

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC., META PLATFORMS TECHNOLOGIES,
LLC, and TWISTED PIXEL GAMES, LLC,
Petitioner,

v.

EIGHT KHZ, LLC,
Patent Owner.

IPR2023-01019
Patent 10,368,179 B1

Before JUSTIN T. ARBES, LYNNE H. BROWNE, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

RAEVSKY, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Meta Platforms, Inc., Meta Platforms Technologies, LLC, and Twisted Pixel Games, LLC (collectively, “Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1–20 of U.S. Patent No. 10,368,179 B1 (Ex. 1001, “the ’179 patent”). Pet. 1. Eight kHz, LLC (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Petitioner filed a Reply to the Preliminary Response (Paper 7, “Prelim. Reply”), and Patent Owner filed a Sur-reply (Paper 8, “Prelim. Sur-reply”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless it is determined that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition. After considering the parties’ arguments and evidence, and for the reasons set forth below, Petitioner demonstrates a reasonable likelihood of prevailing with respect to at least one of the challenged claims of the ’179 patent. Accordingly, we institute an *inter partes* review with respect to all challenged claims and grounds asserted in the Petition. 37 C.F.R. § 42.108(a) (2022).

Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far. This is not a final decision as to patentability of the challenged claims.

II. BACKGROUND

A. Related Matters

The parties identify the following infringement lawsuit involving the ’179 patent: *Eight kHz, LLC v. Meta Platforms, Inc.*, No. 6:22-cv-00575-

ADA-DTG (W.D. Tex. Jun. 3, 2022) (the “District Court litigation”). Pet. 65; Paper 5, 1.

The following *inter partes* review has also been filed against related U.S. Patent No. 10,448,184 B1: *Meta Platforms, Inc. v. Eight kHz, LLC*, IPR2023-01020 (PTAB filed June 8, 2023).

B. Real Parties-in-Interest

Meta Platforms, Inc., Meta Platforms Technologies, LLC, and Twisted Pixel Games, LLC identify themselves as the only real parties-in-interest (RPI). Pet. 65. Patent Owner identifies itself as the sole RPI. Paper 5, 1.

C. The '179 patent

The '179 patent describes a method for providing binaural sound to a person through electronic earphones. Ex. 1001, code (57). The binaural sound localizes to a sound localization point (SLP) in empty space that is away from but proximate to the person. *Id.* When an event occurs, the binaural sound switches or changes to stereo sound, to mono sound, or to altered binaural sound. *Id.* Figure 1 is reproduced below.

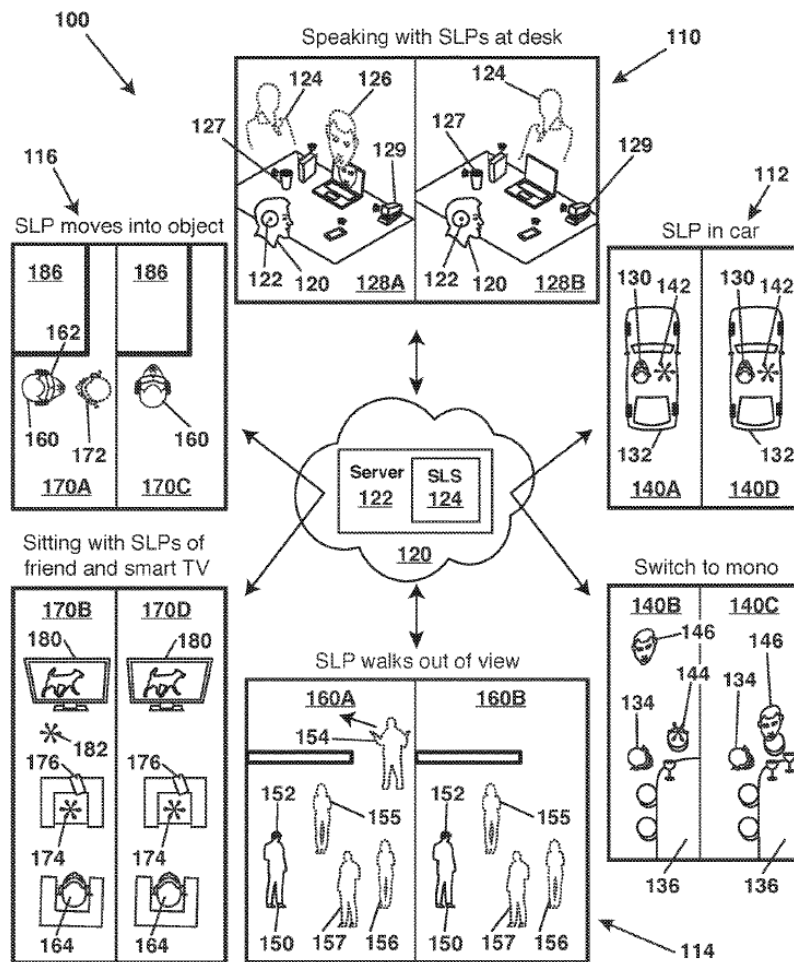


Figure 1

Figure 1 depicts computer system 100 with example scenarios (110, 112, 114, 116) of changing binaural sound. *Id.* at 6:8–10. For example, in scenario 110, a user 120 wears electronic earphones 122 while simultaneously localizing a voice of an intelligent personal assistant (IPA) to a first sound localization point 124 and a voice of a friend to a second sound localization point 126. *Id.* at 6:13–17. As shown in box 128A, the user 120 localizes the voice of the IPA to his left and localizes the voice of his friend in front of himself and above his laptop computer that is situated on his desk.

Id. at 6:17–20. An image of the friend appears on a display of the laptop while the SLP 126 appears above the laptop. *Id.* at 6:20–22.

As another example, in scenario 112, a user 130 drives a car 132 while talking to another user 134 who wears headphones with microphones and sits at a table 136. *Id.* at 6:32–34. As shown in box 140A, user 130 localizes a voice of user 134 to a sound localization point 142 (indicated with an asterisk-like symbol) that is located in an empty passenger seat in the front of the car 132. *Id.* at 6:34–37.

In scenario 114, a user 150 wears an optical head mounted display (OHMD) 152 that simultaneously provides a plurality of sound localization points 154, 155, 156, and 157 during a conference call with four individuals (each individual being represented with a visual image and accompanying SLP). *Id.* at 6:60–65. In scenario 116, a user 160 wears electronic glasses 162 and talks to another user 164 who sits in a chair in his family room and wears a headphone with mics. *Id.* at 7:8–10.

D. Challenged Claims

Claim 14, below, is illustrative of the challenged claims. Petitioner's claim element labels are included for ease of reference.

14. A method executed by one or more electronic devices, the method comprising:

- [a] storing head-related transfer functions (HRTFs) in memory;
- [b] displaying, with a wearable electronic device (WED) worn on a head of a user, a virtual image in an environment;
- [c] processing, by a digital signal processor (DSP), sound with the HRTFs to generate binaural sound that externally localizes in empty space from the virtual image in the environment;
- [d] determining, with the WED, when the user is leaving the environment; and
- [e] alerting the user that the user is leaving the environment by reducing a volume of the binaural sound that localizes from the virtual image and that is being provided to the user.

Ex. 1001, 47:41–48:16; *see* Pet. 15–23.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 2):

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
1, 3, 4, 6–10, 14–19	103	Clement, ² Osman, ³ Sauk ⁴
1–20	103	Lyren, ⁵ Reif ⁶

Petitioner also relies on the declaration of Dr. Agnieszka Roginska (Ex. 1003). Patent Owner relies on the declaration of Dr. Durand R. Begault (Ex. 2006).

III. ANALYSIS

A. Discretion under 35 U.S.C. § 314(a)

Patent Owner argues that we should exercise discretion under § 314(a) to deny institution in light of the related District Court litigation. Prelim. Resp. 50–59.

We consider the following factors when determining whether to deny institution under § 314(a) based on a parallel district court proceeding:

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. The ’113 patent’s earliest claimed priority application was filed after March 16, 2013, so the AIA versions of §§ 102, 103 apply. Ex. 1001, code (63).

² U.S. Patent No. 9,690,374 B2 to Clement, issued June 27, 2017 (Ex. 1005).

³ U.S. Patent No. 9,037,468 B2 to Osman, issued May 19, 2015 (Ex. 1006).

⁴ U.S. Patent No. 7,876,903 B2 to Sauk, issued Jan. 25, 2011 (Ex. 1007).

⁵ U.S. Publication No. 2017/0188168 A1 to Lyren, published June 29, 2017 (Ex. 1008).

⁶ U.S. Publication No. 2018/0373412 A1 to Reif, published Dec. 27, 2018 (Ex. 1009).

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board's exercise of discretion, including the merits.

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 5–6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). We also consider “several clarifications” made by the Director of the United States Patent and Trademark Office (“USPTO”). See USPTO Memorandum, Interim Procedure for Discretionary Denials in AIA Post Grant Proceedings with Parallel District Court Litigation, 2 (June 21, 2022) (“Director’s Memo”).⁷

The Director’s Memo provides that “[c]onsistent with *Sotera Wireless, Inc.*,^[8] the PTAB will not discretionarily deny institution in view of parallel district court litigation where a petitioner presents a stipulation not to pursue in a parallel proceeding the same grounds or any grounds that could have reasonably been raised before the PTAB.” Director’s Memo 3. With our authorization, Petitioner has filed a stipulation which stipulates that

⁷ Available at https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

⁸ *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential).

If the PTAB institutes the pending IPR in IPR2023-01019 challenging the patentability of claims 1-20 of the '179 patent, then [Defendants Meta Platforms, Inc., Meta Platforms Technologies, LLC, and Twisted Pixel Games, LLC] will not pursue as to the challenged claims any ground raised or that could have been reasonably raised in the IPR in the above-captioned district court litigation (No. 6:22-cv-00575-ADA).

Prelim. Reply 1.

Patent Owner concedes that Petitioner has filed a “*Sotera*-like stipulation” but argues that it is insufficient because it “leaves the door open to a duplication of efforts and the possibility of conflicting decisions.”

Prelim. Sur-reply 1 (citing Ex. 1141, 4 (“This stipulation is not intended . . . to limit Meta’s ability to assert . . . invalidity under 35 U.S.C. §§ 102 and 103 not available in IPR and under 35 U.S.C. §§ 101 and 112[], regardless of whether IPRs are instituted.” (emphasis omitted))). Namely, Patent Owner argues that Petitioner’s stipulation carves out “the right to assert overlapping system art in the parallel district court proceeding,” such that institution here would not address the risk of “inconsistent outcomes between the PTAB and the district court.” *Id.* at 4.

We disagree with Patent Owner, as Petitioner’s stipulation sufficiently comports with the language of the Director’s Memo, consistent with *Sotera Wireless, Inc.* See Director’s Memo 3. Patent Owner’s argument invites us to disagree with the reasoning of *Sotera* itself and the Director’s Memo, which we are bound to follow. Accordingly, Patent Owner’s argument is unavailing.

Patent Owner also urges us not to accept a “late” *Sotera* stipulation. Prelim. Sur-reply 4. We disagree that Petitioner’s *Sotera* stipulation is late. It is within our discretion to permit Petitioner to file a stipulation prior to

institution. *See NXP USA, Inc. v. Impinj, Inc.*, IPR2021-01556, Paper 13 (PTAB Sept. 7, 2022) (precedential).

We therefore decline to discretionarily deny institution in view of the related District Court litigation.

B. Principles of Law

Petitioner bears the burden to demonstrate unpatentability, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented 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.” *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence, objective indicia of nonobviousness. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the Petition's challenges.

C. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 13, 17. Petitioner asserts that

A POSA [person of ordinary skill in the art or “POSITA”] in the relevant timeframe (2015 to 2019) would have had a Bachelor's degree in computer science/engineering, music technology, or a related field, and at least two years of industry

experience, or academic research experience, in virtual/augmented reality, audio engineering, or an equivalent. Additional education can compensate for less experience, and vice-versa.

Pet. 6 (citing Ex. 1003 ¶¶ 34–36).

Patent Owner applies Petitioner’s proposed level of skill in the art at this stage. Prelim. Resp. 4. We are persuaded, on the present record, that Petitioner’s proposal is consistent with the problems and solutions in the ’179 patent and prior art of record. We adopt Petitioner’s definition of the level of skill for the purposes of this Decision.

D. Claim Construction

In *inter partes* review, we construe a claim 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), including construing the claim 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. 37 C.F.R. § 42.100(b).

The parties do not propose any claim constructions. *See* Pet. 6–7; Prelim. Resp. 4. We agree that no terms require construction at this stage. *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))).

E. Asserted Obviousness over Clement, Osman, and Sauk

Petitioner contends that claims 1, 3, 4, 6–10, and 14–19 would have been obvious over the combination of Clement, Osman, and Sauk. Pet. 7–35.

1. Overview of Clement

Clement describes an audiovisual system that generates a virtual immersive experience, which includes an electronic user device in communication with a tracking device. Ex. 1005, code (57). The tracking device may track a user's physical movement in a real-world space and translate the tracked physical movement into corresponding movement in the virtual world generated by the user device. *Id.* The system may detect when a user and the user device are approaching a boundary of a tracking area and automatically initiate a transition out of the virtual world and into the real world. *Id.*

Figure 3A of Clement is reproduced below:

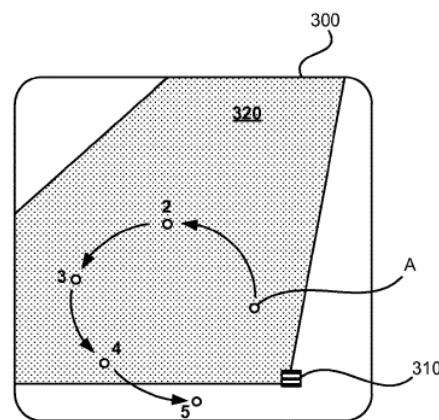


FIG. 3A

Figure 3A depicts automatically transitioning into and out of an immersive experience. *Id.* at 2:9–11. As shown in Figure 3A, a user A, immersed in the virtual world, may move in the real world space 300, for example,

sequentially from position 1 to position 5. *Id.* at 4:49–51. At positions 1, 2 and 3, the user A is completely within the field of view, or tracking area 320, of the tracking device 310. *Id.* at 4:51–53. At position 3, the user A is within the tracking area 320, but close to a boundary of the real world space 300, such as, for example, a wall. *Id.* at 4:53–56. At position 4, the user A is just within the tracking area 320, very close to a boundary of the tracking area 320. *Id.* at 4:56–57. At position 5, the user has crossed the boundary of the tracking area 320 and has moved completely out of the field of view, or tracking area 320 of the tracking device 310. *Id.* at 4:57–60.

2. *Overview of Osman*

Osman describes an approach for simulating the source of a sound in a three-dimensional space. Ex. 1006, 1:29–32. Osman describes a sound localization function that generates a localized sound based on a sound and the location in space perceived as the origin of the sound. *Id.* at 4:37–41. One example of a sound localization function is a Head-Related Transfer Function (HRTF), which Osman describes as a response that characterizes how an ear perceives a sound from a point in space. *Id.* at 4:50–53. When sounds are generated in a video game, for example, an HRTF of a user is used to convert the sound into a localized sound that appears to the user to be coming from the sound origin. *Id.* at 10:4–13.

3. *Overview of Sauk*

Sauk describes an approach for producing, combining, and customizing virtual sound environments. Ex. 1007, code (57). A binaural sound system includes a receiver configured for receiving a signal containing at least a first type of information and a second type of information. *Id.* at 2:48–51. The first type of information includes

enunciated data. *Id.* at 2:51–52. The enunciated data specifies certain information intended to be audibly enunciated to a user. *Id.* at 2:52–53. The second type of information comprises a first type of metadata and a second type of metadata. *Id.* at 2:53–55.

The first type of metadata includes information which identifies a characteristic of the enunciated data exclusive of spatial position information. *Id.* at 2:55–57. The second type of metadata identifies spatial position information associated with the enunciated data. *Id.* at 2:57–59. The binaural sound system also includes an audio processing system responsive to the signal. *Id.* at 2:59–60. The audio processing system is configured for audibly reproducing the enunciated data to the user in accordance with a predetermined audio enhancement based on the first metadata, the second metadata, or both. *Id.* at 2:61–64.

4. *Independent Claim 14*⁹

a. *Undisputed limitations*

Petitioner asserts that the combination of Clement, Osman, and Sauk discloses the preamble and limitations 14[a]–[c], and [e]. Pet. 15–24. Petitioner identifies where the combination of Clement, Osman, and Sauk teaches these limitations, supporting this showing with testimony from Dr. Roginska, which Patent Owner does not dispute at this stage. *See id.*

We determine, on this record, that the combination of Clement, Osman, and Sauk discloses the preamble (whether or not limiting) and these limitations. *See LG Elecs., Inc. v. Conversant Wireless Licensing S.A.R.L.*, 759 F. App'x 917, 925 (Fed. Cir. 2019) (nonprecedential) (“The Board is

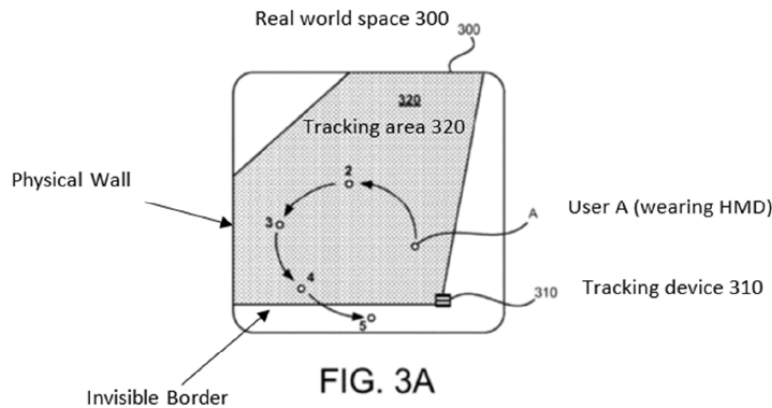
⁹ We follow the parties’ choice of leading with claim 14, rather than claim 1. Pet. 15; Prelim. Resp. 10.

‘not required to address undisputed matters’ or arguments about limitations with which it was never presented.”) (quoting *In re NuVasive, Inc.*, 841 F.3d 966, 974 (Fed. Cir. 2016)).

b. [d] determining, with the WED, when the user is leaving the environment

Petitioner contends that Clement discloses limitation 14[d], and Patent Owner disputes this. Pet. 22–23; Prelim. Resp. 10–14. According to Petitioner, Clement discloses a head mounted display device (HMD), which represents the claimed wearable electronic device (WED). Pet. 22 (citing, e.g., Ex. 1005, 7:4–16, 7:28–8:90, 8:36–43, 12:29–29, Figs. 10–11). Clement’s HMD “include[s] a sensor that detects . . . the user’s proximity to a boundary of the tracking area 320,” Petitioner argues. *Id.* Petitioner asserts that “Clement’s HMD confirms, based on the user’s direction, speed, and/or acceleration, that the user is approaching the boundary, to determine when the user is leaving the environment.” *Id.* at 23 (citing Ex. 1005, 12:30–13:10, Figs. 10–11; Ex. 1003 ¶¶ 75–76, 158–159).

Patent Owner argues that Clement fails to teach “*a wearable electronic device (WED) that determines when a user is leaving an environment.*” Prelim. Resp. 11. Clement’s HMD does not detect when a user is leaving a tracking area, Patent Owner argues, because it is Clement’s tracking device 310 that determines this. *Id.* At most, Patent Owner contends, Clement’s HMD tracks a user’s proximity to physical obstacles, such as a wall. *Id.* Patent Owner reproduces the following annotated Figure 3A of Clement:



Id. at 12 (annotated by Patent Owner to show a physical wall, invisible border, tracking device 310, user A, and real world space 300). Patent Owner explains that in Figure 3A, the user A is immersed in a virtual world and may move in a real-world space 300 between positions 1–5, which may be translated into corresponding movements in the virtual world. *Id.* (citing Ex. 1005, 4:49–5:16). At position 3, Patent Owner explains, the user A is within the tracking area 320 but is close to a boundary of the real-world space 300, such as a physical wall. *Id.* Patent Owner further explains that at position 5, the user A has crossed the boundary of the tracking area 320 and thus is out of the virtual world. *Id.* (citing Ex. 1005, 6:44–51). As such, Patent Owner argues, the boundary of Clement’s tracking area 320 is defined by a physical boundary of the real-world space 300 (e.g., physical wall) and an invisible border defined by the view of the tracking device 310. *Id.*

Patent Owner contends that Clement’s HMD detects only proximity to physical boundaries and does not determine when a user is crossing the invisible border (i.e., environment). *Id.* at 13. Only tracking device 310 determines when the user is crossing the invisible border (leaving the environment), not the HMD, Patent Owner argues. *Id.* As Clement’s

tracking device is separate from the HMD, Patent Owner contends that Clement does not teach “determining, *with the WED*, when the user is leaving the environment,” as recited in limitation 14[d]. *Id.* at 14.

Petitioner persuades us at this stage that Clement discloses limitation 1[d]. For instance, Petitioner persuasively argues that Clement’s HMD “include[s] a sensor that detects . . . the user’s proximity to a boundary of the tracking area 320.” Pet. 22 (citing, e.g., Ex. 1005, 7:4–16); *see also* Ex. 1005, 6:28–31 (“HMD 100 and/or the tracking device 310 . . . determines that the user is positioned within the preset threshold . . . of the boundary of the tracking area 320.”). Thus, we find unavailing Patent Owner’s argument that only tracking device 310 determines when the user is crossing the invisible border in Clement. *See* Prelim. Resp. 13.

On this record, we find that Clement discloses limitation 14[d].

c. Summary as to Claim 14

Based on the preliminary record before us, Petitioner has shown a reasonable likelihood that claim 14 would have been obvious over the combination of Clement, Osman, and Sauk.¹⁰

5. Independent Claim 7

Petitioner sets forth similar arguments for independent claim 7 as for claim 14. *See* Pet. 27–28. Patent Owner disputes two limitations, discussed below.

¹⁰ During trial, Petitioner should clarify whether it is relying on Sauk for claim 14. Petitioner refers only briefly to Sauk for limitation 14[c], so the record is unclear as to whether Petitioner believes that reliance on Sauk is necessary to prove unpatentability. *See* Pet. 21 (“also as taught by Sauk”).

a. [d] determining, with the WED, when the user is leaving the environment

Patent Owner first asserts that “Petitioner fails to clearly identify the prior art that allegedly invalidates claim 7, providing confusing internal cross-references to broad discussions of parts of claim 14.” Prelim. Resp. 15 (citing Pet. 27–28). We disagree. Petitioner states that limitations “7[pre] to 7[d] . . . are taught by the combination for the same reasons discussed above for corresponding Elements 14[pre] to 14[d].” Pet. 27 (emphasis omitted). Limitations 7[pre]–7[d] are very similar, and in some cases, identical, to the corresponding limitations 14pre–14[d], so we have no trouble following Petitioner’s argument.

Patent Owner next asserts that Clement and Osman fail to teach “determining, *with the WED*, when the user is leaving the environment,” for the same reasons as Patent Owner raises for limitation 14[d]. Prelim. Resp. 15. This argument fails at this stage for the same reasons explained above for claim 14.

b. [e] alerting the user that the user is leaving the environment by altering processing of the binaural sound to degrade audio cues in order to prevent the user from experiencing external localization of the binaural sound

Patent Owner also disputes limitation 7[e]. Prelim. Resp. 16–26. Petitioner contends that limitation 7[e] is taught by the combination of Clement, Osman, and Sauk for the same reasons as for limitation 14[e] and claims 15 and 16. Pet. 28.

For limitation 14[e], which recites in part, “alerting the user that the user is leaving the environment by reducing a volume of the binaural sound,” Petitioner argues that Clement discloses warning a user of an

approaching boundary by initiating a “transition” that may “fade out” the virtual audio, “including the audio that localizes to the virtual image.” *Id.* at 23 (citing, e.g., Ex. 1005, 9:20–31, 12:30–13:10, 5:55–6:6; Ex. 1003 ¶¶ 76–77, 162–170). Claim 15 adds, “alerting the user that the user is leaving the environment by *degrading the binaural sound* being provided to the user as the user is leaving the environment.” Ex. 1001, 48:16–19 (emphasis added). For this claim, Petitioner contends that “Clement teaches degrading the sound by fading it out (reducing its volume).” Pet. 25. Additionally, Petitioner cites Sauk, arguing that “[o]ne way to inform the user of the immediacy or relevance of the transition is to provide an additional audible indication, such as degrading the ‘binaural [audio] to monophonic or stereophonic audio [to] signif[y] a different level of relevancy.’” *Id.* (citing Ex. 1007, 11:25–41).¹¹ Claim 16 recites, “alerting the user that the user is leaving the environment by *altering, by the DSP, processing of the binaural sound* so the user perceives less external localization.” Ex. 1001, 48:20–24 (emphasis added). For this claim, Petitioner contends that Clement’s “DSP (*see* Element 14[c]) alters its processing to provide stereo or mono audio” and that “[s]tereo and mono audio removes the user’s perceived external localization.” *Id.* at 26 (citing Ex. 1003 ¶¶ 171–183; Ex. 1007, 11:26–41).

Patent Owner raises several arguments for this limitation. For reasons we explain below, Patent Owner raises a potentially meritorious argument regarding Petitioner’s rationale to combine Sauk with Clement. We

¹¹ Petitioner also cites Patent Owner’s declarant’s prior deposition testimony as conceding that switching from binaural to stereo or mono sound to serve as an alert was known. Pet. 25 (citing Ex. 1095, 208:20–209:8). At this stage, we question what impact this statement should have, if at all. We leave this question for trial.

accordingly do not decide at this stage whether Petitioner has met its burden on claim 7. For guidance to the parties during trial, we also address Patent Owner's other arguments.

(1) No motivation to combine

Patent Owner challenges Petitioner's proposed combination of Sauk with Clement. Prelim. Resp. 22–26. Before addressing Patent Owner's argument, we summarize Petitioner's rationale to combine.

Petitioner asserts that a POSITA implementing “Clement would have looked to Sauk for additional teachings regarding binaural sound, including signaling the importance of things or events to provide flexibility and additional options for different conditions in, e.g., virtual gameplay, thus ensuring a suitable warning regarding the transition.” Pet. 14. For example, Petitioner argues, Clement discloses “warning” a user to avoid an obstacle or wall, but only gives the example of a buzzer. *Id.* (citing Ex. 1005, 7:28–8:35). Petitioner asserts that a POSITA “would have known that other options are available and may[]be preferable.” *Id.* Petitioner then cites to Sauk, which “teaches changing from binaural to stereo or monophonic sound to signal ‘relevancy or importance,’ such as warning of a ‘hazard.’” *Id.* (citing Ex. 1007, 11:26–40, 12:33–51; Ex. 1003 ¶¶ 111–113). Petitioner also asserts a reasonable expectation of success in the combination. *Id.* at 14–15 (citing Ex. 1003 ¶¶ 109, 114–115).

Patent Owner argues that Sauk teaches away from degrading audio cues. Prelim. Resp. 22–26. Sauk teaches “**adding binaural audio alerts to increase** spatial awareness when the user is approaching a hazard,” Patent Owner contends. *Id.* at 23 (citing Ex. 1007, 12:33–51; Ex. 2006 ¶ 38). Along those lines, Patent Owner contends that “degrading the audio cues

would frustrate the purpose of Sauk because Sauk focuses on providing directional context to indicate or alert to a user the location of the hazard, while degrading the audio cues would reduce the spatial context of the binaural sound.” *Id.* at 25. Patent Owner further explains that “if a POSITA were to look at the alert options available in Sauk, the POSITA would find that rather than altering binaural sound down to stereo or mono, Sauk teaches the opposite and adds in new externalized binaural alerts.” *Id.* (citing Ex. 2006 ¶ 39).

At this stage, we agree with Patent Owner that Sauk teaches the opposite of how Petitioner applies Sauk. In particular, Petitioner incorrectly asserts that “Sauk teaches changing from binaural to stereo or monophonic sound to signal ‘relevancy or importance,’ *such as warning of a ‘hazard.’*” Pet. 14 (emphasis added). While we agree that Sauk teaches changing from binaural to stereo or monophonic sound to signify “a different level of relevancy or importance,” Sauk does not do so to warn of a hazard. *See* Ex. 1007, 11:32–39. Rather, Sauk’s “relevancy or importance” indication relates to providing audio to one group of soldiers “in a binaural format,” while providing audio from other groups in a monophonic or stereo format. *Id.* at 11:46–66. A user “can use this distinction to selectively focus on the voices of members of their own group.” *Id.* at 12:1–3.

In contrast, rather than eliminating 3-D binaural audio to indicate a hazard, Sauk extolls the value of *using* 3-D binaural audio to alert a user to a hazard. Ex. 2006 ¶ 39. For example, sensors in Sauk detect a hazard and alert a soldier by issuing an audible warning with 3-D binaural audio. Ex. 1007, 12:14–51. Sauk explains that “by listening to the 3-D binaural audio, the user would be able to ascertain a direction of the sensor 401 (and/or the

associated hazard).” *Id.* at 12:47–50. “Consequently, the user would know which direction to move away from in order to escape the affected area.” *Id.* at 12:50–51. Sauk therefore teaches that binaural audio helps a soldier identify where a hazard is coming from. Thus, based on Sauk’s disclosure, one of ordinary skill in the art would not have removed binaural audio when alerting users to nearby hazards.

As such, we have concerns at this stage about Petitioner’s proposed motivation to combine. Although Petitioner relies on Clement in part for disclosing a “warning” and Sauk for “changing from binaural to stereo or monophonic sound,” on this record, Petitioner’s reasoning for doing so is lacking. *See* Pet. 14. Petitioner provides no persuasive reason why one of ordinary skill in the art would have ignored Sauk’s disclosure of adding binaural sound for alerts and instead looked to Sauk’s non-alert context for removing binaural sound.¹²

(2) No altering

The remainder of Patent Owner’s arguments for this limitation are not compelling at this stage, but we address them to provide guidance to the parties during trial.

Patent Owner asserts that Clement, Osman, and Sauk fail to teach altering processing binaural sound. Prelim. Resp. 16. Patent Owner emphasizes that “limitation 7[e] requires altering *processing* of the binaural sound previously generated,” and “does not recite degrading binaural sound.” *Id.* at 16–17. Clement’s reducing volume does not teach the claimed altering, Patent Owner contends, “because binaural sound with

¹² Patent Owner raises other arguments against the combination, which we do not find compelling at this stage. *E.g.*, Prelim. Resp. 24.

reduced volume would still have audio cues that provide sound localization.” *Id.* at 17. On this point, we disagree with Patent Owner. Limitation 7[e]’s “altering processing of the binaural sound to *degrade* audio cues” does not, on this record, require *eliminating* those audio cues. Thus, we find, on this record, that Clement’s volume reduction discloses degrading audio cues. To the extent Patent Owner disagrees, Patent Owner should make its claim construction of “degrade audio cues” explicit during trial.

Patent Owner also disputes that Sauk discloses this limitation, arguing that “the change to certain audio formats described in Sauk does not involve altering processing previously generated binaural audio in response to a change in a user’s position in an environment.” *Id.* at 18 (citing Ex. 2006 ¶ 33). In Patent Owner’s view, Sauk’s “data is *reproduced*, which is different from dynamically *altering processing of* the binaural sound.” *Id.* at 19. In other words, Patent Owner contends, “Sauk merely creates a static reproduction of the enunciated data without any altering of the previously produced audio.” *Id.* at 20.

We also disagree with this argument at this stage. Sauk discloses that “a user could *change* the less relevant audio to a monophonic (1-D) or stereophonic (2-D) dimension,” and that “[t]his process also removes any localization cues for that audio.” Ex. 1007, 11:34–40 (emphasis added). Sauk’s disclosure that a user could “change” the audio to remove localization cues, on this record, discloses “altering” the processing of the binaural sound. Dr. Roginska also testifies that a POSITA would have understood that in Sauk, “the localization cues for binaural audio were removed by altering the filters used in the filtering process of binaural audio, and/or by altering the binaurally processed audio to reduce or eliminate the

perception of spatial sound by removing the interaural (ITD and ILD) cues.” Ex. 1003 ¶ 179 (citing Ex. 1007, 7:1–8:33, 11:26–41, Fig. 5). At this stage, we find that this testimony sufficiently establishes that Sauk discloses altering “the processing” of the binaural sound, although we maintain the concerns we express above regarding combining Sauk with Clement.

(3) No degrading

Patent Owner further contends that “Sauk does not disclose and never mentions ‘*degrad[ing]* audio cues’ in its disclosure.” Prelim. Resp. 20. In Patent Owner’s view, “Sauk *generates* the desired audio in a binaural or stereo format based on [received] metadata.” *Id.* at 21 (citing Ex. 1007, 11:26–55; Ex. 2006 ¶ 34). Therefore, Patent Owner asserts, “since the binaural properties of the audio data in Sauk is predefined, Sauk cannot *degrade* audio cues in previously generated binaural sound, much less *degrade* audio cues in previously generated binaural sound in response to a user’s position in an environment.” *Id.*

Patent Owner appears to implicitly construe “*degrad[ing]*” more restrictively than is warranted by a plain reading of the claim. Even assuming that Patent Owner is correct, that Sauk merely generates binaural sound or generates stereo sound based on received metadata, Patent Owner does not persuasively explain why Sauk’s switching from binaural sound to stereo is not “*degrad[ing]* audio cues.” If stereo sound replaces the binaural sound, then the audio cues are no longer present, and therefore, on this record, the binaural sound has been degraded to stereo sound. In other words, we are persuaded, based on the current record, that “altering processing of the binaural sound to degrade audio cues” can encompass merely stopping playback of the binaural sound (i.e., no longer processing it)

and replacing it with stereo sound (i.e., degrading audio cues), under a plain reading of the claim.

(4) No alerting

Patent Owner argues that Clement and Sauk do not disclose alerting by degrading audio because Sauk instead alerts for hazards only binaurally. Prelim. Resp. 22. At this stage, we view this argument to be less persuasive than Patent Owner's argument against the combination, addressed above. In the proposed combination, Petitioner appears to cherry pick disclosure from Sauk to fill in Clement's gap. Petitioner's proposed combination therefore appears to disclose limitation 7[e]. So we do not agree with Patent Owner at this stage that the combination does not disclose it, but instead we have doubts about the rationale to combine itself.

c. Summary as to Claim 7

Because we have doubts about Petitioner's rationale to combine Sauk with Clement at this stage, we leave for trial the issue of whether claim 7 would have been obvious over the combination of Clement, Osman, and Sauk.

6. Independent Claim 1

Petitioner sets forth similar arguments for independent claim 1 as for claim 14. *See* Pet. 30–31. Patent Owner raises similar arguments for limitation 1[d] as for limitations 14[d] and 7[d]. Prelim. Resp. 26–27. We find these arguments unavailing at this stage for similar reasons as we describe above. Patent Owner also raises similar arguments for limitation 1[e] as for limitation 7[e]. Prelim. Resp. 27–28. We have similar concerns with Petitioner's rationale to combine arguments for this limitation as with limitation 7[e]. *See* Pet. 31. Because we have doubts about Petitioner's

rationale to combine Sauk with Clement at this stage, we leave for trial the issue of whether claim 1 would have been obvious over the combination of Clement, Osman, and Sauk.

7. Dependent Claims 3, 4, 6, 8–10, and 15–19

Petitioner contends that dependent claim 3, 4, 6, 8–10, and 15–19 would have been obvious over the combination of Clement, Osman, and Sauk. Pet. 24–27, 28–30, 31–35. Patent Owner does not specifically contest these claims at this stage. Prelim. Resp. 14, 26, 28. We leave for trial the issue of whether Petitioner establishes that the combination of Clement, Osman, and Sauk would have rendered obvious claims 3, 4, 6, 8–10, and 15–19.

F. Asserted Obviousness over Lyren and Reif

Petitioner contends that claims 1–20 would have been obvious over the combination of Lyren and Reif. Pet. 35–64.

1. Overview of Lyren

Lyren is the publication of the earliest application to which the '179 patent claims priority. Cf. Ex. 1008, with Ex. 1001, code (63). As such, the disclosure of Lyren is similar to the '179 patent's disclosure. In fact, Patent Owner asserts that the specifications of Lyren and the '179 patent are identical. Prelim. Resp. 31.

2. Overview of Reif

Reif discloses a virtual reality (VR) system that identifies a bounding box including a safe region. Ex. 1009, code (57). The bounding box encloses an area that allows a user wearing a head mounted display (HMD) to safely view content of a virtual world. *Id.* The VR system identifies the user's location relative to the bounding box and tracks the user's location.

Id. When it is determined that the user is located outside the safe region of the bounding box, the VR system can modify what is presented to the user via the HMD, can warn the user, and/or can suggest that the user move back to the safe region. *Id.*

3. *'179 patent's effective filing date*

Petitioner contends that the '179 patent's priority chain is broken at its immediate parent, Application No. 16/106,140 ("the '140 application," Ex. 1028, 92–191). Pet. 37. As a result, Petitioner contends, the '179 patent's claims are not entitled to the benefit of any date earlier than their actual filing date, so Lyren—the publication of the earliest priority application of the '179 patent—is prior art. *Id.* at 35, 37. Patent Owner disputes this. Prelim. Resp. 28–44.

Petitioner contends that the '140 application does not provide support for claim limitations 1[d]–[e], 7[d]–[e], and 14[d]–[e]—and thus, none of the independent claims are supported. Pet. 37. Referring to these limitations, Petitioner asserts that all of the claims “recite the HMD/WED sensing or determining when the user is leaving the 3D environment, and alerting or warning that user of that fact by reducing the sound’s volume and/or otherwise altering it.” *Id.* Petitioner contends that although the '140 application teaches altering sound “upon detecting various *other* ‘events,’” those “events do not include the user leaving the environment as recited in the independent claims.” *Id.* (citing Ex. 1003 ¶¶ 225–229). Petitioner acknowledges that the '140 application determines a location but argues that it does not disclose using that location “to determine and warn the user that *the user is leaving the virtual environment*, as recited.” *Id.* at 38.

Patent Owner argues that Petitioner erroneously asserts that all the claims are directed to determining when the user is leaving a 3D environment, as only claims 1–6 claim a 3D environment. Prelim. Resp. 34–35. The remaining claims “explicitly recite ‘leaving an environment,’ [] not a *3D environment*,” Patent Owner argues. *Id.* at 35. We highlight this argument here because it is core to the parties’ dispute, and we address more detailed arguments by Patent Owner below.

For the reasons discussed below, we agree with Petitioner at this stage that claim 1 is unsupported by the ’140 application because the ’140 application does not support “sensing . . . when the user leaves the 3D virtual environment” and “warning the user that the user is leaving the 3D virtual environment.” However, Patent Owner’s argument about the term “environment” in other claims may have merit. Petitioner assumes, but does not adequately explain, that all the claims are directed to determining when a user is leaving a “3D” environment, even though claims 7 and 14 refer to an “environment,” not a “3D” environment. Because support for claims 7 and 14 may turn on the meaning of “environment,” which the parties have not construed, we leave for trial the issue of whether claims 7–20 are supported.

a. Claim 1

(1) Limitation 1[d]: sensing, with one or more sensors in the HMD, when the user leaves the 3D virtual environment that includes the virtual image

Petitioner contends that limitation 1[d] is unsupported because “the ’140 application describes shifting from binaural sound to stereo or mono when a user is in a dangerous location *in real life* . . . , not . . . a *virtual environment*.” Pet. 38 (emphasis added) (citing Ex. 1028, 119–120, 146–

147; Ex. 1003 ¶¶ 225–227). Petitioner adds, “the user is not even wearing a HMD or other WED displaying a virtual environment.” *Id.*

Patent Owner argues that the ’140 application does disclose a user wearing a WED that triggers an action when a user leaves an environment. Prelim. Resp. 35. Patent Owner relies on Figure 6 of the ’140 application, which is reproduced below:

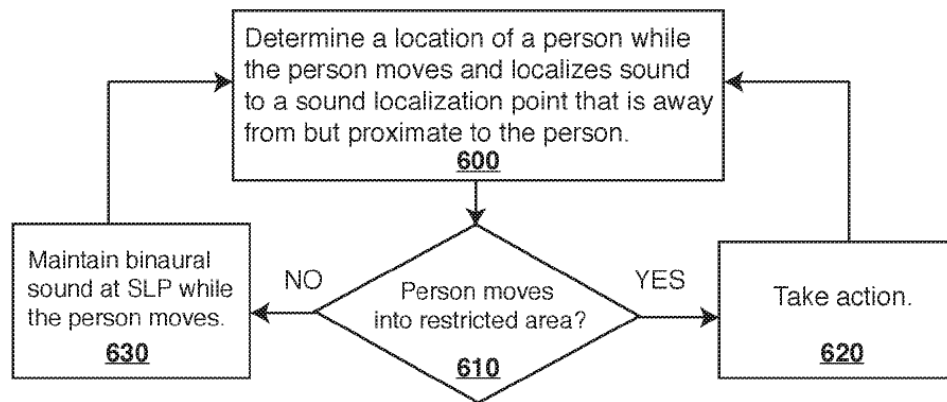


Figure 6

Id.; Ex. 1028, 182. Figure 6 depicts “a method to determine a location of a person and to take an action when the person moves into a restricted area.” Ex. 1028, 119. Block 610 of Figure 6 determines whether a person moves into a restricted area, and if so, takes an action at block 620. *Id.* Patent Owner calls the restricted area an environment and refers to the non-restricted area the user leaves as another environment. Prelim. Resp. 35. Patent Owner asserts that the WED performs the method of Figure 6 because the disclosed “WED 2008 includes sensors 2080, a location tracker 2082, and a sound localization system 2092, which can perform the methods (e.g.,

FIGS. 2-16) described in the specification.” *Id.* (citing ’140 application, 60:7–8, 67:32–71:18).¹³

We agree with Patent Owner that the WED implements the method of Figure 6 but disagree at this stage that Figure 6 supports sensing when the user leaves the type of environment recited in limitation 1[d], which is a “3D virtual environment.” Figure 6 is insufficient to support limitation 1[d] because Figure 6’s “restricted area” is a physical location, not a 3D virtual environment. The ’140 application explains:

Examples of restricted areas include, but are not limited to, an area, a location, or a point that prohibits SLPs or sound localization, an area in which it is dangerous to localize sound, a vehicle, or other location. Examples of such locations include at or near *a construction zone or other inherently dangerous or hazardous area, inside an automobile, on a motorcycle or other motorized vehicle, in a library or a hospital or a sports arena or an elevator or a school or classroom, on a public transport (such as a bus, train, or airplane).*

Ex. 1028, 120 (emphasis added). A construction zone, automobile, motorcycle, library, or hospital, etc., exist in the real world, not a 3D virtual world. Thus, Figure 6 alone does not support limitation 1[d].

Patent Owner also points to other disclosure for the “3D virtual” portion of this limitation. For example, Patent Owner asserts that the ’140 application explicitly describes adjusting binaural sound in response to changes to virtual environments, quoting the following disclosure:

“a change in the ability to detect . . . *position in a physical or a virtual environment*, or a change in the *ability to detect an environment*,” “cues detected in a user’s . . . physical or virtual

¹³ During trial, Patent Owner should cite the appropriate page numbers of Exhibit 1028, not the internal page numbers of the ’140 application itself, for consistency of the record.

environment such as cues indicating a location, position, or orientation, or *a changing in them*, cues indicating . . . a *changing in a physical or virtual environment*,” and “a degradation in the *visibility of a user’s physical or virtual environment*.”

Prelim. Resp. 37 (citing ’140 application, 49:31–50:10, 50:15–20). Patent Owner argues that “a POSITA would clearly understand that the Patentee had possession of the claimed invention because the detectable events that can cause actions (e.g., adjust binaural sounds) as detailed in the ’140 Application include changing between physical and virtual environments.” *Id.* at 38. Patent Owner adds an inherency argument, asserting that “[c]hanging between physical and virtual environments requires a determination that the user is leaving the virtual environment.” *Id.* Thus, Patent Owner concludes, since the WED performs the actions triggered by detected events, “a POSITA would clearly understand that the ’140 Application discloses the WED determining that the user is leaving the 3D [virtual] environment.” *Id.*

We disagree with Patent Owner at this stage. The ’140 application’s disclosure of detecting a “change in” a virtual environment does not disclose a user leaving a 3D virtual environment. *See* Ex. 1028, 141. Instead, the disclosed “change in . . . position in . . . a virtual environment” encompasses detecting a difference in position *within* the virtual environment, not necessarily a user *leaving* a virtual environment. Patent Owner argues that the ’140 application discloses “changing between physical and virtual environments,” but that is not what it says. *See* Prelim. Resp. 38. The ’140 application describes a “change in . . . position *in* a physical or a virtual environment,” not a change *between* environments. *See* Ex. 1028, 141 (emphasis added). Thus, Patent Owner’s further assertion that “[c]hanging

between physical and virtual environments requires a determination that the user is leaving the virtual environment” is untethered from the disclosure of the ’140 application.

Accordingly, although written description support may be inherent in a disclosure, Patent Owner does not persuasively explain at this stage why the cited disclosure necessarily discloses “sensing . . . when the user leaves the 3D virtual environment.” *Nuvo Pharms. (Ireland) Designated Activity Co. v. Dr. Reddy’s Labs. Inc.*, 923 F.3d 1368, 1382–83 (Fed. Cir. 2019) (“[U]nder a narrow set of circumstances, the written description requirement may be satisfied without an explicit disclosure if the claimed features are necessarily inherent in what is expressly described.”). We therefore agree with Petitioner at this stage that limitation 1[d] is not supported by the ’140 application.

(2) Limitation 1[e]: warning the user that the user is leaving the 3D virtual environment

Regarding claim 1’s “warning,” Patent Owner relies on “implicit or inherent” disclosure in the ’140 application. Prelim. Resp. 38 (emphasis omitted). Patent Owner points to Figure 6 as describing “events being triggered based on the user leaving a first environment (e.g., non-restricted area) into a second environment (e.g., restricted).” *Id.* at 38–39. Then, Patent Owner refers to Figure 16 as indicating “that actions, such as altering binaural sound, may be taken in response to detecting an event.” *Id.* at 39 (citing Ex. 2006 ¶ 42). Patent Owner thus asserts that “the user would implicitly be alerted that the user has left the first environment and entered the second environment due to the sound format change.” *Id.*

At this stage, Patent Owner's implicit support argument is unconvincing. As limitation 1[d]'s "sensing . . . when the user leaves the 3D virtual environment" is unsupported on this record, it follows that "warning the user that the user is leaving the 3D virtual environment" is also unsupported. Patent Owner's citation to Figure 16 does not rectify the missing disclosure regarding leaving a 3D virtual environment, as Figure 16 more generically refers to, in Patent Owner's words, "actions, such as altering binaural sound, [that] may be taken in response to detecting an event." *Id.*

Patent Owner further asserts that the '140 application "at least *implicitly* discloses warning or alerting the user that the user is leaving the 3D environment by altering binaural sound in the same way that the Petitioner asserted that Clement and Lyren discloses the same." *Id.* On this point, we disagree with Patent Owner. Patent Owner's analogizing of Petitioner's obviousness arguments to show implicit support is unpersuasive because obviousness is not the standard for written description support. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351–52 (Fed. Cir. 2010). Rather, "the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Id.* Thus, "a description that merely renders the invention obvious does not satisfy the requirement." *Id.* at 1352.

We therefore agree with Petitioner on this record that limitation 1[e] is not supported by the '140 application.

b. Claims 7 and 14

Claims 7 and 14 differ from claim 1 in that they refer to “the environment,” rather than a “3D virtual environment.” As we noted above, Petitioner assumes, but does not adequately explain, that all the claims are directed to determining when a user is leaving a “3D” environment, even though claims 7 and 14 refer merely to an “environment” in limitations 7[d]–[e] and 14[d]–[e]. *See* Pet. 37 (“All of the ’179 patent’s claims . . . recite . . . leaving the 3D environment[.]”). To the extent that “environment” may encompass a physical environment, Patent Owner’s argument regarding Figures 6 and 16, summarized above, may have merit for these claims.

Although the general rule is that the use of two different terms in patent claims implies that they have different meanings, “that implication is overcome where . . . the evidence indicates that the patentee used the two terms interchangeably.” *Baran v. Med. Device Techs., Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010). The omission of “3D virtual” before “environment” in claims 7 and 14 implies that “environment” and “3D virtual environment” may have different meanings. However, claims 7 and 14 also recite displaying “*a virtual image in an environment.*” Ex. 1001, 46:61–62, 48:4–5 (emphasis added). This language may suggest that claim 7 and 14’s environment is actually a virtual environment, meaning that the patentee may have used the terms “environment” and “3D virtual environment” interchangeably. But as neither party has addressed this “virtual image in an environment” language or submitted a proposed construction of “environment,” we leave for trial the issue of whether claims 7 and 14 are supported by the ’140 application. During trial, the parties should construe

the term “environment” and cite relevant support in the specification of the ’179 patent, prosecution history, et., as appropriate.

c. Summary regarding ’179 patent’s effective filing date

At this stage, at least independent claim 1 lacks support to the ’140 application, the immediate parent application to which the ’179 patent claims priority. Accordingly, on this record, we determine that claim 1 and dependent claims 2–6 are entitled only to the ’179 patent’s filing date. Thus, on this record, Lyren and Reif are prior art to at least claims 1–6 of the ’179 patent.

We do not decide at this stage whether claims 7–20 lack support to the ’140 application. For purposes of guiding the parties during trial, however, we apply Lyren and Reif to all of the claims, as if claims 7–20 also lacked support.

4. Claim 14

a. Undisputed limitations

Petitioner asserts that Lyren discloses all the limitations of claim 14 except limitations 14[d] and 14[e]. Pet. 45–51. Petitioner relies on Reif for limitations 14[d] and 14[e]. *Id.* at 49–51.

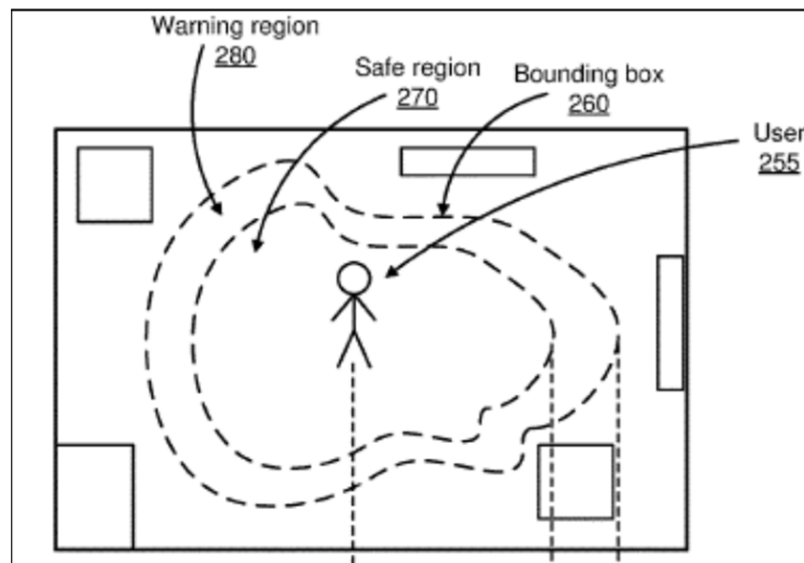
Patent Owner disputes only that one of ordinary skill in the art would have combined Lyren and Reif with respect to limitation 14[e]. Prelim. Resp. 45–46. As Patent Owner concedes that the specifications of Lyren and the ’179 patent are identical, Prelim. Resp. 31, we do not summarize Petitioner’s arguments for the undisputed limitations here.

b. The Proposed Combination

Petitioner concedes that Lyren does not teach limitations 14[d] and [e] but argues that Lyren “does, however, teach determining when ‘a wide

variety of different types of [other] events’ occur, and altering the binaural sound by . . . reducing its volume and/or switching it to stereo or mono.” Pet. 49 (citing Ex. 1008 ¶¶ 25, 63–97, 103). Petitioner contends that Reif discloses the missing limitations and “also explains that a [POSITA] implementing a HMD or other WED for viewing a virtual environment (as in Lyren) would have included such functionality for safety reasons, i.e., to help protect users from injury by bumping or tripping over objects in the real world.” *Id.*

Petitioner refers to Reif Figure 2C,¹⁴ reproduced below:



Id. at 49–50. Reif’s Figure 2C illustrates an example scenario involving bounding box 260, including safe region 270 and warning region 280, within which user 255 is located. Ex. 1009 ¶ 26. Petitioner quotes Reif as teaching: “when it is determined that the user is located outside the safe region of the bounding box, the VR system can modify what is presented to the user via the HMD, can warn the user, and/or can suggest that the user

¹⁴ Petitioner mistakenly refers to this as Fig. 2B. Pet. 50.

move back to the safe region.” Pet. 50 (citing Ex. 1009, code (57), ¶¶ 2–5, 16–19; Ex. 1003 ¶¶ 252–256).¹⁵

Petitioner contends that Reif’s sensors on the user’s HMD are used to determine the user’s location in the real world, and thus the user’s location relative to the bounding box in Figure 2C. *Id.* (citing Ex. 1009 ¶ 33). Petitioner further argues that Reif discloses a warning that a user is leaving the environment, for example, by issuing an audible alert. *Id.* at 50–51 (citing Ex. 1009 ¶¶ 16–18, 36, 39; Ex. 1003 ¶ 254). For the claimed warning, Petitioner also relies on Lyren’s altering of the binaural sound by reducing its volume or switching from stereo to mono sound. *Id.* at 51 (citing Ex. 1008 ¶ 103). In particular, Petitioner contends that a POSITA “would have used these audible alerts/warnings taught in Lyren to alert the user that the user is leaving the safe zone (and thus the virtual environment), as taught by Reif, to help keep users safe.” *Id.* (citing Ex. 1003 ¶¶ 250–263).

One benefit Petitioner proposes to support a rationale to combine is that a POSITA “would have implemented this feature to help protect the users from injury by bumping, hitting, tripping over, etc., real-world objects when moving around while viewing the virtual environment in the HMD (i.e., a type of head-mounted WED).” *Id.* at 43 (citing, e.g., Ex. 1003 ¶¶ 90, 251–254). Petitioner provides additional argument and evidence supporting

¹⁵ Petitioner also discusses Patent Owner’s infringement contentions from the District Court litigation. Pet. 49–50 (citing Ex. 1084). The infringement contentions are not germane to the issue of whether Lyren and Reif would have rendered the claims obvious. *Inter partes* review considers patentability “only on the basis of prior art consisting of patents or printed publications,” not infringement contentions. 35 U.S.C. § 311(b).

a motivation to combine, with a reasonable expectation of success, which we need not address in detail at this stage. *See id.* at 41–45.

Patent Owner argues that “the combination of Lyren and Reif teaches away from alerting the user that the user is leaving the environment by reducing a volume of the binaural sound that localizes from the virtual image and that is being provided to the user.” Prelim. Resp. 45. Patent Owner acknowledges that Reif teaches “gradually decreasing *the opacity of the virtual scene*” displayed as a user travels away from a boundary, but asserts that “Reif never describes using audio cues in the same manner.” *Id.* at 45–46 (citing Ex. 1009 ¶¶ 18, 39). “In contrast,” Patent Owner argues, “Reif mentions *increasing* audio cues to notify a user of his position with respect to a boundary,” so Reif teaches away. *Id.* at 46 (emphasis added). Patent Owner adds that “[i]n fact, Reif never mentions binaural sound or using sound localization effects anywhere in its disclosure.” *Id.*

Petitioner persuades us on this record that one of ordinary skill in the art would have combined Lyren and Reif in the manner proposed, with a reasonable expectation of success. We agree that, in the combination, a POSITA would have implemented Lyren’s audible alerts to alert the user that the user is leaving Reif’s safe zone (and thus the virtual environment) to help keep users safe. Pet. 51 (citing Ex. 1003 ¶¶ 250–263). We also agree with Petitioner’s articulated benefit that the combination would “help protect the users from injury by bumping, hitting, tripping over, etc., real-world objects when moving around while viewing the virtual environment in the HMD (i.e., a type of head-mounted WED).” *Id.* at 43.

We disagree, on this record, that Reif teaches away. Reif’s disclosure of an “audio indication [that] can include a warning beep or a voice

message” does not teach away from using Lyren’s altering of binaural sound by reducing its volume and/or switching it to stereo or mono. *See* Ex. 1009 ¶ 39. In the very next sentence after describing the warning beep, Reif explains that “it should be appreciated that many variations are possible.” *Id.* Reif therefore does not “criticize, discredit, or otherwise discourage” the proposed modification, as would be required for a finding of teaching away. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Not only that, but Patent Owner’s statement that “Reif never mentions binaural sound or using sound localization effects anywhere in its disclosure” also cuts against Patent Owner’s teaching away argument. Prelim. Resp. 46. If Reif never mentions binaural sound, it is unlikely that Reif criticizes, discredits, or otherwise discourages binaural sound. *See Fulton*, 391 F.3d at 1201.

c. Summary as to Claim 14

Assuming that Lyren is prior art, as explained above, Petitioner’s arguments that claim 14 would have been obvious over the combination of Lyren and Reif would be persuasive based on the current record.

8. Independent Claims 1 and 7

Petitioner sets forth similar arguments for independent claim 1 as for claim 14. *See* Pet. 56, 59–60. Patent Owner raises similar arguments as with claim 14. Prelim. Resp. 46–50. Accordingly, Petitioner persuades us that there is a reasonable likelihood that claim 1 would have been obvious over the combination of Lyren and Reif, and, assuming that Lyren is prior art, Petitioner’s arguments regarding claim 7 would be persuasive based on the current record.

9. *Dependent Claims 2–6, 8–13, and 15–20*

Petitioner contends that dependent claim 2–6, 8–13, and 15–20 would have been obvious over the combination of Lyren and Reif. Pet. 52–64. Patent Owner does not contest these claims at this stage. We leave for trial the issue of whether Petitioner establishes that the combination of Lyren and Reif would have rendered obvious claims 2–6, 8–13, and 15–20.

IV. CONCLUSION

At this stage of the proceeding, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its challenges as to at least one challenged claim. At this preliminary stage, we have not made a final determination as to the patentability of the challenged claims or any underlying factual and legal issues.

V. ORDER

It is, therefore,

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of all challenged claims of the '179 patent is instituted with respect to all grounds of unpatentability set forth in the Petition; and

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

IPR2023-01019
Patent 10,368,179 B1

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