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

PATENT OWNER'S SUR-REPLY UNDER C.F.R. § 42.23

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2004	Lex Machina, Patent Cases (All Judges) Time to Trial, U.S. District Court for the Western District of Texas, September 9, 2023
2005	Lex Machina, Patent Cases (Judge Alan D. Albright) Time to Trial, U.S. District Court for the Western District of Texas, September 9, 2023
2006	Declaration of Dr. Durand R. Begault regarding U.S. Patent Nos. 10,368,179 and 10,448,184 (September 14, 2023) ("Begault")
2007	Curriculum Vitae (CV) of Dr. Durand R. Begault
2008	Defendant's Final Invalidity Contentions, Ex. E-10, October 18, 2023
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2011	Defendant's Final Invalidity Contentions, Ex. F-09, October 18, 2023
2012	Declaration of Dr. Durand R. Begault regarding U.S. Patent Nos. 10,368,179 and 10,448,184 in support of Patent Owner's Response (April 2, 2024) ("Begault Supp.")
2013	Curriculum Vitae (CV) of Dr. Durand R. Begault (updated)
2014	Deposition transcript of Dr. Agnieska Roginska, taken on February 27, 2024 ("Roginska Depo.")
2015	Excerpt from Merriam Webster's Dictionary, available at https://www.merriam-webster.com/dictionary/environment, accessed March 11, 2024

I. INTRODUCTION

The challenged claims of the '179 Patent[1] are not rendered obvious by any of the Grounds in the Petition. Faced with PO's positions, Petitioner resorts to fabricating non-existent disclosure in the prior art—"Relevance Signal" that appears nowhere in Sauk and "automatic determination of relevance" that appears nowhere in Clement—and fabricating a non-existent legal standard for written description—requiring a "that a POSITA would alter Figure 6 in the precise way PO proposes to try to match the claims" in contrast to the correct legal standard of whether the disclosure "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date". Petitioner's arguments fail and thus the challenged claims should be upheld.

II. CLAIM CONSTRUCTIONS

A. "Environment"

The Board should adopt the claim constructions for the terms "environment" and "3D virtual environment" provided in the POR. POR.8-12. While Petitioner asserts that PO is "try[ing] to manufacture written description support," no such manufacturing is required. Regardless of how "environment" and "3D virtual environment" are construed, the parent application provides ample written description support for generating a warning/alert based on when the user leaves the

[1] Patent Owner uses the same abbreviations as in the Response.

3D virtual environment, the physical environment, or the augmented reality environment, as will be discussed in additional detail in Section IV.A. below.

Petitioner erroneously suggests that Dr. Begault provides conflicting positions. Reply.4. As Dr. Begault described in his declaration, leaving the environment is an "external condition" "relative to the respective environment." Ex. 2006¶¶13-14. In his deposition, Dr. Begault further clarified that the leaving operation of the user is in a physical environment, while there may also be an associated virtual environment. Ex. 1147:126 8-17. Indeed, that is precisely what is disclosed in the '179 Patent.

B. "3D virtual environment"

As established in the POR, the term "3D virtual environment" in independent claim 1 and associated dependent claims should be construed to mean "three-dimensional perceived surroundings in which a user operates that incorporates a virtual image and/or sound." Petitioner erroneously states that PO suggests "a 3D sound-only environment." Reply 6. However, PO has never suggested that the current claims could be a "sound-only environment." Indeed, claim 1 recites inclusion of a virtual image. Instead, PO's construction acknowledges that the 3D virtual aspects of the environment may be a 3D binaural audio soundscape, as described in the specification and acknowledged by Petitioner's expert. '179 Patent, 2:40-46; *see also* Roginska Depo. (Ex. 2014), 176:3-6.

As recited by claim 1, the virtual image is also included in the 3D virtual environment, but absent this recitation, the 3D virtual environment need not include any visual representation, let alone visual immersion, as previously suggested by Petitioner.

C. "Determining, with the WED, when the user is leaving the environment"

The phrase, "determining, with the WED, when the user is leaving the environment" in claims 7 and 14, when construed consistently with its plain and ordinary meaning as well as the intrinsic and extrinsic record, means "determining, with the WED and independent of a stationary tracking device, when the user is leaving the environment." Petitioner's citation to the specification, which supports the WED "*can* be used to determine whether a user is leaving the environment," (Reply.6), actually supports PO's position. The specification never mentions the use of external devices to determine when the user is leaving the environment. Thus, contrary to Petitioner's argument, PO's construction of this limitation as meaning "determining, with the WED and independent of a stationary tracking device, when the user is leaving the environment" is consistent with the intrinsic record as a whole. '179 Patent, 39:9-12, 39:25-48, 40:7-15; *see also* Figure 20.

III. GROUND 1 – THE HYPOTHETICAL COMBINATION DOES NOT ESTABLISH A *PRIMA FACIE* CASE OF OBVIOUSNESS

A. A POSITA Would Not Have Combined Clement and Osman with Sauk

There is no motivation to combine Clement and Osman with Sauk because the combination would frustrate the purpose of Sauk, as already recognized by the Board. Faced with this deficiency, Petitioner fabricates disclosure in Sauk regarding a "Relevance Signal"—a term that does not appear anywhere in any reference at issue.

Petitioner refers to a non-existent "Relevance Signal" to argue that Sauk teaches "switching sounds from binaural to mono/stereo as the user leaves the environment and the environment becomes less relevant to provide additional layers of warning and ensure user safety." Reply.8-9. Sauk never mentions a "Relevance Signal;" Petitioner's argument is based on disclosure that simply does not exist in either Clement or Sauk. Indeed, the "Selective Relevance Mode" of Sauk merely allows a user to ***predefine*** separate binaural audio environments for certain other users that the user considers relevant. Sauk, 11:25-66.

And, neither Clement nor Sauk teach that a user leaving an environment would "necessarily" render the audio experienced by the user in the environment as less relevant. *Cf.* Reply.8. Clement is silent regarding whether the virtual environment's sound would be "less relevant" when a user leaves the environment

and thus Petitioner's reliance on "Clement's disclosure of automatic determination of relevance by detecting that the user is leaving the environment" simply fails. Reply.14.[2]

Petitioner mistakenly maintains that Sauk teaches a binaural to non-binaural shift "as certain sounds become less relevant to the user." Pet. 10; *see also* Reply.7. As established in the POR, Sauk simply does not teach or suggest such dynamic relevancy resulting in dynamic transitions from formerly binaural audio to non-binaural audio. POR.18-21. As the mode's name suggests, Sauk's "Selective Relevance Mode" requires ***pre-determined user selection*** of relevant audio. Sauk 11:34-38 ("a ***user*** could change the less relevant audio").[3] There is no teaching or suggestion that relevancy dynamically changes based on the user's position,

[2] This is an improper new argument raised for the first time in Petitioner's reply. The Petition does not contain any argument that Clement discloses an "automatic determination of relevance," perhaps because Clement does not once mention the term relevancy or any associated word. Indeed, in Clement the transition is not a function of determined relevancy to a user; instead it is based upon "discrepancies in the immersive experience and disorientation" that may be caused by user movement. Clement, 2:50-55.

[3] Unless otherwise noted, all emphasis is added.

resulting in formerly relevant audio (binaurally-presented) subsequently being presented in a non-binaural format. Instead, Sauk explains that "the binaural audio environments are defined for each ***predetermined group of users***" and "***[t]hereafter*** each BSS 400 can use received metadata to determine a group of a user from which enunciated data originated [where] enunciated data received from various users within a user's predetermined group ***will be presented*** in a binaural format." Sauk 11:42-53. To the contrary, Sauk suggests that locations other than the user's location could be extremely relevant. For example, Sauk discloses drawing a soldier on the street to a sniper's location on the roof, using additive binaural virtual alerts. *Id.,* 13:13-26. There is simply no teaching or suggestion that a user leaving an environment would be determined to render the audio less relevant, much less how Sauk would handle such a scenario.

Petitioner's position stacks a series of assumptions upon a faulty foundation, namely that to alert/warn the user that he/she is leaving the environment:

1. a POSITA would *ignore* the "Alert and Warnings" section of Sauk, and, instead
2. look to Sauk's Selective Relevance Mode that discloses changing the audio format of the virtual audio into stereo/mono *assuming*

3. the user predefines the event of leaving the environment as being irrelevant, and
4. while also fading out the virtual audio and fading in the ambient audio as described by Clement.

This is completely unsupported and Petitioner's argument fails.

In addition, a POSITA would not combine either the Selective Relevance mode or the Hazard Alerts of Sauk, alone or together, with Clement and Osman to arrive at the claimed limitations. Indeed, as established by Petitioner, Clement's "end" is to provide "a 'smooth, or graceful, transition… from the virtual world to the real world." Pet. 7-8 (citing Clement (Ex. 1005) at 2:43-63). Petitioner concedes that "Once the user completes the transition and is outside the virtual area, the ***user will no longer see or hear images or sounds from the virtual environment and will be left with***, for instance a transparent display and ***actual sounds from the real world***." *Id.*

Sauk's Selective Relevance Mode, however, retains less relevant audio, which clearly ***teaches away*** from the Petitioner's conceded goals and solution of Clement as stated above. Sauk, 11:29-31 ("a user may not want to eliminate all background audio information").

Petitioner, for the first time, suggests that Sauk's Selective Relevance Mode could be added to its Hazard Alert (which, as established, is a binaural alert that

provides locational awareness), resulting in less relevant audio being switched to stereo or mono to remove distraction ***and*** an additive binaural alert to help the user focus on avoiding hazards. Reply.9-10. This additive binaural alert is not present in any of the claims, which each require altering the binaural audio experienced by the user, and is thus irrelevant.

Even if there were any suggestion in Sauk to add its Selective Relevance Mode with its Hazard Alert, it would frustrate the disclosure in Clement that all virtual world distractions are removed when the transition out of the virtual world is complete: "at or before the user electronic device reaches the boundary." Clement 1:58-59; *see also* Pet. 8. In contrast to Petitioner's new position, retaining virtual sound via Sauk's Selective Relevance Mode would actually result in less effective transition into the real world under Clement with potentially more distractions.

Therefore, the Petitioner has failed to "articulate specific reasoning, *based on evidence of record*, to support the legal conclusion of obviousness." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380-81 (Fed. Cir. 2016).

B. The Combined Art Fails to Disclose or Teach the Invention as Claimed

Further, even if the provided combination were proper (it is not), Petitioner has not met its burden to demonstrate unpatentability. Indeed, as established, the

cited combination fails to disclose all limitations of the current claims and, thus, is clearly deficient.

1. Clement and Sauk fail to teach alerting the user that the user is leaving the environment by reducing a volume of the binaural sound of limitation 14[e].

Petitioner asserts the Petition does not depend on Sauk for claim 14 (Reply.11) but previously presented arguments for limitation 14[e] that rely only on a combination of Clement and Sauk. Pet.23 (citing *only* Clement and Sauk in section discussing limitation 14[e]). Petitioner now asserts that the combination of Clement with Osman teaches limitation 14[e]. Reply.11 Petitioner's "entirely new rationale" raised for the first time in Reply should be rejected. *See Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369-70 (Fed. Cir. 2016) ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim … A reply may only respond to arguments raised in the corresponding opposition or patent owner response.").

Even if considered, there is no motivation to combine Clement with Sauk to teach alerting the user is leaving the environment by altering the binaural sound, as established above. In contrast, Sauk's disclosure that in "Selective Relevance Mode," the "decibel level of the 1-D, 2-D or 3-D audio can be adjusted ***to whatever the listener desires*** for that dimension" (Sauk, 11:26-41) is clearly limited to the

user's pre-selected preferences for audio and does not teach or suggest reducing the "decibel level" as an alert or warning. *Compare* Pet.23-24, and Roginska, ¶167, *with* Begault Supp., ¶98. Petitioner has not carried its burden regarding how a user-defined format for specific types of audio would be dynamically applied to a situation, such as leaving a virtual world as provided in Clement.[4]

2. Clement fails to teach determining, *with a wearable electronic device (WED)/with sensors in the HMD*, when a user is leaving an environment of limitations 1[d], 7[d], and 14[d].

As established previously, the term "determining, with a wearable electronic device (WED), when a user is leaving an environment" when construed consistently with the entire intrinsic record means "determining, with the WED and independent of a stationary tracking device, when the user is leaving the environment." In view of this, Petitioner fails to establish that a skilled artisan could have made the claimed invention based on the disclosure of Clement, which nowhere describes how its HMD could determine—without the use of the stationary tracking device in Clement—when a user is leaving an environment.

Petitioner and its expert asserted that a POSITA would have known how to use an HMD to make this determination but fail to account for the tracking area 320

[4] For similar reasons, Petitioner has failed to carry its burden regarding claim 8, which also requires reducing the volume of the audio provided to the user.

defined within Clement. Reply.12. That is, Petitioner asserts that sensors and tracking techniques implemented by HMDs were known to POSITAs and thus a POSITA would use these techniques in view of Clement's system. However, Petitioner fails to recognize that the tracking area 320 of Clement is defined by a field of view and range of *the tracking device 310*. Clement, 4:26-29. As such, even if the HMD's sensors and tracking techniques were known to POSITAs, Petitioner never indicates how POSITAs would determine the user's proximity to the boundary of the tracking area 320 without the use of the tracking device 310.

Notably, Petitioner's expert Dr. Roginska testified that the "crucial disclosure" is Clement's teaching that an HMD is capable of locating and tracking the user because the camera 180 of the HMD 100 may detect the proximity to the boundary of the tracking area. Roginska Suppl.¶99 citing Clement 7:7-16. In this "crucial disclosure," however, Clement still depends on the tracking area 320 as defined by the tracking device 310 to define the boundary. The sensors of the HMD in Clement are only able to detect a proximity to *physical boundaries of the tracking area 320*—not an *invisible boundary* defined by a separate tracking device. Clement, 3:30-33 and 54-57.

As such, while a POSITA may know to use the data from the tracking device 310 and the camera 180 to determine the user's proximity to the tracking area 320, a POSITA, in view of Clement's tracking device 310 and tracking area 320, would

not know how to define the boundary of the "environment" without the tracking device 310, and thus could not independently detect that the user was leaving the environment *with the WED*.

Contrary to Petitioner's argument (Reply.13), the '179 Patent is not silent on how to accomplish this limitation. Indeed, the specification discloses an example in which an electronic device monitors a position of a person using a camera, GPS, or other sensors, and thus self-detects the position of the user within the environment. '179 Patent, 8:47-9:42. Moreover, the '179 Patent expressly teaches that the WED includes a location tracker that tracks activity of user and if the tracked data corresponds to an event, the electronic device changes binaural sound. *See* '179 Patent, 40:7-15, 24-41.

Petitioner's attempts to provide support for its position based on additional references not mentioned in the Petition are improper. *Intelligent Bio-Sys., Inc.*, 821 F.3d at 1369-70 ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim"). Nevertheless, even if considered, Petitioner's reliance on both of these references is misplaced:

- Pedrotti—like Clement—relies on an external stationary base station to determine a position and orientation of an HMD. Pedrotti establishes a

"safe area" where trackers are used to determine a position and orientation of an HMD and/or the handheld controller *relative to a stationary base station*, "by, for example, sensing an electromagnetic field generated from a local base station, video game console or other apparatus (not shown)." *See* Pedrotti (Ex.1080), 4:49-54 and 5:29-34.

- Donner is unconcerned with detecting a position of a user relative to an environment and instead focuses on accommodating for user's head motion while presenting VR scenes. Donner (Ex.1150), ¶3. Donner fails to establish how the disclosed sensors (e.g., gyroscope, magnetometer) would independently detect the location of the user relative to the tracking area 320 defined by the tracking device 310. *See* Donner (Ex.1150), ¶¶13; 27-28.

Accordingly, Petitioner fails to provide any supporting evidence to enable a POSITA to use Clement's HMD *without the separate tracking device* to determine when the user is leaving the environment.

As a result, Clement is inoperable as a prior art reference to teach "determining, *with the WED*, when the user is leaving the environment," as recited in limitation 14[d] and 7[d].

3. Clement and Sauk fail to teach alerting a user by filtering/degrading binaural sound/audio cues to prevent external localization of the binaural sound of limitations 1[e] and 7[e].

Even if combined, Clement and Sauk do not teach alerting a user by *degrading audio cues to prevent the user from experiencing localization*. Indeed, altering the audio cues to prevent the user from experiencing external localization would frustrate the purpose of Sauk because Sauk focuses on ***providing localization*** 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. Sauk, 12:33-51. As established above, there is no "Relevance Signal" in Sauk and Sauk's Selective Relevance Mode, even if combined with Clement, would not result in degrading audio cues to prevent external localization as an alert that the user is leaving the environment. Neither Clement nor Sauk teach or disclose that the audio of the environment is less relevant when the user is leaving the environment, which is the only basis disclosed in Sauk to switch the audio from binaural to mono/stereo.

Indeed, Petitioner has presented no objective evidence that a POSITA would be motivated to degrade or remove localization to provide a notification to the user—much less an alert/warning—that the transition process of Clement is initiated. Since neither Clement nor Sauk describes degrading audio to provide an alert or warning, a POSITA would only be motivated to combine the alert options available in Sauk

to add new externalized binaural alerts to enable the user to experience localized warnings related to leaving the environment, which is the opposite of altering binaural sound to prevent the user from experiencing localization. Decision, 21; Begault, ¶39. Even if Sauk's Selective Relevance Mode were considered, it requires the user to input a predefined determination of relevancy, and thus does not disclose this limitation.

4. Claims 10, 15-19

Petitioner asserts that its Petition relies on Clement's disclosure of "automatic determination of relevance by detecting that the user is leaving the environment." Reply.14. As already established, however, Clement makes no such automatic determination. Indeed, Dr. Rogniska fails to provide any evidence that leaving the environment in Clement would cause the binaural audio to be considered irrelevant and change to stereo/mono, as opposed to the additive buzz or fade out taught by Clement. There is nothing in Clement or Sauk that suggests the desirability of modifying virtual audio in Clement to stereo/mono.

5. Claims 4, 6, 9

With regard to claims 4, 6, and 9 that require switching the binaural sound to stereo sound based on the visibility of the virtual image, Petitioner argues that although Sauk uses *binaural sound* for group members that are out of sight, this

disclosure of Sauk is not related to a "virtual image" and attempts to explain that virtual images in games, as described in Osman, become irrelevant when they disappear. Reply.16.

While Dr. Roginska argues that a POSITA would determine that virtual images not in view are less relevant relative to sounds related to images that are in view (Rogniska Suppl.¶65), she disregards Osman's disclosure of using "a good HRTF model" to "greatly improve the accuracy of sound localization for objects *outside the field of display*" for "virtual objects" during game play. Reply.16-17, Osman (Ex.1006), 6:54-7:33. Indeed, Petitioner merely asserts that images that are not in view are less relevant and ignores the teachings of both Sauk and Osman that binaural sound should be maintained for objects when out of view.

6. Claim 3

Claim 3 requires warning when the user is leaving a virtual area where the virtual image is located while remaining in the 3D virtual environment. Contrary to Petitioner's assertion (Reply.17), PO attacks Clement in view of the references on the record, as opposed to the references (Jang and "Second Life") that Petitioner improperly attempts to bring in through its expert. 37 C.F.R. § 42.104(b)(2); *See* POR.44-45.

IV. GROUND 2 – LYREN IS INVALID PRIOR ART

Petitioner's Ground 2 position that the '140 Application does not satisfy the written description requirement relies on disingenuous interpretations of caselaw and is belied by the clear disclosure in the specification. Pet.37; POR.36-52.

A. All Claims Are Supported by the '140 Application

While Petitioner makes much of "implicit" disclosure, asserting that it is insufficient "as a matter of law" (Reply.18), the Manual of Patent Examining Procedure clearly states that there is no *in haec verba* requirement for written description, and the claims may be supported in the specification "through express, implicit, or inherent disclosure." M.P.E.P. 2163.I.B. *Novartis*, relied upon by Petitioner, does not conflict with this standard, and indeed repeats that a limitation "need not be recited in the specification *in haec verba*." *Novartis Pharms. Corp. v. Accord Healthcare, Inc.*, 38 F.4th 1013, 1017 (Fed. Cir. 2022). In *Novartis*, the court recognized that the "written description requirement may be satisfied" by inherent disclosure, even silence: "For example, if the record established that in a particular field, the absence of mention of a limitation necessarily excluded that limitation, written description could be satisfied despite the specification's silence." *Id.* at 1017. In contrast, here, the claims involve positive limitations, not negative, where both express and inherent disclosure "reasonably conveys to those skilled in the art

that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351–52 (Fed. Cir. 2010).

1. Warning the User that the User is Leaving the Environment/ 3D Virtual Environment

As established, the '140 Application provides multiple examples and disclosures in which a POSITA would recognize a description of the claimed subject matter related to alerting or warning the user that the user is leaving the environment/3D virtual environment by reducing the binaural sound's volume or otherwise altering it. POR.48-60. When describing Figure 6, the '140 Application expressly states that, at block 600, the user starts in an environment where "sound [is localized] to a sound localization point that is away from but proximate to the person," or a 3D virtual environment. Ex.1028, 119:21-23. When the user moves into a restricted area, or "an area, location, or a point that prohibits SLPs," an event is detected, which causes the audio to alter the 3D sound being experienced by the user. *Id.*, 119:21-32. Thus, when the user leaves one physical environment (i.e., the non-restricted area) and moves into another physical environment (i.e., the restricted area) the user is alerted by the change in the 3D sound being provided by the user. Begault Supp., ¶52.

The '140 Application also discloses that "[e]xamples herein can take place in physical spaces, in computer rendered spaces (VR), in partially computer rendered

spaces (AR), and in combinations thereof." *Id*. at 168:15-16; *see also* POR.54. In light of this clear disclosure regarding the examples disclosed in the '140 Application, Petitioner asserts "there is no suggestion of the specific claimed combination nor that a POSITA would alter Figure 6 in the precise way PO proposes to try to match the claims." Reply.22. This, however, is not the legal standard for written description. The legal standard is whether the disclosure "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms.*, 598 F.3d at 1351-52.

Faced with this, Petitioner attempts to dismiss this disclosure, equating it to boilerplate language. Reply.22. Petitioner's attempt fails, however, because the language in the '140 Application is not boilerplate, unlike the generic, non-substantive elements provided in *D Three Enters., LLC v. SunModo Corp.*, 890 F.3d 1042 (Fed. Cir. 2018). The language in *D Three* is clearly non-specific boilerplate: "[PHOSITAs] will recognize certain modifications, permutations, additions and sub-combinations therefore. It is therefore intended that the following appended claims hereinafter introduced re interpreted to include all such modifications, permutations, additions and sub-combinations are within their true sprit [sic] and scope." *Id.* at 1050-51. This language does not provide any actual alternatives to be applied. In contrast, the language in the '140 Application provides particular

alternative environments (e.g., physical, VR, and AR) in which the examples extensively described throughout the specification can be applied.

The Federal Circuit has distinguished such broadening statements from boilerplate and found such statements sufficient for written description support. *See, e.g., Northrup Grumman Corp. v. Intel Corp.*, 325 F.2d 1346, 1356 (Fed. Cir. 2003) (rejecting defendant's argument that patentee was relying upon mere boilerplate that "the present invention may be made to conform to any one of a variety of data transfer algorithms" and instead found that the patent provided "substantive, albeit general, support for the declared intention" of a broad application); *Honeywell Int'l., Inc. v. U.S.*, 609 F.3d 1292, 1301 (Fed. Cir. 2010) (finding the specification sufficiently disclosed the claimed subject matter regarding cockpit displays, citing language in the original application that expressly included CRTs "or other display transducers" and a broadening statement that "[w]hile specific configurations of the local display . . . have been described, it is understood that the present invention can be applied to a wide variety of display and vision aid devices"); *DealerTrack, Inc. v. Huber*, 674 F.3d 1315, 1321 (Fed. Cir. 2012) (relying on a statement in the specification providing specific examples of communications media tailored to the claimed invention as sufficient to support a claim construction of "communications media" that included the internet).

Here, the statement that "[e]xamples herein can take place in physical spaces, in computer rendered spaces (VR), in partially computer rendered spaces (AR), and in combinations thereof" is a broadening statement that provides specific applications for the examples disclosed in the '140 Application. A POSITA would recognize this statement as disclosing that the examples provided in the '140 Application could take place in any of these environments and thus is substantive disclosure, not meaningless boilerplate that can be ignored. Begault Supp., ¶55.

Thus, while Petitioner makes much of its claim construction issue, it is a red herring: the claim language is supported regardless of whether the term "environment" in claims 7 and 14 is interpreted to mean "physical environment" or "physical environment and 3D virtual environment." For the same reason, the claim language in claim 1 that the user is leaving a "3D virtual environment" is likewise supported.

2. Warning/Alerting the User by Altering Binaural Sound and/or Reducing/Lowering the Volume of Sound

Further, the '140 Application explicitly discloses that the warning/alert may occur by altering binaural sound and reducing/lowering the volume of such sound. The '140 Application discloses that "example actions include, but are not limited to, ***one or more of switch the sound from binaural sound to stereo sound***, switch the sound from binaural sound to mono sound, … lower a volume of the sound" (Ex.

1028, 115:31-116-1;116:4) and that "different volumes" of the sound may accompany the binaural switching (Ex. 1028, 108:14). Thus, contrary to Petitioner's argument, there is express disclosure of lowering/reducing the volume of the binaural sound, which may be combined with an alteration to binaural sound. *Cf.* Reply.19.

In addition, PO has already established that lowering/reducing the volume in combination with an alteration to binaural sound would alert or warn the user that the user is leaving the environment/3D virtual environment. POR.59-60; Begault Supp., ¶¶33, 51, 59-60; 62. The '140 Application discloses that an "alert is an audible alert and/or a visual alert to a person" and "include, but are not limited to, one or more of displaying a visual warning, providing an audible sound … displaying a visual or perceivable indication or warning … and providing another indication that notifies a user." Ex. 1028, 136:3-10; *see also id.*, 138:24-27; POR.51-52. Petitioner's citation to Dr. Begault's deposition (Reply.19) mischaracterizes his testimony and takes it out of context. Ex. 1147, 86:22-87:17. In his declaration, Dr. Begault testified that the "adjustments in binaural sound … would implicitly alert or warn the user that the user is leaving the physical environment … or 3D virtual environment" and described how a POSITA would understand how the changes in the sound would "effect an alert" to the user. Begault Supp. ¶59, ¶¶64-80. Thus, contrary to Petitioner's assertion, the disclosure in the '140 Application

regarding the changes in binaural sound to mono or stereo would provide an alert/warning to a user.

3. Determining/Sensing, with the WED/HMD, when the user is leaving the physical environment or 3D virtual environment

The '140 Application also discloses that the WED determines when the user is leaving the physical environment, as required by claims 7 and 14, and the HMD determines when the user is leaving the 3D virtual environment, as required by claim 1. The detection of the event triggering the change in audio is based on the physical location of the user, as can be tracked via a location and movement tracker of the WED/HMD. *See id*., 120:20-27.

The '140 Application specifically discloses that "[b]locks and/or methods discussed herein can be executed and/or made by … an electronic device" (167:9-14) and expressly includes "***wearable electronic devices***" and "other portable and non-portable electronic devices" as an "electronic device" (159:5-16). A POSITA would clearly understand that the embodiments described in the '140 Application may be implemented with the WED (claims 7 and 14) or HMD (claim 1). Begault Supp., ¶¶56, 62. Moreover, since the WED is a type of electronic device described as executing actions triggered by the detected events of the '140 Application, a POSITA would clearly understand that the '140 Application "reasonably conveys" the WED determining that the user is leaving the physical environment and/or

leaving the 3D virtual environment. *Id*.; *Ariad Pharms.*, 598 F.3d at 1351-52; Begault Supp., ¶¶62, 70.

Again, faced with the clear disclosure in the specification, Petitioner resorts to denigrating such disclosure by mischaracterizing it as boilerplate. Reply.25. As before, the language relied upon by PO that expressly discloses wearable electronic devices as the type of electronic devices that can be used to execute the methods and examples disclosed in the '140 Application is not boilerplate but instead broadening statements that specifically relate to the examples. Indeed, contrary to Petitioner's argument, the disclosure describing Alice moving from a non-restricted area to a restricted area and the resulting change in audio from 3D sound to mono sound supports this claim limitation. While this example describes Alice wearing headphones, other examples of "electronic devices" disclosed in the '140 Application include a WED, as established above. The '140 Application expressly provides that the "[e]xamples herein can take place in physical spaces, in computer rendered spaces (VR), in partially computer rendered spaces (AR), and in combinations thereof." Thus Alice's WED may include a visual image (for example in an AR context), determine when Alice is leaving the non-restricted area for the restricted area, and alert Alice by the change in the 3D sound.

The '140 Application also discloses an example where the user is wearing a WED and experiences visual images:

> In scenario 114, a user wears an optical head mounted display (OMHD) that simultaneously provides a plurality of sound localization points during a conference call with four individuals (each individual being represented with a visual image and accompanying SLP). As such, the sound localization points coincide with visual displays or images of people with whom the user talks.

103:21-36 (reference numbers omitted). This scenario 114, taken with the disclosure regarding Figure 6, which describes altering the audio being experienced by the user upon detection the user is moving into a restricted area (119:21-23, 25-32), reasonably conveys to a POSITA that the inventors had possession of the claimed invention. *See also* '140 Application, 170:21-22 ("[M]ethods discussed within different figures can be added to or exchanged with methods in other figures.").

Therefore, in contrast to Petitioner's assertion that the '140 Application "lacks any disclosure" to support the claim language, the cited examples and portions of the '140 Application "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms.*, 598 F.3d at 1351-52; Begault Supp., ¶¶62, 70.

Accordingly, the '179 Patent maintains the priority chain to the '140 Application, which includes the same specification as Lyren. Therefore, the '179 Patent maintains the priority chain to Lyren, and Lyren is not valid prior art with respect to the '179 Patent. Thus, Ground 2 fails.

V. CONCLUSION

For the reasons above, Petitioner's proposed grounds of unpatentability fail. Thus, Patent Owner asks the Board to find all challenged claims patentable.

Date: August 7, 2024

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), the undersigned hereby certifies that the foregoing Patent Owner's Sur-Reply Under C.F.R. § 42.23 contains 5,545 words using the word count feature of Microsoft Word.

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §42.6(e), the undersigned hereby certifies that the above-captioned Patent Owner's Sur-Reply Under C.F.R. § 42.23, and its cited exhibits, were served via electronic mail, as authorized by Petitioner's Mandatory Notices, on August 7, 2024 at the following email correspondence addresses of record:

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