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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VALVE CORPORATION,
Petitioner

v.

IMMERSION CORPORATION,
Patent Owner

Case No. IPR2024-00557

Patent No. 10,665,067

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,665,067
1002	Prosecution History of U.S. Patent No. 10,665,067
1003	Declaration of Gregory Welch
1004	CV of Gregory Welch
1005	Plaintiff’s Preliminary Infringement Contentions, <i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-00712 (W.D. Wash.) (served Oct. 20, 2023)
1006	Exhibit F to Plaintiff’s Preliminary Infringement Contentions, <i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-00712 (W.D. Wash.) (served Oct. 20, 2023)
1007	Amended Joint Status Report and Discovery Plan, <i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-00712, Dkt No. 42 (W.D. Wash) (filed Oct. 18, 2023)
1008	U.S. Patent Appl. Publ. No. 2018/0144549 (“Gonzales”)
1009	U.S. Patent Appl. Publ. No. 2016/0274662 (“Rimon”)
1010	U.S. Patent Appl. Publ. No. 2017/0354864 (“Rogers”)
1011	U.S. Patent Appl. Publ. No. 2017/0108930 (“Banerjee”)
1012	U.S. Patent Appl. Publ. No. 2012/0045742 (“Meglan”)
1013	Ronald T. Azuma, “A survey of augmented reality,” <i>Presence: Teleoperators and Virtual Environments</i> , vol. 6, no.4, pp.355 –385, August, 1997 (“Azuma”)
1014	Carmigniani <i>et al.</i> , “Augmented reality technologies, systems and applications,” <i>Multimedia Tools and Applications</i> (2011) 51:341–377, (“Carmigniani”)
1015	Araujo <i>et al.</i> , “An haptic-based immersive environment for shape analysis and modelling,” <i>Journal of Real-Time Image Processing</i> (2010) 5:73–90 (“Araujo”)
1016	U.S. Patent No. 7,812,815 (“Banerjee-815”)

1017	U.S. Patent No. 6,417,638 (“Guy”)
1018	U.S. Patent No. 7,411,576 (“Massie-576”)
1019	U.S. Patent Appl. Publ. No. 2010/0291505 (“Rawley”)
1020	Ronald T. Azuma, “A survey of augmented reality,” <i>Presence: Teleoperators and Virtual Environments</i> , vol. 6, no.4, pp.355-385, August, 1997 (“Azuma-Stamped-Copy”)
1021	U.S. Patent No. 9,563,266 (“Banerjee-266”)
1022	U.S. Patent Appl. Publ. No. 2002/0097223 (“Rosenburg”)
1023	U.S. Patent No. 5,587,937 (“Massie-937”)
1024	U.S. Patent No. 11,127,306 (“Goel”)
1025	U.S. Patent No. 10,172,676 (“Ecabert”)
1026	U.S. Patent Appl. Publ. No. 2018/0335841 (“Rubin”)
1027	U.S. Patent No. 9,881,520 (“Ullrich-520”)
1028	U.S. Patent No. 10,146,335 (“Balan”)
1029	Federal Court Management Statistics (September 2023)
1030	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-00712-TL, Dkt. No. 15 (W.D. Wash. May 18, 2023) (Proof of Service)
1031	<i>Immersion Corp. v. Valve Corp.</i> , 2:23-cv-00712-TL, Dkt. No. 46 (W.D. Wash. Nov. 11, 2023)
1032	U.S. Patent Appl. Publ. No. 2009/0263775 (“Ullrich-775”)
1033	U.S. Patent Appl. Publ. No. 2019/0179426 (“Ojala”)
1034	U.S. Patent No. 10,701,318 (“Valli”)
1035	U.S. Patent Appl. Publ. No. 2018/0050268 (“Jones”)
1036	U.S. Patent No. 10,319,109 (“Murrish”)
1037	U.S. Patent No. 10,803,761 (“Welch”)
1038	Declaration of Nathan R. Speed in Support of Motion for Admission <i>Pro Hac Vice</i>
1039	U.S. Pat. No. 9,035,899 (“Modarres”)

1040	Collins English Dictionary (2016)
1041	Oxford Student's Dictionary (2016)
1042	The American Heritage Dictionary of the English Language (2016)

I. INTRODUCTION

At institution, the Board found that Valve was reasonably likely to prevail in demonstrating claim 1 unpatentable based on any of three separate references—Banerjee, Meglan, and Rogers. In reaching that finding, the Board rejected Immersion’s attempts to narrowly construe the challenged claims and the prior art’s teachings. Immersion’s Patent Owner Response (“POR”) recycles the same arguments and provides the Board with no evidence or persuasive reasoning to deviate from its prior findings. The challenged claims should be held unpatentable.

For Ground 1, Immersion argues that Banerjee does not disclose limitation [1A], which recites “*a proxy object comprising one or more haptic output devices.*”¹ According to Immersion, limitation [1A] should be construed to require that the claimed “*haptic output devices*” be “contain[ed] inside” the “*proxy object.*” POR, 10. Immersion’s narrow construction is based on an interpretation of the intrinsic record that is contrary to Federal Circuit precedent. Regardless, as the Board correctly observed at institution, Immersion’s proposed construction is immaterial because Banerjee discloses “*a proxy object*” that contains a “*haptic output device*” and renders the challenged claims unpatentable even under Immersion’s construction.

¹ Claim language italicized; other emphasis added throughout.

For Ground 2, Immersion repeats its pre-institution argument that Meglan’s “*haptic effect*” is based on “*data*” regarding the position of other objects in Meglan’s system rather than the position of the “*proxy object*.” *Id.* at 29. The Board rejected this mischaracterization of Meglan at institution. Meglan unambiguously describes a system in which cameras track the position of the “*proxy object*” (Meglan’s surrogate and/or substrate) and that position information is used to generate a haptic effect. Immersion has no response to Meglan’s actual disclosure. Meglan anticipates the challenged claims.

Finally, Immersion’s arguments for Ground 3 mischaracterize Rogers. For example, while conceding that Rogers’s camera is “*a sensor for tracking a position of the proxy object*,” Immersion argues that the positional data Rogers’s camera generates is not used to “*determine a haptic effect*.” *Id.* at 37. But Rogers’s haptic effect is indisputably determined based on the pointing direction of Rogers’s “*proxy object*,” and Rogers is explicit that “visual tracking” of the “*proxy object*” **by Rogers’s camera** is used “to determine the pointing direction” of the proxy object. EX1010, [0106]. The purported distinctions between the claims and Rogers that Immersion identifies do not exist.

II. CLAIM CONSTRUCTION

Immersion repeats two claim-construction arguments that seek to narrowly construe the claims. But as the Board observed at institution, Immersion’s proposed constructions are immaterial because the prior art meets the challenged claims even under Immersion’s constructions. Paper No. 9 (“DI”), 15-17, 28-29. The Board thus need not determine whether Immersion’s proposed constructions are correct to find the claims unpatentable. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). Nonetheless, Valve briefly addresses Immersion’s flawed constructions below.

A. Limitation [1A]: “*a proxy object comprising one or more haptic output devices*”

Immersion says that “*proxy object*” should be construed as “a physical object that acts as a proxy for a virtual object and that itself *contains inside* a haptic output device, e.g., an actuator.” POR, 10-14. Immersion only argues that this proposed construction avoids Banerjee (Ground 1). However, as discussed *infra* Section III, the Board correctly found that Immersion’s proposed construction is immaterial because Banerjee satisfies limitation [1A] even under Immersion’s construction. If considered, however, the Board should reject Immersion’s construction because it finds no support in the record.

Immersion’s proposed construction limits the location of the claimed “*haptic output devices*” to being “*inside*” the “*proxy object*.” To support its construction,

Immersion cherry-picks two *exemplary* embodiments in the specification (POR, 12), but Immersion conveniently ignores an embodiment in which the haptic device is not “inside” the proxy object. Specifically, Immersion ignores an embodiment in which “haptic tape” is used. EX1001, 4:23-38. Haptic tape adheres to the proxy object’s *exterior* and is thus not inside the proxy object. *See, e.g.*, EX1039, 5:16-34 (describing haptic tape “coupled to” a device by “adhesive”). Immersion’s narrow construction would improperly exclude the “haptic tape” embodiment. *Google LLC v. EcoFactor, Inc.*, 92 F.4th 1049, 1058 (Fed. Cir. 2024) (“We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.”) (quotation omitted).

Immersion also relies on a proposed amendment submitted during prosecution that recites (in part):

a proxy object;
a haptic output device ~~mechanically coupled to~~ within the proxy object.

Id.; EX1002, 258 (alterations original).

According to Immersion, this proposed amendment shows that the applicants disavowed haptic output devices “mechanically coupled” to the proxy object and narrowed the “claim scope to only proxy objects with haptic output devices (e.g., actuators) inside of it.” POR, 13. But the proposed amendment was *never entered*. EX1002, 272-273. The applicants subsequently submitted a new proposed amendment, which resulted in allowance (EX1002, 295), reciting (in part):

a proxy object comprising one or more haptic output devices;
~~a haptic output device mechanically coupled to the proxy object;~~

EX1002, 280 (alterations original).

That the applicants narrowed the claim language to require the “haptic device [be] ***within*** the proxy object,” but then ***withdrew*** the narrowing amendment in favor of limitation [1A]’s broader language lays bare that Immersion is attempting to re-write the claim as if the applicants had never withdrawn the narrowing amendment. The Federal Circuit is clear, however, that a narrowing amendment that is withdrawn does not limit the scope of a limitation. *United States v. Telectronics, Inc.*, 857 F.2d 778, 782-83 (Fed. Cir. 1988) (narrowing language that is not part of the issued claims cannot restrict their scope); *3M Innovative Props. Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1372-73 (Fed. Cir. 2003) (refusing to impose a sequential limitation the applicant abandoned during prosecution); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 909 (Fed. Cir. 2004) (similar).

Although ultimately immaterial (*see infra* Section III), Immersion’s proposed construction is inconsistent with the intrinsic evidence and Federal Circuit precedent. If an express construction is needed, limitation [1A] should be afforded its plain meaning, *e.g.*, a proxy object including or having one or more haptic output devices.

B. Limitation [1D2]: “*determine a haptic effect based in part on data received from the sensor*”

While purporting to construe “*data received from the sensor*,” Immersion does not actually construe any terms and instead simply seeks to inject into the claim the bolded words: “*position data of the proxy object* received from the sensor *that tracks a position of the proxy object*.” POR, 14-17. Although ultimately immaterial (*infra* Section IV-V), the Board should (as it did at institution) reject Immersion’s attempt to inject limitations into the claim. DI, 28-29.

Limitation [1D2] recites “*data received from the sensor*.” As the Board noted, the recited “*data*” can be *any* data “*received from the sensor*,” and is not limited to positional data. DI, 28 (“[L]imitation 1D2 only explicitly requires determining a haptic effect based on ‘data received from the sensor’—not necessarily *positional* data received from the sensor.”).

Immersion argues that because the antecedent for “*the sensor*” in limitation [1D2] is limitation [1C]’s “*a sensor for tracking a position of the proxy object*,” the “*data*” in [1D2] must “refer back to the specific sensor data type—i.e., position data—in [limitation] [1C].” POR, 14. But limitation [1C] does not recite “position data” or even “data,” and limitation [1D2] does not recite “*the* position data” or “*the* data.” The claim language does not support Immersion’s antecedent-basis argument.

Immersion’s argument also fails for another reason. It is premised on the implicit assertion that the *only* data the “*sensor for tracking a position of the proxy*

object” in limitation [1C] generates is positional data for the proxy object. That is refuted by dependent claim 7 and the specification.

Dependent claim 7 recites “wherein the sensor [of claim 1] comprises ***at least one of*** ten different sensors. As the Board observed, this confirms that claim 1’s “*sensor*” can “comprise a ***combination*** of sensors.” DI, 28. The claimed “*sensor*” can include sensors that plainly generate data in addition to positional data. EX1001, claim 7 (“a light sensor”; “a microphone”).

Dependent claim 7 aligns with the specification which teaches that “[a]ny suitable number, type, or arrangement of sensors can be used.” EX1001, 4:1-2. The specification identifies twelve sensor types and teaches that “different embodiments may include...any combination of such sensors.” EX1001, 4:2-18. Certain of the identified sensors generate data other than positional data for the proxy object. *Id.* (“A light sensor may be used to determine perceived luminosity. And a microphone may be used to detect sound.”).

Thus, the Board correctly concluded that “the recited ‘sensor’ can provide many types of data.” DI, 29. And because the claimed “*sensor*” can include sensors that provide data in addition to positional data, the “*data*” in limitation [1D2] is not limited to positional data for the proxy object and encompasses any data from limitation [1C]’s “*sensor*” that is used in part to “*determine a haptic effect.*” See also EX1001, 7:67-8:3 (explaining sensor data is used “to identify characteristics of

proxy object [] to determine a haptic effect”); 4:1-17 (describing various sensors); 4:47-55 (explaining “characteristics” are used to determine haptic effects).

Immersion does not expressly disagree with the Board’s finding that the claimed “*sensor*” can be a combination of sensors. *See* POR, 15-17. Immersion argues, however, that whether the claimed “*sensor*” is a single sensor or a combination of sensors, the data the sensor generates must be limited to “tracking a position of the proxy object.” POR, 15-16. Again, however, claim 1 merely recites “*data*,” not “position data,” and the Board must “construe the claim as written, not as [Immersion] wish[es] they had written it.” *Chef Am., Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1374 (Fed. Cir. 2004).

Immersion cites *Alcon Research, LTD. v. Apotex Inc.*, 687 F.3d 1362, 1367 (Fed. Cir. 2012) which stands for the non-controversial proposition that “a dependent claim cannot be broader than the claim from which it depends.” POR, 15-16. Based on claim 1’s recitation of “*a sensor for tracking a position of the proxy object*,” Immersion argues that all the sensors in dependent claim 7 must generate position tracking data for the proxy object. POR, 16. Even if that were so, Immersion ignores that some of claim 7’s sensors (“light sensor,” “pressure sensor,” “microphone”) undeniably produce data other than position data. The specification explains that the light sensor can “determine perceived luminosity” and a microphone can “detect sound.” EX1001, 4:2-16. Based on claim 7’s dependency from claim 1, claim 1’s

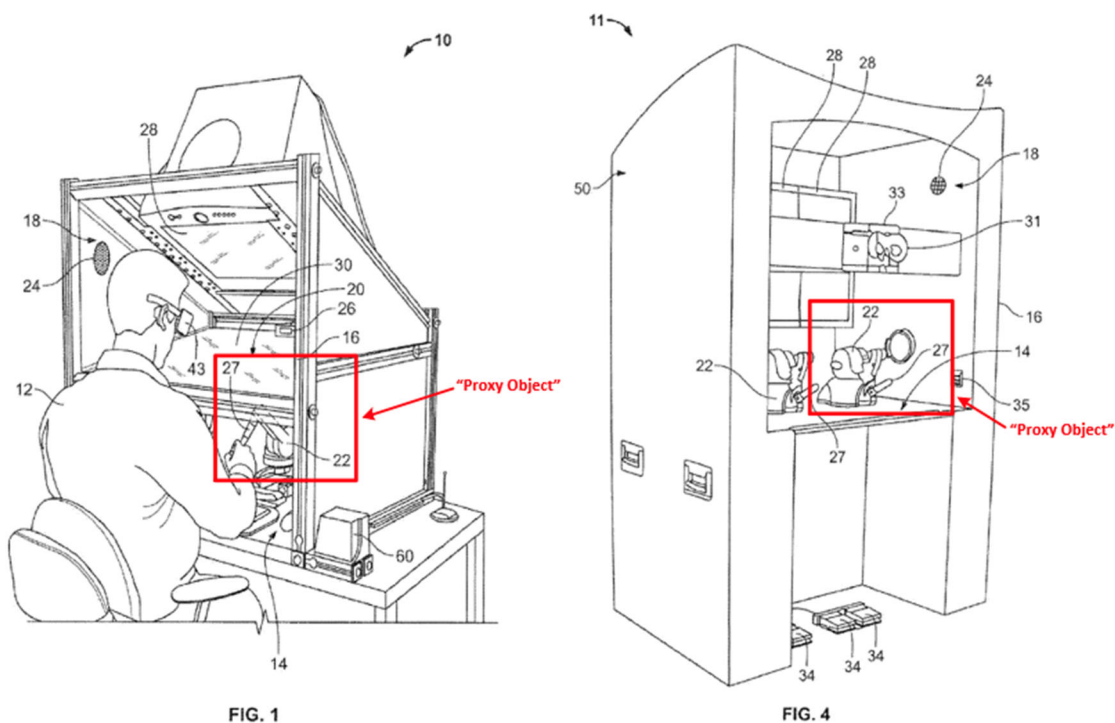
“*sensor*” indisputably encompasses such sensors that provide “*data*” as claimed that is not limited to data that tracks the proxy object’s position.

Given the intrinsic record, the plain-and-ordinary interpretation of limitation [1D2] the Board adopted at institution is correct. DI, 28-29. The “*data*” the claimed system uses to “*determine a haptic effect*” need not be positional data for the proxy object and can include other types of data received from the “*sensor*” in limitation [1C].

III. GROUND 1: BANERJEE

Banerjee discloses an augmented-reality station for simulating a surgical procedure. EX1011, Abstract. The station has a “haptic device 22” with a hand-held “stylus 27.” EX1011, [0035]. The Petition (at 14-16) established that Banerjee’s haptic device 22 (including stylus 27) meets the claimed “*proxy object*” because the haptic device acts as a proxy for a surgical instrument and contains actuators.² Banerjee’s haptic device 22 (including stylus 27) is shown below:

² The Petition (at 17) also argued in the alternative that stylus 27 alone was the “*proxy object*,” but the Board need not address that argument given that Banerjee plainly anticipates under the Petition’s primary mapping.



Petition, 15.

Immersion's only response is to (a) mischaracterize Banerjee as describing its haptic device 22 and stylus 27 as separate objects mechanically coupled together, and (b) allege that neither the haptic device (excluding its stylus) nor the stylus (by itself) is "*a proxy object comprising one or more haptic devices.*" POR, 19-26. As it did at institution, the Board should reject Immersion's mischaracterization of Banerjee because Banerjee explicitly teaches that its haptic device 22 *includes* stylus 27. DI, 16-17. If the Board once again finds that Banerjee's stylus is part of the haptic device, Immersion does not dispute that Banerjee anticipates the challenged claims.

Banerjee is explicit that its stylus 27 is part of haptic device 22. As the Board observed (DI, 16), Banerjee explains that a “user can hold and manipulate the haptic device 22 with *its* stylus 27.” EX1011, [0035]. Likewise, Banerjee’s claim 1 explicitly recites a “first haptic device *comprising* a hand-held stylus.” EX1011, claim 1. This is consistent with Figure 4 (reproduced above) which depicts haptic device 22 as a device with various parts, including stylus 27. EX1011, FIG. 4.

Banerjee further teaches that “haptics rendering software 44” “read[s] the position and orientation of *each haptic device 22, for example a stylus 27.*” EX1011, [0042]; DI, 16. Banerjee also describes an embodiment with “two haptic devices...each having a haptic stylus 27.” EX1011, [0062]. As the Board correctly explained at institution, “stylus 27 is the part of haptic device 22 that directly interacts with the user.” DI, 16 (citing EX1011, [0044], [0057], claim 1).

Immersion asserts that the Board’s interpretation was wrong but cites nothing in Banerjee to support that. POR, 22. Immersion (at 22) points to Figure 4, but Figure 4 depicts haptic device 22 as including stylus 27. Nothing in Figure 4 contradicts the clear description in Banerjee that stylus 27 is part of haptic device 22.

Immersion also alleges that Banerjee discloses “an ‘interface’ between stylus 27 and haptic device 22,” which allegedly “confirm[s] that they are separate components coupled together.” POR, 22 (citing EX1011, [0037]). Immersion badly

mischaracterizes Banerjee. Banerjee’s “interface” is provided by “*software*” running on Figure 3’s computer 32 and provides a user “interface with a haptic device 22.” EX1011, [0037]. Banerjee never describes “an ‘interface’ *between* stylus 27 and haptic device 22.” POR, 22.

Thus, Immersion cites no teaching in Banerjee that supports Immersion’s argument that stylus 27 is not part of haptic device 22. The only other evidence Immersion cites is its expert declaration, but the cited testimony merely parrots Immersion’s POR verbatim and provides no substantive analysis. *Compare* POR, 21-22 *with* EX2007, ¶¶ 66-70. This testimony warrants no weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 12 at 5 (Feb. 10, 2023) (precedential).

The Board interpreted Banerjee correctly at institution because “haptic device 22 and haptic stylus 27 can be treated together as the recited ‘proxy object.’” DI, 16. All of Immersion’s arguments as to why Banerjee allegedly does not anticipate claim 1 fail because they all depend on treating stylus 27 as not being part of haptic device 22. POR, 23-26.

IV. GROUND 2: MEGLAN

Meglan’s system teaches individuals how to control a hemorrhage. EX1012, Abstract. In Meglan’s system, a virtual image of simulated trauma is superimposed onto a mannequin used as a surrogate for a trauma victim. *Id.*, [0066]. Haptic effects are output when a user touches the simulated trauma on the mannequin. *Id.*, [0090].

The Board found Meglan disclosed claim 1 at institution (DI, 23-25), and Immersion offers no evidence or reasoning for the Board to reach a different conclusion on the fully developed record.

The Petition mapped the claimed “*proxy object*” to Meglan’s surrogate 20 and its substrate 2000, and the claimed “*sensor for tracking a position of the proxy object*” to Meglan’s camera system 50. Petition, 48-50, 53-54. Immersion concedes that the haptic effects Meglan generates (*e.g.*, a simulated pulse or heat) are determined based on positional data from Meglan’s camera system but argues that the camera system only tracks the position of the trainee’s fingers—not the position of the “*proxy object*” (surrogate 20 and/or substrate 2000). POR, 30-31. Immersion mischaracterizes Meglan’s disclosure.

As the Board correctly determined at institution, Meglan’s camera system “tracks not just trainee 100’s hands, but also the *position* and orientation *of surrogate 20*,” and provides a haptic effect “only when trainee 100’s hands contact the surface of surrogate 20.” DI, 25 (quotations omitted) (citing EX1012, [0072]-[0074], [0090], claims 1, 13). Claim 1 of Meglan—which the Board cited—makes crystal clear that Meglan (i) uses a “*video feed*” to determine “*a location of the surrogate* and [] at least one object,” (ii) “detect[s] an interaction” between the surrogate and the object “*based at least in part on the determined location of the surrogate* and the at least one object,” and then (iii) “generate[s] a simulated

hemodynamic consequence of the detected interaction,” *i.e.*, a haptic effect. EX1012, claim 1; *see also* claim 7 (“simulated blood flow based on...***the determined location of the surrogate...***”), claim 15 (similar to claim 1). Thus, the Board rightly concluded that Meglan’s haptic effect is “based, at least in part, on the position of surrogate 20 as sensed from the camera feed, and ***whether the user’s hands are in contact with that position.***” DI, 25.

Meglan repeatedly teaches using its camera to detect both the location (*i.e.*, position) of the surrogate 20 and the user’s ***interaction*** with the surrogate to “*determine a haptic effect,*” *i.e.*, a “simulated consequence of the detected ***interaction***” such as a simulated pulse. EX1012, [0032]. For example, Meglan describes “receiving an input video feed from a camera system ***aimed at the surrogate,***” and using that video feed to (i) determine “***a location of the surrogate,***” and (ii) “detect[] an interaction between the at least one object and the surrogate.” *Id.* Based on the detected interaction, a haptic effect—like a simulated pulse—is generated. *See id.*

Meglan is thus explicit that the determination of whether to generate a haptic effect is based on a video feed that tracks, *inter alia*, the surrogate’s position. *See also* EX1012, [0072]-[0074] (“The program 90 may use any suitable technique for identifying and determining ***the position and orientation of objects*** viewed by the camera system 50 ... ***includ[ing] surrogate 20***”).

Meglan’s paragraph [0113] (cited Petition, 54) makes clear that the camera system is also used to “determine the precise location of the substrate 2000.” The location of the substrate 2000 is used to “accurately and precisely detect the interaction between the trainee 100 and the surrogate ... and precisely and accurately provide haptic feedback to the trainee.” EX1012, [0116].

Immersion says that Meglan’s paragraph [0090] (which the institution decision cited at page 25) teaches generating a haptic effect based on a load sensor beneath surrogate 20 and the location of the trainee’s fingers, but *not* based on position information about the “stationary” surrogate 20. POR, 32-33. Immersion is wrong. The opening sentence to paragraph [0090]—as the Board correctly noted (DI, 25)—explains that the haptic effect only occurs “[w]hen the trainee 100 places his/her gloved hand *on the surrogate 20*.” EX1012, [0090]; *see also* [0074] (explaining that the video feed from Meglan’s camera is used to detect when an object “interacts with the surrogate”), claim 1.

Immersion’s entire argument is based on two unfounded assertions: (i) that the only position data that matters in Meglan is an absolute position of the trainee’s hands divorced from any understanding by Meglan’s system of how that absolute hand position relates to the positions of the surrogate 20 and substrate 2000, and (ii) that Meglan’s “load sensor” alone determines when a trainee’s hand interacts with the surrogate. POR, 33-34. But Meglan explicitly teaches that its system detects an

interaction between the trainee's hands and the surrogate/substrate in part by determining the locations of the surrogate and/or the substrate. *See, e.g.*, EX1012, claim 1 (“detect an interaction between the at least one object and the surrogate based at least in part on the determined location of the surrogate and the at least one object”), [0032] (similar). Immersion's two assertions are incompatible with what Meglan actually teaches.

Immersion also suggests (in a footnote) that the Petition did not argue that Meglan's camera tracks the position of Meglan's surrogate. POR, 32 n.2. This is not correct. The Petition explicitly argued that “Meglan's camera system 50/1050 includes a claimed ‘*sensor*’ producing data from which program 90 detects in real-time the ‘three-dimensional shape and ***position*** and orientation ***of the surrogate 20***, the trainee's hands, ***and*** any other object[s]’ (including ***substrate 2000***, [0113]) to ‘track and identify their movements’ ([0074]), thus ‘*tracking a position of the proxy object,*’ meeting [1C].” Petition, 54. The Petition also argued that “***when*** program 90 determines that trainee 100's hands are in contact with surrogate 20” based on the video feed from the camera system, “program 90 uses ‘the location of the finger(s) over simulated vascular structures, combined with the current state of the hemodynamic simulation’ to ‘calculat[e] a simulated pulse’ ([0090]) that processor 60 signals to the pulse generator(s) to simulate haptically.” Petition, 57-58.

As shown above, Meglan plainly discloses limitation [1D1] even under Immersion’s proposed narrow construction, which requires that the claimed “*data*” be limited to positional data of the “*proxy object*.” The Board can thus find the claims anticipated by Meglan without addressing Immersion’s proposed construction.

To be clear, however, Meglan anticipates under Valve’s proposed plain-meaning construction too. If the Board finds that Meglan’s camera is “*a sensor for tracking a position of the proxy object*” (which it plainly is, *e.g.*, EX1012, claim 1, [0032]), then that fact finding is dispositive under Valve’s plain-meaning construction because Immersion concedes that “*data*” from that “*sensor*” (*e.g.*, at least positional data for a trainee’s finger) is used to determine a haptic effect, which is all limitation [1D1] requires under Valve’s plain-meaning construction. *See* POR, 30.

Whether because Meglan meets Immersion’s proposed construction for limitation [1D1] or because Meglan meets Valve’s plain-meaning construction for that limitation, Meglan anticipates the challenged claims. Immersion offers the Board no persuasive argument to the contrary.

V. GROUND 3: ROGERS

Rogers discloses a videogame system that tracks the position of an interface object and superimposes images (*e.g.*, virtual hands, virtual gun) onto that object.

EX1010, [0001]-[0007], [0021], [0107]-[0109]. The Petition established that Rogers's system includes two sensors—a camera and an inertial sensor—that each meets the claimed “*sensor*,” because each is used by Rogers to track the position of Rogers's interface object, *i.e.*, the claimed “*proxy object*.” Petition, 72-73.

Immersion advances two arguments against the Petition's showing. Both arguments fail because they mischaracterize Rogers's disclosure.

First, Immersion argues that while Rogers's camera is a “*sensor*” as recited in limitation [1C], the positional data it generates is not used to determine a haptic effect. That argument mischaracterizes Rogers, which states in no uncertain terms that positional data from Rogers's camera is used to generate the haptic effect the Petition relied upon.

Second, Immersion argues that while Rogers's inertial sensor generates data that is used by Rogers to determine a haptic effect, the inertial sensor is not a “*sensor*” as recited in limitation [1C] because it tracks ***movement*** of Rogers's “*proxy object*,” not its ***position***. Again, this is inconsistent with Rogers, which describes inertial data as being used to determine the position of Rogers's “*proxy object*.” It is also inconsistent with the ordinary meaning of “*tracking a position*,” which plainly includes tracking movement—*i.e.*, change in position—of an object.

A. Rogers's Camera

Immersion does not dispute that Rogers's camera is "*a sensor for tracking a position of the proxy object*" as recited in limitation [1C] and that Rogers's camera generates positional (e.g., location) data for Rogers's interface object, *i.e.*, the claimed "*proxy object*." See POR, 43 ("the camera tracks location"); *see also* EX1010, [0018] ("computing device configured to process the captured images [from the camera] and the inertial data ***to determine a position*** of a virtual object that is rendered in the view of the virtual environment"); claim 17. Immersion argues, however, that the positional data that Rogers's camera generates is not used to "*determine a haptic effect*" as limitation [1D2] requires. POR, 38-40. Immersion is wrong.

In Rogers, a player reloads his/her virtual weapon by "pointing the directional interface object 104 upward." EX1010, [0105]. When Rogers's system determines that the interface object is pointing upward, the system causes a moveable weight in the interface object "to move so as to mimic the sensation of weapon reloading mechanics of the virtual weapon." *Id.* Immersion does not dispute that in this weapon-reload embodiment a "*haptic effect*" is generated when the system determines that the user is pointing the interface object upward.

Immersion argues, however, that ***only*** data from Rogers's inertial sensor—not Rogers's camera—is used to determine the pointing direction of Rogers's interface

object, and therefore the “*haptic effect*” that is generated is not “*based in part on data received from*” the camera. POR, 39-40. However, paragraph [0106] of Rogers (cited Petition, 74-75) flatly contradicts Immersion’s argument as it teaches that:

A combination of ***visual tracking of the trackable object*** and data from inertial sensors in the directional interface object can be utilized as input ***to determine the pointing direction of the virtual weapon*** in the VR environment.

EX1010, [0106]; *see also* EX1003, ¶¶ 311, 318.

Immersion alleges that the Petition mixed embodiments and relied on a weapon-reload example where only the inertia sensor is used because “there is no disclosure whatsoever in Rogers that position tracking data from camera 108 is utilized for this weapon reload case.” POR, 38. Immersion is wrong again. Rogers’s paragraph [0105] explains that the user reloads the virtual weapon by “***pointing*** the directional interface object 104 ***upward***,” and Rogers’s paragraph [0106] makes clear that the camera is used “to ***determine the pointing direction*** of the virtual weapon.” *See also* EX1010, [0052] (discussing the camera “track[ing] the directional interface object”); [0081] (discussing visual tracking “based on recognition in captured images”); [0113] (discussing “visual tracking of the direction interface object...based on image recognition”). Immersion’s contention that “Rogers does not disclose the use of position tracking data to sense whether the weapon is tilted upward” (POR, 38) is refuted by Rogers’s disclosure.

Rogers's paragraph [0047] further confirms the camera's role in determining when to generate a haptic effect as it teaches that:

The computer 106 transmits inputs from the HMD 102, the directional interface object 104 and ***the camera 108***, to the cloud gaming provider, ***which processes the inputs*** to affect the game state of the executing video game. The ***output from the executing video game***, such as video data, audio data, and ***haptic feedback data***, is transmitted to the computer 106. The computer 106 may further process the data before transmission or may directly transmit the data to the relevant devices. For example, video and audio streams are provided to the HMD 102, whereas a ***vibration feedback command is provided to the directional interface object 104***.

Paragraph [0047] teaches that ***the camera*** provides inputs to the cloud-gaming provider and those inputs include data that results in haptic/vibration feedback commands being sent to Rogers's interface object. That is, "*determin[ing] a haptic effect [is] based in part on data received from*" the camera, which is all limitation [1D1] requires even under Immersion's narrow construction.

Immersion's suggestion that determining the pointing direction of interface object 104 does not determine a "*position*" of that object is also baseless. POR, 38. As discussed in more detail *infra* pp. 22-24, "*position*" is a broad non-technical term, and the specification does not re-define or disavow the term's full breadth. Plainly, determining the direction an object is pointing determines how that object is ***positioned***, *i.e.*, arranged in space. EX1040, 1548 ("the manner in which a person or thing is placed; arrangement"); EX1041, 839 (similar); EX1042, 1374-75 (similar).

The positional data Rogers’s camera generates is used to “*determine a haptic effect*” as limitation [1D2] requires. That refutes the only argument that Immersion offers for why Rogers allegedly does not anticipate. If the Board agrees, the Board need not address Immersion’s remaining argument regarding the Petition’s separate mapping of Rogers’s inertial sensor to limitation [1C]’s “*sensor*.” As explained below, however, that argument is also meritless.

B. Rogers’s Inertial Sensor

1. The inertial sensor tracks the position of Rogers’s interface object.

Immersion does not dispute that Rogers’s system receives “*data*” from Rogers’s inertial sensor and uses that “*data*,” in part, to “*determine a haptic effect*” in the weapon-reload embodiment. *See* POR, 40 (arguing that the weapon-reload “use case only requires ‘Inertial Tracking’”). Immersion argues, however, that the inertial sensor is not “*a sensor for tracking a position of the proxy object*” because the inertial sensor tracks ***movement*** of Rogers’s interface object. POR, 41-44. In other words, Immersion contends that “*tracking a position of the proxy object*” does not include tracking the object’s movement. That is contrary to the plain meaning of “*position*” and the specification.

“*[P]osition*” is a non-technical term with a broad ordinary meaning that includes “location of a person or thing.” EX1040, 1548; *see also* EX1041, 839 (similar), EX1042, 1374-75 (similar). Tracking an object’s movement through

space plainly involves tracking the object's "*position*" in space. EX1040, 1282 (defining "movement" as "the act, process, or result of moving," and defining "move" as "change in location *or position*"); EX1041, 707 (similar); EX1042, 1152 (similar). Tracking an object's movement tracks the object's change in position which is "*track[ing] a position of the*" object.

Rogers's inertial sensor generates "inertial data indicative of movement of the directional interface object" and that data is used (with other data) "to determine *a position* of a virtual object." Rogers, claim 17; *see also id.* [0018] ("computing device configured to process the captured images *and the inertial data to determine a position* of a virtual object that is rendered in the view of the virtual environment"). Thus, Rogers uses the inertial data indicative of the interface object's *movement* to determine the object's *position* in space. *Id.*

Even if Rogers's inertial data does not provide *absolute* position information for Rogers's interface object, that would be immaterial because Immersion concedes that "*a sensor for tracking a position of the proxy object*" can do so *indirectly* using data, like acceleration or velocity, that must be combined with "additional information or calculations" to determine an object's absolute position. POR, 17. Rogers's inertial sensors are indistinguishable from the hypothetical accelerometer that Immersion says is a "*sensor for tracking a position of the proxy object.*" *Id.*; *see* EX1010, [0018] (describing the use of an inertial sensor to determine "movement of

the directional interface object”); [0119] (describing motion sensors including “an accelerometer”).

The ’067 patent specification does not disavow or redefine the ordinary meaning of “*position*.” *Luminara Worldwide, LLC v. Liown Elecs. Co.*, 814 F.3d 1343, 1353 (Fed. Cir. 2016). In fact, the specification primarily uses “position” when summarizing embodiments of the “present disclosure” using language that tracks the claims. EX1001, Abstract, 1:30-40. The only other time “position” is used, the term is used consistent with its ordinary meaning. EX1001, 6:38-39 (“[S]ensor 108 may be used to track the position or other characteristics of wearable peripheral device 304.”).

While the specification only briefly mentions tracking an object’s “position,” it repeatedly describes using sensors to track a proxy object’s ***movement*** so that haptic effects and images can be produced on the object as it moves. *See, e.g.*, EX1001, 2:65-3:9 (“[I]nformation from a sensor(s) is passed to a processor...The modified image of the proxy object through the AR display, and the texture output by the haptic output device, can then be modified in real-time ***to reflect any movement of the proxy object.***”); 6:6-14 (“***sensors 108 track proxy object 202*** so the texture produced by the haptic effect in proxy object 202 and the AR visual effect may be felt and seen, respectively, ***regardless of any movement*** or rotation ***of proxy object 202*** by user 206.”); *see also* 7:61-64, 8:10-15.

Interpreting “*tracking a position*” of an object to exclude tracking that object’s “movement” would improperly read these movement-tracking embodiments out of the claims. *Google*, 92 F.4th at 1058 (“We normally do not interpret claim terms in a way that excludes embodiments disclosed in the specification.”) (quotation omitted). Therefore, based on the plain meaning of the word “*position*,” Rogers’s inertial sensor is “*a sensor for tracking **a position** of the proxy object.*”

2. Rogers uses data from the inertial sensor to “*determine a modified visual effect.*”

Apart from wrongly arguing that Rogers’s inertial sensor does not track the interface object’s “*position*,” Immersion also argues that Rogers’s inertial data is not used to “*determine a modified visual effect*” as recited in limitation [1D1]. POR, 45-47 (“Petitioner has only shown that modified visual effects are based on position sensor data while haptic effects are based on inertial sensor data.”). Immersion mischaracterizes Rogers.

Rogers is explicit that its “computing device” is “configured to process the captured images and the *inertial data* to determine *a position* of a virtual object that is rendered in the view of the virtual environment.” EX1010, [0018]; *see also* [0106] (“combination of visual tracking of the trackable object and *data from inertial sensors* in the directional interface object can be utilized as input to determine the pointing direction of the virtual weapon in the VR environment”); claim 17. Therefore, Rogers’s modified visual effects—*e.g.*, an image of a virtual-weapon

being pointed in a particular direction in the VR environment—are based not only on visual tracking data from Rogers’s camera but also based on inertial data from Rogers’s inertial sensor. *See* EX1010, FIGS. 10-11 (depicting virtual weapon).

Because inertial data from Rogers’s inertial sensors (as well tracking data from Rogers’s camera) is used to determine the position of Rogers’s interface object and that positional information is then used to determine how a virtual weapon is shown to the user in the VR environment, Rogers’s inertial data is used to “*determine a modified visual effect*” as recited in limitation [1D1]. Immersion’s contrary arguments (POR, 45-47) again rely on a misinterpretation of Rogers.

VI. CONCLUSION

The challenged claims are unpatentable.

Respectfully submitted,
Valve Corporation

Date: 02-04-2025

/ Nathan R. Speed /

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CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned certifies that the foregoing **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** contains 5,585 words excluding; a table of contents, a table of authorities, a certificate of service or word count, or appendix of exhibits or claim listing. Petitioner has relied on the word count feature of the word processing system used to create this paper in making this certification.

Date: February 4, 2025

/MacAulay Rush/
MacAulay Rush
Paralegal
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I certify that on February 4, 2025, I will cause a copy of the foregoing document, including any exhibits filed therewith, to be served via electronic mail, as previously consented to by Patent Owner, upon the following:

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