

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

KEYNETIK, INC.,
Appellant

v.

SAMSUNG ELECTRONICS CO., LTD.,
Appellee

2020-1271

Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2018-00986.

Decided: January 27, 2021

MARK W. HALDERMAN, Armstrong Teasdale, LLP, Philadelphia, PA, argued for appellant. Also represented by EDWARD F. BEHM.

NAVEEN MODI, Paul Hastings LLP, Washington, DC, argued for appellee. Also represented by CHETAN BANSAL, STEPHEN BLAKE KINNAIRD, JOSEPH PALYS.

Before DYK, CLEVINGER, and O'MALLEY, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* DYK.

Opinion concurring-in-part and dissenting-in-part filed by
Circuit Judge O'MALLEY.

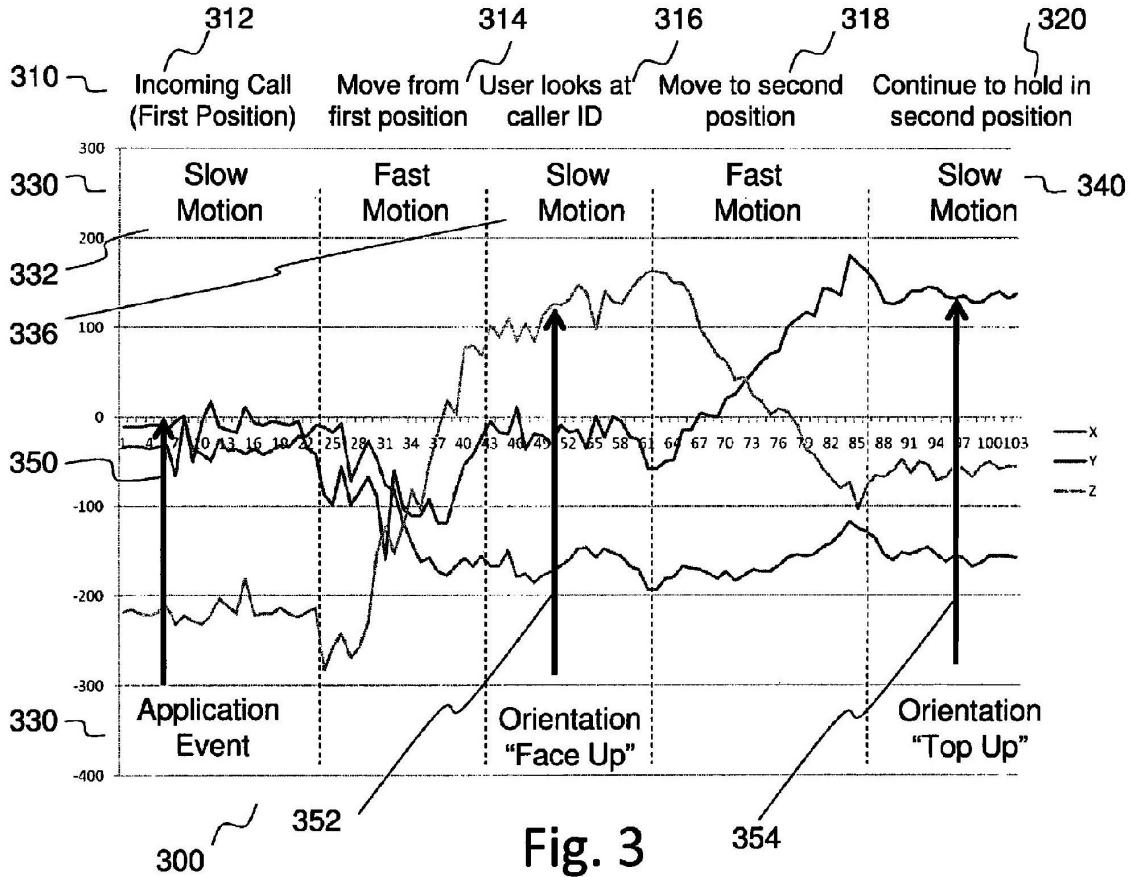
DYK, *Circuit Judge*.

KEYnetik, Inc. (“KEYnetik”) appeals from a final decision of the Patent Trial and Appeal Board (“Board”) holding that claims 1–20 of U.S. Patent No. 8,370,106 (“the ’106 patent”) are unpatentable as obvious. We *affirm* the Board’s claim construction and obviousness determination as to claims 1–3, 5–6, 8–14, 16–17, and 19–20. We also *affirm* the Board’s finding of a motivation to combine as to dependent claims 4, 7, 15, and 18. However, we *vacate* the Board’s obviousness determination as to claims 4, 7, 15, and 18 and *remand* for the Board to make a determination of reasonable expectation of success.

BACKGROUND

KEYnetik is the assignee of the ’106 patent. The ’106 patent discloses an invention that “comprises a system, method, and article for processing motion.” ’106 patent, col. 1 ll. 54–55. The system includes a “processor,” which “acquire[s] movement data” from a “motion sensor,” *id.* col. 1 ll. 56–61, and “detectors,” which can “detect[] motion such as movement and rest” and “orientation towards gravity from a rest position,” *id.* col. 1 ll. 61–67. The system also includes an “inference state machine,” which “maintains a sequence of the detected motion conditions, produces a profile description for the sequence of the detected motion, and outputs an event corresponding to the profile description.” *Id.* col. 2 ll. 2–5.

An exemplary embodiment of the claimed invention, shown in Figure 3 of the ’106 patent below, allows the user to answer an incoming call to a handheld phone by moving the phone through a sequence of “five states” or steps. *Id.* col. 6 l. 60–col. 7 l. 1.



As shown in Figure 3, a user first receives “an incoming call” (312), which is described as involving “Slow Motion”; the user then “mov[es] the handheld [phone] from [its] prior position” (314), described as “Fast Motion”; the user “look[s] at the visual display of the handheld [phone]” (316), described as involving “Slow Motion” and “Orientation ‘Face Up’”; the user “mov[es] the handheld [phone] to a second position [in] response to the received call” (318), described as “Fast Motion”; and the user “continu[es] to hold the handheld [phone] in the second position” (320),

described as involving “Slow Motion” and “Orientation ‘Top Up.’” *Id.* Fig. 3 & col. 6 l. 56–col. 7 l. 1. The system recognizes this sequence as a “Motion Profile,” which results in a command to “answer . . . the call for the handheld device.” *Id.* col. 8 ll. 2–12.

Independent claim 1 of the ’106 patent recites:

1. A motion based input system comprising:

a processor in communication with a memory;

a motion sensor in communication with the processor;

the processor to acquire movement data from the motion sensor;

a manager configured to execute on the processor and to control motion and orientation detectors, including:

a motion detector to detect motion, including identification of a fast motion phase and a slow motion phase, wherein the motion is classified as slow and fast based upon comparing a magnitude of a motion vector with a magnitude of gravity; and

an orientation detector to detect orientation towards gravity for each slow motion phase; and

an inference state machine in communication with the manager configured to: maintain a sequence of the detected orientations towards gravity, each orientation in the sequence being limited to a slow motion phase;

produce a profile description for the sequence of the detected orientations; and

output an event corresponding to the profile description.

Id. col. 12 ll. 31–51. Independent claim 12 claims “[a]n article for processing motion data” with similar limitations as claim 1. *Id.* col. 13 l. 25–col. 14 l. 7. Dependent claims 4, 7, 15, and 18 include various other limitations. KEYnetik does not argue that these limitations are pertinent to the patentability of the dependent claims.

Samsung Electronics Co., Ltd. (“Samsung”) filed a petition for inter partes review of claims 1–20 of the ’106 patent. The Board instituted inter partes review and found that all of the challenged claims would have been obvious to a person of ordinary skill in the art. KEYnetik appeals the Board’s construction of certain claim terms and the ultimate obviousness determination. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. § 141(c).

DISCUSSION

In reviewing the Board’s claim construction, “[w]e review underlying factual determinations concerning extrinsic evidence for substantial evidence and the ultimate construction of the claim de novo.” *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1280 (Fed. Cir. 2015). “If, as here, the [inter partes review] stems from a petition filed before November 13, 2018, the claims are given the ‘broadest reasonable interpretation’ consistent with the specification.” *Game & Tech. Co. v. Wargaming Grp. Ltd.*, 942 F.3d 1343, 1351 (Fed. Cir. 2019); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142 (2016); *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51340 (United States Patent and Trademark Office, Oct. 11, 2018).

The Board’s ultimate determination on obviousness is a legal determination that we review de novo, although we review any underlying factual findings for substantial

evidence. *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015).¹

I

KEYnetik challenges the Board's construction of two limitations that appear in both claim 1 and claim 12, the only independent claims of the '106 patent. These arguments are largely repeated in the dissent.

A

We first address the orientation detector limitation. This limitation is “an orientation detector to detect orientation towards gravity for each slow motion phase” (the “orientation detector limitation”). '106 patent, col. 12 ll. 43–44 (claim 1); *see also id.* col. 13 ll. 37–38 (claim 12). Under the Board's construction, this limitation “encompasses multiple orientation detections for a given slow motion phase and does not preclude orientation detection for fast motions phases.” J.A. 26–27.²

¹ Congress amended 35 U.S.C. § 103 when it enacted the Leahy–Smith America Invents Act (“AIA”). Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287 (2011). Because the application that led to the '106 patent has an effective filing date before March 16, 2013, the pre-AIA version applies. *Id.* § 3(n)(1), 125 Stat. at 293; *see In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1329 n.2 (Fed. Cir. 2016).

² Claim 12 contains an additional limitation not found in claim 1: “instructions to detect orientation towards gravity for each slow motion phase and *absent detecting orientation towards gravity during fast motion phases*, wherein the motion is classified as slow and fast based upon comparing a magnitude of a motion vector with a magnitude of gravity.” '106 patent, col. 13 ll. 37–42 (emphasis added). The Board construed “absent detecting orientation towards gravity during fast motion phases” to

First, KEYnetik and the dissent argue that “the plain claim language does not permit multiple orientations to be detected during a single slow phase,” relying on the use of the term “for,” the use of the term “orientation” in the singular without any article in the reference, and the use of the term “orientation condition” in claim 12. Appellant’s Br. 27–32. As the Board found, none of these linguistic arguments supports KEYnetik’s position, nor does the specification. The use of the word “orientation” without an article does not suggest that the reference is limited to a single orientation. Though KEYnetik notes that examples in the specification, such as Figure 3, show one orientation detected during slow motion phases, as the Board concluded, the specification provides no basis to limit the claims to those examples, and the claim language under the broadest reasonable interpretation standard is not so limited.

The Board credited Samsung’s expert testimony that “the orientation detector limitation does not preclude multiple detected orientations for each slow motion phase because it is consistent with the Specification.” J.A. 27–28. By contrast, the Board found that KEYnetik’s expert testimony “[did] not include a persuasive explanation” in support of KEYnetik’s position that “the word ‘for’ would inform a POSITA that ‘orientation’ is detected for the phase itself . . . not merely an orientation during the phase.” *Id.* at 27 (internal quotation marks omitted). The dissent argues that the word “for” suggests “an orientation representative of the condition of the motion phase,” Dissenting Op. 3 (quoting Appellant’s Br. 27), but as the Board noted, the word “for” has broader definitions that fall within the broadest reasonable interpretation of this

mean “without detecting orientation towards gravity for fast motion.” J.A. 47. KEYnetik does not appeal this construction.

limitation. See J.A. 27, 3013 (“Definition of For by Merriam-Webster” includes “used as a function word to indicate the object or recipient of a perception, desire, or activity” and “with respect to”).

KEYnetik and the dissent argue that the Board erred for another reason. KEYnetik contends that “[t]he plain English definition of the word ‘each’ would inform a POSITA that orientation must be detected for two or more slow motion phases.” Appellant’s Br. 40 (emphasis omitted). On this point, the Board credited Samsung’s expert testimony that “the orientation detector limitation could be satisfied by only one slow motion phase because, in the context of the claims, ‘each’ can refer to one or more.” J.A. 32. The Board also credited Samsung’s expert testimony that “[a]pplying the plain and ordinary meaning, this claim language does not require there to be more than one slow motion phase” and that “if there was only one slow motion phase and orientation was detected for that one slow motion phase; then the claim is satisfied because an orientation is detected for ‘each’ slow motion phase.” *Id.* (alteration in original).

The Board’s construction is consistent with ordinary English usage of the term “each.” “Each” indicates there is a set with potentially multiple members, and that each of these potential members of the set has defined characteristics. This is made clear by the more general definitions in the Oxford English Dictionary. The word “each” used as an adjective can mean “to give the same sense in relation to individual members of an identifiable set as all or both before a plural noun give in relation to the aggregate.” *Each*, *Oxford English Dictionary*, <https://www.oed.com/view/Entry/58924> (last visited Jan. 26, 2021).

The word “set” can mean “[a]n assemblage of distinct entities, either individually specified or which satisfy certain specified conditions.” *Set*, *Oxford English Dictionary*,

<https://www.oed.com/view/Entry/176794> (last visited Jan. 26, 2021). A “set” need not consist of multiple things and may consist of nothing, i.e., an “empty set.” *Id.*³

Considering the intrinsic and extrinsic evidence, we see no error in the Board’s construction of the orientation detector limitation.

B

We next address the sequence limitation. The sequence limitation is “an inference state machine . . . configured to: maintain a sequence of the detected orientations towards gravity, each orientation in the sequence being limited to a slow motion phase” (“the sequence limitation”). ’106 patent, col. 12 ll. 45–48 (claim 1); *see also id.* col. 14 ll. 1–3 (claim 12). Under the Board’s construction, this limitation “does not preclude two or more orientations in the sequence being limited to *the same* slow motion phase,” J.A. 34–35, and “the inference state machine maintains the sequence for slow motion and does not preclude maintaining orientations for both slow motion and fast motion, provided at least consecutive orientations correspond to a slow motion phase,” *id.* at 47.

KEYnetik and the dissent argue that “[t]he broadest reasonable interpretation of ‘being limited to a slow motion phase’ of the Sequence Limitation requires ‘precluding

³ KEYnetik relies on *Alcohol Monitoring Sys., Inc. v. Actsoft, Inc.*, 414 F. App’x 294 (Fed. Cir. 2011). In that case we considered a claim limitation that required “transmitting each of” certain “measurement results.” *Id.* at 296.

We held that the limitation as properly construed “require[d] transmitting every measurement result . . . in a way that the measurement results are ‘separately identifiable.’” *Id.* at 300 (emphases omitted). Our holding turned on the definition of “each” meaning “distinct” rather than meaning one of a plurality. *Id.* at 299–300.

orientations detected during fast motion’ from being maintained in the claimed sequence.” Appellant’s Br. 45 (emphases omitted). KEYnetik argues that “the claimed ‘motion based input system’ (claim 1) or ‘article’ (claim 12) must itself be configured to limit the maintained sequence to only those orientations detected during a slow motion phase.” *Id.* (emphases omitted).

The Board disagreed, finding that “although the claim recites that the inference state machine is configured to *maintain* the sequence of detected orientations, the plain meaning of ‘each orientation in the sequence being limited to a slow motion phase’ does not require the inference state machine to have orchestrated the limiting of the orientations to those corresponding to slow motion.” J.A. 37. In other words, the sequence limitation “does not require the inference state machine to actively limit the maintained sequence to slow motion phases.” *Id.* at 57.

The Board provided an example of the following “long sequence of detected orientations that has been maintained by a hypothetical inference state machine, together with the motion classification during which the orientation was detected for each.” *Id.* at 35–36.

Sequence No.	1	2	3	4
Motion	Fast	Slow	Slow	Fast
Orientation	*	Down ^{T1}	Down ^{T2}	*

The Board noted that “[w]ithin the larger sequence 1–4, consecutive sequence numbers 2-3 constitute a ‘sequence’ of orientations,” where the two orientations are each limited to a slow motion phase. *Id.* at 36.

We see no reason why a system that can maintain a sequence of only 2–3 cannot be within the claim limitation even though the sequence of 1–4 does not fall within the claim limitation. We agree with the Board that, under the broadest reasonable interpretation standard, “claim 1 allows continuously maintaining orientations during both fast motion and slow motion phases, provided a sequence of orientations *is* maintained [i.e., merely consecutive orientations corresponding to slow motions] that is limited to slow motion phases.” J.A. 42 (alteration in original) (quoting *id.* at 332 (institution decision)). Claims 1 and 12 use the signal “comprising,” ’106 patent, col. 12 l. 31, col. 13 l. 26, “which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.” *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997).

KEYnetik contends that the Board’s interpretation of the sequence limitation is inconsistent with the prosecution history. KEYnetik notes that “[d]uring prosecution, the examiner initially rejected the claims as obvious under *Huang* and *Marvit*,” and “[i]n response, the Patentee amended the claims, including by adding ‘each orientation in the sequence being limited to a slow motion phase’ to the Sequence Limitation.” Appellant’s Br. 47 (emphasis omitted). The applicant stated in the prosecution history that “neither [*Marvit*] nor *Huang* teach the aspect pertaining to classifying motion into fast and slow motion phases and calculating orientation towards gravity only for the slow motion phases.” J.A. 41 (alteration in original) (quoting J.A. 1081) (emphasis omitted). According to KEYnetik, the amendment was added “to distinguish [the] invention over both *Huang* and *Marvit*” because the “[e]vent profiles of *Marvit* and *Huang* are based on all motion phases and are not limited to orientations for slow motion phases.” Appellant’s Br. 47 (alteration in original) (quoting J.A. 1080–81). KEYnetik argues that this amendment “disclaimed maintaining sequences based on ‘all motion phases.’” *Id.*

The Board was “not persuaded these statements amount to a clear disclaimer of claim scope such that the claims must be interpreted to mean orientation is detected and maintained for slow motion phases only.” J.A. 41. The Board noted that the statement in the prosecution history used the term “calculating orientation,” rather than either “detect[ing] orientation” or “maintain[ing] . . . orientations,” as used in claim 1. J.A. 41 (alterations in original) (quoting ’106 patent, col. 12 ll. 31–51).⁴ The Board further noted that “the word ‘only’ does not appear in claim 1,” *id.*, nor does it appear in claim 12, *see* ’106 patent, col. 13 l. 24–col. 14 l. 7, thus suggesting that the sequence limitation in those claims does not prohibit detecting and maintaining (as opposed to calculating) orientations during fast motion phases.⁵

We see no error in the Board’s construction of the sequence limitation.

II

KEYnetik next argues that the Board erred in finding a motivation to combine two of the prior art references,

⁴ The specification refers to the lack of calculating (or processing) orientation during fast motion phases in describing Figure 2 of the ’106 patent, noting that “if a fast motion is detected . . . , the motion data is not communicated (and therefore not shown) to the orientation detector . . . for processing.” ’106 patent, col. 6 ll. 50–52.

⁵ By contrast, claim 4, which depends from claim 1, recites “instructions to avoid detecting orientation during a fast motion condition.” ’106 patent, col. 12 ll. 61–63. Claim 15, which depends from claim 12, recites “instructions to avoid detecting orientation during a fast motion condition.” *Id.* col. 14 ll. 17–18.

*Linjama*⁶ and *Tosaki*,⁷ which the Board relied on in concluding that claims 4, 7, 15, and 18 were invalid.⁸

Linjama provides “computer program products . . . to sense orientations or sequence of orientations, i.e. gestures, of mobile devices.” J.A. 1208 ¶ 7. “The orientation or sequence of orientations control components and/or functions of the mobile device.” *Id.* In one embodiment of *Linjama*, a “mobile terminal” may comprise “one or more motion sensors” that “are configured to determine whether the mobile terminal is moving.” J.A. 1211 ¶ 52. For example, the motion sensor may determine “that the mobile terminal is substantially stationary,” and an “orientation sensor” may signal “that the mobile terminal is in a downward orientation.” *Id.* “This combination of substantially stationary and downward orientation may correspond to a predefined gesture,” which is recognized by a “gesture detector.” *Id.* The gesture detector then sends a “control signal” that “correspond[s] to inactivating the audible sounds of the mobile terminal.” *Id.*

Tosaki discloses “[a]n input device in which a player moves the whole of the input device and a game processing device for processing a simulated game.” *Tosaki*, Abstract. “The input device includes detecting means for detecting

⁶ U.S. Patent Application Publication No. 2008/0229255 A1.

⁷ U.S. Patent No. 6,312,335 B1.

⁸ The Board relied on the combination of *Linjama*, *Tosaki*, and *Lehrman*, U.S. Patent No. 6,703,939 B2, as the sole grounds for finding claims 4, 7, 15, and 18 invalid as obvious. KEYnetik only contests the Board’s finding of a motivation to combine and reasonable expectation of success as to *Linjama* and *Tosaki*. KEYnetik does not dispute motivation to combine or reasonable expectation of success as to the other combinations relied on by the Board in finding that the other claims were invalid as obvious.

physical quantities corresponding to the movement of the input device as a whole and converting the physical quantities to a detection signal which is output.” *Id.* One embodiment of *Tosaki* is a game that “simulates fishing . . . to an input device and processing technology for [the] same which simulates a fishing rod . . . without the mechanical constraints associated with a fishing line.” *Id.* col. 1 ll. 8–12.

The Board found that Samsung provided a motivation to combine *Linjama* and *Tosaki* such that *Linjama*’s gesture detector would “only detect[] orientation during a slow motion phase” because such a modification “would have helped ensure that unintended movements (e.g., when the mobile terminal is not substantially stationary) do not result in identification of gestures that the user did not intend . . . [thus making] the combined system more user-friendly.” J.A. 72 (alteration in original) (quoting J.A. 918). The Board also cited Samsung’s additional rationale to modify *Linjama* in light of *Tosaki* “to save power.” *Id.*; see also *id.* at 918. The Board noted that Samsung’s “power saving’ motivation” was “unrebutted” and supported by “convincing” expert testimony. *Id.* at 75.

KEYnetik argues that “*Linjama* teaches detecting motion AND orientation at the same time, which *Tosaki* prohibits because it teaches detecting orientation OR movement, but never detects both motion and orientation,” and therefore, the references teach away from each other. Appellant’s Br. 61.

“A reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). KEYnetik provides no rationale as to why a person of ordinary skill would be discouraged from applying *Tosaki* to *Linjama*, or that the combination of the two

would result in a direction divergent from that taken by the patentee. We see no error in the Board's determination of a motivation to combine.

III

KEYnetik argues that “the Board erred in concluding that [Samsung] met its burden in showing that a POSITA would . . . have a reasonable expectation of success in combining *Linjama* and *Tosaki*.” Appellant's Br. 59. As discussed earlier, this alleged error affects only the Board's determination of invalidity only for claims 4, 7, 15, and 18. KEYnetik argues that the Board committed legal error in stating that “Petitioner has no such ‘burden’ to show that a POSITA would have had a reasonable expectation of success in combining the references.” *Id.* (quoting J.A. 76). We agree with KEYnetik and remand to the Board to make a determination of reasonable expectation of success in combining *Linjama* and *Tosaki* with respect to claims 4, 7, 15, and 18.

“[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prod. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1069 (Fed. Cir. 2012)). It was Samsung's “burden” to demonstrate “that the skilled artisan would have had a reasonable expectation of success” in combining references. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016) (quoting *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1360 (Fed. Cir. 2012)).

The Board erred in assigning no burden to Samsung and making no finding as to reasonable expectation of success in combining the contested references. We vacate the Board's final determination of obviousness as to claims 4, 7, 15, and 18, and remand to the Board to make a

determination of whether there was reasonable expectation of success in combining *Linjama* and *Tosaki*.

CONCLUSION

We affirm the Board's claim construction, determination of motivation to combine *Linjama* and *Tosaki*, and obviousness determination as to claims 1–3, 5–6, 8–14, 16–17, and 19–20. We vacate the portion of the Board's decision regarding reasonable expectation of success and its obviousness determination as to claims 4, 7, 15, and 18, and we remand for the Board to make a determination of reasonable expectation of success to combine *Linjama* and *Tosaki*.

AFFIRMED-IN-PART, VACATED-IN-PART, AND REMANDED

COSTS

No costs.

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
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KEYNETIK, INC.,
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Appeal from the United States Patent and Trademark Office, Patent Trial and Appeal Board in No. IPR2018-00986.

O'MALLEY, *Circuit Judge*, concurring in part and dissenting in part.

The Board found all claims of the '106 patent unpatentable as obvious in view of the prior art. *Samsung Elecs. Co. v. KEYnetik, Inc.*, No. IPR2018-00986, 2019 Pat. App. LEXIS 13034 (P.T.A.B. Dec. 18, 2019) ("*Board Decision*"). I agree with the majority that the Board's analysis of claims 4, 7, 15, and 18 was fundamentally flawed because it applied an incorrect legal standard. As to those claims, the Board stated that Samsung had no burden to establish a reasonable expectation of success from combining the prior art references at issue. We have held the exact

opposite. *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359,1367–68 (Fed. Cir. 2016) (It is the petitioner’s “burden to demonstrate both ‘that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.’”). The Board’s error on this point could not be clearer.

Although I agree with the majority’s decision to remand to correct that error, there are other errors which the majority lets stand. In particular, I believe the Board erred in construing the “orientation detector” limitation and the “sequence” limitation—terms that appear in both claim 1 and claim 12, the only independent claims at issue—and that those errors infected the obviousness analysis across all claims. In my view, the claim construction should be reversed and the Board’s obviousness analysis, which relies on that construction, should be vacated and remanded to correct those errors as well.

I.

Claim 1 of the ’106 patent recites “an orientation detector to detect orientation towards gravity for each slow motion phase” (“the orientation detector limitation”). ’106 patent, col. 12, ll. 43–44.¹ The Board concluded that this limitation “does not preclude detecting orientation during fast motion phases and also does not preclude multiple orientations being detected during a slow motion phase, which could be the only slow motion phase.” *Board Decision*, 2019 Pat. App. LEXIS 13034, at *24. In reaching this construction, the Board expressly found that: (1) “multiple orientations may be detected for a single ‘phase’ of slow

¹ Claim 12 includes similar language: “instructions to detect orientation towards gravity for each slow motion phase” ’106 patent, at col. 13, ll. 37–39.

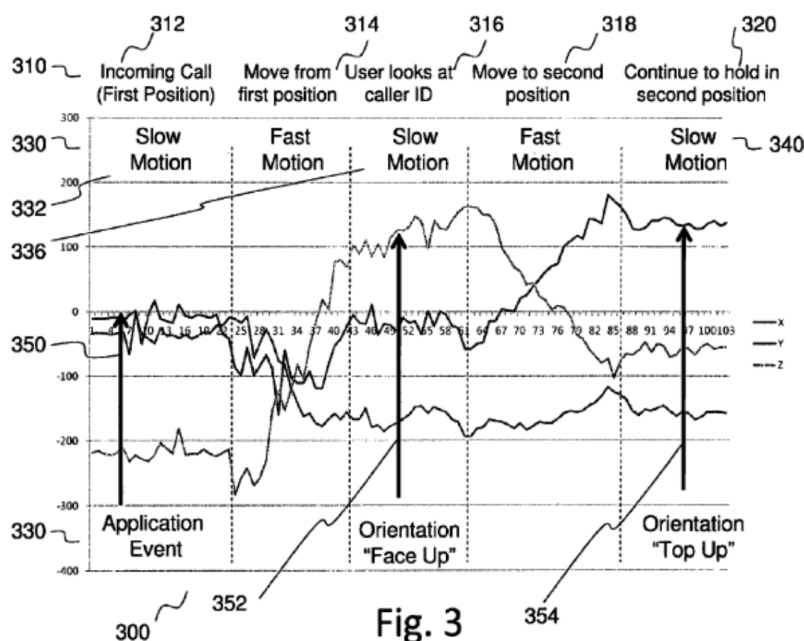
motion;” (2) “no disclosure in the Specification [] precludes the motion detector from continuously providing accelerator data to the orientation detector during a single period of slow motion;” and (3) the “orientation detector limitation” “does not preclude only one slow motion phase” because the word “each” in the phrase “for each slow motion phase” “can refer to one or more.” *Id.* at *20–24. While the majority accepts these conclusions, as explained below, the Board’s findings are inconsistent with both the plain language of the claim and the specification, and its construction of the word “each” defies common English usage.

Turning first to the claim language, as KEYnetik points out, the orientation detector limitation’s use of the singular word “orientation” and the word “for” suggests that “a single ‘orientation’ is detected for the phase itself—i.e., an orientation representative of the condition of the motion phase that had been previously identified as ‘slow’ by the ‘motion detector.’” Appellant’s Br. 27. Although the Board concluded that the orientation detector limitation “does not preclude multiple orientations being detected during a slow motion phase,” nothing in the claim language itself permits detection of multiple orientations during a single slow motion phase. *Board Decision*, 2019 Pat. App. LEXIS 13034, at *22.

Importantly, the claim does not recite “detect orientations” (plural) for each slow motion phase—it recites detect “orientation,” which is singular. And, as KEYnetik points out, the subsequent sequence limitation recites that “a sequence of the detected orientations” (plural) is maintained in the inference state machine, confirming that the preceding use of “orientation” (singular) was intended to be singular. *See Harari v. Lee*, 656 F.3d 1331, 1341 (Fed. Cir. 2011) (noting the patentee’s use of both singular and plural language in the claims suggests the singular use carried only a singular meaning). As such, the claim language supports KEYnetik’s view that a single orientation is detected for each slow motion phase.

Turning to the specification, although the Board conceded that it “may ‘support’ [KEYnetik’s] construction,” the Board concluded that KEYnetik “does not persuade us that the narrower construction is required by the Specification.” *Board Decision*, 2019 Pat. App. LEXIS 13034, at *33. Relying on Figure 3, the Board reasoned that, because “slow motion includes conditions of changing orientation . . . [i]t is [] axiomatic that a period of slow motion may include different orientations.” *Id.* But even the majority recognizes that Figure 3—which depicts an exemplary embodiment of the claimed invention—shows detection of a single orientation for each slow motion phase. *Maj. Op.* at 7.

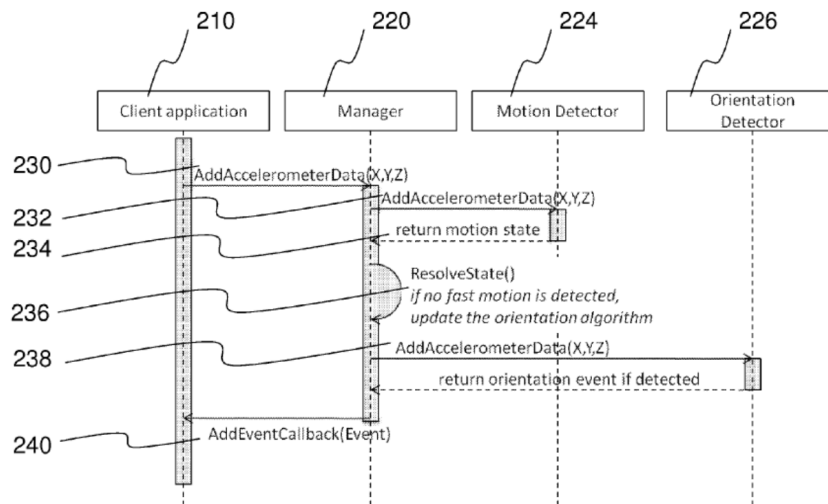
While it is, of course, “improper to limit the claims to the particular preferred embodiments described in the specification,” we have recognized that the “patentee’s choice of preferred embodiments can shed light on the intended scope of the claims.” *Astrazeneca AB v. Mut. Pharm. Co.*, 384 F.3d 1333, 1340 (Fed. Cir. 2004). Here, Figure 3—which explicitly illustrates how the invention of the ’106 patent works—sheds light on the intended scope of the claims and makes clear that there is only one orientation detected for each slow motion phase.



The specification explains that “[t]he motion profile depicted in Fig. 3 is as follows: Rest, Motion, Rest, Orientation Face Up, Motion, Rest, Orientation Top Up.” ’106 patent, at col. 7, ll. 12–14. After the “application event” is recognized, Figure 3 shows two slow motion phases with an intervening fast motion phase. The specification states that “there are two orientation conditions detected, includ[ing] viewing the visual display (352), and maintaining the handheld in the final position (354.” *Id.* at col. 7, ll. 10–12. As KEYnetik points out, although orientation is *measured* multiple times, Figure 3 clearly shows only one orientation (i.e., “Face Up” or “Top Up”) *detected* for each slow motion phase.

As the majority notes, the Board credited Samsung’s expert testimony that “the orientation detector limitation does not preclude multiple detected orientations for each slow motion phase because it is consistent with the Specification.” *Board Decision*, 2019 Pat. App. LEXIS 13034, at *20. Samsung’s expert was relying on Figure 2, shown below, which the patent describes as “a state diagram

illustrating the interworking of the motion detector with a client application.” ’106 patent, col. 2, ll. 49–50.



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Fig. 2

As KEYnetik points out, Figure 2 does not fully illustrate the claimed sequence of detected orientations. Instead, it shows how a stream of motion data (specifically, x, y, and z acceleration data) passes through the detectors and returns a single “orientation event,” “if such an event is programmed in the inference state machine (not shown).” *Id.* at Fig. 2; *id.* at col. 6, ll. 52–55. Therefore, on its face, Figure 2 shows one possible “orientation event” returned to the manager, which is consistent with Figure 3’s depiction of only one orientation maintained by the inference state machine for each slow motion phase. *See id.* at col. 6, ll. 47–55. Nothing in Figure 2 supports detection of multiple orientations during a single slow motion phase.

In any event, the Board’s analysis on this point was flawed. The Board said that it saw “no disclosure in the Specification that precludes the motion detector from continuously providing accelerator data to the orientation detector during a single period of slow motion.” *Board*

Decision, 2019 Pat. App. LEXIS 13034, at *22. As this court has explained, however, “[t]he correct inquiry in giving a claim term its broadest reasonable interpretation in light of the specification is *not* whether the specification proscribes or precludes some broad reading of the claim term adopted by the examiner.” *In re Smith Int’l, Inc.*, 871 F.3d 1375, 1382–83 (Fed. Cir. 2017) (emphasis added). The Board was required to interpret the claims consistently with the specification—not assess whether Samsung’s overly broad reading of the orientation detector limitation was expressly precluded.

Finally, without any support in the intrinsic record, the Board found that the orientation detector limitation’s use of the word “each” in the phrase “detect orientation towards gravity for each slow motion phase” can refer to “one or more” slow motion phases. *Board Decision*, 2019 Pat. App. LEXIS 13034, at *22–24. In reaching this construction, the Board credited the conclusory opinion of Samsung’s expert, who testified that, “in the context of the claims, ‘each’ can refer to one or more.” *Id.* at *23–24. We have recognized, however, that “conclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1318 (Fed. Cir. 2005). Indeed, Samsung presented no evidence to support its interpretation of “each,” and conceded during oral argument before the Board that it had not “tried that hard” to find any evidence. J.A. 729 at ll. 4–9.

The Board then provided its own example of “each” meaning “one or more,” stating that, “if one addressed a room full of people and asked each WW1 veteran to stand and only one person stood, each WW1 veteran would have stood.” *Board Decision*, 2019 Pat. App. LEXIS 13034, at *24. But we have expressly recognized that the plain meaning of “each” refers to “two or more” people or things. *Alcohol Monitoring Sys., Inc. v. Actsoft, Inc.*, 414 F. App’x 294, 299–300 (Fed. Cir. 2011) (“We agree with the district court that the plain meaning of ‘each’ is defined as ‘being

one of two or more distinct individuals” (quoting Merriam-Webster’s Collegiate Dictionary, 390 (11th ed. 2007)). That the Board came up with an example where the term “each” might be used differently cannot overcome its general usage in the English language, especially where the Board’s example is grammatically suspect. The proper phrasing, using the Board’s example, would ask any or all WW1 veterans to stand, which would account for the possibility of there being only one (or none).

The Board’s construction, which the majority again accepts, is inconsistent with the intrinsic record and defies common English usage of the word “each.” In my view, the broadest reasonable interpretation of the “orientation detector limitation” consistent with the specification is detect orientation (singular) of two or more slow motion phases.

II.

Claim 1 also recites “an inference state machine . . . configured to: maintain a sequence of the detected orientations towards gravity, each orientation in the sequence being limited to a slow motion phase” (“the sequence limitation”). ’106 patent, col. 12, ll. 45–48.² Given its construction of the orientation detector limitation, the Board found that “the plain meaning of the sequence limitation does not preclude two orientations detected for a single slow motion phase being maintained as the sequence of detected orientations, each orientation limited to a slow motion phase (which may be the same slow motion phase).” *Board Decision*, 2019 Pat. App. LEXIS 13034, at *26–27. According to the Board, “the inference state machine maintains the sequence for slow motion and does not preclude

² Claim 12 includes similar language: “instructions to maintain a sequence of the detected orientations, each orientation towards gravity in the sequence being limited to a slow motion phase.” ’106 patent, at col. 14, ll. 1–3.

maintaining orientations for both slow motion and fast motion, provided at least consecutive orientations correspond to a slow motion phase.” *Id.* at *39. The majority once more accepts the Board’s interpretation. Once more, I cannot. As explained below, the Board’s construction is inconsistent with the intrinsic record and improperly reads “being limited to a slow motion phase” out of the sequence limitation.

First, although the Board’s construction allows both fast motion and slow motion orientations in the sequence, the claim expressly states that each detected orientation must be “limited to a slow motion phase.” The Board’s construction improperly reads this language out of the claim, rendering it meaningless. *See Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 951 (Fed. Cir. 2006) (holding a patent claim construction that reads limitations out of a claim is “contrary to the principle that claim language should not [be] treated as meaningless”).

As explained above, the claim requires the detection of two or more slow motion phases, which necessarily requires an intermittent fast motion phase. The specification confirms this interpretation. In discussing Figure 3, the specification explains that, “as an incoming telephone call is received, the handheld device can be in any position. During the incoming sequence processing, the user can move the handheld in any way, and the signal processing will identify the gesture *as long as two orientation conditions intermitted by motion conditions are met.*” ’106 patent, col. 7, ll. 18–30 (emphasis added). In other words, the specification expressly requires a fast motion phase separating the slow motion phases.

Given the intrinsic evidence, I agree with KEYnetik that the broadest *reasonable* interpretation of “being limited to a slow motion phase” in the sequence limitation requires precluding orientations detected during fast motion from being maintained in the claimed sequence. To find

otherwise would eviscerate a key feature of the claimed invention. As we recently reiterated, “[a] patent’s statement of the described invention’s purpose informs the proper construction of claim terms, including when the task is to identify the broadest reasonable interpretation.” *Kaken Pharma. Co. v. Iancu*, 952 F.3d 1346, 1352 (Fed. Cir. 2020); see also *In re Power Integrations, Inc.*, 884 F.3d 1370, 1376–77 (Fed. Cir. 2018) (because the patent at issue “strives to eliminate unnecessary components and create a more compact circuit,” the Board’s construction that would include a “bulky” component was “unduly broad” and “inconsistent” with the patent’s “focus”).

Here, the specification explains that,

As the call is received the signal processing to search for a sequence of conditions is started. By using a sequence of orientation conditions of the handheld device, the signal processing generates a fault resilient command absent complex analysis during periods of fast motion. The presence of one or more periods of fast motion serves as confirmation that the sequence is a product of intentional user action(s).

’106 patent, col. 7, ll. 23–30.

By maintaining a “sequence of orientation conditions” with each orientation in the sequence limited to a slow motion phase, the ’106 patent is able to confirm that a user’s gesture “is a product of intentional user action(s).” ’106 patent, col. 7, ll. 25–30. If, as the Board found, the scope of the claimed “sequence” included a series of consecutive orientation signals corresponding to a single orientation of a stationary device—without any intervening fast motion—there would be no way to confirm that the sequence is the product of intentional user action. Put simply, the Board’s construction is both inconsistent with the claim language and the objective of the claimed invention.

III.

For these reasons, I believe the Board's constructions were flawed. As a result, the Board's obviousness determinations should be vacated, and the case should be remanded for further proceedings consistent with the proper construction of the "orientation detector limitation" and the "sequence limitation," as well as for the reasons outlined by the majority. I must respectfully dissent in part.