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Paper 7
Entered: January 11, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

IMMERSION CORPORATION,
Patent Owner.

Case IPR2016-01372
Patent 8,659,571 B2

Before MICHAEL R. ZECHER, BRYAN F. MOORE, and MINN CHUNG, *Administrative Patent Judges*.

CHUNG, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314(a) and 37 C.F.R. § 42.108

I. INTRODUCTION

Apple Inc. ("Petitioner") filed a Petition (Paper 1, "Pet.") requesting an *inter partes* review of claims 1–7, 12–18, and 23–29 (the "challenged claims") of U.S. Patent No. 8,659,571 B2 (Ex. 1001, "the '571 patent"). Immersion Corporation ("Patent Owner") filed a Preliminary Response (Paper 6, "Prelim. Resp.").

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless the information presented in the Petition "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." For the reasons described below, we determine that Petitioner has established a reasonable likelihood of prevailing in showing the unpatentability of claims 1–4, 6, 23–26, and 28. We, however, determine that Petitioner has not established a reasonable likelihood of prevailing in showing the unpatentability of claims 5, 7, 12–18, 27, and 29. Accordingly, we institute an *inter partes* review only as to claims 1–4, 6, 23–26, and 28 of the '571 patent.

II. BACKGROUND

A. Real Party In Interest

Apple Inc. identifies itself as the real-party-in-interest. Pet. 1.

B. Related Proceedings

According to the parties, the '571 patent is the subject of the following proceedings: (1) *Immersion Corp. v. Apple Inc.*, No. 1:16-cv-00077 (D. Del.); and (2) *In the Matter of: Certain Mobile Electronic Devices*

Incorporating Haptics (Including Smartphones and Smartwatches) and Components Thereof, ITC Investigation No. 337-TA-990 (USITC), which has been consolidated with *In the Matter of: Certain Mobile and Portable Electronic Devices Incorporating Haptics (Including Smartphones and Laptops) and Components Thereof*, ITC Investigation No. 337-TA-1004 (USITC). Pet. 1–2; Paper 4, 2.

III. THE '571 PATENT

A. Described Invention

The '571 patent describes a system and method for producing a dynamic haptic effect based on a gesture signal and a device sensor signal. Ex. 1001, Abstract, col. 1, l. 66–col. 2, l. 5. According to the '571 patent, a dynamic haptic effect is a haptic effect that evolves over time as it responds to input parameters, such as a gesture signal or a device sensor signal. *Id.* at col. 2, ll. 64–66, col. 3, ll. 12–15.

Figure 1 of the '571 patent is reproduced below.

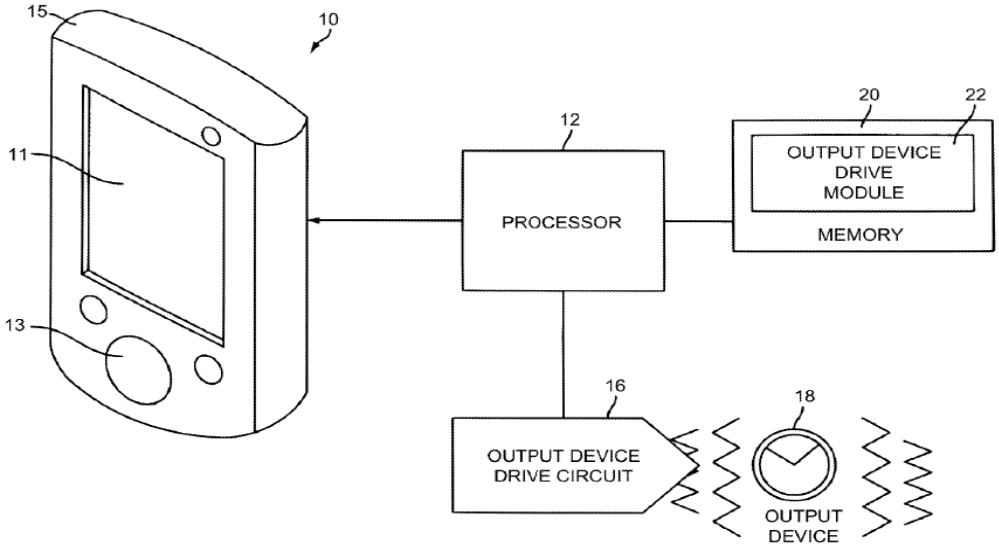

FIG. 1

Figure 1 depicts a block diagram of haptically-enabled system 10 in an exemplary embodiment of the '571 patent. *Id.* at col. 3, ll. 63–64. As shown in Figure 1 above, system 10 includes touch-sensitive surface 11 and may also include mechanical keys or buttons 13. *Id.* at col. 3, ll. 64–67. Further, system 10 includes a haptic feedback system that generates vibrations on system 10, e.g., on touch surface 11. *Id.* at col. 3, l. 67–col. 4, l. 3. As also illustrated in Figure 1, the haptic feedback system includes processor 12, which is coupled to memory 20 and actuator drive circuit 16, which, in turn, is coupled to haptic actuator 18. *Id.* at col. 4, ll. 4–6.

Touch surface 11 recognizes touches and also may recognize the position and the magnitude or pressure of the touches on the surface. *Id.* at col. 4, ll. 41–43. The data corresponding to the touches is sent to processor 12, which interprets the touches and generates haptic effect signals. *Id.* at col. 4, ll. 43–46. Touch surface 11 may detect multi-touch contacts and may be capable of distinguishing between multiple touches that occur at the same time. *Id.* at col. 4, ll. 49–51.

According to the '571 patent, a gesture is any movement of the body that conveys meaning or user intent. *Id.* at col. 3, ll. 34–35. Simple gestures, such as a "finger on" or "finger off" gesture, may be combined to form more complex gestures, for example, a "tapping" or "swiping" gesture. *Id.* at col. 3, ll. 35–49. In addition, any number of simple or complex gestures may be combined to form other gestures, such as gestures based on multiple finger contacts. *Id.* at col. 3, ll. 52–56.

Dynamic haptic effects are produced by changing a haptic effect according to an interaction parameter, which may be derived from a gesture

using information such as the position, direction, and velocity of the gesture. *Id.* at col. 10, ll. 24–29. An interaction parameter may also be derived from device sensor data, such as the device acceleration, gyroscopic, or ambient information. *Id.* at col. 11, ll. 4–6. Additionally, an interaction parameter may incorporate a mathematical model related to a real-world physical effect, such as gravity, acceleration, friction, or inertia. *Id.* at col. 12, ll. 38–40. Further, an interaction parameter may optionally incorporate an animation index to correlate the haptic effect to an animation displayed on the device. *Id.* at col. 12, ll. 45–50. Once an interaction parameter is generated from one or more of these sources, a drive signal is applied to a haptic actuator according to the interaction parameter. *Id.* at col. 15, ll. 3–9.

B. Illustrative Claim

Of the challenged claims, claims 1, 12, and 23 are independent. Claim 1 is illustrative of the challenged claims and is reproduced below:

> 1. A method of producing a haptic effect comprising:
>
> receiving a first gesture signal;
>
> receiving a second gesture signal;
>
> generating a dynamic interaction parameter using the first gesture signal and the second gesture signal; and
>
> applying a drive signal to a haptic output device according to the dynamic interaction parameter.

Ex. 1001, col. 16, ll. 8–14.

IV. PETITIONER'S CHALLENGES

A. Prior Art Cited in Petitioner's Challenges

Petitioner cites the following references in its challenges to patentability.

Reference and Relevant Date	Designation	Exhibit No.
U.S. Patent Application Pub. No. 2010/0156818 Al (June 24, 2010)	Burrough[1]	Ex. 1005
U.S. Patent No. 5,734,373 (Mar. 31, 1998)	Rosenberg '373	Ex. 1004
U.S. Patent No. 6,429,846 (Aug. 6, 2002)	Rosenberg '846	Ex. 1006

B. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 3):

Claims Challenged	Statutory Basis	Reference(s)
1–7, 12–18, and 23–29	§ 103(a)	Burrough
1, 2, 4–7, 12, 13, 15–18, 23, 24, and 26–29	§ 103(a)	Rosenberg '373
3, 14, and 25	§ 103(a)	Rosenberg '373 and Rosenberg '846

V. CLAIM CONSTRUCTION

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *see Cuozzo Speed*

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

Techs., LLC v. Lee, 136 S. Ct. 2131, 2144 (2016) (holding that 37 C.F.R. § 42.100(b) "represents a reasonable exercise of the rulemaking authority that Congress delegated to the . . . Office"). Under the broadest reasonable interpretation (BRI) standard, and absent any special definitions, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in view of the specification. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms or phrases must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). A particular embodiment appearing in the written description generally is not incorporated into a claim if the claim language is broader than the embodiment. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

Petitioner proposes constructions for three terms, namely, "gesture signal," "vector signal," and "module." Pet. 8–12. Petitioner discusses four additional terms, including "dynamic interaction parameter," but does not propose constructions for these terms. Instead, Petitioner contends that Patent Owner should be held to Patent Owner's claim construction positions for these terms expressly stated or implied from its infringement allegations in the related proceeding at the ITC. *Id.* at 9–11. Patent Owner disputes the constructions for five of these seven terms, namely, "gesture signal," "dynamic interaction parameter," "physical model," "module," and "generating a dynamic interaction parameter using . . . an animation." Prelim. Resp. 8–18. For purposes of this Decision, we need only to construe the terms "gesture signal," "dynamic interaction parameter," and "module."

See, e.g., Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 803 (Fed. Cir. 1999) (only those terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy).

A. "gesture signal"

Petitioner contends that the term "gesture signal" should be construed to encompass "a signal indicating user interaction with a user interface device." Pet. 8. Patent Owner, on the other hand, argues that this term should be interpreted to mean "an electronic signal, representing a recognized movement of the body that conveys meaning or user intent." Prelim. Resp. 8.

The parties acknowledge that the '571 patent provides a description of a "gesture" in the following sentence: "[a] gesture is any movement of the body that conveys meaning or user intent." Ex. 1001, col. 3, ll. 34–35; *see* Pet. 8, Prelim. Resp. 8 (citing Ex. 1001, col. 3, ll. 34–35). For purposes of this Decision, we determine that this sentence provides a lexicographic definition for the term "gesture." First, the form of the sentence is definitional in that the term "gesture" is followed by a definitional description—"*is* any movement of the body that conveys meaning or user intent." Ex. 1001, col. 3, ll. 34–35 (emphasis added). *See Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1136 (Fed. Cir. 2007) (The use of the word "is" in the specification may "signify that a patentee is serving as its own lexicographer." (citation omitted)). Second, the description of a "gesture" in the cited sentence is broader than, but consistent with, other descriptions found in the Specification. For example, the Specification describes that "[a] gesture can also be any form of hand movement

recognized by a device having an accelerometer, gyroscope, or other motion sensor, and converted to electronic signals." Ex. 1001, col. 3, ll. 56–59.

As described in the Specification and indicated by the plain language of the claim term, a "gesture signal" is simply a signal indicating a "gesture." *See, e.g., id.* at col. 10, ll. 36–43 (describing that multiple inputs in time from a finger being swiped across a touch screen indicate the positions of the contact point of the finger moving along the touch screen in a swipe gesture). In other words, a "gesture signal" is simply "a signal indicating a movement of the body that conveys meaning or user intent."

To the extent Petitioner contends that the term "gesture signal" means "a signal indicating user interaction with a user interface device" (*see* Pet. 8), Petitioner's argument is unpersuasive because Petitioner does not explain why the express definition of the term "gesture" provided in the Specification should be disregarded. Although Petitioner argues that the broadest reasonable interpretation of the term "gesture signal" must encompass the description in the Specification of the use of various user interface devices that "produce gesture signals," such as a touch sensitive surface, mouse, or joystick (*id.*), Petitioner's argument goes to the *source* of a "gesture signal" and does not address what a "gesture" is.

Patent Owner's proposed definition of the term "gesture signal"—"an electronic signal, representing a recognized movement of the body that conveys meaning or user intent"—incorporates the definition of "gesture" found in the Specification but further limits the term "gesture signal" in the following two aspects: (1) a "gesture signal" must be limited to an "electronic" signal (Prelim. Resp. 8 (citing Ex. 1001, col. 3, ll. 56–59)), and

(2) a "gesture signal" must represent a "recognized" movement of the body (*id.* at 8–11). Considering the first aspect regarding an "electronic" signal, Patent Owner's argument is unpersuasive because the passage cited by Patent Owner indicates that it is describing an exemplary embodiment. *See* Ex. 1001, col. 3, ll. 56–59 ("A gesture *can also be* any form of hand movement recognized by a device . . . and converted to electronic signals.") (emphasis added). A particular embodiment appearing in the written description is generally not incorporated into a claim if the claim language is broader than the embodiment. *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004) (citation omitted). Further, "it is improper to read limitations from a preferred embodiment described in the specification—even if it is the only embodiment—into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited." *Epos Techs. Ltd. v. Pegasus Techs. Ltd.*, 766 F.3d 1338, 1341 (Fed. Cir. 2014). Patent Owner does not identify, nor do we discern, an explicit intent in the intrinsic record to limit the "gesture signal" recited in the claims to "electronic" signals described in the preferred embodiments of the '571 patent.

Next, Patent Owner's contention that a "gesture signal" represents "a *recognized* movement of the body" simply makes the unremarkable statement that the movements of user input are recognized by the system or the device described in the '571 patent. *See* Ex. 1001, col. 3, ll. 36–59 (describing various movements of a finger or a hand recognized by the device), col. 4, ll. 41–43 (describing the touch surface recognizing touches, as well as the position and magnitude or pressure of the touches, on the

surface). If a feature is not necessary to give meaning to what the inventor means by a claim term, it would be "extraneous" and should not be read into the claim. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998); *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). At this preliminary stage, the record presented shows that adding the word "recognized" to modify the phrase "movement of the body" is not necessary to give meaning to the term "gesture signal." It is no more necessary to do so than it is necessary to similarly modify the word "signal" to require explicitly that signals are "recognized" by the system or the device to give meaning to the term "gesture signal."

In support of its proposed construction, Patent Owner argues that, in various embodiments described in the Specification, what sorts of movements are *recognized as gestures*, e.g., complex, multi-touch gestures, depends on the capability or the implementation of a particular system pertaining to the embodiments. Prelim. Resp. 8–11. Patent Owner's argument is unpersuasive because it does not correspond to the language of Patent Owner's proposed construction, which is that a "gesture signal" represents "a *recognized movement* of the body," not "a movement of the body *recognized as a gesture*."

In a related argument, Patent Owner asserts that a positional translation input is not necessarily a gesture because the patentee distinguished mere position information from a gesture signal during the prosecution of a predecessor application to the '571 patent. Prelim. Resp. 11 (citing Ex. 2003, 9). Similar to Patent Owner's unpersuasive argument

discussed above, Patent Owner's contention amounts to an argument that only those movements *recognized as a gesture* constitute a "gesture signal," which does not track the language of the construction proposed by Patent Owner.

On this record, and for purposes of this Decision, we preliminarily construe "gesture signal" to mean "a signal indicating a movement of the body that conveys meaning or user intent" based upon the express definition of "gesture" provided in the Specification.

B. "dynamic interaction parameter"

Petitioner does not propose a construction for the term "dynamic interaction parameter" but, instead, argues that Patent Owner should be held to a construction at least as broad as the construction Patent Owner advanced in the related ITC proceeding, which, according to Petitioner, was "an interaction parameter that changes over time or reacts in real time." Pet. 9 (citing Ex. 1010, 2). Patent Owner argues that the term "dynamic interaction parameter" should be construed to mean a "parameter that changes over time or reacts in real time based on a user's interaction with a device," which, although differing from the language quoted by Petitioner by the addition of the phrase "based on a user's interaction with a device," was the construction Patent Owner in fact proposed in the related ITC proceeding.[2] Prelim. Resp. 14–15 (citing Ex. 2008, 6). Patent Owner further contends that Petitioner's proposed construction of the term at the ITC also included the phrase "based on a user's interaction with a device," and that Petitioner

[2] Patent Owner argues that the construction Petitioner quoted and attributed to Patent Owner is outdated. Prelim. Resp. 15 n.1.

hence would presumably agree to the addition of the phrase in the definition of the term "dynamic interaction parameter." *Id.* at 15.

On this record, and for purposes of this Decision, we adopt Patent Owner's proposed construction and preliminarily interpret "dynamic interaction parameter" to mean "a parameter that changes over time or reacts in real time based on a user's interaction with a device."

C. "module"

Claim 12 recites, in relevant part, "a drive module electronically coupled to the haptic output device for receiving a first gesture signal, receiving a second gesture signal, and generating a dynamic interaction parameter using the first gesture signal and the second gesture signal" (the "drive module limitation"). Ex. 1001, col. 16, ll. 53–57. The term "drive module" also is recited in challenged claims 15–18, which depend from claim 12. Petitioner contends that the term "module" recited in these claims should be construed to mean "a set of instructions executed by a processor." Pet. 11. Patent Owner disagrees and asserts that the term "drive module" should be interpreted as "a circuit or other hardware component that generates drive signals for a haptic output device." Prelim. Resp. 17. The parties, however, do not address the issue of whether the "drive module limitation" quoted above should be interpreted as a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6.[3] Despite the parties' failure to address

[3] Section 4(c) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), re-designated 35 U.S.C. § 112 ¶ 6, as 35 U.S.C. § 112(f). Because the '571 patent has an effective filing date prior to September 16, 2012, the effective date of § 4(c) of the AIA, we refer to the pre-AIA version of 35 U.S.C. § 112. *See* AIA § 4(e).

the issue, we consider the applicability of § 112 ¶ 6 to the drive module limitation recited in claim 12 and the limitations recited in dependent claims 15–18 that include the term "module" because "'[m]odule' is a well-known nonce word that can operate as a substitute for 'means' in the context of § 112, para. 6." *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1350 (Fed. Cir. 2015) (en banc in relevant part).

1. Applicability of 35 U.S.C. § 112 ¶ 6

Although a claim term that does not use the word "means" triggers the rebuttable presumption that 35 U.S.C. § 112 ¶ 6 does not apply, that presumption can be overcome "if the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function.'" *Williamson*, 792 F.3d at 1349. "The standard is whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure." *Id.*

The "drive module limitation" set forth above is in a format consistent with traditional means-plus-function claim limitations in that it replaces the term "means" with the term "module" and recites certain functions performed by the "drive module"—namely, "receiving a first gesture signal, receiving a second gesture signal, and generating a dynamic interaction parameter using the first gesture signal and the second gesture signal." Similar to *Williamson*, the word "module" used in the "drive module limitation" in this case does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term "means" had been used. *See Williamson*,

792 F.3d at 1350. The prefix "drive" does not impart structure into the term "module" because the claim simply states that the "drive module" can perform the recited function and does not use the term "drive module" as a substitute for anything that might connote a definite structure. *See Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) (finding that the term "compliance mechanism" invokes § 112 ¶ 6, because the asserted claims "simply state that the 'compliance mechanism' can perform various functions"). Furthermore, a "drive module" is described in the Specification as "*instructions* that, when executed by processor 12, generate drive signals for actuator 18." Ex. 1001, col. 4, ll. 33–35 (emphasis added). These instructions are software or program instructions stored in memory. *Id.* at col. 4, ll. 31–32, Fig. 1. Hence, the Specification describes the "drive module" in purely functional terms and does not impart any structural significance to the term.

Patent Owner asserts that, because claim 12 recites that the "drive module" is "electronically coupled" to a "haptic output device" and a "drive circuit," the "drive module" must be a hardware component capable of being electronically coupled to other hardware components. Prelim. Resp. 17. Patent Owner, however, does not cite, nor do we discern, an explicit disclosure in the Specification that indicates that the "drive module" is a hardware component or circuitry or any other physical entity having a sufficiently definite structure. The only description of the "drive module" provided in the Specification identifies the "drive module" as merely software or program instructions for generating drive signals, stored in memory and executed by a processor, as discussed above.

Furthermore, the fact that claim 12 recites that the "drive module" is "electronically coupled" to a "haptic output device" and a "drive circuit" is insufficient to avoid the application of § 112 ¶ 6 because the claim does not describe how the "drive module" interacts with the "haptic output device" or the "drive circuit" in a way that might inform the structural character of the drive module limitation or otherwise impart structure to the "drive module" as recited in the claim. *See Williamson*, 792 F.3d at 1351 (finding that, although portions of the challenged claim describe certain inputs and outputs to a "distributed learning control module" at a very high level, this was insufficient to avoid means-plus-function treatment because the claim does not describe how the "distributed learning control module" interacts with other components in the system in a way that might inform the structural character of the limitation-in-question or otherwise impart structure to the "distributed learning control module" as recited in the claim). Dependent claims 15–18 do not impart a structural connotation to the term "drive module," because they merely recite additional functions performed by the "drive module."

Accordingly, we determine that the presumption against means-plus-function treatment is overcome and that § 112 ¶ 6 applies to the limitations recited in claims 12 and 15–18 that include the term "drive module."

b. Construction Under 35 U.S.C. § 112 ¶ 6

Construing a means-plus-function limitation requires first defining the particular function of the limitation and then identifying the corresponding structure for that function in the specification. *Golight Inc. v. Wal-Mart Stores Inc.*, 355 F.3d 1327, 1333–34 (Fed. Cir. 2004). The corresponding

structure of a means-plus-function limitation, however, must be "more than simply a general purpose computer or microprocessor" to avoid impermissible functional claiming, unless certain narrow exceptions concerning generic computer functions apply. *Aristocrat Techs. Austl. Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008); *see In re Katz Interactive Call Proc. Patent Litig.*, 639 F.3d 1303, 1316 (Fed. Cir. 2011). If the function is performed by a general purpose computer or microprocessor, the specification, in general, must disclose the algorithm that the computer performs to accomplish that function. *Media Rights*, 800 F.3d at 1374 (citing *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1367 (Fed. Cir. 2008)); *Triton Tech of Texas, LLC v. Nintendo of Am., Inc.*, 753 F.3d 1375, 1378 (Fed. Cir. 2014) (citing *Aristocrat*, 521 F.3d at 1333). The specification can express the algorithm in any understandable terms, e.g., as a mathematical formula, in prose, as a flow chart, or in any other manner that provides sufficient structure. *Advanced Ground Info. Sys., Inc. v. Life360, Inc.*, 830 F.3d 1341, 1349 (Fed. Cir. 2016) (citing *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008)). Simply reciting a claimed function in the specification, and saying nothing about how the computer or processor ensures that such a function is performed, is not a sufficient disclosure for an algorithm which, by definition, must contain a sequence of steps. *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1384 (Fed. Cir. 2009).

The function recited in the drive module limitation of claim 12 is "receiving a first gesture signal, receiving a second gesture signal, and generating a dynamic interaction parameter using the first gesture signal and

the second gesture signal." Addressing the function of receiving a gesture signal, the Specification describes generally that the data corresponding to the touches on the touch surface is sent to a processor, which interprets the touches and generates haptic effect signals. Ex. 1001, col. 4, ll. 41–46. The Specification also describes an exemplary embodiment of a swipe gesture where multiple inputs are received from a finger being swiped across the touch sensitive display. *Id.* at col. 10, ll. 36–43. In addition, Figure 13 and accompanying text describe receiving gesture signals. *Id.* at col. 14, ll. 41–62, Fig. 13. In these disclosures, although the Specification describes that multiple inputs may be received at different times, it does not disclose a well-defined or otherwise recognizable sequence of steps for receiving the gesture signals by the drive module. *See Blackboard*, 574 F.3d at 1384. Hence, the '571 patent fails to disclose sufficient structure for performing the recited function of "receiving a . . . gesture signal." *See Finisar*, 523 F.3d at 1340.

Considering the function of generating a dynamic interaction parameter using the first gesture signal and the second gesture signal, the Specification describes generally that an interaction parameter that provides dynamic haptic effects can be derived from gestures "using information such as the position, direction, and velocity" of the gestures. Ex. 1001, col. 10, ll. 24–33. The Specification further describes that an interaction parameter is generated using a gesture difference vector, which is obtained by comparing a gesture signal to a haptic effect signal. *Id.* at col. 14, l. 64–col. 15, l. 3; Fig. 13. There is, however, no disclosure of a well-defined or otherwise recognizable sequence of steps for comparing a gesture signal to a

haptic effect signal to produce a gesture difference vector or generating an interaction parameter using the gesture difference vector.

According to the Specification, Table 2 provides exemplary methods of "input synthesis" that may be used to generate an interaction parameter from gesture signals. *Id.* at col. 15, ll. 3–7. Table 2 lists various methods of synthesis along with a brief description of each method, such as "Additive synthesis - combining inputs, typically of varying amplitudes," "Subtractive synthesis - filtering of complex signals or multiple signal inputs," and "Frequency modulation synthesis - modulating a carrier wave signal with one or more operators." The Specification, however, does not disclose any well-defined or otherwise recognizable sequence of steps for the methods listed in Table 2, such as steps for "combining inputs," "varying amplitudes," "filtering of complex signals," or "modulating a carrier wave signal with . . . operators." Absent such disclosures, we are not persuaded that the Specification discloses a specific algorithm that transforms an otherwise general purpose computer into a special purpose computer programmed to perform the recited function of "generating a dynamic interaction parameter." Therefore, the '571 patent fails to disclose sufficient structure for performing the recited function of "generating a dynamic interaction parameter." *See Blackboard*, 574 F.3d at 1384; *Finisar*, 523 F.3d at 1340.

Because the '571 patent fails to disclose sufficient structure corresponding to the "drive module limitation" recited in claim 12, we are unable to determine the scope and meaning of claim 12. Claims 13 and 14 depend from claim 12 and further recite "the first or second gesture signal

comprises a vector signal" and "the first or second gesture signal comprises an on-screen signal," respectively. Claims 15–18 depend from claim 12 and recite additional functions performed by the "drive module." These additional limitations do not cure the deficiency in base claim 12, and, therefore, the scope and meaning of dependent claims 13–18 cannot be determined as well.

VI. ANALYSIS OF PETITIONER'S PRIOR ART CHALLENGES

A. Claims 12–18

Petitioner contends claims 12–18 are unpatentable under 35 U.S.C. § 103(a) as obvious over Burrough. Pet. 3. Petitioner additionally challenges some of the claims in this group as obviousness over Rosenberg '373 (claims 12, 13, and 15–18) and over the combination of Rosenberg '373 and Rosenberg '846 (claim 14). *Id.*

Because we are unable to determine the scope and meaning of claims 12–18, as discussed above in Section V, we cannot conduct the necessary factual inquiry for determining obviousness with respect to these claims, such as ascertaining differences between the claimed subject matter and the prior art. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see also In re Aoyama*, 656 F.3d 1293, 1298 (Fed. Cir. 2011) (quoting *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010)) ("[A] claim cannot be both indefinite and anticipated."); *In re Steele*, 305 F.2d 859, 862–63 (CCPA 1962) (reversing the Board's decision of obviousness because it relied on "what at best are speculative assumptions as to the meaning of the claims"). We are unable to conclude, therefore, that there is a reasonable likelihood that Petitioner would prevail in its challenge of

claims 12–18. Accordingly, we decline to institute an *inter partes* review of claims 12–18.

B. Claims 1–7 and 23–29 as Obvious Over Burrough

Petitioner contends claims 1–7 and 23–29 are unpatentable as obvious under 35 U.S.C. § 103(a) over Burrough. Pet. 12–27, 30–32. In support of its contentions, Petitioner submits the Declaration of Dr. Patrick Baudisch (Ex. 1002). *Id.* For the reasons discussed below, we are persuaded that Petitioner has demonstrated a reasonable likelihood that it will prevail in showing unpatentability only as to claims 1–4, 6, 23–26, and 28 as obvious over Burrough.

1. Relevant 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 the 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) where in evidence, so-called secondary considerations. *Graham*, 383 U.S. at 17–18.

2. Overview of Burrough (Ex. 1005)

Burrough describes a method and system for identifying multi-touch gestures and providing multi-haptic responses. Ex. 1005, Abstract.

Burrough discloses a touch sensitive input device capable of recognizing at least two substantially simultaneously occurring gestures using at least two different fingers as a multi-touch event. *Id.* ¶ 35. The touch sensitive device communicates with haptic actuators to provide haptic feedback according to a haptic profile in response to a multi-touch event. *Id.* In an embodiment, each finger receives different haptic feedback depending on the location of each finger on the touch sensitive input device. *Id.*

Burrough discloses that the relationship between a touch event and the corresponding haptic response can be dynamic in nature, meaning that the haptic profile used to respond to a touch event can be varied based on various factors. *Id.* ¶ 51. For example, in a zoom gesture using two fingers, as the distance between the two fingers increases during a zoom-in, the haptic feedback vibration can be made faster or more intense. *Id.* ¶ 80.

Figures 12C and 12D of Burrough are reproduced below.

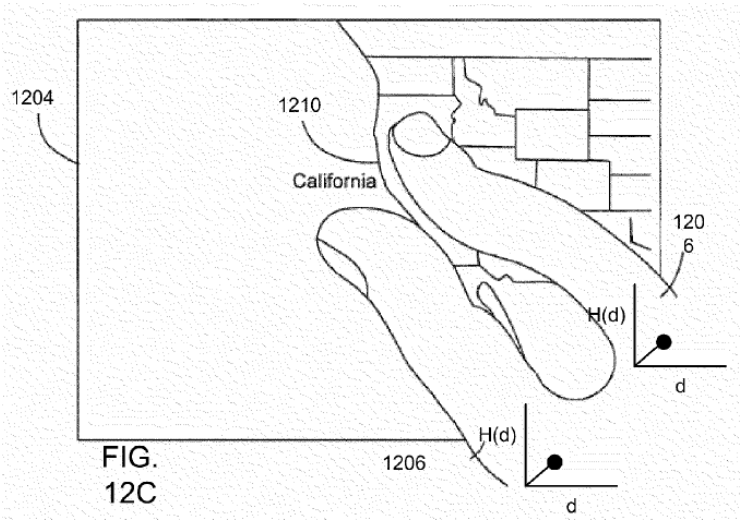

FIG. 12C

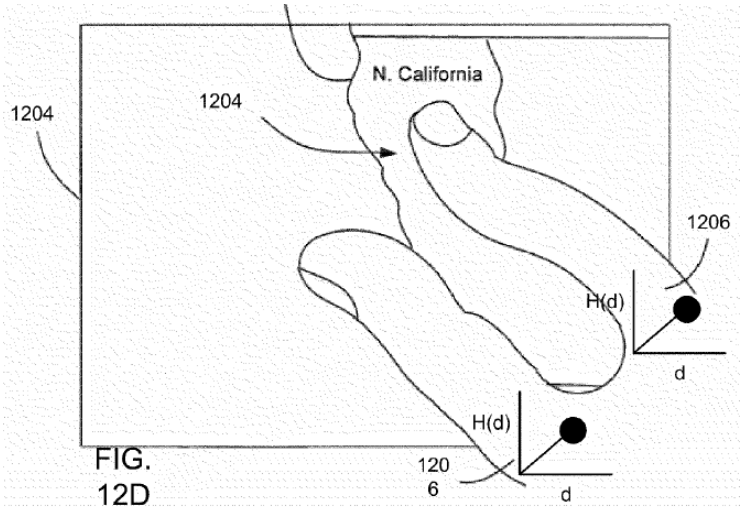

FIG. 12D

Figures 12C and 12D depict two sequential steps in a zooming sequence to zoom in on a map of North America. *Id.* ¶ 82. During the zooming sequence, the haptic response H(d) is applied to each finger. *Id.* As indicated in Figures 12C and 12D above, the magnitude of the haptic response H(d) increases linearly with distance d between the fingers. *Id.* In other words, as the two fingers move apart and the map is zoomed in, the haptic effect H becomes progressively stronger at each finger. *Id.*

3. Discussion

a. Level of Skill in the Art

The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). In determining the level of skill in the art, various factors may be considered, including the types of problems encountered in the art, prior art solutions to those problems, the sophistication of the technology, rapidity with which innovations are made, and educational level of active workers in the field. *Id*. In addition, we are

guided by the level of skill in the art reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d. 1350, 1355 (Fed. Cir. 2001).

Relying upon the Declaration of Dr. Baudisch, Petitioner contends that a person of ordinary skill in the art at the time of the invention of the '571 patent would have had a Bachelors' degree in computer science, electrical engineering, or a comparable field of study, plus approximately two to three years of professional experience with software engineering, haptics programming, or other relevant industry experience. According to Petitioner, additional graduate education could substitute for professional experience and significant experience in the field could substitute for formal education. Pet. 6 (citing Ex. 1002 ¶ 38). Patent Owner cites the Declaration of Yon Visell, Ph.D. (Ex. 2001), and argues that a person of ordinary skill in the art would have had at least: (1) a Bachelor's of Science degree in an engineering discipline such as Mechanical Engineering or Computer Science, or (2) at least two years of experience working with human machine interface systems, graphical user interfaces, haptic feedback systems, robotics, biomechanics, or mobile devices or equivalent embedded systems. Prelim. Resp. 5 (citing Ex. 2001 ¶ 24). According to Patent Owner, despite the differences between the parties' proposed level of skill in the art, the conclusions regarding unpatentability would be the same regardless of whose definition is applied. *Id.*

On this record, for purposes of this Decision, we determine that the level of skill in the art is evidenced by the prior art of record and the type of problems and solutions described in the '571 patent, and includes experience

in haptic response technology in multi-touch or multi-gesture systems. *See* Ex. 1001, col. 1, ll. 15–18; Ex. 1005, Abstract, ¶ 3.

b. Claim 1

i. First and Second Gesture Signals

Claim 1 recites "receiving a first gesture signal" and "receiving a second gesture signal." Ex. 1001, col. 16, ll. 9–10. Petitioner contends that Burrough teaches these limitations because Burrough describes a touch screen capable of recognizing "at least two substantially simultaneously occurring gestures using at least two different fingers or other object[s]" (Pet. 13 (citing Ex. 1005 ¶ 35)), such as the finger touches in a multi-touch zoom gesture in which first and second fingers are detected on the touch screen at the same time, and an image can be zoomed in by moving the two fingers apart together. Pet. 13–16 (citing Ex. 1005 ¶¶ 16, 17, 35, 46, 79, 80). Citing the testimony of Dr. Baudisch, Petitioner further argues that, because Burrough's sensing device generates signals representing each touch on the touch screen in a multi-touch event (Ex. 1005 ¶ 46), a person of ordinary skill in the art would have understood that the sensing device generates a first gesture signal representing one of the two fingers on the touch screen, and a second gesture signal representing the other finger on the touch screen. Pet. 15–16 (citing Ex. 1002 ¶ 62).

Patent Owner contends that Burrough's two-finger zoom is a *single* gesture, and, therefore, a single finger "contact" in the zoom gesture described in Burrough is not a "gesture" recited in the challenged claims. Prelim. Resp. 21–24 (citing Ex. 1005 ¶¶ 46, 79, Fig. 11). Patent Owner,

however, does not address Petitioner's citation of paragraph 35 of Burrough (Pet. 13), which states the following:

> One aspect of the invention describes a touch sensitive input device able to recognize at least *two* substantially simultaneously occurring *gestures* using at least *two different fingers* or other objects (hereinafter referred to as a *multi-touch event*).

Ex. 1005 ¶ 35 (emphases added). Patent Owner's argument is unpersuasive because Burrough discloses explicitly that a multi-touch event or gesture may be based on two or more single-touch gestures. In fact, the '571 patent describes multi-touch gestures in a similar manner as follows:

> Any number of two dimensional or three dimensional *simple* or complex *gestures* may be *combined* in any manner *to form* any number of *other gestures*, including, but not limited to, *multiple finger contacts*, palm or first contact, or proximity to the device.

Ex. 1001, col. 3, ll. 52–56 (emphases added). Thus, the fact that Burrough describes a multi-touch zoom as an integral gesture does not compel the conclusion that the single-finger touches in the zoom gesture are not gestures.

Patent Owner further contends that a single-finger touch at a point in time in Burrough's two-finger zoom gesture does not teach a "gesture signal" because the single-finger contact does not, by itself, express any intent for zooming. Prelim. Resp. 22–23. As discussed above in Section V, for purposes of this Decision we construe "gesture signal" to mean "a signal indicating a movement of the body that conveys meaning or user intent." Patent Owner's argument is unpersuasive because this definition does not exclude conveying meaning and user intent in conjunction with other gesture

signals. This understanding is supported by the '571 patent's disclosure discussed above, which describes combining multiple gestures to form other gestures, including multi-touch gestures. Ex. 1001, col. 3, ll. 52–56.

Hence, we are persuaded by Petitioner's argument that the signals representing each finger in the multi-touch zoom gesture of Burrough are "gesture signals" because they are signals "indicating a movement of the body" (i.e., the movement of the fingers) that "convey meaning or user intent" (i.e., the user's intent to zoom). On this record, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that Burrough teaches "receiving a first gesture signal" and "receiving a second gesture signal," as recited in claim 1.

ii. Generating a Dynamic Interaction Parameter

Claim 1 recites "generating a dynamic interaction parameter using the first gesture signal and the second gesture signal." Ex. 1001, col. 16, ll. 11–12. Petitioner contends Burrough's multi-touch zoom gesture discussed above teaches this limitation because Burrough describes that the haptic effect corresponding to each finger in a multi-touch zoom gesture is a function of the distance d between the two fingers. Pet. 16–18 (citing Ex. 1005 ¶¶ 34, 51, 80, 82, Figs. 12A–12H; Ex. 1002 ¶¶ 63–70). Petitioner asserts that the haptic response H(d) described in Burrough is a "dynamic interaction parameter" recited in claim 1 under Patent Owner's proposed construction because H(d) changes over time or reacts in real time based on a user's interaction with the touch screen (i.e., as the user's fingers move apart, the distance between the fingers increases, and the haptic response H(d) likewise increases as a function of this distance d). *Id.* at 18. In

support of its argument, Petitioner cites the disclosure in Burrough that describes a zoom gesture where the distance between the two fingers is compared and a zoom-in signal is generated in response, as well as an embodiment of a zoom gesture where, as the distance between the two fingers increases, the magnitude of the haptic response H(d) is increased linearly with distance d. *Id.* at 16–17 (citing Ex. 1005 ¶¶ 34, 51, 80, 82, Figs. 12A–12H).

Patent Owner asserts that Burrough does not disclose the claimed "dynamic interaction parameter" because the distance d described in Burrough is the distance between the finger positions, not gestures. Prelim. Resp. 24–26 (citing Ex. 1005 ¶ 82, Fig. 11). Patent Owner's argument is unpersuasive because Patent Owner does not explain adequately why the haptic response H(d) identified by Petitioner is not "a parameter that changes over time or reacts in real time based on a user's interaction with a device," which is, as discussed in Section V, the definition of the term "dynamic interaction parameter" we adopted for purposes of this Decision.

In effect, what Patent Owner argues is that Burrough does not teach "generating a dynamic interaction parameter *using the first gesture signal and the second gesture signal*" because the single-finger touches in Burrough's multi-touch zoom gesture are not "gestures." This is essentially the same argument Patent Owner made in the context of the "receiving a first gesture signal" and "receiving a second gesture signal" limitations discussed in the previous subsection, which is unpersuasive for the same reasons discussed above.

Patent Owner further argues that there is no disclosure in Burrough of what H(d) does, other than a general disclosure that H(d) may increase when the distance d increases. Prelim. Resp. 26 (citing Ex. 1005 ¶ 82). Patent Owner's argument is unpersuasive because Patent Owner does not address Petitioner's citation of paragraph 51 of Burrough (Pet. 16–17), which describes a dynamic haptic response in the form of changing vibrations based on a change in touch characteristics, such as "speed, direction, and *location*, etc." (Ex. 1005 ¶ 51 (emphasis added)), as well as paragraph 80, which describes a zoom gesture where a zoom-in haptic response can be "faster (or slower) or more intense (or less intense) *vibration* as the distance between the two fingers increases" (*id.* ¶ 80 (emphasis added)).

Based on the foregoing, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that Burrough teaches "generating a dynamic interaction parameter using the first gesture signal and the second gesture signal," as recited in claim 1.

iii. Applying a Drive Signal to a Haptic Output Device

The last limitation of claim 1 recites "applying a drive signal to a haptic output device according to the dynamic interaction parameter." Ex. 1001, col. 16, ll. 13–14. Petitioner contends that Burrough teaches this limitation because Burrough describes that a microcontroller uses touch information (e.g., the location or movement of the user's fingers on the touch screen) and a haptic profile (which describes a haptic response H in terms of duration, type, and strength of vibrotactile response) to control the haptic actuators by applying a voltage V to the actuators. Pet. 18–19 (citing Ex. 1005 ¶¶ 35, 47, 56). The force of the haptic effect is directly

proportional to the supplied voltage. *Id.* at 19 (citing Ex. 1005 ¶ 56). Citing the testimony of Dr. Baudisch, Petitioner argues that, in the case of the zoom gesture discussed above, a person of ordinary skill in the art would have understood that the microcontroller applies voltages (i.e., drive signals) to the haptic actuators according to the change in haptic response H(d) (i.e., the dynamic interaction parameter) as the user's fingers move together and apart. *Id.* at 19–20 (citing Ex. 1002 ¶ 74).

Patent Owner asserts that Burrough does not disclose this last limitation of claim 1 because paragraph 47 of Burrough cited by Petitioner does not discuss H(d) and uses different terminology (e.g., touch information T_{info}) to describe the process of generating haptic responses from paragraphs 79–82 that disclose the multi-touch zoom gesture. Prelim. Resp. 27–28. Patent Owner's argument is unpersuasive because Petitioner's challenge is based on a ground of obviousness, not anticipation. Unlike anticipation, the obviousness analysis does not require all of the teachings to come from the same embodiment arranged as in the claim. *See Net MoneyIN*, 545 F.3d at 1371 (holding that anticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim and that any deviation invokes the question of obviousness). Rather, "[d]etermining obviousness requires considering whether two or more pieces of prior art could be combined, or *a single piece of prior art could be modified*, to produce the claimed invention." *Comaper Corp. v. Antec Inc.*, 596 F.3d 1343, 1351–52 (Fed. Cir. 2010) (emphasis added).

Citing the testimony of Dr. Baudisch, Petitioner argues that it would have been obvious to a person of ordinary skill in the art to apply

Burrough's teachings of controlling haptic actuators to Burrough's multi-touch zoom embodiments—that is, Petitioner proposes modifying Burrough by combing the teachings of different aspects of the reference's disclosures that are not explicitly combined in the reference—to generate a drive signal for the haptic actuators according to the haptic response determined in the zoom gesture algorithm, for example, to generate haptic effects that vary as a function of the distance between the user's fingers. Pet. 20 (citing Ex. 1002 ¶ 75). Petitioner argues that the motivation to make such a combination is found in Burrough's disclosure of generating a "haptic effect H for each finger [that] increases linearly" with the distance between the user's fingers. *Id.* (citing Ex. 1005 ¶ 82). In other words, Petitioner asserts that Burrough's multi-touch zoom embodiment expressly contemplates producing haptic output via haptic actuators. *See id.*

On this record, and for purposes of this Decision, we are persuaded Petitioner has demonstrated sufficiently that a person of ordinary skill in the art would have combined the teachings of Burrough as Petitioner proposes, and that the proposed combination teaches "applying a drive signal to a haptic output device according to the dynamic interaction parameter," as recited in claim 1.

iv. Conclusion

Based on the record presented, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that the differences between the claimed subject matter of claim 1 and Burrough are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the filing of the '571

patent. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 1 under 35 U.S.C. § 103(a) as obvious over Burrough.

c. Claim 2

Claim 2 depends from claim 1, and further recites "wherein the first or second gesture signal comprises a vector signal." Ex. 1001, col. 16, ll. 15–16. The parties agree that a "vector signal" includes both a magnitude and direction. Pet. 9; Prelim. Resp. 15. Petitioner contends that Burrough teaches gesture signals that comprise vector signals because the motion of the fingers in Burrough's multi-touch zoom gesture discussed above in the context of claim 1 would have both a magnitude and a direction. Pet. 20–21 (citing Ex. 1005 ¶ 51, Ex. 1002 ¶¶ 76–78).

Patent Owner argues that "the x-y coordinate of a single finger contact" purportedly identified by Petitioner as a gesture signal does not have a direction and, therefore, cannot be a vector signal. Prelim. Resp. 29. Patent Owner's argument is unpersuasive because Patent Owner does not address Petitioner's contentions regarding the motion of the fingers in Burrough's multi-touch zoom gesture.

We have reviewed the rest of Patent Owner's arguments and find them similarly unpersuasive because they largely disregard Petitioner's contentions regarding the motion of the fingers in Burrough's multi-touch zoom gesture. For example, Patent Owner argues, citing the testimony of Dr. Visell, that Petitioner's analysis is mathematically erroneous because the Petition erroneously transcribes "any finger motion ($\partial T/\partial x$, $\partial T/\partial y$)" from Burrough, which, according to Dr. Visell, describes a "gradient," to "any

finger motion (dT/dx, dT/dy)," which purportedly represents a "total derivative." Prelim. Resp. 28 (citing Ex. 2001 ¶ 77). Patent Owner does not address, however, whether the *motion* of the fingers in Burrough's multi-touch zoom gesture would have a magnitude and direction.

Based on the record presented, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that the gesture signals representing the single-finger touches of each finger in the multi-touch zoom gesture of Burrough are vector signals having a magnitude and direction. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 2 under 35 U.S.C. § 103(a) as obvious over Burrough.

d. Claim 3

Claim 3 depends from claim 1, and further recites "wherein the first or second gesture signal comprises an on-screen signal." Ex. 1001, col. 16, ll. 17–18. The parties agree that a signal generated based on interactions with a touch screen constitutes an "on-screen signal." Pet. 10; Prelim. Resp. 15–16. Petitioner contends that Burrough teaches gesture signals that comprise on-screen signals because the signals representing user's fingers in the multi-touch zoom gesture of Burrough represent one or more touches on the touch screen. Pet. 21–22 (citing Ex. 1005 ¶ 81, Figs. 12A–12H; Ex. 1002 ¶¶ 79–80).

Patent Owner essentially relies on the same arguments it advanced with respect to claim 1, and argues that the signals identified by Petitioner are not gesture signals and, therefore, cannot be gesture signals comprising

on-screen signals. Prelim. Resp. 30. Patent Owner argument is unpersuasive for the same reasons discussed with respect to claim 1 above.

Based on the record presented, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that the gesture signals representing the user's fingers in the multi-touch zoom gesture of Burrough are on-screen signals generated based on interactions with a touch screen. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 3 under 35 U.S.C. § 103(a) as obvious over Burrough.

e. Claim 4

Claim 4 depends from claim 1, and further recites "wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter from a difference between the first gesture signal and the second gesture signal." Ex. 1001, col. 16, ll. 19–22. Petitioner asserts that Burrough teaches generating a dynamic interaction parameter from a difference between the first gesture signal and the second gesture signal because Burrough describes determining the distance between the user's fingers in the multi-touch zoom gesture and generating the haptic response H(d) (i.e., the dynamic interaction parameter) as a function of this distance. Pet. 22 (citing Ex. 1005 ¶¶ 80, 81; Ex. 1002 ¶¶ 81–84). Citing the testimony of Dr. Baudisch, Petitioner argues that it would have been obvious to a personal of ordinary skill in the art that the distance between the user's fingers can be calculated by taking the difference between the positions of the fingers. *Id.* (citing Ex. 1002 ¶ 84). Petitioner asserts that the motivation to obtain the inter-digit distance from location information comes from

Burrough's disclosure that touch signals may indicate the "location . . . of the finger on the touch sensitive" screen. *Id.* at 22–23 (citing Ex. 1005 ¶ 42).

At this preliminary stage, we find Petitioner's argument, as well as the supporting testimony of Dr. Baudisch, persuasive because, for an obviousness analysis, prior art references must be "considered together with the knowledge of one of ordinary skill in the pertinent art," *Paulsen*, 30 F.3d at 1480, and "a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ," *KSR*, 550 U.S. at 418, such as obtaining distance information by computing the difference between location values.

Patent Owner essentially relies on the same arguments it advanced with respect to claim 1 and argues that Burrough does not teach "gesture signals" and "dynamic interaction parameter." Prelim. Resp. 31. Patent Owner argument is unpersuasive for the same reasons discussed with respect to claim 1 above.

Based on the record presented, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that the differences between the claimed subject matter of claim 4 and Burrough are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art at the time of the filing of the '571 patent. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 4 under 35 U.S.C. § 103(a) as obvious over Burrough.

f. Claim 5

Claim 5 depends from claim 1, and further recites "wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and a physical model." Ex. 1001, col. 16, ll. 23–26. Petitioner contends that Burrough teaches generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and a physical model because Burrough describes that the multi-touch touch screen "determines the distinct areas of contact and identifies the contacts" based upon a physical model of a finger, such as "their geometric features and geometric arrangement." Pet. 23 (citing Ex. 1005 ¶ 5). Petitioner argues that it would have been obvious to a person of ordinary skill in the art to use the geometric properties of a human finger to, for example, determine the center location of each finger when calculating the distance between two fingers. *Id.* at 23–24 (citing Ex. 1002 ¶ 87).

Patent Owner asserts that Petitioner does not demonstrate Burrough teaches the limitation recited in claim 5 because the claim requires the physical model to be used in the generation of the dynamic interaction parameter, not in the process of receiving the device sensor signals or gesture signals. Prelim. Resp. 33. Patent Owner argues that no physical models described in the cited paragraphs of Burrough are used as an ingredient in the generation of haptic response H(d), which Petitioner identifies as the "dynamic interaction parameter." *Id.*

We are persuaded by Patent Owner's argument that Petitioner does not demonstrate that the physical model of a finger cited by Petitioner is

used to generate the haptic response H(d). As Petitioner points out, paragraph 5 of Burrough describes determining the location of a finger touch based on the geometric model of the finger. Pet. 23. As discussed above in the context of claim 1, however, this information regarding the location of the finger already is included in the first and second gesture signals. Petitioner does not explain adequately whether Burrough teaches or suggests using any *additional* location information from the geometric properties of a human finger (e.g., the distance between the center locations of the fingers) to replace or modify the distance information obtained from the first and second gesture signals in computing the haptic response H(d). Hence, Petitioner's contentions show that the geometric properties of a finger may be used to generate the gesture signals in Burrough's multi-touch zoom, but do not show whether any physical model, such as geometric properties of a finger, is used in addition to the gesture signals to generate the haptic response H(d).

On this record, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 5 under 35 U.S.C. § 103(a) as obvious over Burrough.

g. Claim 6

Claim 6 depends from claim 1, and further recites "wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and an animation." Ex. 1001, col. 16, ll. 27–30. The parties agree that "generating a dynamic interaction parameter using . . . an animation" involves coordination with an animation. Pet. 10–11; Prelim. Resp. 16–17.

Petitioner contends that Burrough teaches generating a dynamic interaction parameter using an animation because Burrough describes that haptic effects or haptic responses are coordinated with zooming in or out of a graphical object (i.e., the displayed zoom in or out animation). Pet. 24–25 (citing Ex. 1005 ¶¶ 51, 80, 81).

Patent Owner asserts that there is no disclosure in Burrough of adjusting the haptic response H(d) to account for the displayed zoom graphics. Prelim. Resp. 36. Patent Owner also argues that H(d) does not change based on any animation and that the zoom level is determined directly by the distance between the fingers. *Id.* Patent Owner's arguments are unpersuasive because they do not address Patent Owner's proposed construction of the term "generating a dynamic interaction parameter using . . . an animation," which is "*generating a dynamic interaction parameter by* incorporating information from an animation or *coordinating the dynamic interaction parameter to an animation*." *Id.* at 17 (emphases added). We are persuaded by Petitioner's argument that Burrough teaches "generating a dynamic interaction parameter using . . . an animation" under Patent Owner's proposed construction because Burrough's zoom animation is coordinated with the haptic response H(d). Pet. 24.

Based on the record presented, and for purposes of this Decision, we are persuaded that Petitioner has demonstrated sufficiently that Burrough teaches "generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and an animation," as recited in claim 6. Accordingly, we are persuaded that Petitioner has demonstrated a reasonable

likelihood of prevailing in its challenge to claim 6 under 35 U.S.C. § 103(a) as obvious over Burrough.

h. Claim 7

Claim 7 depends from claim 1, and further recites "receiving a first device sensor signal; receiving a second device sensor signal; and wherein generating a dynamic interaction parameter comprises generating a dynamic interaction parameter using the first gesture signal and the second gesture signal and the first device sensor signal and the second device sensor signal." Ex. 1001, col. 16, ll. 31–38. Petitioner contends that Burrough teaches the recited limitation of claim 7 because Burrough describes that the two fingers used in Burrough's zoom gesture can each have different haptic profiles based on the pressure applied by each finger (i.e., the first and second device sensor signals). Pet. 26–27 (citing Ex. 1005 ¶ 79). Hence, Petitioner argues that it would have been obvious to a person of ordinary skill in the art to generate the haptic response (dynamic interaction parameter) based upon both the distance between the user's fingers in a zoom gesture, as well as the pressure applied by each finger to create, for example, a haptic effect for each finger that varies both as a function of distance and as a function of pressure. *Id.* at 27 (citing Ex. 1002 ¶ 100).

Patent Owner asserts that Petitioner does not demonstrate that Burrough teaches the recited limitation of claim 7 because there is no teaching or suggestion in Burrough as to how a combined haptic response would use the two pressure signals (i.e., both a first and a second pressure signals) together. Prelim. Resp. 38–40. We agree with Patent Owner's argument.

As described in Burrough, the haptic response H(d) relied upon by Petitioner as teaching a "dynamic interaction parameter" is a haptic response for a particular finger based on the haptic profile for that specific finger. *See* Ex. 1005 ¶ 82 ("[Figures 12A–12H show] the haptic profiles for *each of the fingers* relating the distance d between the two fingers to the corresponding haptic response H(d) experienced *at each finger*.") (emphases added); Figs. 12B–12H (depicting a separate haptic response H(d) as well as a separate haptic profile, i.e., a plot of H(d) as a function of d, for each finger). Claim 7 recites "generating *a* dynamic interaction parameter" (i.e., generating a single dynamic interaction parameter) "*using* the first gesture signal and the second gesture signal and the first device sensor signal *and* the second device sensor signal" (i.e., by using both gesture signals, as well as *both* the first and second device sensor signals together). Hence, in order to demonstrate that Burrough teaches the recited limitation of claim 7, Petitioner must show that the haptic response H(d) for *one* finger is generated using the pressure signals for *both* fingers used in the zoom gesture, that is, the pressure information for that finger to which the haptic response H(d) is to be applied, as well as the pressure information for the other finger used in the zoom gesture. Petitioner, however, does not address this issue in the Petition. Petitioner's contention that it would have been obvious to "create a haptic effect for each finger that varies both as a function of distance and as a function of pressure" does not track the language of the claim with sufficient precision and, therefore, lacks sufficient specificity to demonstrate that Burrough teaches the limitation recited in claim 7. *See* Pet. 27.

Accordingly, based on the record presented, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claim 7 under 35 U.S.C. § 103(a) as obvious over Burrough.

i. Claims 23–29

Claims 23–29 are computer readable medium claims corresponding to method claims 1–7, respectively. Hence, for the same reasons discussed above with respect to claims 1–4 and 6, we are persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claims 23–26 and 28 under 35 U.S.C. § 103(a) as obvious over Burrough. However, for the same reasons discussed above with respect to claims 5 and 7, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of prevailing in its challenge to claims 27 and 29 under 35 U.S.C. § 103(a) as obvious over Burrough.

C. Claims 1, 2, 4–7, 23, 24, and 26–29 as Obvious Over Rosenberg '373

Petitioner contends that claims 1, 2, 4–7, 12, 13, 15–18, 23, 24, and 26–29 are unpatentable under 35 U.S.C. § 103(a) as obvious over Rosenberg '373 (Ex. 1004). Pet. 32–53. As discussed in Section VI.A above, we are unable to determine the scope and meaning of claims 12, 13, and 15–18, and, therefore, cannot conduct the necessary factual inquiry for determining obviousness with respect to these claims. Accordingly, we consider Petitioner's obviousness challenge to claims 1, 2, 4–7, 23, 24, and 26–29 only in this section.

Rosenberg '373 describes a force feedback interface device having a local microprocessor that reads sensor data from a "user object," such as a

joystick. Ex. 1004, Abstract. The microprocessor controls actuators to provide force feedback to the user object, and communicates with a host computer that is coupled to the interface device. *Id.* The sensor data can include position values, velocity values, and/or acceleration values relating to the motion of the user object. *Id.* at col. 15, ll. 50–53. Based on the sensor data, force feedback on the user object is determined. *Id.* at col. 16, ll. 1–42. For example, in a video game application, if the user is controlling a simulated race car, the position of the joystick determines whether the race car is moving into a wall and whether a collision force should be generated on the joystick. *Id.* at col. 16, ll. 25–32.

Petitioner contends that the "sensor data" described in Rosenberg '373 are "gesture signals" recited in the challenged claims because they "indicate user interaction with [a] user object," such as a joystick. Pet. 35–36 (citing Ex. 1004, col. 15, ll. 46–60).

Patent Owner asserts that the "sensor data" identified by Petitioner do not constitute "gesture signals" because they are devoid of any connotation of user intent or meaning. Prelim. Resp. 46. Patent Owner argues that tracking the raw position of a joystick, by itself, is not receiving a "gesture signal" in the context of the '571 patent because further processing (e.g., by software) is necessary to discern gestures from the raw sensor data. *Id.* at 47. Patent Owner asserts that there is no disclosure in Rosenberg '373 of any attempt to discern a user gesture. *Id.* We are persuaded by Patent Owner's argument.

As discussed in the claim construction section above, we construe the term "gesture signal" to mean "a signal indicating a movement of the body

that conveys meaning or user intent." Under this claim construction, we are persuaded by Patent Owner's argument that the "sensor data" put out by a user object, such as a joystick, do not constitute "gesture signals" recited in the challenged claims. As pointed out by Patent Owner, the '571 patent describes a processor interpreting raw touch input data to detect or discern gestures that convey meaning or user intent. *See*, *e.g.*, Ex. 1001, col. 4, ll. 41–46 ("Touch surface 11 recognizes touches . . . on the surface. The data corresponding to the touches is sent to processor 12 . . . and processor 12 *interprets* the touches and in response generates haptic effect signals." (emphasis added)), col. 3, ll. 35–62 (describing interpreting various touches into gestures, such as "finger on", "finger off," "tap," and "swipe."). As discussed above, Petitioner identifies the "sensor data" of Rosenberg '373, which include "position values, velocity values, and/or acceleration values" from the motion of the joystick, as "gesture signals" recited in the claims. Pet. 35–36 (citing Ex. 1004, col. 15, ll. 46–60). Petitioner, however, does not explain how Rosenberg '373 teaches further *interpreting* these raw device input data to discern "a movement of the body that conveys meaning or user intent." Indeed, the Petition contains no discussion of any meaning or user intent that may be conveyed by the "sensor data" of Rosenberg '373. Therefore, Petitioner's arguments and evidence do not establish that Rosenberg '373 teaches "receiving a first gesture signal" and "receiving a second gesture signal," as recited in claims 1 and 23.

Accordingly, based on the record presented, we are not persuaded that Petitioner has demonstrated a reasonable likelihood of Petitioner prevailing

in its challenge to independent claims 1 and 23 under 35 U.S.C. § 103(a) as obvious over Rosenberg ’373.

Petitioner’s arguments and evidence presented with respect to dependent claims 2, 4–7, 24, and 26–29, which depend from claims 1 or 23, do not remedy the deficiencies in Petitioner’s analysis of independent claims 1 and 23. Therefore, Petitioner does not demonstrate a reasonable likelihood of prevailing in its challenge to dependent claims 2, 4–7, 24, and 26–29 under 35 U.S.C. § 103(a) as obvious over Rosenberg ’373.

D. Claims 3 and 25 as Obvious Over the Combination of Rosenberg ’373 and Rosenberg ’846

Petitioner contends that claims 3, 14, and 25 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Rosenberg ’373 and Rosenberg ’846 (Ex. 1006). Pet. 53–56. Similar to our discussion above of the ground of challenge based on Rosenberg ’373 alone, we are unable to determine the scope and meaning of claim 14, and, therefore, we cannot conduct the necessary factual inquiry for determining obviousness with respect to this claim. Accordingly, we consider Petitioner’s obviousness challenge to claims 3 and 25 only in this section.

Petitioner relies on Rosenberg ’373 as rendering obvious underlying independent claims 1 and 23, from which claims 3 and 25 depend, respectively. Pet. 53–56. Rosenberg ’846 is relied upon by Petitioner only to teach the additionally recited limitations of claims 3 and 25. *Id.* at 54–56. Hence, Rosenberg ’846 cannot and does not remedy the above-identified deficiencies in Petitioner’s analysis of challenged independent claims 1 and 23 as obvious over Rosenberg ’373.

Accordingly, based on this record, the information presented in the Petition does not demonstrate a reasonable likelihood of Petitioner prevailing in its challenge to claims 3 and 25 under 35 U.S.C. § 103(a) as obvious over the combination of Rosenberg '373 and Rosenberg '846.

VII. CONCLUSION

Based on the arguments and evidence presented in the Petition, we are persuaded that Petitioner has demonstrated a reasonable likelihood that it will prevail in showing unpatentability of claims 1–4, 6, 23–26, and 28 of the '571 patent.

We have not made a final determination as to the patentability of any of the challenged claims. Our final determination will be based on the record as fully developed during trial.

VIII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314, we hereby institute an *inter partes* review only as to claims 1–4, 6, 23–26, and 28 of the '571 patent on the basis that these claims are unpatentable under 35 U.S.C. § 103(a) as obvious over Burrough;

FURTHER ORDERED that no other ground of unpatentability alleged in the Petition for any claim is authorized for this *inter partes* review; 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, the trial commencing on the entry date of this Decision.

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