

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HTC CORPORATION AND HTC AMERICA, INC.,
Petitioner,

v.

MOTIVA PATENTS, LLC,
Patent Owner.

IPR2019-01665
Patent 8,159,354 B2

Before LYNNE E. PETTIGREW, MONICA S. ULLAGADDI, and
IFTIKHAR AHMED, *Administrative Patent Judges*.

PETTIGREW, *Administrative Patent Judge*.

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

I. INTRODUCTION

HTC Corporation and HTC American, Inc. (collectively, “Petitioner”) filed a Petition for *inter partes* review of claims 32 and 49 of U.S. Patent No. 8,159,354 B2 (Ex. 1001, “the ’354 patent”). Paper 2 (“Pet.”). Motiva Patents, LLC (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

Under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a), we have authority to institute an *inter partes* review if “the information presented in the petition . . . and any response . . . 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.” 35 U.S.C. § 314(a). After considering the Petition, the Preliminary Response, and the evidence of record, we conclude the information presented shows a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one of the challenged claims of the ’354 patent. Accordingly, we institute an *inter partes* review of claims 32 and 49 of the ’354 patent on the grounds asserted in the Petition.

II. BACKGROUND

A. Related Matters

Petitioner identifies the following district court proceedings involving the ’354 patent: *Motiva Patents, LLC v. Sony Corp.*, No. 9:18-cv-00180 (E.D. Tex.); *Motiva Patents, LLC v. HTC Corp.*, No. 9:18-cv-00179 (E.D. Tex.); and *Motiva Patents, LLC v. Facebook Techs., LLC.*, No. 9:18-cv-00178 (E.D. Tex.). Pet. 2. Patent Owner identifies the following district court proceedings involving the ’354 patent: *Motiva Patents, LLC v. HTC*

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Corp., No. 9:19-cv-00181 (E.D. Tex.); and *HTC Corp. v. Motiva Patents, LLC*, No. 3:19-cv-06373 (N.D. Cal.). Paper 4, 1.

Petitioner has filed the following petitions for *inter partes* review of other patents in the same chain of continuations as the '354 patent: IPR2019-01664, challenging claims of U.S. Patent No. 8,427,325 B2 (Ex. 2004, “the '325 patent”), which is the child of the '354 patent; and IPR2019-01666, challenging claims of U.S. Patent No. 9,427,659 B2 (Ex. 2006, “the '659 patent”), which is the grandchild of the '354 patent. *See* Ex. 2006, code (63) (related U.S. application data for the '659 patent providing the chain of continuations).

B. Overview of the '354 Patent

The '354 patent relates generally to a motion-tracking system for measuring the position and orientation (collectively “pose”) of one or more transponders. *See* Ex. 1001, 1:16–18, 2:11–12. The system may train a user who is wearing or holding one or more transponders to manipulate the pose of the transponders through a movement trajectory while guided by interactive and sensory feedback. *Id.* at 1:18–22, 2:41–46.

In the preferred embodiment, the system includes one or more active transponders that radiate or transmit signals for absolute position tracking, process “an embedded inertial sensor for relative orientation tracking and absolute tracking refinement,” and provide “essentially real-time aural, visual, and tactile sensory interfaces to the user.” *Id.* at 2:46–55. For example, the transponder may include an embedded vibrator motor for providing tactile feedback or a series of embedded light emitting diodes (LEDs) for providing visual feedback. *Id.* at 11:66–12:5, Figs. 2A, 2B. The system also includes a processor unit that receives and processes the radiating or transmitted signals from the transponders, iteratively calculates

the transponders' pose and convolution, and continually exchanges this information and analysis with the transponders or a host computer system. *Id.* at 2:55–66.

As the user moves a transponder, the processing unit may compare the transponder's pose to a “reference movement trajectory” and calculate the error in real-time between the actual and reference movement trajectories. *Id.* at 14:64–15:3. Based on the error calculation, the system may determine what sensory feedback to provide to the user so that the user may correct his or her manipulation strategy. *Id.* A host computer system may provide an auxiliary processing and display means to allow a software program, such as a video game, to access the transponders' calculated positional data and use it “to alter the pose of a graphical primitive in proportion to the motions of the transponders within the context of a computer generated virtual environment.” *Id.* at 15:12–22.

In one embodiment, the system includes two transponders defining the endpoints of a movement vector, such that the relative translation and rotation of the transponders may be measured and evaluated for functional movement capability. *Id.* at 3:35–39. Such functional movement capabilities include “limb range of motion and its control thereof, limb strength conditioning, . . . overall proprioception and hand-eye coordination skills, and overall body movement.” *Id.* at 3:40–43.

C. Illustrative Claim

Challenged claims 32 and 49 are both independent. Claim 32 is illustrative of the claimed subject matter and is reproduced below:

32. A system for a user to play a video game, comprising:
a first hand-held communication device comprising:

- a transmitter for transmitting signals;
- a receiver for receiving signals; and
- an output device;

a processing system, remote from the first hand-held communication device for wirelessly receiving the signals transmitted by the transmitter, determining movement information for first hand-held communication device;

a second hand-held communication device, in wireless communication with the processing system said second hand-held communication device, comprising a transmitter for transmitting signals;

wherein the processing system is adapted to determine movement information of the second hand-held communication device and send feedback data to the user based on the movement information of the first and second hand-held communication devices;

wherein the first hand-held communication device is adapted to receive and process the feedback data and generates sensory stimuli for the user based on the received data and delivered through the output device; and

wherein the movement information of the first and second hand-held communication devices are used to control a graphical object on a display screen.

Ex. 1001, 36:45–37:3.

D. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable based on the following grounds (Pet. 11):

Claims Challenged	35 U.S.C. §	Reference(s)
32, 49	102(b)	Nishitani ¹
32, 49	102(b)	Rosenberg ²
32, 49	103	Horton ³ , Woolston ⁴

In support of its contentions, Petitioner relies on the Declaration of Dr. Gregory Welch (Ex. 1003).

III. DISCUSSION

A. Patent Owner's Argument Regarding 35 U.S.C. § 325(d)

Patent Owner argues that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution of *inter partes* review in this case. Prelim. Resp. 1. In particular, Patent Owner asserts that the Petition is “primarily based on Nishitani and Rosenberg,” references that were “already before the Patent Office and [were] also considered in depth during reexaminations of [U.S. Patent No. 7,292,151 and U.S. Patent No. 7,952,483], parents of the challenged patent.”⁵ *Id.* Patent Owner contends that because the Office already has reviewed Nishitani and Rosenberg in connection with “closely related parent patents” and was

¹ U.S. Patent App'n Pub. No. 2001/0015123 A1, published Aug. 23, 2001 (Ex. 1006, “Nishitani”).

² Int'l Pub. No. WO 97/12337, published Apr. 3, 1997 (Ex. 1009, “Rosenberg”).

³ U.S. Patent No. 5,615,132, issued Mar. 25, 1997 (Ex. 1010, “Horton”).

⁴ U.S. Patent No. 6,162,123, issued Dec. 19, 2000 (Ex. 1011, “Woolston”).

⁵ U.S. Patent No. 7,952,483 (“the '483 patent”) is the parent of the '354 patent. *See* Ex. 1001, code (63). U.S. Patent No. 7,292,151 (“the '151 patent”) is the grandparent of the '483 patent. *See id.*

aware of the two references during prosecution of the '354 patent, “the Board should not now use its limited resources to institute an inter partes review based on the same prior art.” *Id.* at 1–2 (citing *ZTE (USA) Inc. v. Fractus, S.A.*, IPR2018-01457, Paper 20 at 5 (PTAB Oct. 4, 2019)).

Petitioner does not address § 325(d) in its Petition. *See generally* Pet.

Section 325(d) provides that the Director may elect not to institute⁶ a proceeding if “the same or substantially the same prior art or arguments [in the petition] previously were presented to the Office.” 35 U.S.C. § 325(d); *Advanced Bionics, LLC, v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 7 (PTAB Feb. 13, 2020) (designated precedential Mar. 24, 2020). The Board uses a two-part framework in evaluating whether to exercise discretion under § 325(d). *Advanced Bionics*, Paper 6 at 8. First, we consider “whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office.” *Id.* Second, if either condition in the first part is satisfied, we consider “whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Id.* If a condition in the first part “is satisfied and the petitioner fails to make a showing of material error, the Director generally will exercise discretion not to institute *inter partes* review.” *Id.* at 8–9.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 (Dec. 15, 2017) (precedential as to § III.C.5, first paragraph), sets forth several non-exclusive factors that provide useful insight in applying the two-part framework. *Advanced Bionics*, Paper 6 at 9. In the first part of the framework, we look to *Becton, Dickinson* factors (a), (b), and (d) to evaluate

⁶ The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

“the similarities and material differences between the asserted art and the prior art” previously presented to the Office during a proceeding pertaining to the challenged patent (factor (a)), “the cumulative nature of the asserted art and the prior art evaluated” previously (factor (b)), and “the extent of the overlap between the arguments” previously presented “and the manner in which petitioner relies on the prior art” (factor (d)). *Advanced Bionics*, Paper 6 at 9 n.10 (citing *Becton, Dickinson*, Paper 8 at 17–18); *see id.* at 9–10. If we determine that the same or substantially the same art or arguments previously were presented to the Office, we turn to the second part of the framework to determine whether the petitioner has demonstrated material error by the Office. *Id.* at 10. The remaining *Becton, Dickinson* factors relate to this second inquiry: factor (c) (“the extent to which the asserted art was evaluated [previously], including whether the prior art was the basis for rejection”), factor (e) (“whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art”), and factor (f) (“the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments”). *Id.* at 9 n.10; *see id.* at 9–10.

We begin our analysis with the first part of the *Advanced Bionics* framework. The Petition asserts three grounds of unpatentability against each of the challenged claims—anticipation by Nishitani, anticipation by Rosenberg, and obviousness over the combination of Horton and Woolston. Pet. 11. As Petitioner notes, the applicant cited Nishitani and Rosenberg in an Information Disclosure Statement (“IDS”) during prosecution of the ’354 patent, but the Examiner did not expressly consider either reference. *See* Pet. 12, 31; Ex. 1002, 26, 57, 115, 137 (’354 patent file history); *see* Ex. 1001, code (56) (’354 patent listing Nishitani and Rosenberg among the

references cited). Petitioner also acknowledges that Nishitani and Rosenberg were applied during reexamination of the parent '483 patent. Pet. 12, 31–32. Specifically, Petitioner argues that many of the limitations in the challenged claims (i.e., claims 32 and 49 of the '354 patent) were found to be disclosed by Nishitani and Rosenberg during reexamination of the '483 patent, resulting in cancellation of many claims of the '483 patent. *Id.* (citing Ex. 1007, 21–29, 36–41).

Patent Owner contends that the Office was well aware of the reexamination proceedings, including Nishitani and Rosenberg, during prosecution of the '354 patent, and that the relevant *Becton, Dickinson* factors are met because the claims of the '354 patent are substantially similar to claims evaluated in view of Nishitani and Rosenberg during reexamination of the '483 patent. Prelim. Resp. 1–3. The record does not support Patent Owner's position. During prosecution of the application that issued as the '354 patent, the claims did not face a single prior art rejection and were rejected only for nonstatutory double patenting over claims 1–50 of the '483 patent, *prior to reexamination of the '483 patent*. Ex. 1002, 192–93 (office action dated October 13, 2011). After the applicant filed a terminal disclaimer based on the '483 patent to overcome the rejection, the Examiner allowed the claims of the '354 patent. *Id.* at 97–98, 166, 182–83. The Notice of Allowance issued on December 13, 2011, *prior to the request for reexamination of the '483 patent* on January 19, 2012. *Id.* at 97–98 ('354 patent Notice of Allowance); Ex. 1007, 328–70 ('483 patent reexamination request).

For these reasons, we find that, with respect to the challenged claims of the '354 patent, Nishitani and Rosenberg were not previously presented to the Office under § 325(d) on the basis of their evaluation during the

reexamination of the '483 patent because the '483 patent reexamination was not requested or ordered until after the Notice of Allowance issued in the '354 patent. We do find, however, that Nishitani and Rosenberg previously were presented to the Office because they were included in an IDS filed during prosecution of the '354 patent.

The Petition asserts a third ground of unpatentability—obviousness over Horton and Woolston. Pet. 1. Neither reference was cited or considered during prosecution of the '354 patent. *See* Pet. 47, 49; Ex. 1002. Patent Owner does not present an argument that these references or substantially similar art or arguments were previously presented to the Office. Furthermore, as noted, the claims of the '354 patent did not face a single prior art rejection during prosecution. *See* Pet. 5; Ex. 1002. Therefore, with respect to the obviousness ground asserted in the Petition, the same art was not presented previously to the Office (*Becton, Dickinson* factor (a)), the same arguments were not presented previously to the Office (factor (d)), and the art is not cumulative of art evaluated during examination of the '354 patent (factor (b)).

Thus, under the first part of the *Advanced Bionics* framework, we find that the Petition asserts against all the challenged claims some prior art that is not the same or substantially the same art previously presented to the Office and provides arguments not previously presented to the Office. *See Advanced Bionics*, Paper 6 at 8. With respect to the prior art that was previously presented to the Office, we determine that the record suggests material error by the Office under the second part of the *Advanced Bionics* framework during prosecution of the '354 patent. *See id.* First, during the reexamination of the parent '483 patent that occurred after the claims of the '354 patent were allowed, the Office found that Nishitani and Rosenberg

each disclose many limitations also recited in the challenged claims. Further, as demonstrated in the discussion below of Petitioner's asserted anticipation grounds based on Nishitani and Rosenberg, each of these references appears on its face to disclose limitations of the challenged claims of the '354 patent. Based on the specific facts of this case, we determine the Office erred in overlooking the teachings of these references.

After careful consideration of the record before us, we determine that on balance the totality of the evidence favors declining to exercise our discretion under 35 U.S.C. § 325(d) to deny institution. *See id.* at 8–9; *see also Oticon Medical AB v. Cochlear Ltd.*, IPR2019-00975, Paper 15 at 20 (PTAB Oct. 16, 2019) (designated precedential as to §§ II.B and II.C on Mar. 24, 2020) (declining to exercise discretion when new, noncumulative prior art was asserted in the Petition).

B. Patent Owner's Argument Regarding 35 U.S.C. § 314(a)

Patent Owner also argues that the Board should not use its limited resources to address issues that can be resolved expeditiously in district court. Prelim. Resp. at 3–4 (citing *NHK Spring Co. v. Intri-Plex Techs.*, IPR2018-00752, Paper 8 at 19–20 (PTAB Sept. 12, 2018) (precedential)). Patent Owner explains that there has been extensive litigation activity related to Patent Owner's patents and a pending district court action “will be scheduled for trial long before the Board issues a decision.” *Id.* (citing Exs. 1005, 2007–2011).

According to Patent Owner, a trial date was to be set at a scheduling conference on January 29, 2020. *Id.* at 3 (citing Ex. 2010). Patent Owner, however, has not provided us with updated information regarding a trial date. Having reviewed the status of the district court action on Public Access to Court Electronic Records (PACER), we determine that trial is

scheduled to begin *after* the date on which a final written decision in this proceeding will issue. Accordingly, we decline to exercise our discretion to deny institution under 35 U.S.C. § 314(a).

C. Patent Owner’s Challenge under the Appointments Clause

Patent Owner contends we should not institute an *inter partes* review “because the appointment of the APJs violates the Appointments Clause” of the U.S. Constitution. Prelim. Resp. 4. Although acknowledging that the U.S. Court of Appeals for the Federal Circuit held that severing certain job protections for APJs remedied any Appointments Clause problem, *see Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320 (Fed. Cir. 2019), Patent Owner argues that the severance remedy was inappropriate and ineffective. Prelim. Resp. 4–5.

The issue before us at this juncture is whether the evidence presented shows a reasonable likelihood that Petitioner would prevail in establishing the unpatentability of at least one challenged claim so that we may institute an *inter partes* review. *Arthrex* makes clear there is “no constitutional infirmity” in an institution decision. 941 F.3d at 1340. Patent Owner’s arguments, therefore, do not support denial of institution.

D. Principles of Law

In order to anticipate a claimed invention, a prior art reference must disclose all of the claim limitations “arranged or combined in the same way as in the claim.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1370 (Fed. Cir. 2008). 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 ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness.⁷ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). “To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

E. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would include someone who had, at the priority date of the ’354 patent (i) a Bachelor’s degree in computer science, computer engineering, electrical engineering, or a similar technical field; (ii) a basic understanding of the principles of operation of the technologies commonly used for motion sensing and for communication between electronic peripherals; and (iii) one or more years of experience in analysis, design, or development of systems employing some of the sensing and communication principles; with additional education substituting for experience and vice versa.

Pet. 6. Petitioner supports this assertion with the testimony of Dr. Welch. Ex. 1003 ¶ 71. Patent Owner does not take a position as to the level of ordinary skill in the art. *See generally* Prelim. Resp.

⁷ With respect to the fourth *Graham* factor, the parties at this time do not present arguments or evidence regarding objective indicia of non-obviousness. Therefore, the obviousness analysis at this stage of the proceeding is based on the first three *Graham* factors.

On the present record, we determine that Petitioner’s proposed level of ordinary skill in the art is consistent with the ’354 patent and asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001). Therefore, we adopt Petitioner’s proposal for purposes of deciding whether to institute *inter partes* review.

F. Claim Construction

In an *inter partes* review filed on or after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2019); Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340–41, 51,343 (Oct. 11, 2018). In applying this standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13.

Petitioner proposes constructions for two claim terms—“remote” and “sensory stimuli”—yet asserts that neither term requires construction for purposes of this decision. Pet. 8–10. Patent Owner does not address claim construction in its Preliminary Response. *See generally* Prelim. Resp. We agree with Petitioner that, at this stage of the proceeding, the term “remote” does not require construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (holding that only claim terms in controversy need to be construed, and only to the extent necessary to resolve the controversy (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))). For purposes of this

decision, however, we determine that “sensory stimuli” requires construction.

Claim 32 recites “the first hand-held communication device is adapted to receive and process the feedback data and generates *sensory stimuli* for the user based on the received data and delivered through the output device.” Ex. 1001, 36:63–67 (emphasis added). Claim 49 recites a similar limitation. *Id.* at 37:66–38:3. Petitioner contends the term “sensory stimuli” means “the output device is capable of providing at least two of aural, visual, and tactile stimuli.” Pet. 9. We understand Petitioner’s construction to require a stimulus from at least two different sensory categories.

Petitioner argues that its construction is consistent with the written description of the ’354 patent, in which “[e]very disclosed embodiment, including the figures, . . . requires an output device capable of providing multiple types of stimulus.” *Id.* (citing, e.g., Ex. 1001, 2:46–55, 6:4–11, 10:54–59, Fig. 7). The cited portion in column 2 of the ’354 patent discloses “a subsystem [that] . . . provides . . . essentially real-time aural, visual, and tactile sensory interfaces to the user.” Ex. 1001, 2:46–55; *see id.* at 6:3–6 (“Modulation & Feedback Thresholds/Triggers Properties—the aural, visual, tactile interfaces require threshold settings which determine their excitation or stimulation characteristics.”); 10:55–57 (“this system engages the sensory systems with non-distracting, intuitive, embedded aural, visual, and tactile stimuli”). The ’354 patent further discloses “[t]he transponder can deliver aural, visual, and tactile stimuli to queue the individual.” *Id.* at 16:46–47; *see id.* at 17:18–20, 17:59–18:2, 18:44–60, Fig. 7.

Based on our review of the present record, we understand the cited portions of the ’354 patent to disclose the *capabilities* of the motion-tracking system and constituent transponder. The cited portions do not indicate that a

stimulus from each sensory category, or from more than one sensory category, is required to be output by the output device. Petitioner's construction would have us read the capabilities of Petitioner's output device into the claim term "sensory stimuli." The cited portions of the '354 patent do not support such a construction.

At this stage of the proceeding, we agree with the district court's conclusion that "the 'stimuli' in [the claims] could be multiple stimuli of a particular type, such as multiple aural stimuli, multiple visual stimuli, or multiple tactile stimuli." Ex. 1005, 20. We invite the parties to address the construction of this limitation further at trial.

G. Asserted Anticipation by Nishitani

Petitioner contends that claims 32 and 49 of the '354 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Nishitani. Pet. 12–31. Relying on the Declaration of Dr. Welch (Ex. 1003), Petitioner asserts that Nishitani discloses each limitation of the challenged claims. *Id.* Patent Owner does not address Petitioner's contentions on the merits in its Preliminary Response. *See generally* Prelim. Resp. For the reasons discussed below, we conclude that Petitioner has demonstrated a reasonable likelihood it would prevail in showing that Nishitani anticipates claims 32 and 49.

1. Nishitani

Nishitani discloses a "tone generation control system" that detects the motions of a user and controls the performance of music based on the

detected motions. *See, e.g.,* Ex. 1006 ¶¶ 1, 225, Fig. 13. Figure 13 of Nishitani is reproduced below:

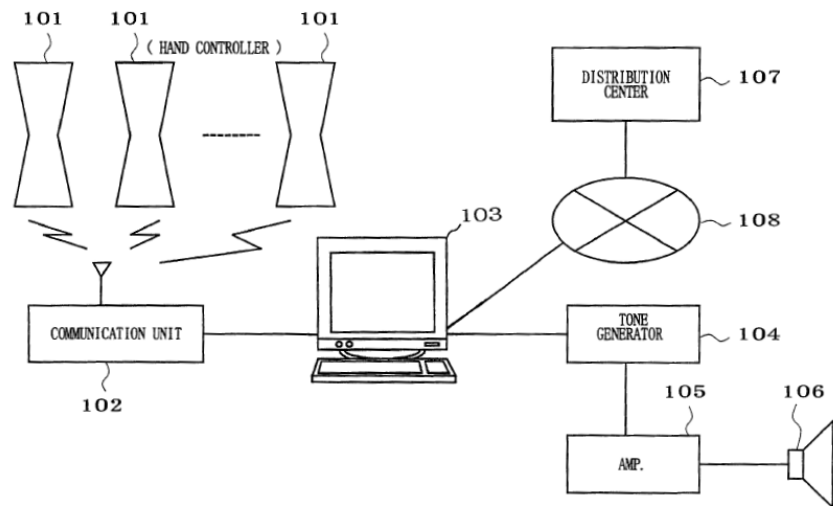


FIG. 13

Figure 13, shown above, shows an exemplary hardware setup of Nishitani's tone generation control system. *Id.* ¶ 225.

The system includes baton-shaped hand controllers 101 that a user may hold and manipulate by swinging them in a desired direction to generate various tones or control an automatic performance. *Id.* ¶¶ 225, 227. Each hand controller 101 may include an acceleration sensor for detecting acceleration of the swinging movement of the hand controller. *Id.* ¶¶ 225, 230, Fig. 24. Such motion information may be transmitted wirelessly as “detection data” from hand controller 101 to communication unit 102. *Id.* ¶ 225. Located some distance away from the hand controllers, the system may also include personal computer 103 that receives the motion information from hand controller 101 wirelessly via communication unit 102. *Id.* ¶¶ 225, 246, 248, Fig. 13. Hand controller 101 also may receive signals from personal computer 103 via communication unit 102. *Id.* ¶ 273.

Personal computer 103 may control tone generation by tone generator apparatus 104 by analyzing the detection data received from hand controller 101. *Id.* ¶ 225. Personal computer 103 also may transmit “tempo deviation information indicative of a degree of deviation from a predetermined tempo” to hand controller 101 to provide feedback data to the user. *Id.* ¶ 281. “Such information can become performance guide information for the human operator, and tone volume information, in addition to such performance guide information, may be visually shown” on a display of hand controller 101. *Id.*

Personal computer 103 also may provide tone generation guides to the hand controller. *Id.* ¶ 282. As a result, “the user is allowed to make a predetermined motion or take a predetermined posture on the basis of the tone generation guides so that tone generation control or automatic performance control can be performed with ease.” *Id.* “The tone generation guides may be, for example, in the form of illumination of LEDs, and/or vibration of a vibrator conventionally used in a cellular phone or the like.” *Id.*

In addition, the personal computer 103 may use the detected motion data of the hand controller 101 to affect movement of an animated virtual performer or displayed musical score data in a computer generated virtual environment. *Id.* ¶ 334. For example, a “displayed performer moves in accordance with the performance tempo of the performance part so that there can be provided a moving visual image as if the performer were actually performing that part.” *Id.* “In the case where the image data are the musical score data, display of the musical score will be updated in accordance with a performance tempo of the performance part.” *Id.* ¶ 334, Figs. 40, 41. In both cases, “a pattern is organized such that visual images of a plurality of

performance parts being currently performed are shown together on a single screen.” *Id.* ¶ 347.

2. Claim 32

Petitioner contends that Nishitani discloses every limitation of independent claim 32. Pet. 13–26. First, to the extent the preamble is limiting, Petitioner contends that Nishitani’s tone generation control system may be used for interactive games that include video. *Id.* at 13–14 (citing Ex. 1006 ¶¶ 16, 325). Thus, Petitioner shows sufficiently for purposes of institution that Nishitani discloses a “system for a user to play a video game,” as provided in the preamble of claim 32.⁸

Turning to the body of claim 32, Petitioner contends that Nishitani’s hand controller 101, which a user holds and which transmits detection data to communication unit 102, is a “first hand-held communication device,” as recited in claim 32. *Id.* at 14 (citing Ex. 1006 ¶¶ 225, 227). With reference to Nishitani’s Figure 24 (not reproduced herein), Petitioner contends that Nishitani’s hand controller 101 comprises “a transmitter for transmitting signals” (including transmission output amplifier 25) and “a receiver for receiving signals” (reception circuit 26 and demodulation circuit 27). *Id.* at 15–16 (citing Ex. 1006 ¶¶ 25, 28, 244, 273, 274, Fig. 24). With reference to Figures 14A and 14B (not reproduced herein), Petitioner contends that Nishitani’s hand controller 101 also comprises “an output device” (e.g., two-digit seven-segment display device 116 and LEDs 114). *Id.* at 17 (citing Ex. 1006 ¶ 230). At this stage of the proceeding, Petitioner shows sufficiently that Nishitani discloses these claim limitations.

⁸ We need not determine whether the preamble is limiting because Petitioner shows sufficiently that Nishitani discloses the preamble.

Next, Petitioner asserts that Nishitani's personal computer 103 is "a processing system, remote from the first hand-held communication device" because it includes a central processing unit and is located some distance away from the user and hand controllers, as shown in Figure 13 of Nishitani. *Id.* at 17 (citing Ex. 1006 ¶¶ 36, 248, Fig. 13). Petitioner also asserts that Nishitani's personal computer 103 "wirelessly receiv[es] the signals transmitted by the transmitter" because detection data (i.e., acceleration data) are transmitted wirelessly from hand controller 101 to communication unit 102, which forwards the data to personal computer 103. *Id.* at 18 (citing Ex. 1006 ¶¶ 225, 246). Further, Petitioner contends that Nishitani's personal computer 103 "determin[es] movement information for [the] first hand-held communication device" when it analyzes detection data from hand controller 101. *Id.* at 19–20 (citing, e.g., Ex. 1006 ¶¶ 225, 233, 334). On the present record, Petitioner makes a sufficient showing that Nishitani discloses the claimed "processing system."

Claim 32 also recites "a second hand-held communication device, in wireless communication with the processing system," and "comprising a transmitter for transmitting signals." For this limitation, Petitioner points to Nishitani's disclosure that a user may manipulate two or more hand-held controllers to generate a plurality of detection data. *Id.* at 20 (citing Ex. 1006 ¶¶ 218, 294). Petitioner further asserts that each hand controller 101 comprises a transmitter (including transmission output amplifier) and wirelessly transmits detection data to personal computer 103 via communication unit 102. *Id.* at 20–21 (citing Ex. 1006 ¶¶ 25, 225, 244, 246). In addition, Petitioner asserts that each hand controller includes a signal reception function to receive data output from personal computer 103. *Id.* at 20 (citing Ex. 1006 ¶¶ 28, 273). Claim 32 also requires the

“processing system [to be] adapted to determine movement information of the second hand-held communication device,” for which Petitioner again cites Nishitani’s disclosure of personal computer 103 analyzing detection data from hand controller 101. *Id.* at 21–22 (citing, e.g., Ex. 1006 ¶¶ 225, 233, 334). At this stage of the proceeding, Petitioner shows sufficiently that Nishitani discloses these claim limitations.

Next, Petitioner asserts that Nishitani’s processing system (personal computer 103) “send[s] feedback data to the user based on the movement information of the first and second hand-held communication devices” when it transmits performance guide data to the hand controllers to illuminate LEDs and provide vibration of a vibrator on the hand controller. *Id.* at 23 (citing Ex. 1006 ¶¶ 28, 281, 282). Further, Petitioner contends that when multiple hand controllers 101 are used, Nishitani discloses that feedback can be based on the detection data from multiple hand controllers. *Id.* at 23–24 (citing Ex. 1006 ¶ 293). Petitioner also cites Nishitani’s illumination of LEDs and vibration of hand controller 101 for disclosing that “the first hand-held communication device is adapted to receive and process the feedback data and generates sensory stimuli for the user based on the received data and delivered through the output device.” *Id.* at 24–25 (citing, e.g., Ex. 1006 ¶¶ 28, 282). Petitioner makes a sufficient showing that Nishitani discloses these limitations.

Finally, claim 32 recites “wherein the movement information of the first and second hand-held communication devices are used to control a graphical object on a display screen.” For this limitation, Petitioner asserts that Nishitani’s personal computer 103 receives detected motion data from hand controllers 101 and uses the motion data to control images of performers on a display screen. *Id.* at 25–26 (citing, e.g., Ex. 1006 ¶¶ 334,

347). On the present record, and for purposes of this decision, Petitioner shows sufficiently that Nishitani discloses this limitation.

3. Claim 49

Most of the limitations in independent claim 49 are the same as or similar to limitations in claim 32, and Petitioner's analysis of those limitations refers back to its analysis for claim 32. *See* Pet. 26–28. As for the differences, claim 49 requires only a first hand-held communication device and further includes the following limitations: “wherein the movement information of the first hand-held communication device controls the movement of at least one object in a computer generated virtual environment,” and “wherein the processing system is adapted to determine the three-dimensional position of the first hand-held communication device and wherein the object is controlled in a virtual three-dimensional environment.” Ex. 1001, 37:63–65, 38:4–7.

For the first limitation, Petitioner again cites Nishitani's disclosure that personal computer 103 receives detected motion data from hand controllers 101 and uses the motion data to control images of performers on a display screen, which Petitioner contends is a “computer generated virtual environment.” Pet. 27 (citing, e.g., Ex. 1006 ¶¶ 334, 347). For the second limitation, Petitioner relies on Nishitani's disclosure of three-dimensional sensors that detect movement in three intersecting directions based on the user's motions and the resulting images of a virtual performer on the display screen. *Id.* at 28–30 (citing, e.g., Ex. 1006 ¶¶ 113–114, 182–183, 334, 349). On the present record, and for purposes of this decision, we determine that Petitioner shows sufficiently that Nishitani discloses the limitations of claim 49.

4. Conclusion

Having considered Petitioner's contentions, which Patent Owner has not addressed at this stage of the proceeding, we determine Petitioner shows sufficiently that Nishitani discloses every limitation of claims 32 and 49. Accordingly, for the reasons given and on the record before us, we determine the information presented shows a reasonable likelihood that Petitioner would prevail in establishing that Nishitani anticipates claims 32 and 49.

H. Asserted Anticipation by Rosenberg

Petitioner contends that claims 32 and 49 of the '354 patent are unpatentable under 35 U.S.C. § 102(b) as anticipated by Rosenberg. Pet. 31–46. Relying on the Declaration of Dr. Welch (Ex. 1003), Petitioner asserts that Rosenberg discloses each limitation of the challenged claims. *Id.* Patent Owner does not address Petitioner's contentions on the merits in its Preliminary Response. *See generally* Prelim. Resp. For the reasons discussed below, we conclude that Petitioner has demonstrated a reasonable likelihood it would prevail in showing that Rosenberg anticipates claim 32 but has not demonstrated a reasonable likelihood it would prevail in showing that Rosenberg anticipates claim 49.

1. Rosenberg

Rosenberg discloses computer interface devices that provide force feedback to a user. Ex. 1009, 1:4–6, 4:3–4. Rosenberg's computer interface devices, such as a joystick, mouse, or stylus, may be grasped by a user and manipulated to interact with a computer running a host application program such as a video game or a simulation. *Id.* at 1:7–16, 4:16–18, 8:17–19, 18:27–30, 56:4–5, Fig. 2. The computer may update the game or simulation in response to the user's manipulation of the joystick or mouse and provide

feedback to the user via the display screen and audio speakers. *Id.* at 1:16–18. For example, the “interface allows the position of the mouse or stylus to be tracked and provides force feedback to the stylus using sensors and actuators.” *Id.* at 15:27–29.

The interface device may include input controls such as “a button device . . . coupled to the interface apparatus that provides a button input signal to the microprocessor when the user presses the button.” *Id.* at 4:31–33, 13:35–14:1, 17:1–6. The interface device also may include sensors that “sense the position, motion, and/or other characteristics of a user object . . . of the interface device . . . along one or more degrees of freedom and provide signals to [a] microprocessor . . . including information representative of those characteristics.” *Id.* at 14:11–13; *see id.* at 14:35–15:1, 15:27–29, 46:8–12. “[S]ignals traveling between the host computer system . . . and the interface device . . . can be sent and received using wireless transmission.” *Id.* at 11:30–31.

After receiving sensor data, the host computer system may update the application program in response to the user’s manipulations of an object (and any other user input received as sensor data) and determine if one or more force commands need to be output to the user object. *Id.* at 42:26–29. The interface device may receive instructions from the host computer and provide signals to the actuators accordingly. *Id.* at 13:3–5. In other words, the host computer system may output a “force command” to the interface device to cause force feedback by the interface device. *Id.* at 8:32–33. Forces applied to the actuators include a variety of haptic sensations and cover “different force sensations, durations, directions, or other high-level characteristics of forces.” *Id.* at 43:5–8, 51:18–21. “For example, if the user is moving a virtual race car within a virtual pool of mud in a video game, a

damping type of force should be applied to the object . . . as long as the race car moves within the mud.” *Id.* at 43:17–19. The host computer also may update the host application and images on the display screen in response to the sensor data. *Id.* at 42:24–25, 42:32–36.

2. Claim 32

Petitioner contends that Rosenberg discloses every limitation of independent claim 32. Pet. 34–43. First, to the extent the preamble is limiting, Petitioner contends that Rosenberg’s host computer system implements an application program that may be a video game. *Id.* at 34 (citing Ex. 1009, 8:16–19). Thus, Petitioner shows sufficiently for purposes of institution that Rosenberg discloses a “system for a user to play a video game,” as provided in the preamble of claim 32.⁹

Turning to the body of claim 32, Petitioner contends that Rosenberg’s interface device is a “first hand-held communication device” because it includes a user object, such as a mouse or stylus, that can be grasped and manipulated by a user, and communicates with host computer system 12. *Id.* at 34–35 (citing Ex. 1009, 18:27–30, 56:4–5, 18:32–34, 11:30–35). Petitioner also contends that Rosenberg’s interface device comprises “a transmitter for transmitting signals” (antenna on the interface device), “a receiver for receiving signals” (antenna), and “an output device” (actuator for applying force to the joystick). *Id.* at 35–36 (citing, e.g., Ex. 1009, 11:30–35, 5:25–26). At this stage of the proceeding, Petitioner shows sufficiently that Rosenberg discloses these claim limitations.

⁹ We need not determine whether the preamble is limiting because Petitioner shows sufficiently that Rosenberg discloses the preamble.

Next, Petitioner asserts that Rosenberg’s host computer system is “a processing system, remote from the first hand-held communication device” because it may be one of several home video game systems commonly connected to a television, and such systems are stand-alone systems placed some distance from users and interface devices. *Id.* at 36–37 (citing Ex. 1009, 8:7–9, 8:11–13; Ex. 1003 ¶ 158). Petitioner also asserts that Rosenberg’s host computer system “wirelessly receiv[es] signals transmitted by the transmitter” because Rosenberg discloses that signals between host computer system 12 and interface device 14 can be sent and received using wireless transmission. *Id.* at 37 (citing Ex. 1009, 11:30–35). Further, Petitioner contends that Rosenberg’s host computer “determin[es] movement information for [the] first hand-held communication device” when it processes and interprets data from the sensors in the user object. *Id.* at 37–38 (citing Ex. 1009, 14:11–13, 14:35–15:1, 15:27–29, 46:8–12). On the present record, Petitioner makes a sufficient showing that Rosenberg discloses the claimed “processing system.”

Claim 32 also recites “a second hand-held communication device, in wireless communication with the processing system,” and “comprising a transmitter for transmitting signals.” For this limitation, Petitioner points to Rosenberg’s disclosure that multiple interface devices can be coupled to a single host computer system. *Id.* at 38 (citing Ex. 1009, 12:13–18). Petitioner further cites Rosenberg’s disclosure that signals between host computer system 12 and interface device 14 can be sent and received using wireless transmission via antennas. *Id.* at 38–39 (citing, e.g., Ex. 1009, 11:30–35). Claim 32 also requires the “processing system [to be] adapted to determine movement information of the second hand-held communication device,” for which Petitioner again cites Rosenberg’s host computer

processing and interpreting data from the sensors on the user object. *Id.* at 39–40 (citing Ex. 1009, 14:11–13, 14:35–15:1, 15:27–29, 46:8–12). At this stage of the proceeding, Petitioner shows sufficiently that Rosenberg discloses these claim limitations.

Next, Petitioner asserts that Rosenberg’s processing system (host computer) “send[s] feedback data to the user based on the movement information of the first and second hand-held communication devices” when it sends a force command to the interface device to cause force feedback by the interface device. *Id.* at 40 (citing Ex. 1009, 8:32–33, 13:3–5, 42:26–29). Further, Petitioner contends that when multiple interface devices are connected to a single host computer, Rosenberg discloses that the force feedback for one interface device may be affected by sensor data from other interface devices. *Id.* at 40–41 (citing Ex. 1009, 50:29–33, 43:32–35). Petitioner also cites Rosenberg’s description of “a variety of haptic sensations” provided to the user for disclosing that “the first hand-held communication device is adapted to receive and process the feedback data and generates sensory stimuli for the user based on the received data and delivered through the output device.” *Id.* at 41 (citing, e.g., Ex. 1009, 8:32–3, 13:3–5, 43:5–8, 51:18–21). On the present record, and for purposes of this decision, Petitioner makes a sufficient showing that Rosenberg discloses these limitations.

Finally, claim 32 recites “wherein the movement information of the first and second hand-held communication devices are used to control a graphical object on a display screen.” For this limitation, Petitioner asserts that Rosenberg’s host computer discloses a display screen that displays the movement of graphical objects based on movement information received from sensor data from multiple interface devices. *Id.* at 42–43 (citing, e.g.,

Ex. 1009, 9:17–18, 42:32–35, 43:17–25). On the present record, Petitioner shows sufficiently that Rosenberg discloses this limitation.

3. Claim 49

For the limitations in independent claim 49 that are the same as or similar to limitations in claim 32, Petitioner refers back to its analysis for claim 32. *See* Pet. 43–44. For the limitation reciting “wherein the processing system is adapted to determine the three-dimensional position of the first hand-held communication device and wherein the object is controlled in a virtual three-dimensional environment,” Petitioner relies on Rosenberg’s disclosure of sensors on a user object that “sense the position, motion, and/or other characteristics of a user object 34 of the interface device 14 along one or more degrees of freedom and provide signals to microprocessor 26 including information representative of those characteristics.” *Id.* at 44–45 (quoting Ex. 1009, 14:11–13). Petitioner, however, does not explain why “one or more degrees of freedom” necessarily refers to a three-dimensional position rather than a one- or two-dimensional position. Therefore, on the present record, we are not persuaded Petitioner shows sufficiently that Rosenberg discloses this limitation for anticipation purposes.

4. Conclusion

Having considered Petitioner’s contentions, which Patent Owner has not addressed at this stage of the proceeding, we determine Petitioner shows sufficiently that Rosenberg discloses every limitation of claim 32 but not of claim 49. Accordingly, for the reasons given and on the record before us, we determine the information presented shows a reasonable likelihood that Petitioner would prevail in establishing that Rosenberg anticipates claim 32

but does not show a reasonable likelihood that Petitioner would prevail in establishing that Rosenberg anticipates claim 49.

I. Asserted Obviousness over Horton and Woolston

Petitioner contends that claims 32 and 49 of the '354 patent are unpatentable under 35 U.S.C. § 103 as obvious over the combined teachings of Horton and Woolston. Pet. 47–73. Relying on the Declaration of Dr. Welch (Ex. 1003), Petitioner asserts that the combination of Horton and Woolston teaches or suggests each limitation of the challenged claims, and Petitioner further articulates reasoning with rational underpinning as to why a person of ordinary skill in the art would have combined the references in the manner asserted. *Id.* For the reasons discussed below, we conclude that Petitioner has demonstrated a reasonable likelihood it would prevail in showing that claim 49 would have been obvious over the combined teachings of Horton and Woolston but has not demonstrated a reasonable likelihood it would prevail in showing that claim 32 would have been obvious over Horton and Woolston.

1. Horton

Horton discloses a three-dimensional position and orientation tracking system that uses accelerometers to determine the position and orientation of an object moveable within a limited volume. Ex. 1010, Abstract, 1:9–11. Horton's tracking system is used in virtual reality applications or "immersive simulations" in which a computer or processor "must continuously determine with a high degree of accuracy the position and orientation of a user (or part of the user[,] e.g., head or hand) relative to a 'virtual world' or simulated environment in which the user operates." *Id.* at 1:13–19.

Figure 7 of Horton is reproduced below:

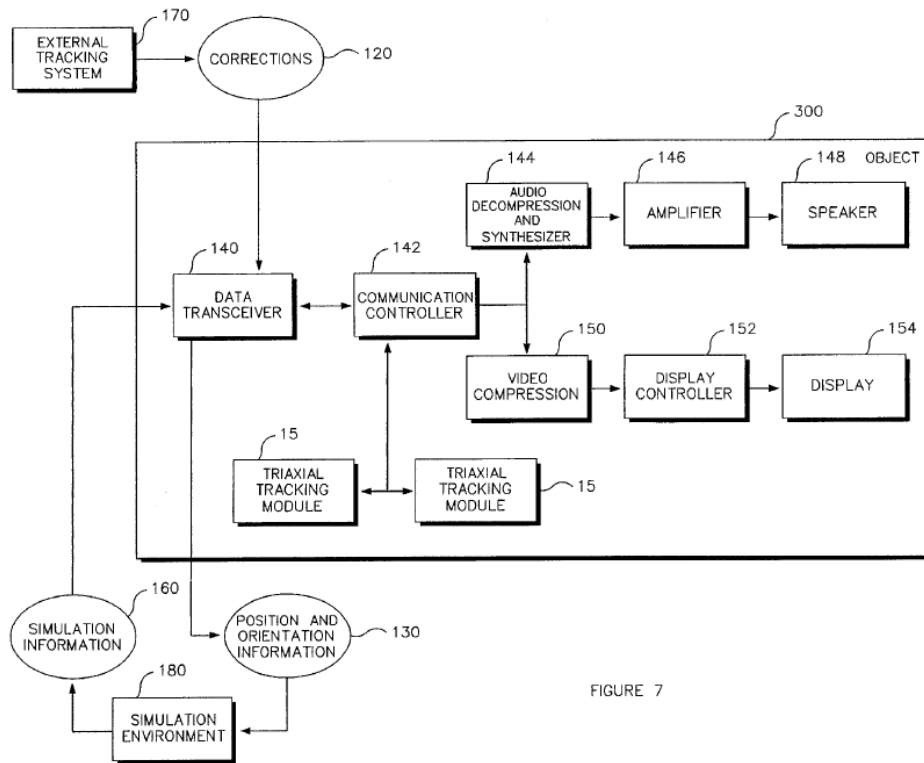


FIGURE 7

Figure 7 above is a block diagram of a virtual reality invention using Horton's tracking system. *Id.* at 3:19, 9:7–8; *see also id.* at 3:17–18, 8:54–55 (referring to simplified block diagram in Figure 6). Object 300 may be, for example, a head-mounted display unit, a wristband or data glove, or other similar device to monitor the user's movement. *Id.* at 5:10–13. In one embodiment, object 300 includes six accelerometers to track six degrees of freedom of an object in three dimensions (e.g., x, y, and z position coordinates, and roll, pitch, and yaw orientation components). *Id.* at 3:41–44. Tracking processor 40 (not shown) of tracking module 15 mounted on object 300 calculates position and orientation information 130 of object 300 based on data obtained from the accelerometers. *Id.* at 6:25–17. Position and orientation information 130 are transmitted to simulation environment 180. *Id.* at 8:60–62. "Simulation environment 180 outputs

simulation information 160 such as video, audio, tactile, force, or olfactory signals, possibly modified as a function of position and orientation information 130 received.” *Id.* at 8:62–67. Object 300 receives simulation information 160 and uses it, for example, to display video or play audio for the user. *Id.* at 8:67–9:2.

2. *Woolston*

Woolston discloses an interactive video game system including a hand-held sword apparatus that inputs velocity and position information into an electronic game and receives physical feedback through the sword apparatus from the electronic game. Ex. 1011, 1:5–9, 2:41–44. Woolston’s system includes a game controller (which refers to a game console or computing device rather than a user device) that tracks the position and attitude of the sword apparatus. *Id.* at 15:65–66. Woolston’s game controller is coupled to infrared receivers that may work in conjunction with blasters on the sword apparatus to determine the position of the sword. *Id.* at 9:13–17, 9:39–46. The sword apparatus also includes an inertial positioning system used to “keep the computer game apprised of the spatial attitude and/or location of the sword apparatus.” *Id.* at 3:51–52.

3. *Claim 49*

Because the information presented shows a reasonable likelihood that Petitioner would prevail on this ground only with respect to independent claim 49, we begin our analysis with that claim before turning to claim 32. Petitioner contends that the combination of Horton and Woolston teaches or suggests the subject matter of claim 49. Pet. 64–73. For the limitations that are the same or similar to limitations in claim 32, Petitioner refers back to its analysis of claim 32. *Id.* at 64–65, 68; *see id.* at 51–57, 60. Our discussion below similarly cites Petitioner’s analysis of claim 32 for those limitations.

First, to the extent the preamble is limiting, Petitioner contends that Horton teaches tracking the position and orientation of head-mounted display units for two users in a virtual reality environment and that one possible application is a race car video game. *Id.* at 51 (citing Ex. 1010, 2:52–54, 3:58–62, 10:22–25). According to Petitioner, a person of ordinary skill in the art would have understood that a video game is a form of simulation or virtual reality application and that virtual reality environments often are used to implement video games. *Id.* at 51–52 (citing Ex. 1003 ¶ 189). We determine that Petitioner shows sufficiently for purposes of institution that Horton teaches a “system for a user to play a video game,” as provided in the preamble.¹⁰

Turning to the body of claim 49, Petitioner contends that Horton teaches a “first hand-held communication device” (object 300, which may be a head-mounted display unit or data glove and wirelessly communicates with simulation processor 194) that comprises “a transmitter for transmitting signals” (data transceiver 140 in object 300), “a receiver for receiving signals” (data transceiver 140), and “an output device” (speaker 148 and color LCD display 154 in object 300). *Id.* at 52–54 (citing, e.g., Ex. 1010, 3:35–55, 9:23–26, 8:62–9:2, 9:40–67, Fig. 7). At this stage of the proceeding, Petitioner shows sufficiently that Horton teaches these limitations.

Petitioner contends that simulation processor 194 in Horton’s simulation environment teaches “a processing system” as recited in the claim. *Id.* at 55 (citing Ex. 1010, 10:28–32, 10:37–40). Petitioner further

¹⁰ We need not determine whether the preamble is limiting because Petitioner shows sufficiently that Horton discloses the preamble.

contends that a person of ordinary skill in the art would have understood that simulation processor 194 is located some distance away from object 300 because the graphic processing power required to run the disclosed virtual reality application would have required a remote, standalone computer. *Id.* (citing Ex. 1003 ¶ 197). For purposes of institution, Petitioner shows sufficiently that Horton teaches “a processing system, remote from the first hand-held communication device.”

Petitioner also contends that simulation processor 194 in Horton’s simulation environment “is adapted to wirelessly receive the signals transmitted by the transmitter” when it wirelessly receives position and orientation information 130 from object 300. *Id.* at 56 (citing Ex. 1010, 9:13–15, 9:23–25, 10:37–40). Further, Petitioner contends that Horton’s simulation processor 194, using simulation software 180, “determin[es] movement information for the first hand-held communication device” when it determines a velocity of object 300 and estimates its future position and orientation. *Id.* (citing Ex. 1010, 8:12–15). On the present record, Petitioner makes a sufficient showing that Horton teaches these limitations.

Claim 49 further recites that the “movement information of the first hand-held communication device controls the movement of at least one object in a computer generated virtual environment.” For this limitation, Petitioner cites Horton’s teaching that simulation processor 194 modifies simulation environment 180 as a function of the position and orientation information received from object 300. *Id.* at 65 (citing Ex. 1010, 2:56–59). Alternatively, Petitioner cites Woolston’s teaching that its game controller projects a virtual reality or game reality space on a display and uses position and attitude of the user’s sword apparatus to project and track a virtual blade. *Id.* at 66–68 (citing, e.g., Ex. 1011, 8:65–9:2, 15:58–16:4, 16:6–8,

15:47–49). Petitioner contends that a person having ordinary skill in the art would have had reason to modify Horton’s simulation environment to include Woolston’s movement of an object (e.g., a virtual sword) based on the movement information of an apparatus (e.g., physical sword), which was a common and predictable way of allowing users to interact with virtual reality applications. *Id.* at 68 (citing Ex. 1003 ¶ 230). On the present record, Petitioner shows sufficiently that the combination of Horton and Woolston teaches this limitation, and Petitioner provides sufficient reasoning with rational underpinning for modifying Horton based on the teachings of Woolston in the manner asserted.

Next, Petitioner asserts that Horton teaches “wherein the processing system is adapted to determine the three-dimensional position of the first hand-held communication device” because Horton discloses a three-dimensional position and tracking system that uses accelerometers to measure acceleration in six degrees of freedom. *Id.* at 69 (citing Ex. 1010, 2:16–21, 4:47–50). Petitioner shows sufficiently that Horton teaches this limitation.

Finally, claim 49 recites “wherein the object is controlled in a virtual three-dimensional environment.” Petitioner again cites Horton’s teaching that simulation processor 194 modifies simulation environment 180 as a function of the position and orientation information received from object 300. *Id.* at 69–70. Alternatively, Petitioner contends that when Woolston’s teachings are combined with Horton as discussed above, the movement of an object (e.g., Woolston’s virtual sword) is controlled in Horton’s three-dimensional based virtual environment. *Id.* at 70–73 (citing, e.g., Ex. 1011, 8:65–9:2, 15:58–16:4, 16:6–8, 15:47–49; Ex. 1003 ¶ 238).

On the present record, Petitioner shows sufficiently that the combination of Horton and Woolston teaches this limitation.

4. Claim 32

Unlike claim 49, which recites only one hand-held communication device, claim 32 recites first and second hand-held communication devices. Claim 32 also includes the following limitations: “wherein the processing system is adapted to . . . send feedback data to the user based on the movement information of the first and second hand-held communication devices,” and “wherein the first hand-held communication device is adapted to receive and process the feedback data and generates sensory stimuli for the user based on the received data and delivered through the output device.” Ex. 1001, 36:58–66. Thus, the feedback data sent to the first hand-held communication device is based on movement information of both hand-held communication devices. For the following reasons, we determine that Petitioner does not make an adequate showing for purposes of institution that either Horton alone or the combination of Horton and Woolston teaches this requirement of claim 32.

Petitioner first asserts that Horton’s processing system (simulation processor 194) “send[s] feedback data to the user based on the movement information of the first and second hand-held communication devices” when it “outputs simulation information 160 such as video, audio, tactile, force, or olfactory signals,” which object 300 receives. *Id.* at 58 (citing Ex. 1010, 8:63–9:2). Regarding the requirement that the feedback be based on movement information from both hand-held communication devices, Petitioner cites Horton’s teaching that a database in the simulation environment contains attributes describing interactions of simulation objects within the environment. *Id.* (citing Ex. 1010, 10:5–10). Petitioner does not

explain, however, how having a database with such attributes would result in feedback data to the user based on movement information of both hand-held communication devices. *See id.* We are not persuaded that Petitioner makes a sufficient showing that Horton alone teaches this limitation.

Alternatively, Petitioner contends it would have been obvious to modify Horton's simulation environment to include feedback to the first hand-held communication device based on the interaction of two user objects in view of Woolston's description of two sword apparatuses controlling motion of virtual swords. *Id.* at 59 (citing Ex. 1003 ¶ 205). Citing only the testimony of Dr. Welch, Petitioner asserts that "the simulation environment *may* want to provide an audio or force feedback to the user that indicated a collision of objects within a virtual environment." *Id.* (emphasis added) (citing Ex. 1003 ¶ 205). On this record, we are not persuaded that Petitioner provides sufficient reasoning for *why* a person of ordinary skill in the art would have modified Horton to provide feedback based on the interaction of two objects simply because Woolston teaches two virtual objects controlled by the motion of two swords.

5. Conclusion

Having considered Petitioner's contentions, which Patent Owner has not addressed at this stage of the proceeding, we determine Petitioner shows sufficiently that the proposed combination of Horton and Woolston teaches or suggests the subject matter of claim 49, and Petitioner sufficiently articulates reasoning with rational underpinning for modifying Horton with the teachings of Woolston in the manner asserted. As explained above, however, we do not make the same determination with respect to claim 32. Accordingly, for the reasons given and on the record before us, we determine the information presented shows a reasonable likelihood that

Petitioner would prevail in establishing that claim 49 would have been obvious over the combined teachings of Horton and Woolston but does not show a reasonable likelihood that Petitioner would prevail in establishing that claim 32 would have been obvious over Horton and Woolston.

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition and Preliminary Response, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims of the '354 patent is unpatentable on the grounds asserted in the Petition.

V. ORDER

Accordingly, it is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is instituted for claims 32 and 49 of the '354 patent on all unpatentability grounds asserted in the Petition; and

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

IPR2019-01665
Patent 8,159,354 B2

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