control of the eyepiece may be enabled through eye movement, and an action of the eye. *See id.* ¶ 304. For example, a camera on the eyepiece views back to the wearer's eyes where eye movements may be interpreted as command information, such as through blinking, repetitive blinking, blink count, blink rate, eye open-closed, gaze tracking, eye movements to the side, up and down, side to side, through a sequence of positions, to a specific position, dwell time in a position, gazing toward a fixed object, and looking through a certain portion of the lens at a real world object. *See id.*

Eye control can enable the viewer to focus on a certain point on the displayed image from the eyepiece and because the camera can correlate the viewing direction of the eye to a point on the display, the eyepiece can interpret commands through a combination of where the wearer is looking and an action by the wearer (e.g., blinking, touching an interface, movement of a position sense device). *See* Ex. 1005 ¶ 304. In some embodiments, head motion control can be used to send commands to the eyepiece along with eye motion control. *See id.* ¶ 309. For example, a wearer may want to move a displayed object to the right, and through eye control, select the object and activate head control. *See id.* By the user tipping their head to the right, the object may be commanded to the right, and the command may be terminated through eye control. *See id.*

2. Analysis of Claim 1

A wearable optics device comprising: a lens; and a dynamic eye tracking mechanism in communication with the lens;

Petitioner contends that Osterhout teaches “[a] wearable optics device comprising: a lens; and a dynamic eye tracking mechanism” based on Osterhout’s disclosure of an interactive head-mounted eyepiece worn by a user that has a see-through or translucent lens that enables the wearer to view a surrounding environment and a displayed image or content, and an eye tracking device or camera for tracking movement of the user’s eye(s). *See* Pet. 16–19 (reproducing Ex. 1005, Fig. 1; quoting Ex. 1005 ¶¶ 11, 19, 164, 301, 304, 305; citing Ex. 1003 ¶¶ 53–54, 57–59; Ex. 1005 ¶ 165).

Petitioner asserts, for example, that Osterhout further teaches “a “dynamic eye tracking mechanism in communication with the lens” based on Osterhout’s disclosure that the dynamic eye tracking mechanism can correlate the viewing direction of the eye to a point on the display, and that

the eyepiece can interpret commands based on that point of the display. *See* Pet. 20 (quoting Ex. 1005 ¶ 304; citing Ex. 1003 ¶ 62). According to Petitioner, “[b]ecause the display is projected on the lens . . . the dynamic eye tracking mechanism is thus further in communication with the lens at least by correlating the viewing direction to a point on the lens.” *Id.* (citing Ex. 1003 ¶ 62; Ex. 1005 ¶ 164).

In another position, Petitioner asserts that the dynamic eye tracking mechanism may be in optical communication with the lens because the eye receives light rays that are transmitted via the translucent lens, and those light rays are detected by the dynamic eye tracking mechanism, for example, by a camera on the eyepiece that views back to the wearer’s eye. *See* Pet. 19 (citing Ex. 1003 ¶ 61; Ex. 1005 ¶¶ 164, 304).

Patent Owner does not address Petitioner’s assertions addressing the preamble recitation and the limitation of “a lens.” *See* PO Resp. 11–26. Patent Owner contends that Petitioner’s arguments that Osterhout teaches “a dynamic eye tracking mechanism in communication with the lens” fails to meet the claim requirement that the lens of the wearable optics device and the dynamic eye tracking mechanism engage in an active exchange of information. *See* PO Resp. 15–18, 22–23. We do not agree with Patent Owner’s arguments, because, as explained above in Section II.B., we do not adopt Patent Owner’s proposed ordinary and customary meaning for “a dynamic eye tracking mechanism in communication with the lens” that would require an active exchange of information.

Patent Owner also argues that Dr. LaViola’s testimony is conclusory and offers no assistance to the Board in understanding how Dr. LaViola’s opinion was reached. *See* PO Resp. 17 (citing Ex. 1003 ¶ 60), 19 (citing Ex. 1003 ¶ 61; Ex. 1005 ¶ 304), 20 (citing Ex. 1003 ¶ 62). Patent Owner

contends that Dr. LaViola’s testimony is entitled to no weight. *See id.* at 17 (citing 37 C.F.R. § 42.65), *id.* at 18. We do not agree because these arguments are premised on Patent Owner’s proposed ordinary and customary meaning for “a dynamic eye tracking mechanism in communication with a lens,” which we decline to adopt.

Having considered both parties’ arguments and the evidence cited by the parties to support their respective arguments, we are persuaded that “a dynamic eye tracking mechanism in communication with the lens” is disclosed or taught by Osterhout. Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches the preamble recitation, and the limitations of “a lens; and a dynamic eye tracking mechanism in communication with the lens.” *See* Pet. 19–20.

wherein the dynamic eye tracking mechanism utilizes optical parameter measurements . . . includ[ing] any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements;

Petitioner asserts that Osterhout teaches these limitations based on Osterhout’s disclosures of using optical components for measuring the motion of the eye, including using corneal reflection, the center of the pupil, and retinal blood vessels as features to track, and using a camera to determine eye movements including blinking, repetitive blinking, blink count, blink rate, and eye open-closed. *See* Pet. 18–19 (quoting Ex. 1005 ¶¶ 301, 304; citing Ex. 1003 ¶¶ 58, 59), 21–23 (quoting Ex. 1005 ¶¶ 301, 304; citing Ex. 1003 ¶¶ 64–67).

Patent Owner contends that Petitioner’s arguments that Osterhout teaches “optical parameter measurements” fails to meet the claim requirement that a measurement is a determination of size, length, or at least

an amount of something. *See* PO Resp. 11–15. We do not agree with Patent Owner’s arguments, because, as explained above in Section II.B., we do not adopt Patent Owner’s proposed ordinary and customary meaning for “optical parameter measurements” specifying that a measurement is a determination of size, length, or amount of something.

Having considered both parties’ arguments and the evidence cited by the parties to support their respective arguments, we are persuaded that this limitation of claim 1 is disclosed or taught by Osterhout. Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches this limitation of claim 1. *See* Pet. 18–19, 21–23.

*wherein an optical/perceptual parameter based operating system
is utilized, wherein the wearable optics device is controlled
by the optical/perceptual based operating system.*

Petitioner asserts that Osterhout teaches these limitations based on Osterhout’s disclosures of a processor of the eyepiece including an operating system that is based on optical parameters and perceptual parameters that handles content for display to the user and sensor information from the sensor. *See* Pet. 23–24 (quoting Ex. 1005 ¶ 45; citing Ex. 1003 ¶¶ 68–69; Ex. 1005 ¶ 164); *see also* Pet. 24–25 (explaining that it would have been obvious to a person of ordinary skill in the art that the processor’s operating system is the component that performs the input/output (I/O) tasks of handling content for display and sensor information from the sensor, quoting Ex. 1019, 269; citing Ex. 1003 ¶ 70).

Petitioner further explains that Osterhout teaches the operating system performs the input output (I/O) functions based on optical and perceptual parameters. *See* Pet. 25 (citing Ex. 1003 ¶ 71). More specifically, Petitioner

asserts that Osterhout's processor correlates the displayed content and the information from the sensor to indicate the eye's line-of-sight relative to the projected image, and uses the line-of-sight information relative to the projected image, plus a user command indication, to invoke an action. *See* Pet. 25–26 (quoting Ex. 1005 ¶ 45; citing Ex. 1003 ¶ 72). Petitioner asserts that the line of sight information for the eye is communicated to the processor as command instructions. *See* Pet. 26 (citing Ex. 1003 ¶ 72; Ex. 1005 ¶ 46); *see also id.* (explaining that it would have been obvious to a person of ordinary skill in the art that the processor's operating system is the component that performs handling input such as line of sight input from the user's eye, and controlling processor actions, quoting Ex. 1019, 5; citing Ex. 1003 ¶ 75; Ex. 1019, 269). Petitioner asserts that inputs to Osterhout's operating system can include an eye tracking device for eye tracking device input. *See* Pet. 27–28 (quoting Ex. 1005 ¶ 306; citing Ex. 1003 ¶ 73; Ex. 1019, 269). Petitioner further contends that eye control can be used to activate and execute commands for the eyepiece, and commands can be terminated through eye control. *See* Pet. 28 (citing Ex. 1005 ¶¶ 309–311; Ex. 1003 ¶ 76; Ex. 1019, 5, 269).

Petitioner further asserts that Osterhout's operating system is based on perceptual parameters including movement tracking, gesture recognition, voice recognition, and other features that use perceptual parameters such as voice, audio, video, and environmental parameters. *See* Pet. 29 (citing Ex. 1003 ¶ 79; Ex. 1005 ¶¶ 308–311); *see also id.* (explaining the disclosure of perceptual parameters in the '113 Patent, quoting Ex. 1001, 14:8–11; citing Ex. 1002, 114; Ex. 1003 ¶ 78). Petitioner asserts the perceptual parameters can be used in conjunction with the eye tracking to activate and execute commands. *See* Pet. 29–31 (citing Ex. 1003 ¶¶ 79–80; Ex. 1005

¶¶ 289–300, 309–311); *see also* Pet. 36 (asserting that the wearable device is controlled by the optical/perceptual based operating system, citing Ex. 1005 ¶ 93). Finally, Petitioner directs attention to Osterhout’s disclosure of eyepiece features that include applications, control technologies, and external control devices, associated external devices, and external processing facilities, and third party facilities, as well as a processing system with a processor, memory, computer control, and interfacing with displays. *See* Pet. 34–35 (reproducing Ex. 1005, Fig. 72; quoting Ex. 1005 ¶ 189; citing Ex. 1003 ¶¶ 87–90; Ex. 1005 ¶¶ 164, 176, 190, 223–224, 273, 282, 300, 321–323, 352, 362–363, 389, 455, 557, 573–582).

Patent Owner does not address or rebut Petitioner’s showing for these limitations. *See* PO Resp. 11–26. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches these limitations of claim 1. *See* Pet. 23–31, 34–36.

Summary

For all of the foregoing reasons, based on the entire record, Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches all of the limitations of claim 1.

3. Analysis of Independent Claim 12

Independent claim 12 recites limitations similar to the limitations recited in claim 1 and Petitioner relies on its analysis addressing the similar limitations in claim 1 to address most of the limitations of independent claim 12. *See* Pet. 16–36 (citing Pet. 26–40; Ex. 1003 ¶¶ 104–107).

Different from claim 1, claim 12 recites “the lens includes a plurality of layers” in place of “the wearable optics device is controlled by the optical/perceptual based operating system.” *Compare* Ex. 1001, 15:10–20 *with*, Ex. 1001, 14:22–33. Petitioner asserts that Osterhout teaches this limitation based on Osterhout’s disclosure of the lens including an electrochromic layer, integral chromic material, and/or chromic coating, and an antireflective layer. *See* Pet. 40–42 (reproducing Ex. 1005, Fig. 65; quoting Ex. 1005 ¶ 19; citing Ex. 1003 ¶¶ 108–110; Ex. 1005 ¶ 193).

Patent Owner does not address or rebut Petitioner’s showing for this limitation of claim 12 based on Osterhout’s disclosure of the lens including an electrochromic layer, integral chromic material, and/or chromic coating, and an antireflective layer.⁶ *See* PO Resp. 11–26. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claim 1, in addition to the foregoing analysis addressing this limitation of claim 12, based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches all of the limitations of claim 12. *See* Pet. 40–42.

⁶ Petitioner presents an alternative position based on Osterhout’s teaching of a “special contact lens” having layers, which Patent Owner addresses in the Response. *See* Pet. 42; PO Resp. 23–25; Pet. Reply 20. We need not address Petitioner’s alternative “special contact lens” position and Patent Owner’s corresponding rebuttal arguments because Petitioner shows that Osterhout discloses this limitation based on Petitioner’s other argument that Osterhout’s lens includes an electrochromic layer, integral chromic material, and/or chromic coating, and an antireflective layer.

4. Analysis of Dependent Claims 2 and 13

Claims 2 and 13 depend respectively from claims 1 and 12 and each recite “the dynamic eye tracking is utilized to control the optical/perceptual based operating system.” Ex. 1001, 14:34–36, 15:21–23. Petitioner asserts that Osterhout teaches dynamic eye tracking is utilized to control the optical/perceptual based operating system based on the same disclosures of Osterhout that Petitioner relied upon for addressing the limitations of claim 1. *See* Pet. 37 (citing Pet. 23–36; Ex. 1003 ¶¶ 96), 43 (citing Pet. 37, 39–42; Ex. 1003 ¶¶ 112–114). Petitioner additionally points out that Osterhout discloses that a wearer may move an object to the right, and through eye control select the object. *See* Pet. 37 (citing Ex. 1003 ¶ 96; Ex. 1005 ¶ 309).

Patent Owner does not address or rebut Petitioner’s showing for this limitation recited in claims 2 and 13. *See* PO Resp. 11–26. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claims 1 and 12, in addition to the foregoing analysis addressing this limitation of claims 2 and 13, based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches all of the limitations of claims 2 and 13. *See* Pet. 37, 43.

5. Analysis of Dependent Claims 3 and 14

Claims 3 and 14 depend respectively from claims 1 and 12 and each recite “wherein applications are utilized to control sensors and communication of the wearable optics device.” Ex. 1001, 14:37–39, 16:1–3.

Petitioner asserts that Osterhout teaches this limitation based on Osterhout's disclosure of various software applications that interface with the eyepiece, including augmented reality and media applications that are utilized to control sensors (e.g., camera, microphone) and communications (e.g., exchange of audio/video data over a network) of the eyepiece. *See* Pet. 37–39 (reproducing Ex. 1005, Fig. 72 (with annotations); citing Ex. 1003 ¶¶ 98–101; Ex. 1005 ¶¶ 189–190, 321–337), 43 (citing Pet. 38–42; Ex. 1003 ¶¶ 115–117).

Patent Owner does not address or rebut Petitioner's showing for this limitation recited in claims 3 and 14. *See* PO Resp. 11–26. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claims 1 and 12, in addition to the foregoing analysis addressing this limitation of claims 3 and 14, based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Osterhout discloses or teaches all of the limitations of claims 3 and 14. *See* Pet. 37–39, 43.

6. Summary

For all of the foregoing reasons, based on the entire record, Petitioner shows by a preponderance that the subject matter of claims 1–3 and 12–14 would have been obvious over Osterhout.

E. Patentability Challenge Based on Mann '526 and Vaissie

1. Overview of Mann '526 (Ex. 1006)

Mann '526 is directed to a wearable camera with a viewfinder. *See* Ex. 1006, code (57). An embodiment of the invention includes eyeglass

frames containing two eyeglass lenses, a wide-angle camera concealed within the nose bridge of the eyeglass frames, and a second camera also concealed in the eyeglass frames. *See id.* at 11:30–38, Fig. 1. In or behind one or both eyeglass lenses is an optical system that provides a magnified view of an electronic display which acts as a viewfinder screen. *See id.* at 12:38–48. Beamsplitters can be integrated into one or both lenses of the eyeglasses. *See id.* at 20:22–36, 22:55–61.

An eye tracker assembly comprising a camera and infrared light sources illuminates and observes the eyeball by way of rays of light that partially reflect off a beamsplitter, allowing a wearer to see straight through to a mirror and thus see virtual light from the viewfinder. *See id.* at 25:1–7, Fig. 10. The eye tracker reports the direction of the eye gaze and conveys this information to an eye tracker processor which converts it into X and Y coordinates that correspond to the viewfinder screen coordinates to indicate where on the viewfinder screen the wearer is looking. *See id.* at 25:7–13, Fig. 10. The eye tracking mechanism causes the focus of the camera to be based on where the user is looking. *See id.* at 6:26–27, 25:14–40 (disclosing focus analyzer and focus controller). The viewfinder can display an X-windows graphical user interface with various windows that can be activated. *See id.* at 14:21–65. A reality window manager may be driven by the eye tracker so that there can be an independent head position (framing) and cursor position (where looking). *See id.* at 26:10–14.

2. Overview of Vaissie (Ex. 1007)

Vaissie is directed to a head mounted device that includes an integrated eye tracking capability. *See Ex. 1007, code (57), 1:56–58.* The eye-tracking portion of the system includes LEDs that emit light which is

reflected onto the cornea and directed to an imaging system to be processed by a computer to determine the sight direction. *See id.* at 3:16–31.

An image of the eye is processed through an image processing computer program to provide data related to location of the pupil and the location of the reflections from the LEDs. *See id.* at 3:39–46, 3:59–4:3, Figs 7A–7B.

3. Analysis of Claim 1

A wearable optics device comprising: a lens; and a dynamic eye tracking mechanism in communication with the lens;

Petitioner asserts that Mann ’526 teaches “[a] wearable optics device comprising: a lens; and a dynamic eye tracking mechanism” based on Mann ’526’s disclosure of a wearable camera and viewfinder that is built into eyeglass frames containing eyeglass lenses, and where the viewfinder includes a focusing mechanism controlled by an automatic focusing mechanism of a camera system comprising an eye-tracking mechanism. *See* Pet. 48–51 (reproducing Ex. 1006, Fig. 1 (with annotations); quoting Ex. 1006, 3:16–18, 6:21–27, 11:30–32; citing Ex. 1003 ¶¶ 132–134). Petitioner contends that the eye tracking mechanism can be used to control a cursor position in a reality window manager, for example, the cursor within viewfinder 192 in Fig. 1D. *See* Pet. 51 (reproducing Ex. 1006, Fig. 1D; citing Ex. 1003 ¶ 134; Ex. 1006, 26:10–19, Fig. 1C).

Petitioner further asserts that Figure 10 of Mann ’526 shows a left eye portion of the wearable camera system, in which the camera focus and vergence are driven by the output of the eye tracking mechanism. *See* Pet. 51–52 (reproducing Ex. 1006, Fig. 10 (with annotations); citing Ex. 1003 ¶¶ 135–136; Ex. 1006, 24:66–25:32). Petitioner further contends the eye tracker includes a camera and infrared light sources that illuminate the eye, wherein the camera observes the eye via light rays reflected in

beamsplitter 1020, and reports the direction of the gaze to an eye tracker processor that converts the eye gaze direction into X and Y coordinates corresponding to the view finder screen. *See* Pet. 52–53 (citing Ex. 1003 ¶ 136; Ex. 1006, 25:1–13, Fig. 10); *see also* Pet. 53 (asserting that the eye tracking mechanism is dynamic, citing Ex. 1003 ¶ 137; Ex. 1006, 24:66–25:32, 26:10–19, Fig. 10).

Petitioner further contends, for example, that “[t]he dynamic eye tracking mechanism is *in communication with the lens* at least because the eye tracking mechanism is in optical communication with the lens.” Pet. 53 (citing Ex. 1003 ¶ 138). More specifically, Petitioner asserts that the camera of the eye tracking mechanism captures an image of the eye by capturing light rays transmitted by the lens and reflected in the eye. *Id.* (citing Ex. 1003 ¶ 138). According to Petitioner, “[t]hese light rays are shown in Fig. 3, in which rays 311 and 321, after being transmitted by the lens, ‘pass through the apparatus and enter directly into the eye without being deflected by two-sided mirror 315.’” *Id.* (quoting Ex. 1006, 18:21–26; citing Ex. 1003 ¶ 138; Ex. 1006, Fig. 3). Petitioner asserts that the mirror 315 of Fig. 3 is also present in the example of the eye tracking mechanism in Fig. 10, and asserts that the light rays 311 and 321 from the lens are thus captured by the eye tracking mechanism. *See* Pet. 53–54 (reproducing Ex. 1006, Fig. 3; citing Ex. 1003 ¶ 138; Ex. 1006, 18:21–26).

In another position, Petitioner asserts that “Mann ’526 expressly suggests that a partially transparent beamsplitter 415 can be ‘installed in place of mirror 315.’” Pet. 54 (citing Ex. 1003 ¶ 139; Ex. 1006, 18:62–19:21). According to Petitioner,

[t]o the extent not expressly disclosed by Mann ’526, it would have been obvious to a [person of ordinary skill in the art] to

install the beamsplitter in place of mirror 315 in communication with the eye tracking mechanism—such as shown in the embodiment shown in Fig. 10—such that the beamsplitter transmits light rays from the lens to the eye tracking mechanism.

Id. (citing Ex. 1003 ¶ 139; Ex. 1006, 18:62–19:21, Figs. 4, 10). Petitioner further explains,

In this configuration, because “only a portion of the rays” from the lens are reflected by the beamsplitter, as shown with respect to light rays 310 in Fig. 4 . . . , remaining light rays are transmitted to the eye tracking mechanism from the lens via the beamsplitter, such that the eye tracking mechanism is in optical communication with the lens, in addition to the optical communication.

Pet. 54–55 (reproducing Ex. 1006, Fig. 4; citing Ex. 1003 ¶ 139; Ex. 1006, 18:62–19:21, Fig. 10). Petitioner asserts that a person of ordinary skill in the art would have been motivated to make this modification in light of the express suggestion to do so in Mann ’526 for the purpose of permitting others to make full eye-contact with the wearer. *See* Pet. 55 (citing Ex. 1003 ¶ 139; Ex. 1006, 18:62–19:15, Figs. 4, 10).

Patent Owner does not address Petitioner’s assertions addressing the preamble recitation and the limitation “a lens.” *See* PO Resp. 26–36. Patent Owner contends that Petitioner’s arguments that Mann ’526 teaches the “dynamic eye tracking mechanism in communication with the lens” fails to meet the claim requirement that the lens of the wearable optics device be engaged in an active exchange of information with the dynamic eye tracking mechanism. *See* PO Resp. 28, 34–35; *see also* PO Sur-reply 13–14 (similar arguments). We do not agree with Patent Owner’s arguments, because, as explained above in Section II.B., we do not adopt Patent Owner’s proposed ordinary and customary meaning for “dynamic eye tracking mechanism in

communication with the lens” that would require an active exchange of information.

Patent Owner further argues that “it is not the case that Mann ’526 relies on any natural light passing through the lens to track eye motion.” PO Resp. 29; *see id.* at 30 (reproducing Ex. 1006, Fig. 10; citing Ex. 1006, 24:66–25:11). Patent Owner asserts that Petitioner “is wrong when it alleges that, ‘the camera of the eye tracking mechanism 1010 captures an image of the eye by capturing light rays *transmitted by the lens* and reflected in the eye.’” *Id.* at 30 (quoting Pet. 53). Patent Owner contends that Mann ’626 instead discloses the eye tracker assembly 1010 illuminates and observes the eyeball by way of light rays 1011, produced by infrared light sources of the eye tracker assembly, partially reflected off the beamsplitter 1020, reflected off the wearer’s eye and then returned to the eye tracker assembly. *See id.* at 30–31 (quoting Ex. 1006, 25:1–5). According to Patent Owner, “[t]here is no teaching of the eye tracking mechanism receiving light rays from the lens to track eye motion, as alleged by [Petitioner].” *Id.* at 31; *see* PO Sur-reply 14–15 (similar arguments). Patent Owner asserts that Petitioner ignores the actual teachings of Mann ’526 because, according to Patent Owner “eye tracking mechanism 1010 does not capture light rays 311 and 312. Instead, the eye tracking mechanism relies on the infrared light sources to track motion of the eye.” PO Resp. 32 (citing Ex. 1006, 25:1–4); *see id.* at 31–33 (reproducing Ex. 1006, Figs. 3, 10; citing Ex. 1006, 17:59–64, 18:7–26); *see also* PO Sur-reply 14–15 (similar arguments).

We do not agree with Patent Owner’s arguments. Petitioner does not assert that the eye tracking mechanism uses natural light that passes through the lens to track eye motion. Petitioner merely asserts that light rays that are transmitted by the lens are reflected by the eye and captured by the eye

tracking mechanism. *See* Pet. 53–54. That is all that claims 1 and 12 require; they do not recite or require that the eye tracking mechanism uses light that passes through the lens to track eye motion. For the same reasons, we also do not agree with Patent Owner’s position that Petitioner’s obviousness argument as to substituting a beamsplitter in place of the mirror of Figure 10 fails because the eye tracking mechanism relies on the infrared light sources to track motion of the eye. *See* PO Resp. 33–34; *see also id.* at 34 (“Importing such an arrangement into Mann ’526’s Figure 10 embodiment does nothing to change the fact that the eye tracking mechanism 1010 utilizes infrared light which it produces, and not light passed through the lens, in order to track eye motion.”).

Having considered both parties’ arguments and the evidence cited by the parties to support their respective arguments, we are persuaded that “a dynamic eye tracking mechanism in communication with the lens” is disclosed, taught, or suggested by Mann ’526. Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that Mann ’526 discloses, teaches, or suggests the preamble recitation, and the limitations of “a lens; and a dynamic eye tracking mechanism in communication with the lens.” *See* Pet. 50–56.

wherein the dynamic eye tracking mechanism utilizes optical parameter measurements. . . includ[ing] any of ciliary measurements, pupil measurements, corneal measurements, eye lens measurements, iris measurements, eye lid measurements, retina measurements;

Petitioner asserts that Mann ’526 in combination with Vaissie teaches these limitations based on Vaissie’s teachings of a head mounted display that has an integrated eye-tracking function that includes a light source that illuminates the cornea of the eye via a beamsplitter and a camera that detects a reflected light image in the cornea, which is processed by a computer to

identify the location of the pupil and therefore identify the location of the user's sight direction. *See* Pet. 56 (citing Ex. 1003 ¶ 143; Ex. 1007, 1:56–58, 3:16–31, 3:39–46, Fig. 4); *see also* Pet. 56–58 (providing additional detail about image processing, reproducing Ex. 1007, Figs. 7A, 7B; citing Ex. 1003 ¶¶ 144–147; Ex. 1007, 3:59–4:3).

Patent Owner contends that the combination of Mann '526 and Vaissie does not teach a dynamic eye tracking mechanism that utilizes optical parameter measurements, which Patent Owner asserts is a determination of size or length. *See* PO Resp. 35–36. According to Patent Owner, “Vaissie’s teachings of an eye-tracking function that determines the location of a pupil, and therefore identifies the direction of a wearer’s gaze using a camera to detect reflected light” “does not rely on any measurements,” “but instead on using image processing.” *Id.* at 36 (citing Pet. 56–58; Ex. 1007, 3:59–4:3). We do not agree with Patent Owner’s arguments, because, as explained above in Section II.B., we do not adopt Patent Owner’s proposed ordinary and customary meaning for “optical parameter measurements” specifying that a measurement is a determination of size, length, or amount of something.

Petitioner contends that a person of ordinary skill in the art would have been motivated to combine Mann '526 with the teachings of Vaissie because Vaissie explains that implementing eye tracking in head-mounted devices can advantageously allow physically challenged people to interact with such devices and to realize the advantages of enhancing local images, correcting depth perception difficulties, and increasing resolution of visual displays. *See* Pet. 58–59 (citing Ex. 1003 ¶¶ 148–150; Ex. 1006, 24:66–25:31, Fig. 10; Ex. 1007, 1:40–53, 1:56–58). Patent Owner does not address or rebut Petitioner’s rationale to combine the teachings of Mann '526 and

Vaissie. *See* PO Resp. 26–36. Based on Petitioner’s supporting citations to Mann ’526, Vaissie, and Dr. LaViola’s testimony (Ex. 1003), we are persuaded Petitioner sets forth sufficient articulated reasoning with rational underpinning to support the conclusion that it would have been obvious to one of ordinary skill in the art to combine the teachings of Mann ’526 with Vaissie’s teachings of optical parameter measurements. *See* Pet. 56–59; *KSR*, 550 U.S. at 418.

Having considered both parties’ arguments and the evidence cited by the parties to support their respective arguments, we are persuaded that this limitation is taught by the combination of Mann ’526 and Vaissie. Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that the combination of Mann ’526 and Vaissie teaches this limitation of claim 1. *See* Pet. 56–59.

*wherein an optical/perceptual parameter based operating system
is utilized, wherein the wearable optics device is controlled
by the optical/perceptual based operating system.*

Petitioner asserts that Mann ’526 combined with Vaissie teaches these limitations based on Mann ’526’s disclosure of a processor that presents a reality window manager, including windows of the commonly-used X-windows graphical user interface. *See* Pet. 60–64 (reproducing Ex. 1006, Fig. 1C; quoting Ex. 1006, 14:22–26; Ex. 1019, 3, 5; citing Ex. 1003 ¶¶ 154–160; Ex. 1006, 11:1–14:10, 14:21–27, 14:42–45, 26:10–18, Figs. 1, 1D; Ex. 1019, 356–357, 360; Ex. 1020, 485). Petitioner further asserts that Mann ’526 in view of Vaissie teaches the operating system is based on optical parameters and perceptual parameters based on Mann ’526’s disclosure of using head tracking and eye tracking to interact with the view finder and graphical user interface. *See* Pet. 65–69

(reproducing Ex. 1006, Fig. 1D; quoting Ex. 1019, 5, 269; citing Ex. 1003 ¶¶ 161–166; Ex. 1006, 13:43–49, 14:8–11, 14:32–65). Petitioner further contends that the eyewear is controlled by the optical/perceptual parameter based operating system to control process execution such as starting and stopping the camera via GUI terminal windows that may be activated by eye tracking and head tracking. *See* Pet. 68–69 (reproducing Ex. 1006, Fig. 1D; citing Ex. 1003 ¶¶ 167–169; Ex. 1006, 14:32–35, 14:55–15:36).

Patent Owner does not address or rebut Petitioner’s showing for these limitations. *See* PO Resp. 26–36. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Based on the entire record, we determine Petitioner shows by a preponderance of the evidence that the combined teachings of Mann ’526 and Vaissie teaches these limitations of claim 1. *See* Pet. 60–69.

Summary

Based on the entire record before us, Petitioner shows by a preponderance of the evidence that the combined teachings of Mann ’526 and Vaissie teach all of the limitations of claim 1.

4. Analysis of Independent Claim 12

Independent claim 12 recites limitations similar to the limitations recited in claim 1 and Petitioner relies on its analysis addressing the similar limitations in claim 1 to address most of the limitations of independent claim 12. *See* Pet. 71–72 (citing Pet. 48–68; Ex. 1003 ¶¶ 175–181). Petitioner asserts that Mann ’526 further teaches “the lens includes a plurality of layers,” recited in claim 12, based on Mann ’526’s disclosure that one or more beamsplitters can be embedded in one lens or both lenses of

the eyeglasses. *See* Pet. 72 (quoting Ex. 1006, 20:22–24; citing Ex. 1003 ¶ 181; Ex. 1006, 22:55–61).

Patent Owner does not address or rebut Petitioner’s showing for this additional limitation of claim 12. *See* PO Resp. 26–36. In any event, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claim 1, in addition to the foregoing analysis addressing this limitation of claim 12, based on the entire record, Petitioner shows by a preponderance of the evidence that the combined teachings of Mann ’526 and Vaissie teach all of the limitations of claim 12. *See* Pet. 71–72.

5. Analysis of Dependent Claims 2 and 13

Petitioner asserts that Mann ’526 in view of Vaissie teaches dynamic eye tracking is utilized to control the optical/perceptual based operating system based on the same disclosures of Mann ’526 and Vaissie that Petitioner relied upon for addressing the limitations of claims 1 and 12. *See* Pet. 69 (citing Pet. 48–50, 68–69; Ex. 1003 ¶¶ 169–171), 72–73 (citing Pet. 69; Ex. 1003 ¶¶ 182–184).

Patent Owner does not address or rebut Petitioner’s showing for this limitation recited in claims 2 and 13. *See* PO Resp. 26–36. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claims 1 and 12, in addition to the foregoing analysis addressing this limitation of claims 2 and 13, based on the entire

record, Petitioner shows by a preponderance of the evidence that the combined teachings of Mann '526 and Vaissie teach all of the limitation of claims 2 and 13. *See* Pet. 69, 72–73.

6. Analysis of Dependent Claims 3 and 14

Petitioner asserts that Mann '526 in view of Vaissie teaches the limitations of claims 3 and 14 based on Mann '526's disclosure that the sensors (e.g., cameras) of the eyeglasses can be controlled by using a terminal window of a window manager application to provide a command to a sensor (e.g., start or stop recording). *See* Pet. 70 (citing Pet. 48–69; Ex. 1003 ¶¶ 172–174; Ex. 1006, 14:55–15:13, 15:31–36), 73 (citing Pet. 71–73; Ex. 1003 ¶¶ 185–187).

Patent Owner does not address or rebut Petitioner's showing for this limitation recited in claims 3 and 14. *See* PO Resp. 26–36. In any event, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Accordingly, for the same reasons as those explained above addressing independent claims 1 and 12, in addition to the foregoing analysis addressing this limitation of claims 3 and 14, based on the entire record, Petitioner shows by a preponderance of the evidence that the combined teachings of Mann '526 and Vaissie teach all of the limitation of claims 3 and 14. *See* Pet. 70, 73.

7. Summary

For all of the foregoing reasons, based on the entire record, Petitioner shows by a preponderance of the evidence that the subject matter of claims 1–3 and 12–14 would have been obvious over the combined teachings of Mann '526 and Vaissie.

III. CONCLUSION

For the foregoing reasons, and after having analyzed the entire record and assigning appropriate weight to the cited supporting evidence, Petitioner has established by a preponderance of the evidence that claims 1–3 and 12–14 of the '113 Patent are unpatentable.⁷

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3, 12–14	103(a)	Osterhout	1–3, 12–14	
1–3, 12–14	103(a)	Mann '526, Vaissie	1–3, 12–14	
Overall Outcome			1–3, 12–14	

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, Petitioner has established by a preponderance of the evidence that claims 1–3 and 12–14 of the '113 Patent are unpatentable; and

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

⁷ Should Patent Owner pursue amendment of the challenged claims in a reissue or reexamination proceeding, we direct 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 files a reissue application or a request for reexamination, Patent Owner is reminded 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).

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