

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

META PLATFORMS, INC.,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

IPR2023-00947
Patent 10,248,298 B2

Before MICHAEL R. ZECHER, PATRICK R. SCANLON, and
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

ZECHER, *Administrative Patent Judge*.

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

I. INTRODUCTION

Petitioner, Meta Platforms, Inc. (“Meta”), filed a Petition requesting an *inter partes* review (“IPR”) of claims 1–3, 5, 6, 8–11, 13, 14, 16–19, 21, 22, and 24 of U.S. Patent No. 10,248,298 B2 (Ex. 1001, “the ’298 patent”). Paper 2 (“Pet.”). Patent Owner, Immersion Corporation (“Immersion”), filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). Based on the authority delegated to us by the Director under 37 C.F.R. § 42.4(a), we may not institute an IPR unless the information presented in the Petition and any response thereto shows “there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2023). Taking into account Immersion’s Preliminary Response, we conclude that the information presented in the Petition establishes that there is a reasonable likelihood that Meta would prevail in challenging at least one of claims 1–3, 5, 6, 8–11, 13, 14, 16–19, 21, 22, and 24 of the ’298 patent as unpatentable. Pursuant to § 314, we hereby institute an *inter partes* review as to these claims of the ’298 patent.

A. Real Party in Interest

Meta identifies itself as the only real party in interest (“RPI”). Pet. 1. Immersion identifies itself as the only RPI. Paper 8, 1 (Immersion’s Updated Mandatory Notices Pursuant to 37 C.F.R. § 42.8).

B. Related Matter

The parties indicate that the ’298 patent is the subject of a district court case titled *Immersion Corp. v. Meta Platforms, Inc.*, No. 6:22-cv-00541-ADA (W.D. Tex. filed May 27, 2002). Pet. 1; Paper 3, 1 (Immersion’s Mandatory Notices Pursuant to 37 C.F.R. § 42.8).

C. The '298 Patent

The '298 patent, titled “Haptically Enhanced Interactivity With Interactive Content,” issued from U.S. Patent Application No. 16/101,608 (“the '608 application”), filed on August 13, 2018. Ex. 1001, codes (54), (21), (22). The '608 application claims the benefit of a series of continuation applications ending with U.S. Patent Application No. 12/895,161, filed on September 30, 2010—now U.S. Patent No. 8,352,643 B2 (“the '643 patent”). *Id.* at code (63).

The '298 patent generally relates to “haptically enhanced interactivity with interactive content being conveyed to a user by a content output appliance . . . under [the] control of one or more processors that controls the output of the interactive content based on one or more position parameters of a peripheral being manipulated by the user.” Ex. 1001, 1:22–28. The '298 patent states that, in existing systems, “[u]sers may interact with virtual objects within a virtual environment” using “augmented reality technology” that “integrate[s] 2D [two-dimensional] and/or 3D [three-dimensional] virtual objects into live video that is digitally processed and ‘augmented’ with 2D and/or 3D virtual objects.” *Id.* at 1:32–39. The '298 patent, however, states that these existing systems provide “no physical sense of interaction with virtual objects . . . to users.” *Id.* at 1:45–47.

The '298 patent purportedly solves this problem by providing “a system configured to present interactive content to a user that is manipulating a peripheral.” Ex. 1001, 1:51–53. According to the '298 patent, “anything manipulatable or able to be interacted with by a user may constitute the peripheral,” including “a body part of the user” (e.g., a hand) or “a computing/interactive digital media device implemented in or on the

user's body” (e.g., a glove). *Id.* at 3:31–50. Figure 1 of the '298 patent, reproduced below, illustrates one embodiment of “a system configured to present interactive content to one or more users manipulating one or more peripherals.” *Id.* at 2:43–46.

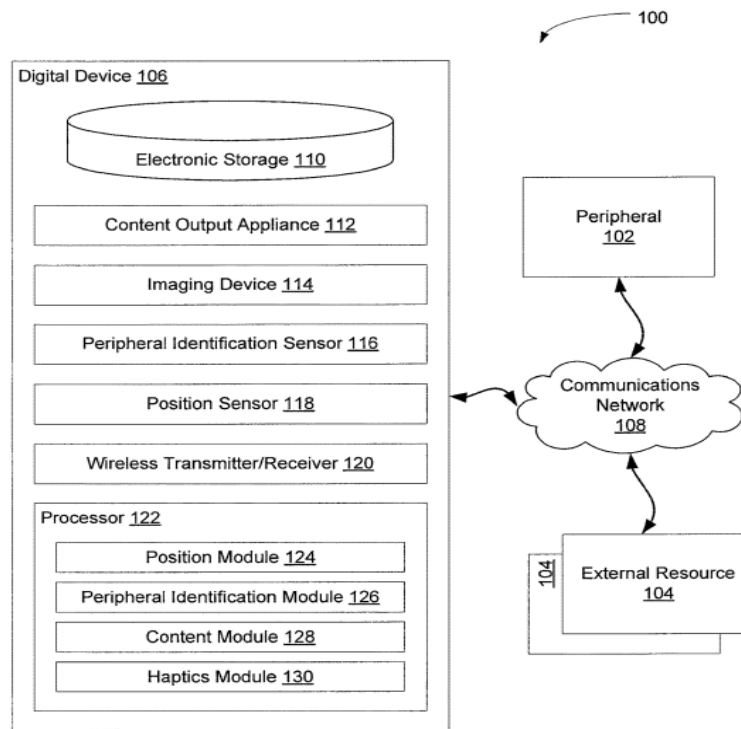


FIG. 1

Figure 1 illustrates that system 100 includes at least one peripheral 102, one or more external resources 104, at least one digital device 106, and other components all connected via communications network 108. *Id.* at 3:12–21.

The '298 patent discloses that digital device 106 includes, among other things, peripheral identification sensor 116 and at least one processor 122. Ex. 1001, 3:61–4:20, Fig. 1. Peripheral identification sensor 116 may be configured to identify peripheral 102 from a plurality of other peripherals by using remote sensing. *Id.* at 5:11–21. Remote sensing of peripheral 102

from a plurality of other peripherals may include, among other things, “optical code identification and/or translation” and “other remote sensing technologies.” *Id.* at 5:21–27. Peripheral identification sensor 116 may identify peripheral 102 by sending an output signal to processor 122 or other components of system 100. *Id.* at 5:27–30.

D. Challenged Claims

Of the challenged claims, claims 1, 9, and 17 are independent. Independent claim 1 is directed to “[a] system,” independent claim 9 is directed to “[a] method,” and independent claim 17 is directed to “[a] non-transitory computer-readable medium comprising program code that is executable by a processor to cause the processor to” perform several steps. Ex. 1001, 12:56, 13:23, 14:9–11. Claims 2, 3, 5, 6, and 8 directly depend from independent claim 1, claims 10, 11, 13, 14, and 16 directly depend from independent claim 9, and claims 18, 19, 21, 22, and 24 directly dependent from independent claim 17. *Id.* at 13:7–10, 13:13–16, 13:21–22, 13:40–43, 13:46–14:2, 14:7–8, 14:26–31, 14:34–38, 14:44–46. Independent claim 1 is illustrative of the challenged claims and is reproduced below.

1. A system comprising:
 - a processor; and
 - a memory device comprising program code that is executable by the processor to cause the processor to:
 - display a virtual environment via an electronic display;
 - detect an interaction with a virtual object in the virtual environment based on a peripheral being at a particular position in free space with respect to the virtual object; and
 - based on detecting the interaction:
 - determine a first feedback parameter that depends on an identifier of the peripheral and a second feedback parameter that

depends on the particular position of the peripheral in free space;
and

transmit a haptic signal configured to cause a haptic output device to output haptic feedback in accordance with the first feedback parameter and the second feedback parameter.

Id. at 12:56–13:6.

E. Asserted Prior Art References

Meta relies on the prior art references set forth in the table below.

Name¹	Reference	Dates	Exhibit Nos.
Nogami	US 2009/0066725 A1	published Mar. 12, 2009; filed Sept. 9, 2008	1003
Nelson	US 7,084,884 B1	issued Aug. 1, 2006; filed Jan. 24, 2001	1004
Moriya	US 6,691,074 B1	issued Feb. 10, 2004; filed Feb. 8, 2001	1005

F. Asserted Grounds of Unpatentability

Meta challenges claims 1–3, 5, 6, 8–11, 13, 14, 16–19, 21, 22, and 24 of the '298 patent based on the asserted grounds of unpatentability set forth in the table below. Pet. 3, 8–60.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 6, 9–11, 14, 17–19, 22	103(a) ²	Nogami
5, 13, 21	103(a)	Nogami, Nelson
8, 16, 24	103(a)	Nogami, Moriya

¹ For clarity and ease of reference, we only list the first named inventor.

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the '298 patent claims the benefit of a series of continuation applications ending with the '643 patent, which was filed before this date, the pre-AIA version of § 103 applies. Ex. 1001, code (63).

II. ANALYSIS

A. Discretionary Denial Arguments Under § 314(a)

1. Parties Arguments

Meta contends that there is no basis for us to exercise our discretion to deny the Petition under § 314(a) because “[it] has not previously filed an IPR petition against the ’298 patent,” and “as of the filing of this Petition, no claim construction or other substantive rulings have [been] issued” in the district court case. Pet. 4. Meta acknowledges that a trial date was set for the district court case on February 20, 2024, but argues that it filed a motion to transfer the case to the U.S. District Court for the Northern District of California that remains pending at the time of filing the Petition. *Id.* To address any concerns regarding duplication of effort between the district court case and this proceeding, Meta provides a stipulation consistent with the one set forth in *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A) by stating that “[it] will not pursue in district court any grounds of invalidity against the challenged claims that were raised or reasonably could have been raised in [this] IPR.” *Id.*

In response, Immersion acknowledges that Meta offered a *Sotera* stipulation, but nonetheless contends that we should exercise our discretion to deny the Petition under § 314(a) based on the advanced state of the district court case and the duplication of invalidity grounds asserted in this proceeding. Prelim. Resp. 29. Immersion concedes that under interim guidance issued by the Under Secretary of Commerce for Intellectual Property and Director of the U.S. Patent and Trademark Office (“Director”), a petition should not “ordinarily” be denied based on factors set forth in

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”) when a petitioner offers a *Sotera* stipulation. *Id.* at 29. However, Immersion argues that we should still discretionarily deny the Petition because, prior to the interim guidance, another Board panel did not find a *Sotera* stipulation to be sufficient to overcome a trial date scheduled significantly before the projected due date for a final written decision. *Id.* at 29–30 (citing *Cisco Sys., Inc. v. Estech Sys., Inc.*, IPR2021-00329, Paper 13 (PTAB July 6, 2021)). Immersion then argues that, because the district court has scheduled a trial date of February 20, 2024, which is roughly ten months before a projected final written decision in this proceeding of December 2024, we should consider this to outweigh Meta’s *Sotera* stipulation and discretionarily deny the Petition. *See id.* at 30 (citing Ex. 2003, 4 (“Scheduling Order” issued by the district court); Ex. 2007, 2 (“Amended Scheduling Order” issued by the district court)).

2. *Fintiv* Analysis

It is well-settled that institution of an IPR is discretionary. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he [U.S. Patent and Trademark Office] is permitted, but never compelled, to institute an IPR proceeding.”); 35 U.S.C. § 314(a) (“The Director *may not* authorize an inter partes review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” (emphasis added)). In *Fintiv*, the Board discussed potential applications of *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential), as well as a

number of other cases dealing with discretionary denial under § 314(a). *Fintiv* identifies a non-exclusive list of six factors parties may consider addressing, particularly where there is a related district court case involving the same patent and whether such a case provides any basis for discretionary denial. *Fintiv* at 5–16. Those factors include the following:

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.

Id. at 5–6.

On June 21, 2022, the Director issued interim guidance in the form of a memo that further clarifies how we should approach analyzing the *Fintiv* factors. Interim Procedure for Discretionary Denials in AIA Post-grant Proceedings with Parallel District Court Litigation, *available at* https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf. (“Director Memo”). Notably, the Director stated that “the PTAB [Patent Trial and Appeal Board] 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 ground that could have been reasonably raised before the PTAB.” Director Memo at 3. With this interim guidance in mind, we decline to exercise our discretion to deny institution of this proceeding based on *Fintiv* because Meta has provided a *Sotera* stipulation. Pet. 4; *see also* Prelim. Resp. 29 (Immersion acknowledging that Meta offered a *Sotera* stipulation).

We do not agree with Immersion’s argument that we can effectively ignore the interim guidance in the Director’s Memo because, prior to her guidance, another Board panel did not find a *Sotera* stipulation to be sufficient to overcome a trial date scheduled significantly before the projected due date for a final written decision. Prelim. Resp. 29–30 (citing *Cisco*, IPR2021-00329, Paper 13). As Immersion correctly notes, the *Cisco* case issued in July 2021, which is roughly one year before the Director Memo issued in June 2022. *See id.* at 29. The Director Memo clearly states that it is “binding agency guidance,” which, in essence, abrogates any prior inconsistent holdings by Board panels regarding the application of *Fintiv*, including the non-precedential holding in the *Cisco* case relied on by Immersion. Director Memo at 3. Put simply, because Meta has provided a *Sotera* stipulation, the Director Memo is controlling and the *Fintiv* factors are not a basis for denying institution.

B. Claim Construction

In this IPR, claim terms are construed using the same claim construction standard as in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2018). That is, claim terms generally are construed in accordance with their ordinary and customary meaning, as would have

been understood by a person of ordinary skill in the art, in view of the specification and the prosecution history pertaining to the patent at issue. *See id.* The ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent,” and “as of the effective filing date of the patent application.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313, 1321 (Fed. Cir. 2005) (en banc).

In its Petition, Meta acknowledge that the parties proposed constructions for the claim term “free space” in the district court case, but Meta nonetheless contends that it “does not believe any term of the ’298 patent requires express construction at this time because . . . the claims are obvious under the constructions proposed by both parties in the pending litigation, or any other reasonable construction.” Pet. 6 (citing Ex. 1007, 2–3 (“Joint Claim Construction Statement” submitted by the parties in the district court case)). In its Preliminary Response, Immersion contends that “all claim terms should be afforded their ordinary and customary meaning, as [would have been] understood by a [person of ordinary skill in the art], in the context of the [’298] patent specification.” Prelim. Resp. 9 (citing Ex. 2002 ¶¶ 37, 38 (Declaration of Gregory Abowd, D.Phil.)).

Based on the preliminary record, there is no readily discernible controversy between the parties that requires us to construe any claim terms at this time. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe 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))).

C. Obviousness Over Nogami

Meta contends that claims 1–3, 6, 9–11, 14, 17–19, and 22 of the '298 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the teachings of Nogami. Pet. 8–50. Meta contends that the teachings of Nogami account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of this reference. *Id.* Meta also relies on the testimony of Jeremy Cooperstock, Ph.D. to support its positions. *See* Ex. 1002 (Declaration of Jeremy Cooperstock, Ph.D.).

Based on the preliminary record, we determine that Meta has shown that there is a reasonable likelihood that it would prevail in challenging at least one of claims 1–3, 6, 9–11, 14, 17–19, and 22 of the '298 patent as unpatentable. We begin our analysis with the principles of law that generally apply to an asserted ground based on obviousness, followed by an assessment of the level of skill in the art, next we provide an overview of Nogami, and then we address the parties' contentions with respect to the independent claims 1, 9, and 17.

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, “would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in

the art; and (4) when in evidence, objective indicia of obviousness or non-obviousness (i.e., secondary considerations, such as commercial success, long-felt but unsolved needs, failure of others, etc.).³ *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). We analyze the asserted grounds based on obviousness with the principles we identify above in mind.

2. *Level of Skill in the Art*

In determining whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham*, 383 U.S. at 17. “The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991). The “person having ordinary skill in the art” is a hypothetical construct, from whose vantage point obviousness is assessed. *In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998).

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). “Not all such factors may be present in every case, and one or

³ At this stage in the proceeding, Immersion does not present arguments or evidence of secondary considerations. See Prelim. Resp.

more of these or other factors may predominate in a particular case.” *Id.* at 696–97.

For purposes of institution, there is sufficient evidence in the record that enables us to determine the knowledge level of a person of ordinary skill in the art. Relying on the testimony of Dr. Cooperstock, Meta argues the following:

[a] person of ordinary skill in the art would have possessed a bachelor’s degree in electrical engineering or computer science (or an equivalent degree), and two years of practical or industry experience in the field of human computer interaction, including implementation of computer-based systems and software for providing haptic feedback effects to a user and determining the position and/or orientation of a device used by a user (such as a device worn on the human body). A person could also have qualified as an ordinarily skilled artisan with more formal education and less practical or industry experience, or vice versa.

Pet. 4–5 (citing Ex. 1002 ¶¶ 12, 13). Relying on the testimony of Dr. Abowd, Immersion offers the same assessment of the level of ordinary skill in the art, except Immersion excludes industry experience applicable to determining the position and/or orientation of a device used by a user, such as a device worn on the human body. Prelim. Resp. 8–9 (citing Ex. 2002 ¶ 11).

The level of skill advanced by each party requires at least a Bachelor of Science degree in electrical engineering, computer science, or an equivalent degree. We do not discern a material difference between the industry experiences advanced by either party, nor does either party premise its arguments exclusively on its own industry experience. To the extent necessary, and for purposes of institution, we adopt Meta’s assessment of the level of ordinary skill in the art because Dr. Cooperstock’s identification of

relevant industry experience applicable to determining the position and/or orientation of a device used by a user, such as a device worn on the human body, is consistent with the '298 patent and the asserted prior art. We note, however, that our obviousness analysis would be the same under either party's assessment.

3. Overview of *Nogami*

Nogami generally relates to “an information-processing apparatus configured to implement an interaction between a virtual space and a user who observes the virtual space.” Ex. 1003 ¶ 2. Figure 1 of *Nogami* illustrates “an exemplary state of a system, which is being used by the user,” according to one embodiment. *Id.* ¶¶ 30, 47.

FIG.1

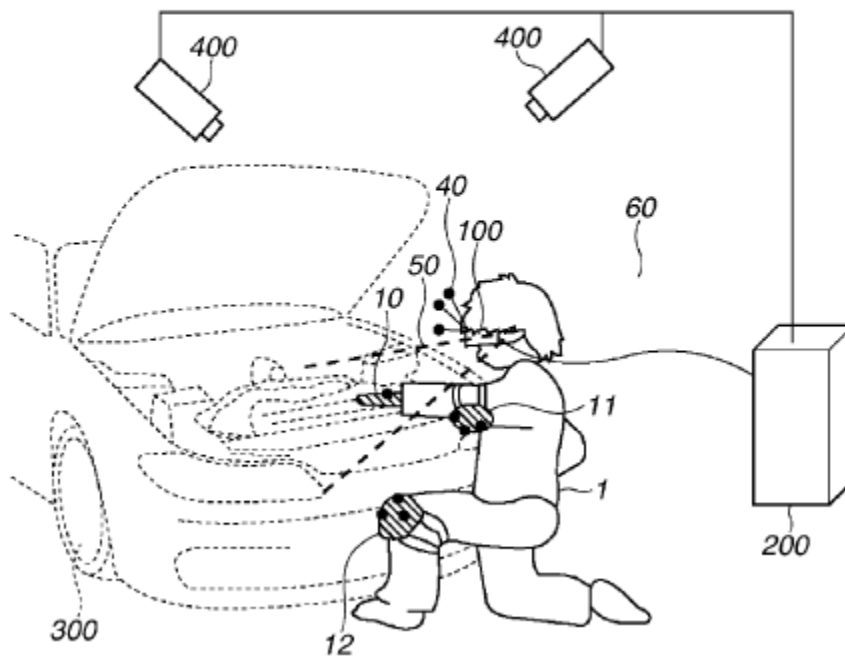


Figure 1 illustrates stimulation generation unit 10 mounted to the hand of user 1, stimulation generation unit 11 mounted to the elbow of user 1, stimulation generation unit 12 mounted to the knee of user 1, and head-mounted display (“HMD”) 100 mounted to the head of user 1, all of which allow the user to experience a virtual space that includes virtual object 300 (e.g., the image of an automobile in an actual size). *Id.* ¶¶ 49–51. Position and orientation sensors 400 acquire the position of markers 40 provided by each of stimulation generation units 10–12, which then are used by calculation processing apparatus 200 to output a combined image that includes a virtual image and real space image to HMD 100. *Id.* ¶ 52.

Nogami refers to range 50 as an “attention range” in which user 1 can perceive virtual object 300, such as by making virtual contact with his/her hand on which stimulation generation unit 10 is worn. Ex. 1003 ¶¶ 100–102. Nogami refers to range 60 as a “non-attention range” in which user 1 perceives virtual object 300, such as by making virtual contact using his/her knee on which stimulation generation unit 12 is worn. *Id.* ¶¶ 100, 103. In these two examples where virtual contact occurs in attention range 50 versus non-attention range 60, calculation processing apparatus 200 controls stimulation generation units 10 and 12 by generating different simulations. *Id.* ¶ 103. More specifically, central processing unit (“CPU”) 201 of calculation processing apparatus 200 generates operation setting information for controlling the operation of stimulation generation units 10–12, which can vary based on whether these units are located in attention range 50. *Id.* ¶¶ 120, 174, Fig. 4, step 406.

Nogami further states that “the intensity felt by the user may differ depending on the position of mounting of the cutaneous sense simulation

unit [which are part of stimulation generation units 10, 11, and 12] on the body of the user.” Ex. 1003 ¶ 279, Fig. 3 (illustrating stimulation generation unit 10 including cutaneous sense simulation units 20). As one example, Nogami states that “the finger of a human can sensitively react to the stimulation but the knee or the elbow of a human cannot react to the stimulation as sensitive as the finger can.” *Id.* ¶ 280. Accordingly, when mounting simulation generation units 10–12 to different regions of the body of user 1 (i.e., the hand, elbow, and knee, respectively), “a value at which the user feels the intensity of the stimulation . . . is set as a reference intensity for each region.” *Id.* By setting different values for the reference intensity for each region, “the contact between the virtual object and any region of the whole body of the user can be clearly provided according to whether contact has occurred within the attention range.” *Id.* ¶ 281.

4. Claims 1, 9, and 17

The preamble of independent claim 1 recites “a system comprising.” Ex. 1001, 12:56. To the extent the preamble should be treated as limiting, Meta contends that Nogami teaches a “system” that includes, among other things, simulation generation units 10–12 worn on the hand, elbow, and knee, respectively, of user 1, HMD 100 mounted to the head of user 1, position and orientation sensors 400 (i.e., cameras or, alternatively, a magnetic sensor included as part of HMD 100), and calculation processing apparatus 200. Pet. 8–11 (citing Ex. 1003 ¶¶ 49, 51, 74, 77, Figs. 1, 2). Meta argues that calculation processing apparatus 200 includes, among other things, CPU 201, random-access memory (“RAM”) 202, read-only memory 203, and data recording unit 205. *Id.* at 11 (citing Ex. 1003 ¶¶ 83–86).

Independent claim 1 recites “a processor; and a memory device comprising program code that is executable by the processor to cause the processor to” perform certain steps. Ex. 1001, 12:57–59. Meta contends that Nogami teaches “a processor” because it discloses CPU 201 included within calculation processing apparatus 200. Pet. 11–12 (citing Ex. 1003 Fig. 2). Meta argues that Nogami teaches “a memory device” because it discloses data recording unit 205, RAM 202, or both. *Id.* at 12 (citing Ex. 1003 ¶¶ 88–90, Ex. 1002 ¶ 56). According to Meta, Nogami teaches “program code that is executable by the processor to cause the processor to” perform certain steps because it discloses that CPU 201 uses the program and data loaded on data recording unit 205 and/or in RAM 202 to perform specific processing tasks. *Id.* at 12–13 (citing Ex. 1003 ¶¶ 83, 88, 89, 90, 91, 285–287; Ex. 1002 ¶¶ 65–67, 73, 83, 102, 107).

The first step of independent claim 1 recites “display[ing] a virtual environment via an electronic display.” Ex. 1001, 12:60. Meta contends that Nogami teaches this “displaying” step because it discloses that HMD 100 includes imaging unit 101 and display unit 102 (i.e., a liquid crystal display screen) that work together to display a user’s real-world surroundings together with one or more virtual objects as a virtual environment. Pet. 14 (citing Ex. 1003 ¶¶ 49, 53, 56, 93, Fig. 1); *see also id.* at 18–19 (arguing the same (citing Ex. 1003 ¶¶ 5, 49, 50, 114; Ex. 1002 ¶ 71)). As one example, Meta argues that Figure of 1 of Nogami illustrates a virtual space including a background virtual object in the form of “an automobile in an actual size.” *Id.* at 15–16 (quoting Ex. 1003 ¶ 50) (citing Ex. 1003, Fig 1). As another example, Meta argues that Figure 6 of Nogami illustrates background virtual objects in the form of shapes 302 and 303. *Id.*

at 16–17 (citing Ex. 1003 ¶¶ 137, 140, Fig. 6). According to Meta, imaging unit 101 of Nogami’s HMD 100 creates a virtual environment for display via display unit 102 by combining background virtual objects, such as those illustrated in Figures 1 and 6, with images of the user’s real-world surroundings. *Id.* at 17–18 (citing Ex. 1003 ¶¶ 52, 53, 56, 92, 93, 97).

The second step of independent claim 1 recites “detect[ing] an interaction with a virtual object in the virtual environment based on a peripheral being at a particular position in free space with respect to the virtual object.” Ex. 1001, 12:61–64. Meta contends that Nogami teaches this “detecting” step because it discloses that CPU 201 detects whether stimulation generation units 10–12 worn by user 1 make virtual contact with a background virtual object, such as virtual object 300 (i.e., the image of an automobile in an actual size). Pet. 20–21 (citing Ex. 1003 ¶¶ 102, 103, Fig. 1). Meta argues that each of Nogami’s stimulation generation units 10–12 qualify as the claimed “peripheral” because the ’298 patent generally describes a peripheral as “anything manipulatable or able to be interacted with by a user,” including “a computing/interactive digital media device . . . on the user’s body.” *Id.* at 21 (quoting Ex. 1001, 3:40–50) (citing Ex. 1003 ¶¶ 120–123, Fig. 4; Ex. 1002 ¶ 75) (alteration in original). Meta further argues that Figure 4 of Nogami illustrates the process of detecting virtual contact between a virtual object and stimulation generation units 10–12. *Id.* at 22–25 (citing Ex. 1003 ¶¶ 50, 78, 102 108–117, 270, 272, 273, Fig. 4 (steps S4002-S4004); Ex. 1002 ¶ 78). Lastly, Meta argues that the Figures 6 and 11 of Nogami illustrate how detecting the interaction with the virtual object is based on stimulation generation units 10–12 being at a particular

position in free space with respect to the virtual object. *Id.* at 25–27 (citing Ex. 1003 ¶¶ 78, 148, 205, 206, Figs. 6, 11; Ex. 1002 ¶ 78).

Next, independent claim 1 recites “based on detecting the interaction.” Ex. 1001, 12:65. Meta contends that Nogami teaches this limitation because detecting the interaction between the virtual object and stimulation generation units 10–12 is predicated on Nogami teaching the “determining” step discussed in further detail below. Pet. 28 (citing Ex. 1003, Figs. 4 (steps S4003-S4007), 7, 19).

The third step in independent claim 1 recites “determin[ing] a first feedback parameter that depends on an identifier of the peripheral and a second feedback parameter that depends on the particular position of the peripheral in free space.” Ex. 1001, 12:66–13:2. Meta contends that Nogami teaches this “determining” step because, after detecting whether stimulation generation units 10–12 worn by user 1 make virtual contact with the virtual object, CPU 201 determines “operation setting information” that is used to control the haptic feedback provided to the cutaneous sense simulation units 20 of these stimulation generation units. Pet. 29–30 (quoting Ex. 1003 ¶¶ 53, 123) (citing Ex. 1003 ¶ 120, Fig. 4 (step S4006)). According to Meta, it would have been obvious to a person of ordinary skill in the art that Nogami’s process of generating operation setting information includes determining at least the claimed “first feedback parameter” and “second feedback parameter.” *Id.* at 30–31.

Beginning with the claimed “first feedback parameter,” Meta contends that Nogami’s reference intensity levels for haptic feedback teaches this limitation, and asserts it would have been obvious to a person of ordinary skill in the art that these reference intensity levels depend on an

identifier for stimulation generation units 10–12 when making virtual contact with the virtual object. Pet. 31; *see also id.* at 37 (arguing the same (citing Ex. 1002 ¶ 92)). According to Meta, Nogami discloses a different reference intensity level may be applied based on the location of stimulation generation unit 10–12 on the body of user 1. *Id.* at 31–32 (citing Ex. 1003 ¶¶ 280, 281). Meta then asserts that Nogami uses the reference intensity level to determine haptic feedback intensity when virtual contact occurs. *Id.* at 32 (citing Ex. 1003 ¶ 281). Meta, however, argues that Nogami does not provide implementation details as to how the reference intensity level is associated with stimulation generation units 10–12 worn by user 1, but it asserts that a person of ordinary skill in the art would have found the lack of detail to be immaterial because “this would have been considered nothing more than a trivial implementation detail.” *Id.* (citing Ex. 1002 ¶ 89). Meta argues that it would have been obvious to a person of ordinary skill in the art to implement Nogami to provide an identifier for each of stimulation generation units 10–12 to allow CPU 201 to distinguish and associate these stimulation generation units with the region of the user’s body on which they are worn. *Id.* at 33. Relying on the testimony of Dr. Cooperstock, Meta argues that, without assigning an identifier to each of stimulation generation units 10–12, Nogami’s system would not be able to distinguish one stimulation generation unit from another, thereby defeating the purpose of Nogami’s reference intensity levels. *Id.* (citing Ex. 1002 ¶ 89).

Meta further contends that Nogami already discloses the ability to assign a unique identifier to each of stimulation generation units 10–12 in the form of barcode 45. Pet. 34–35 (citing Ex. 1003 ¶¶ 206, 207, Fig. 11). Meta recognizes that Nogami does not disclose using barcode 45 to assign

reference intensity levels to stimulation generation units 10–12, but Meta nonetheless asserts that it would have been obvious to a person of ordinary skill in the art to use this barcode 45 as the claimed “first feedback parameter.” *Id.* at 35 (citing Ex. 1002 ¶ 91). According to Meta, determining a haptic parameter based on an identifier, such as Nogami’s barcode 45, is underscored by Nogami’s disclosure of “correspondence relation information,” which CPU 201 uses to identify the stimulation generation unit corresponding to a region virtual object. *Id.* at 35–37 (quoting Ex. 1003 ¶ 176) (citing Ex. 1003 ¶¶ 174, 175).

Turning to the claimed “second feedback parameter,” Meta contends that Nogami provides two separate examples, each of which independently teach this limitation. Pet. 37. First, Meta argues that Figure 14 of Nogami illustrates that, when virtual contact is made outside attention range 50, (1) a specific duration of a first/higher intensity level will be provided (e.g., 1.5 seconds) followed by (2) a specific duration of a second/lower intensity level (e.g., 1 second). *Id.* at 37–39 (citing Ex. 1003 ¶¶ 254, 256, 259, 278, 281, Fig. 14; Ex. 1002 ¶ 94). Relying on the testimony of Dr. Cooperstock, Meta argues that Nogami’s first/higher intensity level (e.g., 1.5 seconds) teaches the claimed “second feedback parameter” because this is consistent with the disclosure in the ’298 patent that identifies “duration” as an exemplary haptic parameter. *Id.* at 39 (quoting Ex. 1001, 8:20–26) (citing Ex. 1002 ¶ 97). Alternatively, relying on the testimony of Dr. Cooperstock, Meta argues that Nogami’s full functionality illustrated in Figure 14 including a first/higher intensity level (e.g., 1.5 seconds) followed by a second/lower intensity level (e.g., 1 second) teaches the claimed “second feedback parameter” because this is consistent with the disclosure in the ’298 patent

that provides an expansive list of exemplary feedback parameters, such as “intensity,” “duration,” “pattern,” and other “aspects” of haptic feedback. *Id.* at 40 (quoting Ex. 1001, 8:20–26) (citing Ex. 1002 ¶ 96). Meta further argues that Nogami teaches the claimed “second feedback parameter . . . depends on the particular position of the peripheral in free space” because the haptic feedback intensity duration and reduction illustrated in Figure 14 occurs when virtual contact occurs outside attention range 50, which, in turn, is based on the position of stimulation generation units 10–12 in free space. *Id.* at 40–41 (citing Ex. 1002 ¶ 98).

Second, Meta contends that Nogami teaches a second, independent example of the claimed “second haptic parameter” because it discloses selecting different haptic feedback patterns based on whether virtual contact occurs inside attention range 50. Pet. 41–42 (citing Ex. 1003 ¶¶ 195, 196, Figs. 10A, 10B). Meta argues that Nogami’s haptic feedback pattern is a second independent example of the claimed “second haptic parameter” because it is distinct from the intensity identified as the claimed “first haptic parameter.” *Id.* at 42–43 (citing Ex. 1002 ¶¶ 100, 101). Meta also argues this is consistent with the disclosure in the ’298 patent that identifies “intensity” and “pattern” of the haptic feedback as distinct parameters. *Id.* at 43 (citing Ex. 1001, 8:20–26). In addition, Meta argues that Nogami’s haptic feedback pattern “depends on the particular position of the peripheral in free space,” because it depends on at least the position of stimulation generation units 10–12 relative to HMD 100. *Id.* (citing Ex. 1002 ¶¶ 99, 101).

The fourth step in independent claim 1 recites “transmit[ting] a haptic signal configured to cause a haptic output device to output haptic feedback

in accordance with the first feedback parameter and the second feedback parameter.” Ex. 1001, 13:3–6. Meta contends that Nogami teaches this “transmitting” step because, after determining the two feedback parameters identified above, CPU 201 transmits operation setting information to cutaneous sense stimulation units 20 that cause them to deliver haptic feedback to user 1. Pet. 43 (citing Ex. 1003 ¶¶ 123, 177, 178). According to Meta, it would have been obvious to a person of ordinary skill in the art that the operation setting information output by CPU 201 would be transmitted in the form of the claimed “haptic signal.” *Id.* at 43–44 (citing Ex. 1002 ¶ 104). Meta argues that Nogami’s cutaneous sense stimulation units 20, which are included as part of stimulation generation units 10–12, teach the claimed “haptic output device” because they include a “vibration motor,” “voice-coil type device,” and other “actuators” that express tactile sense information to the user. *Id.* at 44–45 (quoting Ex. 1003 ¶¶ 67–69) (citing Ex. 1003 ¶ 13; Ex. 1002 ¶ 105). Meta also argues that Nogami’s operation setting information provided to one or more cutaneous sense stimulation units 20 cause them to output haptic feedback to the user with the intensity specified by the claimed “first feedback parameter,” but also with duration and reduction in intensity and/or pattern specified by the claimed “second feedback parameter.” *Id.* at 45–46 (citing Ex. 1003 ¶¶ 123, 192, Figs. 10A, 10B, 14; Ex. 1002 ¶ 103).

Lastly, Meta asserts that a person of ordinary skill in the art would have been motivated to use both feedback parameters to output haptic feedback because “the combination of the two parameters would have provided more informative haptic feedback than either parameter alone.” Pet. 46. According to Meta, this would have enabled Nogami’s system “to

output more complex haptic feedback reflecting the appropriate intensity based on the region of the body on which the stimulation generation unit is worn . . . , thus enabling delivery of haptic feedback that is better tailored to the user and the nature of the virtual contact.” *Id.* at 46–47 (citing Ex. 1002 ¶ 103).

Independent claims 9 and 17 include essentially the same limitations as independent claim 1, except independent claim 9 is written as a “method” claim and independent claim 17 is written as a “non-transitory computer-readable medium” claim. Pet. 48–49 (citing Ex. 1002 ¶¶ 111, 114). For the most part, Meta contends that the same arguments and evidence it provides to explain how Nogami teaches all the limitations of independent claim 1 equally apply to the limitations of independent claims 9 and 17. *Id.*

Beginning with the unique limitation of independent claim 9, Meta argues that Nogami’s CPU 201 performing processing operations teaches that each of the method steps is performed by a “processor.” *Id.* (citing Ex. 1003 ¶¶ 83, 91; Ex. 1002 ¶¶ 57–59, 53–68, 72, 74, 76, 84, 88, 95). Turning to the unique limitations of independent claim 17, Meta argues that either Nogami’s data recording unit 205 or RAM 202 teaches a “non-transitory computer-readable medium.” *Id.* at 49 (citing Ex. 1002 ¶¶ 64, 65). Meta turns to the program code executed by Nogami’s CPU 201 that causes it to perform certain method steps to teach “program code that is executable by a processor.” *Id.* at 49–50 (citing Ex. 1002 ¶¶ 65–67).

Based on the preliminary record, we discern no deficiency in Meta’s characterizations of Nogami, the general background knowledge in the art, or in Meta’s reasoning as to why a person of ordinary skill in the art would have been prompted to modify this reference. In addition, for purposes of

institution, we are persuaded by Dr. Cooperstock's testimony concerning the relevant disclosures in Nogami. At this stage of the proceeding, Immersion argues that Nogami does teach "determin[ing] a first feedback parameter that depends on an identifier of the peripheral," as recited in each of independent claims 1, 9, and 17. *See* Prelim. Resp. 15–26. We address this argument below.

a. "determin[ing] a first feedback parameter that depends on an identifier of the peripheral"

In its Preliminary Response, Immersion disagrees with Meta's position that it would have been obvious to a person of ordinary skill in the art to use an identifier, such as Nogami's barcode 45, to identify each of stimulation generation units 10–12 for purposes of assigning reference intensity levels. Prelim. Resp. 17–18 (citing Pet. 31–37). Immersion argues that Nogami does not disclose using barcode 45 in this way. *Id.* at 18 (citing Ex. 2002 ¶ 42). Instead, Immersion argues that Nogami only uses barcode 45 to determine whether stimulation generation unit 10 is located inside or outside attention range 50—not to identify stimulation generation unit 10 from a plurality of possible stimulation generation units. *Id.* at 20–25 (citing Ex. 1003 ¶¶ 29, 175, 209, 213, Figs. 6, 11; Ex. 2002 ¶¶ 47–49). Moreover, Immersion asserts that Nogami only discloses that stimulation generation unit 10 contains barcode 45. *Id.* at 25 (citing Ex. 1003 ¶¶ 206–213; Ex. 2002 ¶¶ 50, 51). According to Immersion, there is no disclosure in Nogami that stimulation generation units 11 or 12 also contain barcode 45, nor would there be a need for these two stimulation generation units to contain barcode 45 because Nogami is only concerned with whether

stimulation generation unit 10 is inside or outside attention range 50. *Id.* (citing Ex. 1003 ¶¶ 209, 213; Ex. 2002 ¶ 51).

Immersion further contends that Meta does not provide a proper obviousness analysis because Meta fails to explain why a person of ordinary skill in the art would have modified Nogami in the manner proposed in the Petition for two reasons. Prelim. Resp. 18. First, Immersion argues that Meta’s reasoning for modifying Nogami to use an identifier associated with each of stimulation generation units 10–12 to assign reference intensity levels includes stating that it would have been regarded as a “trivial implementation detail” and it falls within the purview of “elementary knowledge of skilled artisans,” but these statements qualify as “common sense” modifications that cannot be used as a wholesale substitute for reasoned analysis and evidentiary support. *Id.* at 18–19 (quoting Pet. 32, 34). Second, Immersion argues that, even if Meta’s assertion that it would have been trivial or elementary for each of stimulation generation units 10–12 to contain identifiers (e.g., barcode 45) were correct, this still is insufficient to demonstrate that it would have been obvious to a person of ordinary skill in the art to use the identifiers for assigning reference intensity levels. *Id.* at 19. Relying on the testimony of its declarant, Dr. Abowd, Immersion asserts that a person of ordinary skill in the art would have implemented Nogami’s reference intensity levels in a different way that does not involve the use of identifiers, an example being a one-time initialization or calibration procedure. *Id.* at 19–20 (citing Ex. 2002 ¶¶ 44, 45).

Based on the preliminary record, we are persuaded that Meta has presented sufficient evidence to support a finding that it would have been obvious to a person of ordinary skill in the art to use an identifier, such as

Nogami's barcode 45, to identify each of stimulation generation units 10–12 for purposes of assigning reference intensity levels. *See* Pet. 31–37. There appears to be no dispute between the parties that Nogami teaches assigning different reference intensity levels depending on the region of the body of user 1 on which stimulation generation units 10–12 are worn. Ex. 1003 ¶¶ 279, 280, Figs. 1, 3 (illustrating stimulation generation unit 10 including cutaneous sense simulation units 20). Nogami further teaches using the different reference intensity levels to determine haptic feedback intensity depending on whether stimulation generation units 10–12 make virtual contact with virtual object 300 within attention range 50. *Id.* ¶ 281, Fig. 1.

The dispute between the parties appears to center on how Nogami's system assigns reference intensity levels to each of stimulation generation units 10–12 worn by user 1. Relying on the testimony of Dr. Cooperstock, Meta asserts “[i]t would have been obvious to implement Nogami to provide an identifier for each stimulation generation unit [10, 11, and 12] in order to allow CPU 201 to distinguish and associate it with the region of the body [of user 1] on which it is worn.” Pet. 33 (quoting Ex. 1002 ¶ 89). At this stage of the proceeding, we preliminary credit Dr. Cooperstock's testimony because it is consistent with Nogami's disclosure that CPU 201 generates operation setting information (e.g., the reference intensity levels) for controlling the operation of stimulation generation units 10–12, which can vary based on whether these stimulation generation units are located in attention range 50. Ex. 1003 ¶¶ 120, 174, Fig. 4, step 406.

Dr. Cooperstock further testifies that “[t]he concept of an ‘**identifier**’ for a peripheral is a basic concept in computer science or engineering” because

[i]t was elementary knowledge of ordinary skilled artisans that virtually all objects on a computer capable of being operated on or manipulated by a computer – such as peripheral device, a computer file, and even a location within the computer’s memory – are associated with an identifier that allows the computer to identify the object and distinguish it from other objects in the computer.

Ex. 1002 ¶ 90. At this stage of the proceeding, we preliminary credit Dr. Cooperstock’s testimony because Nogami discloses an example of using an identifier in this way. That is, Nogami disclose using barcode 45 that “indicates ID [identification] information (e.g., an ID) unique to the stimulation generation unit 10.” Ex. 1003 ¶ 206, Fig. 11. Although Nogami discloses the example of barcode 45 only in relation to stimulation generation unit 10, it seems reasonable for a person of ordinary skill in the art to infer this teaching of barcode 45 equally applies to stimulation generation units 11 and 12 so that CPU 201 may also use barcode 45 as unique identifiers for these two stimulation generation units to distinguish them from stimulation generation unit 10. *See KSR*, 550 U.S. at 418 (An obviousness evaluation “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.”).

Taking into account Nogami’s disclosure with respect to assigning different reference intensity levels depending on the region of the body of user 1 on which stimulation generation units 10–12 are worn, together with Nogami’s teaching or suggestion of using an identifier (e.g., barcode 45) that indicates ID information unique to each of stimulation generation units 10–12, we are persuaded that the preliminary record supports that it would have

been obvious to a person of ordinary skill in the art to use an identifier, such as barcode 45, to identify each of stimulation generation units 10–12 for purposes of assigning reference intensity levels. According to Dr. Cooperstock, “[w]ithout such an identifier, . . . [Nogami’s] system would have been unable to distinguish one stimulation generation unit from another (regardless of region), thus defeating the purpose of Nogami’s region-specific ‘reference intensity’ [levels].” Ex. 1002 ¶ 89. Dr. Cooperstock also testifies that, “without such an identifier, the system of Nogami could not even have output operation setting information to a particular stimulation generation unit because it could not have separately addressed that stimulation generation unit from other stimulation generation units in the system.” *Id.* We preliminarily credit Dr. Cooperstock’s testimony in this regard because it is consistent with Nogami’s disclosure that CPU 201 generates different operation setting information for stimulation generation units 10 and 11 so that they generate stimulations of different reference intensity levels. Ex. 1003 ¶ 154.

We are not persuaded by Immersion’s arguments that Nogami does not disclose using barcode 45 to identify stimulation generation unit 10 from a plurality of possible stimulation generation units, much less to assign stimulation generation unit 10 a reference intensity level. *See* Prelim. Resp. 17–18, 20–25. As an initial matter, we do not agree with the underlying premise of Immersion’s arguments that barcode 45 is not used as a unique identifier for stimulation generation unit 10. As we explain above, Nogami explicitly discloses that barcode 45 “indicates ID information (e.g., an ID) unique to the stimulation generation unit 10.” Ex. 1003 ¶ 206, Fig. 11. Stated differently, Nogami clearly contemplates using barcode 45 as a

unique identifier for stimulation generation unit 10, which, in turn, allows Nogami's CPU 201 to distinguish stimulation generation unit 10 from stimulation generation units 11 and 12.

To the extent Immersion argues that Nogami only discloses stimulation generation unit 10 containing barcode 45 and Nogami does not disclose stimulation generation units 11 and 12 also containing barcode 45, we are not persuaded. *See* Prelim. Resp. 25. Immersion fails to appreciate that, "while an analysis of obviousness always depends on evidence that supports the required *Graham* factual findings, it also may include recourse to logic, judgment, and common sense available to the person of ordinary skill that do not necessarily require explication in any reference." *Perfect Web Tech., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009). We reiterate that, even though Nogami does not disclose explicitly that each of stimulation generation units 11 and 12 also contain barcode 45, it seems reasonable for a person of ordinary skill in the art to infer that Nogami's teaching of barcode 45 equally applies to stimulation generation units 11 and 12 so that CPU 201 may also use barcode 45 as unique identifiers for these two stimulation generation units to distinguish them from stimulation generation unit 10. *See KSR*, 550 U.S. at 418.

At this stage in the proceeding, we are not persuaded by Immersion's argument that that Meta's reasoning for modifying Nogami to use an identifier associated with stimulation generation units 10–12 to assign reference intensity levels amounts to "common sense" modifications that cannot be used as a wholesale substitute for reasoned analysis and evidentiary support. *See* Prelim. Resp. 18–19. As we explain above, based on the preliminary record, Meta has presented sufficient arguments and

evidence that would support modifying Nogami in this way. *See* Pet. 31–37; Ex. 1002 ¶¶ 89–91. During trial, we encourage Immersion to further develop why it believes it would not have been obvious for a person of ordinary skill in the art to use an identifier, such as Nogami’s barcode 45, for the purpose of assigning reference intensity levels to each of stimulation generation units 10–12.

We also are not persuaded by Immersion’s argument that, even if Meta’s assertion that it would have been trivial or elementary for stimulation generation units 10–12 to contain identifiers (e.g., barcode 45) were correct, this still is insufficient to demonstrate that it would have been obvious to a person of ordinary skill in the art to use identifiers for assigning reference intensity levels. *See* Prelim. Resp. 19–20. Immersion’s argument in this regard is based on testimony from its declarant, Dr. Abowd, that a person of ordinary skill in the art would have implemented Nogami’s reference intensity levels in a different way that does not involve the use of identifiers, an example being a one-time initialization or calibration procedure. Ex. 2002 ¶¶ 44, 45. At this stage in the proceeding, we decline to credit Dr. Abowd’s testimony on this particular issue because he does not provide any underlying facts or data to support his opinion. *See* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

b. Summary

In summary, Meta has shown a reasonable likelihood that it would prevail on its assertions that the subject matter of independent claims 1, 9, and 17 would have been obvious over Nogami.

5. *Claims 2, 3, 6, 10, 11, 14, 18, 19, and 22*

Because Meta has demonstrated a reasonable likelihood of success in demonstrating that at least one claim of the '298 patent is unpatentable, we institute on all challenged claims and all grounds raised in the Petition. *See* 37 C.F.R. § 42.108(a) (2023). Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of dependent claims 2, 3, 6, 10, 11, 14, 18, 19, and 22 under this obviousness ground. Nevertheless, we address these dependent claims separately.

Claim 2 depends from independent claim 1, and further recites “wherein the virtual object is a three-dimensional virtual object.” Ex. 1001, 13:7–8. Claims 10 and 18 each recite the same limitation, but depend from independent claims 9 and 17, respectively. *Id.* at 13:40–41, 14:26–28. Meta contends that Nogami teaches these limitations because it discloses virtual objects that are three-dimensional, such as virtual object 300 (i.e. the image of an automobile in an actual size) illustrated in Figure 1 and background virtual objects 302 and 303 illustrated in Figure 6. Pet. 47 (citing Ex. 1003 ¶ 249, Figs. 1, 6; Ex. 1002 ¶ 108); *see also id.* at 49–50 (arguing the same).

Claim 3 depends from independent claim 1, and further recites “wherein the virtual environment is an augmented reality environment.” Ex. 1001, 13:9–10. Claims 11 and 19 each recite the same limitation, but depend from independent claims 9 and 17, respectively. *Id.* at 13:42–43, 14:29–31. Meta contends that Nogami teaches these limitations because it combines images with one or more virtual objects with a user’s real-world surroundings. Pet. 47 (citing Ex. 1002 ¶¶ 71, 72); *see also id.* at 49–50 (arguing the same). According to Meta, this is consistent with the '298 patent, which makes clear that integrating virtual objects with real-world

imagery is the claimed “augmented reality environment.” *Id.* at 47 (citing Ex. 1001, 1:35–40).

Claim 6 depends from independent claim 1, and further recites “wherein the peripheral is an electronic device that comprises the haptic output device.” Ex. 1001, 13:15–16. Claims 14 and 22 each recite the same limitation, but depend from independent claims 9 and 17, respectively. *Id.* at 14:1–2, 14:36–38. Meta contends that Nogami teaches these limitations because it discloses that each of stimulation generation units 10–12 include one or more cutaneous sense stimulation units 20 that provide haptic feedback. Pet. 48 (citing Ex. 1003 ¶¶ 61, 233, 264, Fig. 3); *see also id.* at 49–50 (arguing the same). Meta argues that Nogami’s stimulation generation units 10–12 constitute the claimed “electronic device” because they may include a number of cutaneous sense stimulation units 20 that take the form of vibration motors and other components for delivering haptic feedback. *Id.* at 48 (citing Ex. 1003 ¶¶ 62–72). Meta asserts that one embodiment in Nogami discloses that a stimulation generation unit may include a magnetic receiver/sensor for detecting a magnetic field for use in acquiring position and orientation information. *Id.* (citing Ex. 1003 ¶ 77).

Based on the preliminary record, Meta’s arguments and supporting evidence with respect to dependents claims 2, 3, 6, 10, 11, 14, 18, 19, and 22 are sufficient for purposes of institution. At this stage of the proceeding, Immersion does not address separately Meta’s arguments and supporting evidence as to how Nogami teaches the limitations of these dependent claims. *See* Prelim. Resp. 15–27. When considering Meta’s un rebutted arguments and supporting evidence, Meta has demonstrated a reasonable likelihood that it would prevail on its assertions that the subject matter of

dependents claims 2, 3, 6, 10, 11, 14, 18, 19, and 22 would have been obvious over Nogami.

D. Obviousness Over Nogami and Nelson

Meta contends that claims 5, 13, and 21 of the '298 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Nogami and Nelson. Pet. 50–53. Meta contends that the combined teachings of Nogami and Nelson account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of these references. *Id.* Meta also relies on the testimony of Dr. Cooperstock to support its positions. *See* Ex. 1002.

Based on the preliminary record, we determine that Meta has shown that there is a reasonable likelihood that it would prevail in challenging claims 5, 13, and 21 of the '298 patent as unpatentable. We begin our analysis with an overview of Nelson, and then we address the parties' contentions with respect to the challenged claims.

1. Overview of Nelson

Nelson generally relates to “the interaction of graphical objects in a graphical environment.” Ex. 1004, 1:18–19. Figure 9 of Nelson, reproduced below, illustrates a schematic view of a simulation system having a computer controller. *Id.* at 2:55–56.

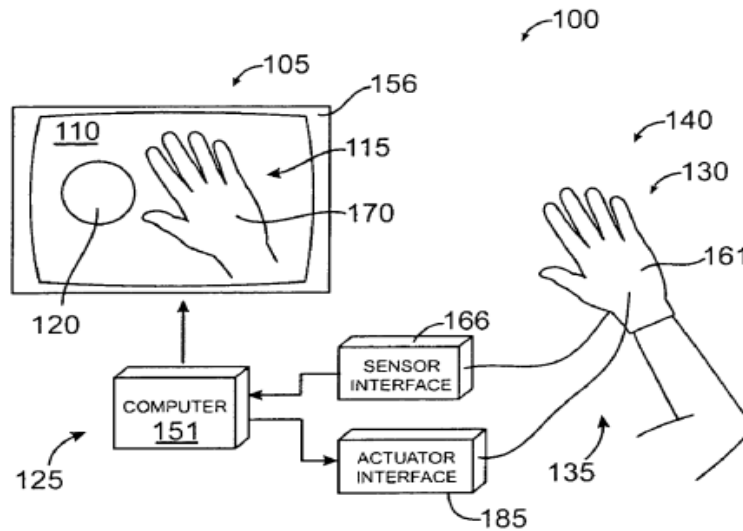


FIG. 9

Figure 9 illustrates simulation system 100 that includes, among other things, controller 125 in the form of computer 151 capable of implementing an application program allowing a user to interact with various peripherals, including interface device 140 and user object 130. *Id.* at 7:36–60. User object 130 may be instrumented glove 161 that includes one or more sensors capable of detecting a manipulation of the glove. *Id.* at 8:30–33, 9:42–45.

2. Claims 5, 13, and 21

Claim 5 depends from independent claim 1, and further recites “wherein the peripheral is a consumer product.” Ex. 1001, 13:13–14. Claims 13 and 21 each recite the same limitation, but depend from independent claims 9 and 17, respectively. *Id.* at 13:46–47, 14:34–35. As it identifies above with respect to independent claim 1, Meta contends that Nogami discloses a peripheral in the form of stimulation generation unit 10 that takes the form of a glove worn on the hand of user 1. Pet. 50 (citing Ex. 1002 ¶ 75). Meta, however, argues that Nogami does not disclose explicitly that stimulation generation unit 10 is a “consumer product.” *Id.* at

50–51. Meta argues that it would have been obvious to a person of ordinary skill in the art that Nogami’s stimulation generation unit 10 would be a product that was available commercially to consumers, as evidenced by Nelson. *Id.* at 51 (citing Ex. 1002 ¶ 119). Meta then turns to Nelson as teaching instrumented glove 161 that interacts with virtual reality environments. *Id.* at 51–52 (citing Ex. 1004, 1:19–26, 8:30–33, 9:42–45, 10:10–17, Fig. 9; Ex. 1002 ¶ 120). According to Meta, Nelson’s instrumented glove 161 is used in consumer contexts, such as playing video games offered by Nintendo, Sega, and Sony. *Id.* at 52 (citing Ex. 1004, 1:25, 3:16–23, 7:44–47, 7:60–63, 7:65).

Turning to rationale to combine, Meta contends that it would have been obvious to a person of ordinary skill in the art to combine the teachings of Nogami and Nelson, thereby predictably resulting in Nogami’s stimulation generation unit 10 being a “consumer product.” Pet. 52 (citing Ex. 1002 ¶ 122). According to Meta, a person of ordinary skill in the art would have been motivated to combine the teachings of Nogami and Nelson because, among other reasons, (1) “the difference between ‘consumer’ and ‘non-consumer’ products to be a marketing distinction [is] immaterial to” Nogami’s system, (2) “allowing stimulation generation unit [10] in Nogami to be a consumer product would have increased the flexibility of [Nogami’s] system by allowing it to be used with a broader range of units provided by third party manufacturers,” and (3) “implementing Nogami to take advantage of specialization within the industry in the development and manufacturing of glove-like stimulation generation units” would have reduced “the burden of designing, implementing, and manufacturing its own stimulation generation units for use with [Nogami’s] system.” *Id.* at 52–53

(citing Ex. 1002 ¶ 124). Meta asserts there would have been a reasonable expectation of success in making this proposed combination because it “involves nothing more than Nogami’s existing stimulation generation units [10–12] being used in a consumer context.” *Id.* at 53 (citing Ex. 1002 ¶ 125).

Based on the preliminary record, Meta’s arguments and supporting evidence with respect to dependent claims 5, 13, and 21 are sufficient for purposes of institution. At this stage of the proceeding, Immersion does not address separately Meta’s arguments and supporting evidence as to how the combined teachings of Nogami and Nelson account for the limitations of these dependent claims, nor does Immersion dispute Meta’s rationale to combine the relevant teachings of these references. *See* Prelim. Resp. 27. When considering Meta’s un rebutted arguments and supporting evidence, Meta has demonstrated a reasonable likelihood that it would prevail on its assertions that the subject matter of dependent claims 5, 13, and 21 would have been obvious over the combined teachings of Nogami and Nelson.

E. Obviousness Over Nogami and Moriya

Meta contends that claims 8, 16, and 24 of the ’298 patent are unpatentable under 35 U.S.C. § 103(a) as obvious over the combined teachings of Nogami and Moriya. Pet. 54–60. Meta contends that the combined teachings of Nogami and Moriya account for the subject matter of each challenged claim, and provides reasoning as to why a person of ordinary skill in the art would have been prompted to modify the teachings of these references. *Id.* Meta also relies on the testimony of Dr. Cooperstock to support its positions. *See* Ex. 1002.

Based on the preliminary record, we determine that Meta has shown that there is a reasonable likelihood that it would prevail in challenging claims 8, 16, and 24 of the '298 patent as unpatentable. We begin our analysis with an overview of Moriya, and then we address the parties' contentions with respect to the challenged claims.

1. Overview of Moriya

Moriya generally relates to “an . . . apparatus and method for positioning and tracking objects, particularly using a non-linear Kalman Filter tracker, where electromagnetic field data and acceleration information are used simultaneously for the determination of the position and orientation of a remote sensing device.” Ex. 1005, 2:61–67. In one embodiment, Moriya disclose a system that includes control unit 30 and database 35 used to control a plurality of electromagnetic field transmitters 10, 12, 14, 16, 18, and 20 connected to a plurality of sensors 40 placed on various body parts of a user. *Id.* at 12:47–13:40, Fig. 1. Figure 2 of Moriya, reproduced below, illustrates a functional block diagram of the various components included within sensor 40. *Id.* at 9:57–58, 12:41–44.

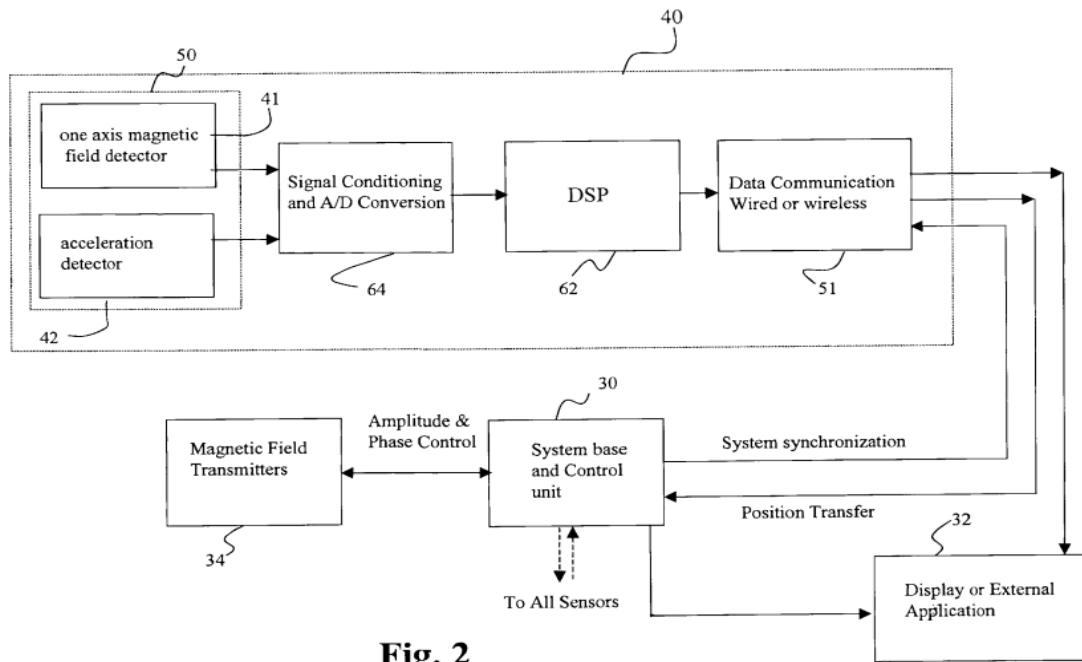


Fig. 2

Figure 2 illustrates, among other things, how sensor 40 receives input from magnetic field detector 41 that is used by integrated digital signal processor (“DSP”) 62 to compute position and orientation coordinates of the sensor. *Id.* at 4:55–5:4, 12:66–13:5.

2. Claims 8, 16, and 24

Claim 8 depends from independent claim 1, and further recites “wherein the peripheral comprise a wearable computer.” Ex. 1001, 13:21–22. Claims 16 and 24 each recite the same limitation, but depend from independent claims 9 and 17, respectively. *Id.* at 14:7–8, 14:44–46. As it identifies above with respect to independent claim 1, Meta contends that Nogami discloses a peripheral in the form of stimulation generation unit 10 that takes the form of a glove worn on the hand of user 1. Pet. 54 (citing Ex. 1002 ¶ 75). Meta further argues that stimulation generation unit 10 may include one or more cutaneous sense simulation units 20, each of which may include a magnetic receiver/sensor for detecting the magnetic field for use in

acquiring position and orientation information. *Id.* (citing Ex. 1003 ¶¶ 61, 77, Fig. 3). In this magnetic receiver/sensor embodiment, Meta argues that Nogami’s calculation processing apparatus 200 acquires position and orientation information from stimulation generation unit 10. *Id.* (citing Ex. 1003 ¶¶ 76, 82). Meta further argues that, although Nogami discloses that stimulation generation unit 10 is “wearable” because it may be worn on the hand of the user, Nogami does not disclose explicitly this unit is a “wearable computer.” *Id.* (citing Ex. 1003 ¶¶ 49, 51, Fig. 1). Meta asserts that it would have been obvious to a person of ordinary skill in the art for Nogami’s stimulation generation unit 10 to include a processor for performing certain operations, as evidenced by Moriya. *Id.* at 54–55. Meta turns to Moriya as teaching wearable sensor 40 that includes, among other things, DSP 62 capable of processing information received from magnetic field detector 41. *Id.* at 55–56 (citing Ex. 1005, 3:37–44, 4:42–5:4, 9:51–65, 11:50–58, 12:66–13:5, 14:4–14, Figs. 1, 2; Ex. 1002 ¶ 130; Ex. 1006, 9⁴).

Turning to rationale to combine, Meta contends that it would have been obvious to a person of ordinary skill in the art to combine the teachings of Nogami and Moriya regarding magnetic-based position and orientation sensors, thereby predictably resulting in Nogami’s stimulation generation unit 10 including Moriya’s DSP 62 for calculating position and orientation information. Pet. 57–58. According to Meta, because Nogami discloses that cutaneous sense simulation units 20 may be used in stimulation generation

⁴ All references to the Microsoft Computer Dictionary Fifth Edition refer to the page numbers inserted by Meta in the bottom, right-hand corner of each page in Exhibit 1006.

unit 10, a person of ordinary skill in the art would have been motivated to look to (and readily appreciated) Moriya for its additional information about magnetic-based position and orientation sensors. *Id.* at 58–59 (citing Ex. 1002 ¶ 133).

Meta asserts that a person of ordinary skill in the art would have been motivated to implement Nogami’s stimulation generation unit 10 to include Moriya’s DSP 62 contained within sensor 40 to compute position and orientation information because it would increase the efficiency of Nogami’s system in two ways: (1) it would relieve “Nogami’s calculation processing apparatus 200 from the responsibility and burden of performing this task, thus freeing it to perform other operations”; and (2) it would reduce the amount of data “stimulation generation unit [10] would have transmitted to Nogami’s calculation processing apparatus 200 because the . . . [stimulation generation] unit need only transmit calculated values and not the potentially larger amount of raw sensor data that must be processed in order to calculate those values.” Pet. 59 (citing Ex. 1002 ¶¶ 134, 135). Lastly, Meta asserts there would have been a reasonable expectation of success in making this proposed combination because it “merely involves using Moriya’s wearable position and orientation sensors [40] in Nogami’s simulation generation units [10–12],” and “[magnetic-based] position and orientation sensors were well known by 2010.” *Id.* (citing Ex. 1002 ¶ 136).

Based on the preliminary record, Meta’s arguments and supporting evidence with respect to dependent claims 8, 16, and 24 are sufficient for purposes of institution. At this stage of the proceeding, Immersion does not address separately Meta’s arguments and supporting evidence as to how the combined teachings of Nogami and Moriya account for the limitations of

these dependent claims, nor does Immersion dispute Meta's rationale to combine the relevant teachings of these references. *See* Prelim. Resp. 27–28. When considering Meta's un rebutted arguments and supporting evidence, Meta has demonstrated a reasonable likelihood that it would prevail on its assertions that the subject matter of dependent claims 8, 16, and 24 would have been obvious over the combined teachings of Nogami and Moriya.

III. CONCLUSION

Taking into account Immersion's Preliminary Response, we conclude that the information presented in the Petition demonstrates that there is a reasonable likelihood that Meta would prevail in challenging at least one of claims 1–3, 5, 6, 8–11, 13, 14, 16–19, 21, 22, and 24 of the '298 patent as unpatentable. Accordingly, we institute an IPR as to all challenged claims and all the grounds raised in the Petition. *See* 37 C.F.R. § 42.108(a). At this stage of the proceeding, we have not made a final determination with respect to the patentability of the challenged claims or the construction of any claim term.

IV. ORDER

Accordingly, it is

ORDERED that, pursuant to 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a), an IPR is hereby instituted as to all of the challenged claims and all of the grounds raised in the Petition; and

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

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