

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC., LG ELECTRONICS, INC., LG ELECTRONICS U.S.A.,
INC., AND GOOGLE LLC

Petitioner,

v.

GESTURE TECHNOLOGY PARTNERS, LLC,

Patent Owner.

IPR2021-00921¹

Patent 8,878,949 B2

Before PATRICK R. SCANLON, BRENT M. DOUGAL, and
SCOTT RAEVSKY, *Administrative Patent Judges*.

SCANLON, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision

Determining Some Challenged Claims Unpatentable

35 U.S.C. § 318(a)

¹ IPR2022-00092 (LG Electronics, Inc. and LG Electronics U.S.A., Inc.) and IPR2022-00362 (Google LLC) have been joined with this proceeding.

I. INTRODUCTION

Apple Inc., LG Electronics, Inc., LG Electronics U.S.A., Inc., and Google LLC (collectively “Petitioner”) challenge claims 1–18 of U.S. Patent No. 8,878,949 B2 (Ex. 1001, “the ’949 patent”). We have jurisdiction under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 5–10, and 12–17 of the ’949 patent are unpatentable but has not shown by a preponderance of the evidence that claims 4, 11, and 18 are unpatentable.

A. Procedural History

Apple Inc. filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of the challenged claims. Gesture Technology Partners, LLC (“Patent Owner”) filed a Preliminary Response (Paper 6).

We instituted a trial as to all challenged claims. Paper 8 (“Decision on Institution” or “Dec. Inst.”).

After institution, LG Electronics, Inc. and LG Electronics U.S.A., Inc. filed a petition and a motion for joinder to this proceeding. IPR2022-00092, Papers 1, 3. We granted the motion for joinder, and IPR2022-00092 was joined with this proceeding and dismissed. Paper 12, 11–12. In addition, Google LLC filed a petition and a motion for joinder to this proceeding. IPR2022-00362, Papers 2, 3. We granted the additional motion for joinder, and IPR2022-00362 was joined with this proceeding and dismissed. Paper 16, 5–6. Consequently, Apple Inc., LG Electronics, Inc., LG Electronics U.S.A., Inc., and Google LLC are joined in this proceeding.

Patent Owner filed a Patent Owner Response (Paper 10, “PO Resp.”), Petitioner filed a Reply (Paper 13, “Reply”), and Patent Owner filed a Sur-reply (Paper 14, “Sur-reply”).

Petitioner relies on the Declaration of Dr. Benjamin B. Bederson (Ex. 1003) and the Supplemental Declaration of Dr. Benjamin B. Bederson (Ex. 1018) in support of its contentions. Patent Owner relies on the Declaration of Benedict Occhiogrosso (Ex. 2002) in support of its contentions.

An oral hearing was held on September 14, 2022. A transcript of the hearing is included in the record. Paper 23 (“Tr.”).

B. Real Parties in Interest

Petitioner identifies Apple Inc., LG Electronics, Inc., LG Electronics U.S.A., Inc., and Google LLC as the real parties in interest. Pet. 65; IPR2022-00092, Paper 1, 62; IPR2022-00362, Paper 1, 61. Patent Owner identifies itself as the real party in interest. Paper 15, 1.

C. Related Matters

The parties identify the following proceedings as related matters involving the ’949 patent: *Gesture Technology Partners, LLC v. Apple Inc.*, No. 6:21-cv-00121 (W.D. Tex.); *Gesture Technology Partners, LLC v. Lenovo Group Ltd.*, No. 6:21-cv-00122 (W.D. Tex.); *Gesture Technology Partners, LLC v. LG Electronics, Inc.*, No. 6:21-cv-00123 (W.D. Tex.); *Gesture Technology Partners, LLC v. Huawei Device Co., Ltd.*, No. 2:21-cv-00040 (E.D. Tex.); *Gesture Technology Partners, LLC v. Samsung Electronics Co., Ltd.*, No. 2:21-cv-00041 (E.D. Tex.), *Gesture Technology Partners, LLC v. Motorola Mobility LLC*, No. 1:22-cv-03535 (N.D. Ill.), and *Gesture Technology Partners, LLC v. Katherine K. Vidal*, No. 1:22-cv-622 (E.D. Va.). Pet. 65; Paper 15, 1–3.

In addition, Patent Owner identifies the following *inter partes* review proceedings as related matters: IPR2021-00917; IPR2021-00920; IPR2021-00922; and IPR2021-00923. Paper 15, 2–3. Patent Owner also identifies the following related *Ex Parte* Reexaminations: No. 90/014,900; No. 90/014,901; No. 90/014,902; and No. 90/014,903. *Id.* at 3–4.

D. The '949 Patent

The '949 patent, titled “Camera Based Interaction and Instruction,” issued November 4, 2014, with claims 1–18. Ex. 1001, codes (45), (54), 15:21–16:50. The '949 patent relates to “enhanc[ing] the quality and usefulness of picture taking for pleasure, commercial, or other business purposes.” *Id.* at 1:4–6. In one embodiment, “stereo photogrammetry is combined with digital image acquisition to acquire or store scenes and poses of interest, and/or to interact with the subject in order to provide data to or from a computer.” *Id.* at 1:6–10.

Figure 2A of the '949 patent is reproduced below.

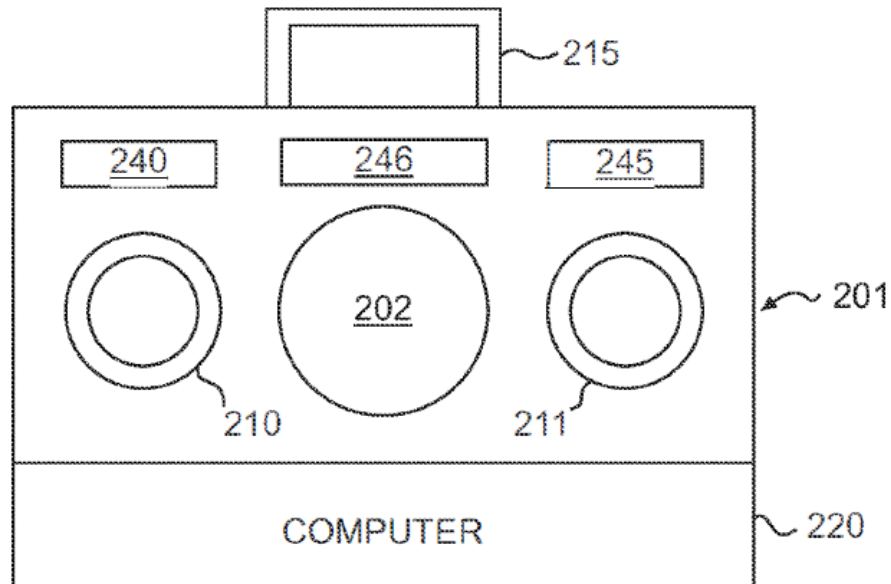


FIG. 2A

Figure 2A illustrates still camera system 201, which includes central camera 202 having high resolution and color accuracy for picture taking. *Id.* at 4:66–5:2. Camera system 201 also includes two cameras 210, 211 on either side of central camera 202. *Id.* at 5:2–3. Cameras 210, 211 “may be lower resolution (allowing lower cost, and higher frame rate, as they have less pixels to scan in a given frame time), with little or no accurate color capability, as they are used to simply see object positions or special datum positions on objects.” *Id.* at 5:3–7.

Camera system 201 further includes computer 220 that processes data from cameras 210, 211 “to get various position and/or orientation data concerning a person.” *Id.* at 5:24–26. “In general, one can use the system to automatically ‘shoot’ pictures” in response to a particular event, such as the subject undertaking a particular position or gesture—i.e., a silent command to take a picture. *Id.* at 5:30–49.

E. Challenged Claims

As noted above, Petitioner challenges claims 1–18 of the ’949 patent. Claims 1, 8, and 13 are independent. Claim 1 is illustrative of the claimed subject matter and is reproduced below:

1. A portable device comprising:
 - a device housing including a forward facing portion, the forward facing portion of the device housing encompassing an electro-optical sensor having a field of view and including a digital camera separate from the electro-optical sensor; and
 - a processing unit within the device housing and operatively coupled to an output of the electro-optical sensor, wherein the processing unit is adapted to:

determine a gesture has been performed in the electro-optical sensor field of view based on the electro-optical sensor output, and

control the digital camera in response to the gesture performed in the electro-optical sensor field of view, wherein the gesture corresponds to an image capture command, and wherein the image capture command causes the digital camera to store an image to memory.

Ex. 1001, 15:21–38.

F. Instituted Grounds of Unpatentability

We instituted *inter partes* review of the challenged claims based on the following grounds of unpatentability asserted by Petitioner:²

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–18	103(a)	Numazaki, ³ Nonaka ⁴
6, 12, 17	103(a)	Numazaki, Nonaka, Aviv ⁵

Dec. Inst. 27; Pet. 6–7.

II. ANALYSIS

A. Legal Standards

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2020). “In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. § 103. Because the ’949 patent has an effective filing date before the March 16, 2013, effective date of the applicable AIA amendments, we apply the pre-AIA version of 35 U.S.C. § 103.

³ US 6,144,366, issued Nov. 7, 2000 (Ex. 1004).

⁴ JP H4-73631, published Mar. 9, 1992 (Ex. 1005).

⁵ US 5,666,157, issued Sept. 9, 1997 (Ex. 1006).

(Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (2012) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. See *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective indicia of non-obviousness (also called secondary considerations), such as commercial success, long-felt but unsolved needs, and failure of others. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze grounds based on obviousness in accordance with the above-stated principles.

B. Level of Ordinary Skill in the Art

In determining whether an invention would have been obvious at the time it was made, 35 U.S.C. § 103 requires us to resolve the level of ordinary skill in the pertinent art at the time of the effective filing date of the claimed invention. *Graham*, 383 U.S. at 17. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art. *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors that may be considered in determining the level of ordinary skill in the art

include, but are not limited to, the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* In a given case, one or more factors may predominate. *Id.*

Petitioner contends that a person having ordinary skill in the art “would have had at least a bachelor’s degree in electrical engineering or equivalent with at least one year of experience in the field of human computer interaction,” and “[a]dditional education or experience might substitute for the above requirements.” Pet. 5–6 (citing Ex. 1003 ¶¶ 29–31). Patent Owner does not dispute Petitioner’s definition for the purposes of its Response. PO Resp. 5.

Based on our review of the record before us, we determine that Petitioner’s stated level of ordinary skill in the art is reasonable because it is consistent with the evidence of record, including the asserted prior art. Accordingly, for the purposes of this Decision, we adopt Petitioner’s definition.

C. Claim Construction

In *inter partes* reviews, the Board interprets claim language using the district-court-type standard, as described in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). *See* 37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1313–14. Although extrinsic evidence, when available, may also be useful when construing claim terms under this standard, extrinsic evidence should be considered in the context of the intrinsic evidence. *See id.* at 1317–19.

Petitioner proposes claim constructions for the phrases “the image capture command causes the digital camera to store an image to memory” in claim 1, “capturing an image to the digital camera in response to . . . the image capture command” in claim 8, and “correlate the gesture detected . . . with an image capture function and subsequently capture an image using the digital camera” in claim 13. Pet. 8. Specifically, Petitioner asserts that these phrases “should be construed broadly enough to encompass capturing/storing video or still images,” and provides reasons supporting its assertion. *Id.* at 8–10. Patent Owner does not contest Petitioner’s proposed claim constructions. PO Resp. 5. We agree with Petitioner’s supporting reasoning and accordingly adopt Petitioner’s proposed claim constructions.

D. Asserted Obviousness Based on Numazaki and Nonaka

Petitioner asserts that claims 1–18 of the ’949 patent are unpatentable under 35 U.S.C. § 103(a) based on Numazaki and Nonaka. Pet. 10–49. Patent Owner provides arguments addressing this asserted ground of unpatentability. PO Resp. 6–29. We first summarize the references and then address the parties’ contentions.

1. Numazaki

Numazaki “relates to a method and an apparatus for generating information input in which input information is extracted by obtaining a reflected light image of a target object.” Ex. 1004, 1:8–11. An information input generation apparatus according to a first embodiment includes lighting unit 101, reflected light extraction unit 102, feature data generation unit 103, and timing signal generation unit 104. *Id.* at 10:23–28, Fig. 1. Light emitting unit 101 emits light that varies in intensity in time according to a timing signal from timing signal generation unit 104. *Id.* at 10:29–31. The light is directed onto a target object, and light reflected from the target object

is extracted by reflected light extraction unit 102. *Id.* at 10:31–35. Feature data generation unit 103 extracts feature data from the reflected light image. *Id.* at 10:57–58. “When the target object is a hand, it becomes possible to obtain the information regarding a gesture or a pointing according to the feature data extracted from the reflected light image of the hand, for example, and it becomes possible to operate a computer by using this obtained information.” *Id.* at 10:61–66.

Figure 2, reproduced below, depicts a detailed block diagram of the information input generation apparatus of the first embodiment. *Id.* at 5:11–12, 11:9–11.

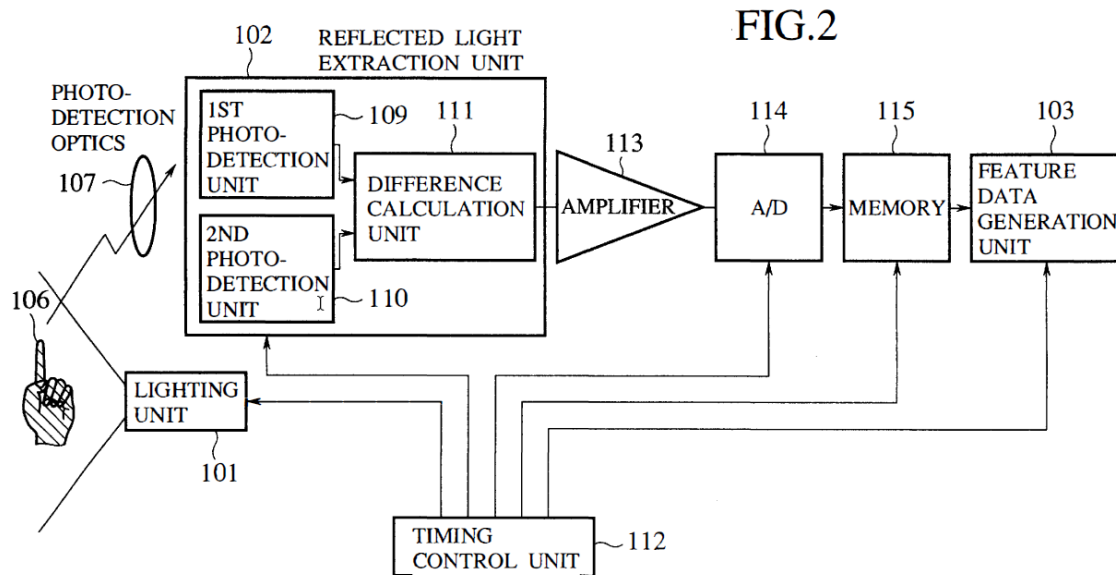


Figure 2 shows that light emitted from lighting unit 101 is reflected by target object 106, such that an image is formed on a photo-detection plane of reflected light extraction unit 102. *Id.* at 11:11–14. Reflected light extraction unit 102 includes first photo-detection unit 109, second photo-detection unit 110, and difference calculation unit 111. *Id.* at 11:16–19. Timing control unit 112 causes lighting unit 101 to emit light when first photo-detection unit 109 is in a photo-detecting state and not to emit light

when second photo-detection unit 110 is in a photo-detecting state. *Id.* at 11:26–32. Accordingly, first photo-detection unit 109 receives the light emitted from lighting unit 101 that is reflected by target object 106 and external light, such as illumination light or sunlight, but second photo-detection unit 110 receives the external light only. *Id.* at 11:33–39.

Difference calculation unit 111 calculates and outputs the difference between the image detected by first photo-detection unit 109 and the image detected by second photo-detection unit 110, which difference corresponds to the light emitted from lighting unit 101 that is reflected by target object 106. *Id.* at 11:43–55. The output from reflected light extraction unit 102 is amplified by amplifier 113, converted from analog signals into digital signals by analog-to-digital converter 114, and stored at memory 115. *Id.* at 11:61–64. At an appropriate time, the data stored in memory 115 is read out and processed by feature data generation unit 103. *Id.* at 11:64–66.

Numazaki also discloses a third embodiment that “is directed to another exemplary case of the feature data generation unit of the first embodiment, which realizes a gesture camera for recognizing the hand action easily and its application as a pointing device in the three-dimensional space.” *Id.* at 29:4–8. Figure 23, reproduced below, shows the feature data generation unit of the third embodiment. *Id.* at 6:4–6, 29:9–10.

FIG.23

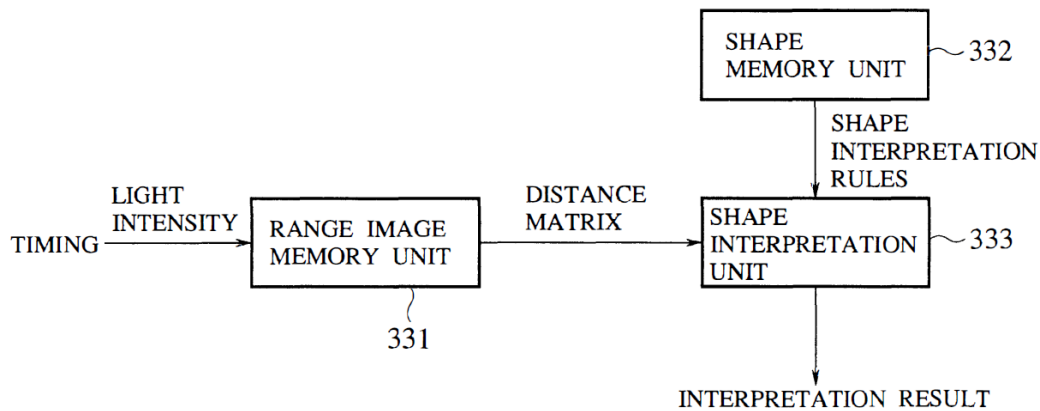


Figure 23 shows that the feature data generation unit includes range image memory unit 331 for storing a distance matrix, shape memory unit 332 for storing shape interpretation rules, and shape interpretation unit 333 for interpreting a shape of the distance matrix according to the shape interpretation rules. *Id.* at 29:11–18. Shape interpretation unit 333 performs the processing for determining if a matching shape interpretation rule exists. *Id.* at 29:28–38, Fig. 25. When a matching shape is found, a command corresponding to that shape is outputted. *Id.* at 30:2–3. Thus, this embodiment uses hand gesture recognition as a trigger for inputting a command into a computer and can also be used to power on and off a device such as a TV or lighting equipment. *Id.* at 31:3–10.

In addition, Numazaki discloses a fifth embodiment that “is directed to another exemplary case of the feature data generation unit in the first embodiment” that uses a video compression technique that extracts only useful image information to lower communications costs. *Id.* at 39:6–20. Figure 46, reproduced below, shows the feature data generation unit according to the fifth embodiment. *Id.* at 7:4–6, 39:21–23.

FIG.46

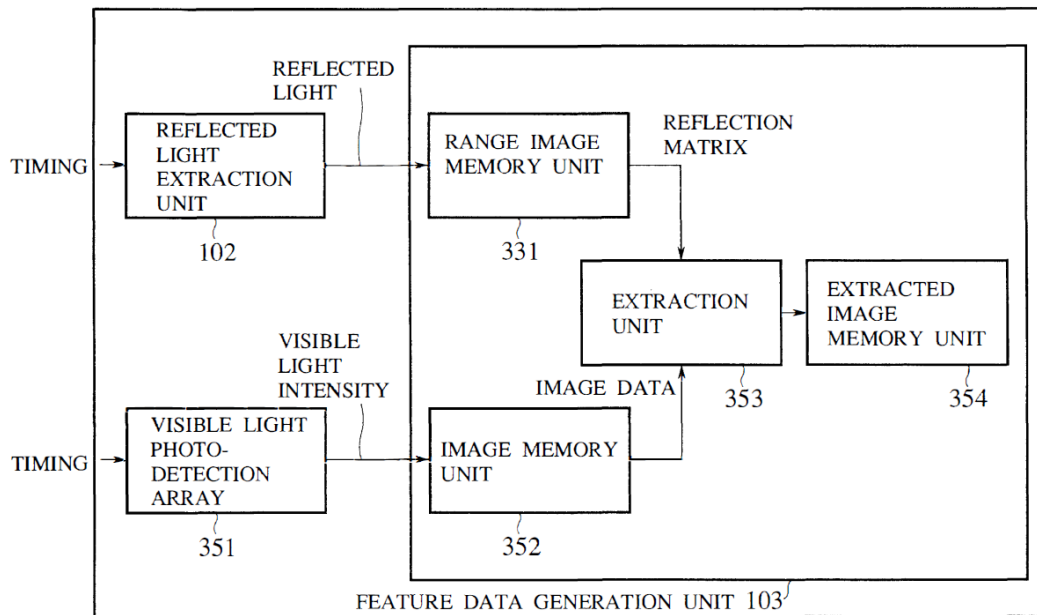


Figure 46 shows feature data generation unit 103 in conjunction with reflected light extraction unit 102 and visible light photo-detection array 351, which is generally a CCD camera for taking video images. *Id.* at 39:24–41. Images captured by visible light photo-detection array 351 are stored in image memory unit 352, and a mask (i.e., the image detected by reflected light extraction unit 102) is stored in range image memory unit 331. *Id.* at 39:51–57. Extraction unit 353 superposes the original image and the mask, leaving only the overlapping portion. *Id.* at 39:57–59.

Numazaki also discloses an eighth embodiment that “is directed to a system configuration incorporating the information input generation apparatus” described in the previous embodiments. *Id.* at 50:21–24. Figure 74, reproduced below, shows a computer equipped with the information input generation apparatus. *Id.* at 8:31–34, 50:25–26.

FIG.74

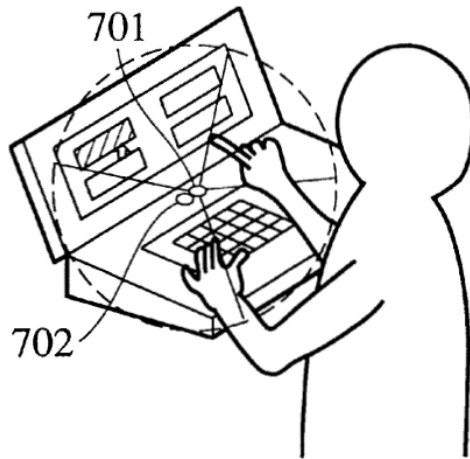


Figure 74 depicts a portable computer having a keyboard and a display integrated with the computer body. *Id.* at 50:26–29. Lighting unit 701 and photo-detection sensor unit 702 are positioned beyond the keyboard. *Id.* at 50:30–33.

2. Nonaka

Nonaka relates to a camera equipped with a remote release device. Ex. 1005, 2:1–3. In one embodiment, a “photographer gives a release instruction by means of a predetermined motion towards the camera in conjunction with the display timing of the aforementioned display patterns, the distance measurement device . . . detects this motion by the subject . . . , and [an] exposure is carried out.” *Id.* at 3:35–38. Nonaka describes that an objective of this invention is to provide “a remote release device-equipped camera which enables remote release operations without using a transmitter or receiver to give a release instruction, thereby achieving a higher degree of freedom, good portability, and cost benefits.” *Id.* at 2:26–29.

3. *Independent Claim 1*

Petitioner contends that the proposed combination of Numazaki and Nonaka discloses the limitations of challenged claim 1. Pet. 10–33. In particular, Petitioner relies on: (1) Numazaki’s first embodiment as teaching using the reflected light extraction unit to detect an object such as a user’s hand; (2) Numazaki’s third embodiment as teaching detecting when the user has performed a pre-registered gesture by comparing the output of the reflected light extraction unit to stored data reflecting pre-registered gestures or hand positions and instructing the device to implement a command corresponding to the gesture; (3) Numazaki’s fifth embodiment as teaching taking video images with visible light photo-detection array 351; and (4) Numazaki’s eighth embodiment as teaching portable devices that implement the information input generation apparatus described in the other embodiments. *Id.* at 20 (citing Ex. 1004, 4:32–35, 29:19–30:5, 31:3–10, 39:21–60, 50:19–24). Regarding these embodiments, Petitioner argues that,

[a]lthough *Numazaki* does not expressly describe combining all these features into a single portable device such that a user could perform a gesture command (pursuant to its third embodiment) that causes video capture to initiate (pursuant to its fifth embodiment), a [person having ordinary skill in the art] would have been motivated to implement *Numazaki*’s portable device in this manner pursuant to *Nonaka*’s image capture command gesture teachings.

Id. at 20–21. For example, Petitioner argues that combining Numazaki’s embodiments as proposed would have improved Numazaki’s portable devices in the same way that Nonaka’s gesture-based image capture functionality benefits its camera device. *Id.* at 21 (citing Ex. 1003 ¶¶ 48–49; *KSR*, 550 U.S. at 417). That is, Petitioner argues that Nonaka’s “gesture-based image capture solution ‘achiev[es] a higher degree of freedom, good

portability, and cost benefits,” and one of ordinary skill in the art “would have recognized that these same benefits would be realized in *Numazaki’s* laptop.” *Id.* (citing Ex. 1006, 2:26–29) (alteration in original). Petitioner also identifies certain passages in *Numazaki* and explains the significance of each passage with respect to the corresponding claim limitation. *Id.* at 25–33. We address below in turn the subject matter of each element of claim 1.

a) Preamble: “A portable device comprising”

For the preamble, Petitioner relies on *Numazaki’s* eighth embodiment as teaching “a computer implemented method for controlling functions on a portable laptop device through gestures or pointing.” Pet. 25–26 (citing Ex. 1004 50:38–43, Fig. 74). Patent Owner does not present arguments for this claim language. To the extent the preamble to claim 1 is limiting, we find, based on the complete record, that Petitioner has demonstrated by a preponderance of the evidence that the combination of *Numazaki* and *Nonaka* discloses this claim language.

b) Limitation [1(a)]: “a device housing including a forward facing portion, the forward facing portion of the device housing encompassing an electro-optical sensor having a field of view and including a digital camera separate from the electro-optical sensor”

Petitioner argues that one of ordinary skill in the art would have been motivated to implement the videoconference functionality of *Numazaki’s* fifth embodiment into the laptop of the eighth embodiment. Pet. 26. To accomplish this implementation, Petitioner argues that *Numazaki’s* two-camera reflected light extraction unit 102 would have been used in conjunction with visible light photo-detection array 351. *Id.* at 26–27 (citing Ex. 1004, 39:21–49). According to Petitioner, because the output of reflected light extraction unit 102 is processed to define which portions of

the video captured by visible photo-detection array 351 are retained, one of ordinary skill in the art would have understood that both reflected light extraction unit 102 and visible photo-detection array 351 are forward facing. *Id.* at 27–28 (citing Ex. 1004, 39:24–60, Fig. 48; Ex. 1003 ¶ 52). Petitioner also argues that reflected light extraction unit 102 corresponds to the claimed electro-optical sensor and visible light photo-detection array 351 corresponds to the claimed digital camera.⁶ *Id.* at 28.

Patent Owner argues that one of ordinary skill in the art would not have understood Numazaki’s reflected light extraction unit 102 to be the claimed electro-optical sensor because it comprises two separate cameras (i.e., photo-detection units 109, 110) and difference calculation unit 111. PO Resp. 8 (citing Ex. 2002 ¶ 45); *see also* Sur-reply 1 (citing Ex. 2002 ¶¶ 44–45) (asserting one of ordinary skill in the art “would not have understood the claimed ‘electro-optical sensor’ as having a ‘difference calculation unit’”).

We do not find this argument persuasive. Numazaki’s reflected light extraction unit 102 includes first photo-detection unit 109, second photo-detection unit 110, and difference calculation unit 111. Ex. 1004, 11:16–19. Each of the first and second photo-detection units “detects the optical image formed on the photo-detection plane and converts it into image signals corresponding to the received light amounts.” *Id.* at 11:20–23. Difference

⁶ During the oral hearing, counsel for Petitioner argued that the “primary theory” set forth in the Petition is that reflected light extraction unit 102, as a whole, satisfies the claimed electro-optical sensor, but photo-detection units 109, 110, individually, also satisfy the claimed electro-optical sensor. Tr. 30:21–31:8. We do not address whether Numazaki’s photo-detection units individually satisfy the claimed electro-optical sensor because that position is not asserted in the Petition.

calculation unit 111 calculates the difference between the images detected by the first and second photodetection units and outputs the obtained difference. *Id.* at 11:53–56. More specifically, “reflected light extraction unit 102 sequentially outputs the reflected light amount for each pixel of the reflected light image” as analog signals that are amplified by amplifier 113 and converted into digital signals by converter 114. *Id.* at 11:59–64.

Numazaki’s disclosure of reflected light extraction unit 102 thus describes a unit that senses light and converts the sensed light into electronic signals, which is consistent with the plain meaning of an “electro-optical sensor.”⁷ As such, we agree with Petitioner’s assertion that reflected light extraction unit 102 satisfies the claimed electro-optical sensor.

Furthermore, in support of its position that reflected light extraction unit 102 is an electro-optical sensor as claimed, Petitioner contends that “although the ’949 Patent does not define ‘electro-optical sensor,’ dependent claim 7 specifies that the sensor is either a ‘CCD detector’ or [a] ‘CMOS detector.’” Pet. 28–29 (citing Ex. 1001, 15:50–52). Petitioner then asserts that Numazaki expressly discloses that reflected light extraction unit 102 has a photo-detection section comprising CMOS sensors or CCD image sensors. *Id.* at 29 (citing Ex. 1004, 12:56–57, 15:23–27). In addition, Patent Owner’s expert, Mr. Occhiogrosso, acknowledges that photo-detection units 109, 110 are electro-optical sensors. Ex. 1019, 15:21–16:3. Accordingly, we determine based on the full record that Numazaki’s reflected light extraction unit 102 provides an electro-optical sensing function.

⁷ The ’949 patent does not define “electro-optical sensor,” and neither party proffers a construction of the term.

As discussed above, difference calculation unit 111 merely processes the image signals produced by the first and second photodetection units and does not alter the electro-optical sensing function of reflected light extraction unit 102. *See* Ex. 1004, 11:53–56. Accordingly, we are not persuaded that the inclusion of difference calculation unit 111 would have suggested to one of ordinary skill in the art that reflected light extraction unit 102 is not an electro-optical sensor.

Next, Patent Owner argues that the Petition wrongly contends that photo-detection sensor unit 702 in Figure 74 of Numazaki “is or includes” one or both of Numazaki’s reflected light extraction unit 102 and visible light photo-detection array 351. PO Resp. 8 (citing Pet. 16, 17, 25–29; Ex. 2002 ¶ 46). According to Patent Owner, “*Numazaki* is silent regarding the ‘photo-detection sensor unit’ in Fig. 74 as being or including one or more of the ‘reflected light extraction unit 102’ and the ‘visible light photo-detection array 351.’” *Id.* at 9 (citing Ex. 2002 ¶ 47). Patent Owner further argues that:

The mere fact that *Numazaki*’s eighth embodiment may “incorporate the information input generation apparatus” of *Numazaki*’s fifth embodiment, Ex. 1004, 50:21–24, does not mean to a [person having ordinary skill in the art] that the “photodetection sensor unit” in Fig. 74 is or includes one or more of the “reflected light extraction unit 102” and the “visible light photo-detection array 351” from Fig. 46 (i.e., the claimed “electro-optical sensor” and “digital camera,” respectively).

PO Resp. 10–11 (citing Ex. 2002 ¶ 49).

Petitioner replies by arguing that Patent Owner’s argument mischaracterizes the proposed combination because “[t]he Petition did not suggest, nor does it depend on, Numazaki expressly teaching that the eighth

embodiment's laptop includes the fifth embodiment's components.”

Reply 4–5.

We agree with Petitioner on this issue. The Petition asserts that one of ordinary skill in the art would have been motivated to implement the videoconference functionality of Numazaki's fifth embodiment into the laptop of the eighth embodiment. Pet. 26. The Petition further asserts that this implementation would have been accomplished by using reflected light extraction unit 102 and visible photo-detection array 351 from Numazaki's fifth embodiment. *Id.* at 26–27 (citing Ex. 1004, 39:21–49, Fig. 46). Thus, rather than asserting that photo-detection sensor unit 702 of Numazaki's eighth embodiment “is or includes” one or both of reflected light extraction unit 102 and visible light photo-detection array 351, the Petition proposes modifying Numazaki's eighth embodiment by including the reflected light extraction unit and the visible light photo-detection array from Numazaki's fifth embodiment to provide videoconference functionality. *Id.* at 26–27; *see also id.* at 20–21 (arguing one of ordinary skill in the art would have been motivated to implement Numazaki's portable device “such that a user could perform a gesture command (pursuant to its third embodiment) that causes video capture to initiate (pursuant to its fifth embodiment)”).

Accordingly, we do not find Patent Owner's argument persuasive. We also disagree with Patent Owner's argument that Petitioner's Reply argument seeks to change Petitioner's position with respect to Numazaki's fifth and eighth embodiments. *See* Sur-reply 2. Specifically, Patent Owner contests Petitioner's assertion regarding the Petition not suggesting that Numazaki expressly teaches that the eighth embodiment's laptop includes the fifth embodiment's components based on the statement in the Petition that Numazaki “expressly contemplates incorporating these early-described

embodiments in the eighth embodiment portable devices.” *Id.* at 3 (citing Reply 5; Pet. 23). This statement, however, discusses *incorporating* aspects of the first seven embodiments *into* the eighth embodiment and does not indicate that the eighth embodiment includes any aspects of the early embodiments prior to any modification.

For the above reasons, we find on the complete record that Petitioner has demonstrated by a preponderance of the evidence that the combination of Numazaki and Nonaka discloses limitation [1(a)].

c) *Limitation [1(b)]: “a processing unit within the device housing and operatively coupled to an output of the electro-optical sensor, wherein the processing unit is adapted to: determine a gesture has been performed in the electro-optical sensor field of view based on the electro-optical sensor output”*

For limitation [1(b)], Petitioner argues that one of ordinary skill in the art would have been motivated to implement the gesture recognition of Numazaki’s third embodiment into the eighth embodiment’s laptop device. Pet. 29. Petitioner also argues that one of ordinary skill in the art “would have understood that *Numazaki’s* third embodiment gesture detection process would be implemented by ‘a processing unit’ within *Numazaki’s* laptop device and adapted (via software) to detect a user’s gesture (or sequence of gestures).” *Id.* at 30 (citing Ex. 1004 ¶¶ 53–54).

Patent Owner argues that Numazaki discloses an information input generation apparatus (which Patent Owner refers to as “IIGA”) that includes feature data generation unit 103. PO Resp. 12 (citing Ex. 1004, 5:10–12, Fig. 2). Patent Owner also argues that the IIGA in Numazaki’s third embodiment is configured as “a gesture camera” by implementing the feature input generation apparatus (and feature data generation unit) depicted in Figure 23. *Id.* at 12–13 (citing Ex. 1004, 6:4–7, 29:4–10, Fig. 23;

Ex. 2002 ¶ 53). Patent Owner adds that the IIGA in Numazaki's fifth embodiment is configured as "a chromakey camera" by implementing the IIGA of Figure 2 with feature data generation unit 103 and visible light photo-detection array 351 depicted in Figure 46. *Id.* at 13–14 (citing Ex. 1004, 39:17–23, Fig. 46; Ex. 2002 ¶ 54). In Patent Owner's view, therefore, the feature data generation units of Figures 23 and 46 have different implementations and different specialized units depending on whether the IIGA is configured as a gesture camera or a chromakey camera. *Id.* at 14 (citing Ex. 1004, 29:4–10, 39:17–23).

In view of these assertions, Patent Owner argues that "the Petition requires that *Numazaki's* eighth embodiment laptop incorporate an IIGA configured as both a gesture camera and a chromakey camera" to meet both limitations [1(a)] and [1(b)], but "*Numazaki* does not disclose that the IIGA can be configured as both a 'gesture camera' and a 'chromakey camera.'" *Id.* at 14–15 (citing Ex. 2002 ¶¶ 55–56); *see also id.* at 16–17 (arguing that Numazaki does not disclose "an embodiment that uses the feature data generation unit of the first embodiment that has the gesture camera for recognizing hand action of the third embodiment and the chromakey camera for extracting only a specific target of the fifth embodiment").

We do not find this argument persuasive. Rather, we agree with Petitioner that Patent Owner again mischaracterizes the proposed combination. *See* Reply 9–10. Namely, the Petition does not assert that Numazaki discloses one embodiment of an information input generation apparatus that includes both a gesture camera and a chromakey camera. Instead, as discussed above, the Petition contends that it would have been obvious to one of ordinary skill in the art to modify the laptop of Numazaki's eighth embodiment to include the gesture recognition of the

third embodiment to initiate the video capture functionality of the fifth embodiment as suggested by Nonaka's image capture command gesture teachings. Pet. 20–21. By focusing on Numazaki's purported failure to disclose this configuration in a single embodiment, Patent Owner's argument fails to address the combination proposed in the Petition.

Regarding the proposed combination, Patent Owner argues that “Petitioner does not explain how the ‘reflected light image’ from the ‘reflected light extraction unit 102’ would be accessed by both ‘shape interpretation unit 333’ from the third embodiment and ‘extraction unit 353’ from the fifth embodiment” or “how these specialized units would operate simultaneously or whether different units would operate at different times or what that timing functionality would require.” PO Resp. 16 (citing Ex. 2002 ¶ 58).

In reply, Petitioner argues that Patent Owner's argument “ignores the entire premise of the combination, which proposes the third embodiment is used as a trigger mechanism to initiate the fifth embodiment, setting forth precisely the timing relationship that Patent Owner demands.” Reply 8. Specifically, Petitioner points to the assertion in the Petition that a person having ordinary skill in the art “would have been motivated to implement this gesture recognition as a means of allowing the user to initiate (or turn on) the fifth embodiment's videoconferencing functionality.” *Id.* (quoting Pet. 31). Petitioner adds that Dr. Bederson confirms that the proposed combination uses the gesture recognition and videoconferencing processing separately and sequentially. *Id.* at 9 (citing Ex. 1018 ¶¶ 3–9).

In its Sur-reply, Patent Owner argues that this reply argument is the first time Petitioner explains the details of the proposed combination and should be disregarded as an improper attempt to correct a deficiency in the

Petition. Sur-reply 4–5. Patent Owner also disputes Petitioner’s assertion that the Petition precisely sets forth the timing relationship of the gesture recognition videoconferencing functionalities in the proposed combination. *Id.* at 5.

We find that Petitioner’s Reply argument is not beyond the proper scope of a reply because it directly responds to Patent Owner’s argument that Petitioner does not explain how elements from both the third and fifth embodiments would be accessed by the reflected light extraction unit and whether these elements would operate simultaneously or at different times. Moreover, Petitioner’s Reply argument elaborates on the contentions in the Petition that the gesture recognition would be implemented as a means of allowing the user to initiate the fifth videoconferencing functionality. Pet. 31; *see Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F. 3d, 919, 925 (Fed. Cir. 2019) (“Parties are not barred from elaborating on their arguments on issues previously raised.”). Accordingly, we find that the Petition adequately explains how the reflected light extraction unit would be accessed by both the third embodiment’s shape interpretation unit 333 and the fifth embodiment’s extraction unit 353. We particularly credit Dr. Bederson’s uncontroverted testimony that “it would be well within the capabilities of a [person having ordinary skill in the art] to utilize the same output by two separate processing blocks to implement the proposed combination,” and one of ordinary skill in the art “would understand there are no technical barriers to arranging multiple distinct processing units that separately process the same output of a single unit.” *See* Ex. 1018 ¶ 9.

Last, we disagree with Patent Owner’s argument that Petitioner “uses impermissible hindsight to combine and merge various disparate embodiments from *Numazaki* in a manner *Numazaki* never contemplated.”

PO Resp. 17 (citing Ex. 2002 ¶ 59). According to Patent Owner, such a combination would not have been obvious to one of ordinary skill in the art because Numazaki did not recognize it as a viable embodiment. *Id.* (citing Ex. 2002 ¶ 59). However, a reason to modify a reference does not have to originate from the reference being modified. The rationale for combining references can be gleaned from a variety of sources. *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006) (“The motivation need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself.”).

Furthermore, we agree with Petitioner that Patent Owner’s argument is unpersuasive in view of the Federal Circuit’s finding that “two separate embodiments in a prior art reference rendered obvious the challenged claim where ‘one of ordinary skill in the art would have been motivated to combine’ them.” Reply 10 (citing *Boston Sci. Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009) (“*Boston Sci*”). Patent Owner attempts to distinguish *Boston Sci.*, arguing that

the two prior art embodiments in *Boston Sci.* were “pictured side by side in the [prior art] patent . . . Figure 3B [] is located directly below figure 4 in the patent.” *Boston Sci.* at 991 (emphasis added). The proximity of the two embodiments formed the basis for obviousness: “Combining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness.” *Id.* (emphasis added). In contrast, *Numazaki*’s third embodiment and fifth embodiment “feature data generation units” are separated by more than 22 figures. *Compare* Ex. 1004, Fig. 23 *with* Ex. 1004, Fig. 46.

Sur-reply 7. Patent Owner also argues that Petitioner’s reliance on *Boston Sci.* is misplaced because the proposed combination here is more complex than the modification at issue in *Boston Sci.* *Id.* at 7–8 (citing *Boston Sci.*, 554 F.3d at 991; Pet. 20–21; Reply 8–9; Ex. 2002 ¶¶ 58–59). These arguments are not persuasive because, although mentioning that the combined embodiments are shown in adjacent figures, the *Boston Sci.* decision does not require such proximity in order for one of ordinary skill in the art to have been motivated to combine embodiments. *Boston Sci.*, 554 F.3d at 991. Moreover, the *Boston Sci.* decision does not require that a proposed combination of separate embodiments be simple in order to be obvious. *Id.*

For the above reasons, we find on the complete record that Petitioner has demonstrated by a preponderance of the evidence that the combination of Numazaki and Nonaka discloses limitation [1(b)].

d) *Limitation [1(c)]: “control the digital camera in response to the gesture performed in the electro-optical sensor field of view, wherein the gesture corresponds to an image capture command, and wherein the image capture command causes the digital camera to store an image to memory”*

As discussed above, Petitioner asserts that one ordinary skill in the art “would have been motivated to implement [the third embodiment’s] gesture recognition as a means of allowing the user to initiate (or turn on) the fifth embodiment’s videoconferencing functionality” because, “pursuant to *Nonaka*’s teachings, the user experience would be improved by allowing users to position themselves in place before the video camera and initiate video capture through a gesture, rather than a physical input or timer mechanism.” Pet. 31. Petitioner also argues that Numazaki’s fifth embodiment uses visible light photo-detection array 351 for taking video

images and image memory unit 352 for storing the video images. *Id.* (citing Ex. 1004, 39:32–35). Petitioner adds that the fifth embodiment processes the output of reflected light extraction unit 102 to identify an outline of the subject of the image and subtracts everything outside the outline to produce an extracted image without background information that is stored in extracted image memory unit 354. *Id.* 31–32 (citing Ex. 1004, 39:24–60, 40:32–35).

In response, Patent Owner argues that because “*Numazaki’s* fifth embodiment discloses extracting faces of speaking persons for transmission via a ‘TV telephone,’” one of ordinary skill in the art “would recognize that to dial the telephone number, the user must physically interact with *Numazaki’s* laptop (e.g., keyboard), and thus the user would already be positioned ‘in place’ for the videoconference.” PO Resp. 18 (citing Ex. 1004, 39:5–16; Ex. 2002 ¶ 62). Thus, Patent Owner argues, there is no motivation to modify *Numazaki* based on Nonaka’s teachings because “[i]t would be redundant to require the user to then perform a gesture signaling that the user is ‘in place’ because such is already known to the laptop by virtue of the physical interactions,” and one of ordinary skill in the art “would recognize that a user would be in reach of *Numazaki’s* laptop before and during a videoconference enabled by *Numazaki’s* laptop.” *Id.* 18–19 (citing Ex. 2002 ¶¶ 62–63).

This argument is not persuasive for several reasons. First, *Numazaki’s* fifth embodiment is not limited to a TV telephone as the disclosure refers to “the TV telephone, for example.” Ex. 1004, 39:12–13. Thus, we are not persuaded that an ordinarily skilled artisan would necessarily understand *Numazaki’s* disclosure as requiring the user to dial a telephone number. Rather, we agree with Petitioner’s argument, supported by Dr.

Bederson's testimony, that one of ordinary skill in the art would have understood that there are many scenarios in which a user would not be sitting in front of the laptop to initiate a videoconference, such as a lecturer standing for a lecture and a tutorial in which the speaker is demonstrating a product that requires a broader field of view than remaining seated before the camera. Reply 12–13 (citing Ex. 1018 ¶¶ 10–11).

Second, even if Numazaki does suggest that the user would need to be within reach to physically interact with the laptop, this does not mean that one of ordinary skill in the art would not have recognized the advantages of using remote gestures taught by Nonaka. An obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *see also id.* at 421 (“A person of ordinary skill is also a person of ordinary creativity, not an automaton.”).

Next, Patent Owner challenges Petitioner's argument that one of ordinary skill in the art would have combined Numazaki's embodiments in the manner proposed to achieve a higher degree of freedom, good portability, and cost benefits as taught by Nonaka. PO Resp. 20. Specifically, Patent Owner argues that “*Nonaka* teaches that ‘a higher degree of freedom, good portability, and cost benefits’ are the results of not needing a remote-control unit to operate a camera,” and “*Numazaki* is completely silent regarding the existence of remote-control units and the use of remote-control units to operate a camera.” *Id.* (citing Ex. 1005, 2). Thus, in Patent Owner's view, Petitioner's reason for combining Numazaki's embodiments is based on solving a problem that Numazaki never had. *Id.* (citing Ex. 2002 ¶ 64).

We agree that Nonaka discloses that its gesture-based image capture functionality provides a higher degree of freedom, good portability, and cost benefits relative to a remote release operation that uses a transmitter or receiver. *See* Ex. 1005, 2:26–29. We disagree, however, that this disclosure would have only suggested to one of ordinary skill in the art *replacing a remote control unit* with a gesture-based image capture functionality. Rather, it is reasonable to conclude that one of ordinary skill in the art would have recognized that Nonaka’s gesture-based image capture functionality was a desirable technique for triggering image capture in general.

Here, Petitioner takes that position, arguing that “*Nonaka* explains that *users desired the ability to remotely trigger image capture*, but that then-existing options were limited to self-timer mechanisms and expensive wireless remote controls—both of which were undesirable.” Pet. 21 (citing Ex. 1006, 2:6-25) (second emphasis added); *see also* Reply 14 (agreeing with the Board’s determination in the Decision on Institution) (citing Dec. Inst. 8). In other words, Petitioner relies on Nonaka as teaching the desirability of remotely triggering image capture *and* using gesture-based image capture functionality to do so. In addition, the Petition is supported by Dr. Bederson’s testimony that “*Numazaki* does not teach a specific process for initiating the video capture as part of its fifth embodiment, but a [person having ordinary skill in the art] would have understood that this video capture process could be started using any of a number of standard methods for initiating a video,” and “*Numazaki*’s native functionality of associating hand gestures with commands would have been a natural fit as a means to initiate video capture.” Ex. 1003 ¶ 49. We find this testimony persuasive on the full record. *See KSR*, 550 U.S. at 417 (“[I]f a technique has been used to improve one device, and a person of ordinary skill in the art

would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.”).

In addition, Patent Owner argues that “the Petition . . . fails to explain why gesture-based image capture initiation provides ‘a greater degree of freedom’ than timers, especially when a timer can be set for any length of time, giving the user whatever time is needed to get into position and get prepared for the video capture.” PO Resp. 20 (citing Pet. 21–22; Ex. 2002 ¶ 65).

This argument is not persuasive because Petitioner is not required to show that the gesture-based image capture initiation provides a greater degree of freedom than timers. “[T]he question is whether there is something in the prior art as a whole to suggest the *desirability*, and thus the obviousness, of making the combination,’ not whether there is something in the prior art as a whole to suggest that the combination is the *most desirable* combination available.” *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) (quoting *In re Beattie*, 974 F.2d 1309, 1311 (Fed. Cir. 1992)).

Last, Patent Owner challenges Petitioner’s argument that one of ordinary skill in the art would have anticipated success in combining Numazaki’s embodiments in the manner proposed. PO Resp. 21–22. Specifically, Patent Owner argues that “[t]he Petition seems to argue that the only difference between *Numazaki*’s third embodiment (gesture detection) and *Numazaki*’s fifth embodiment (TV telephone) is the addition of a ‘video light photo-detection array’ and thus combining *Numazaki*’s third and fifth embodiments would be ‘straightforward,’” but because Numazaki’s third and fifth embodiments have different implementations with different specialized units, combining these embodiments would have entailed much

more than merely adding a video camera. *Id.* (citing Ex. 2002 ¶ 66). Patent Owner also argues that Numazaki’s disclosure of using gestures to power appliances on and off does not guarantee success in combining Numazaki’s embodiments in the manner proposed because an ordinarily skilled artisan would recognize that merely powering on an appliance such as a camera is different than invoking functions such as image capture. *Id.* at 22 (citing Pet. 24; Ex. 1004, 31:7–10, 31:35–44; Ex. 2002 ¶ 67).

These arguments are not persuasive. Instead, we agree with Petitioner that Patent Owner mischaracterizes and over-simplifies Petitioner’s position in arguing that the only difference between the third and fifth embodiments “seems” to be the addition of the video light photo-detection array. *See* Reply 16–17. Indeed, although the Petition asserts that one of ordinary skill in the art “would have understood that adding a third image sensor to the portable laptop in support of the fifth embodiment’s video capture functionality would have been straightforward” (Pet. 24), this is not the only basis for asserting that there would have been a reasonable expectation of success in making the proposed combination. The Petition also asserts that one of ordinary skill in the art “would have anticipated success in implementing *Numazaki* in this manner given that *Numazaki* already includes the technical hardware and programming necessary to detect gestures, associate gestures with commands, and capture video, and expressly contemplates incorporating these early-described embodiments in the eighth embodiment portable devices.” Pet. 23 (citing Ex. 1003 ¶ 51).

We also agree with Petitioner that Patent Owner improperly argues that there is little “guarantee of success” rather than a reasonable expectation of success. *See* Reply 18. “Obviousness does not require absolute predictability of success . . . all that is required is a reasonable expectation of

success.” *In re O’Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988) (citations omitted).

For the above reasons, we find on the complete record that Petitioner has demonstrated by a preponderance of the evidence that the combination of Numazaki and Nonaka discloses limitation [1(c)].

e) Conclusion

For the above reasons, we determine that Petitioner has shown by a preponderance of the evidence that the combination of Numazaki and Nonaka renders obvious claim 1.

4. Independent Claims 8 and 13

Independent claim 8 recites a computer implemented method having similar limitations as the device claim of claim 1. *Compare* Ex. 1001, 15:21–38, *with id.* at 16:1–13. For its analysis of claim 8, Petitioner refers back to its analysis of claim 1. Pet. 43–44. Similarly, independent claim 13 recites an image capture device having similar limitations as claim 1. *Compare* Ex. 1001, 15:21–38, *with id.* at 16:24–40. Petitioner also refers back to its analysis of claim 1 for its analysis of claim 13. Pet. 47–48.

Regarding claims 8 and 13, Patent Owner relies on the same arguments as those advanced with respect to independent claim 1 (PO Resp. 24–25, 27–28), which arguments we have found unpersuasive for the reasons discussed above. Accordingly, based on the complete record, we determine that Petitioner has shown by a preponderance of the evidence that claims 8 and 13 are unpatentable over Numazaki and Nonaka.

5. Dependent Claims 4, 11, and 18

Claim 4 depends from claim 1 and recites that “the electro-optical sensor is fixed in relation to the digital camera.” Ex. 1001, 15:43–44. Claims 11 and 18 depend from claims 8 and 13, respectively, and similarly

recite that the electro-optical sensor is fixed relative to the digital camera.

Id. at 16:17–19, 16:49–50. For this feature, Petitioner asserts that

Numazaki’s fifth embodiment positions an electro-optical sensor (i.e., [r]eflected light extraction unit 102) and digital camera (i.e., visible light photo-detection array 351) side-by-side such that they have overlapping fields of view. Indeed, *Numazaki* expressly teaches that “visible light photo-detection array 351 and the reflected light extraction unit 102 are arranged in parallel.”

Pet. 38 (citing Ex. 1004, 39:4–44); *see also id.* at 47, 49 (asserting the same argument for claims 11 and 18). The Petition does not direct us to any expert testimony supporting this assertion.

In the Decision on Institution, we did not agree “that being arranged in parallel necessarily means that reflected light extraction unit 102 and visible light photo-detection array 351 are fixed relative to each other.” Dec. Inst. 23. In its Response, Patent Owner argues that the portion of *Numazaki* cited by Petitioner for this feature does not contain any description of whether reflected light extraction unit 102 and visible light photo-detection array 351 are fixed with respect to each other. PO Resp. 23 (citing Ex. 1004, 39:4–44); *see also id.* at 26, 29 (making the same argument in connection with claims 11 and 18). Patent Owner also argues that one of ordinary skill in the art “would not interpret ‘arranged in parallel’ to necessarily mean that that ‘reflected light extraction unit 102’ and ‘visible light photo-detection array 351’ are fixed relative to each other.” *Id.* at 23 (citing Ex. 2002 ¶ 71).

Petitioner replies by arguing that the fact that unit 102 and camera 351 have and must retain overlapping fields of view is key to concluding that they are fixed relative to each other. Reply 19–20 (citing Pet. 27–28).

Petitioner also argues that Mr. Occhiogrosso admits, and Dr. Bederson confirms, that (1) “unit 102 and camera 351 must retain overlapping fields of

view in order to ‘satisfy the intended purpose’ of Numazaki’s fifth embodiment;” (2) “that fixing unit 102 and camera 351 in relation to one another ensure that they retain overlapping fields of view;” and (3) there is no “teaching in Numazaki that suggests unit 102 and camera 351 are not fixed in relation to one another.” *Id.* at 20 (citing Ex. 1019, 23:21–24:22, 25:7–14, 25:18–26:2; Ex. 1018 ¶¶ 13–15).

In the Sur-reply, Patent Owner argues that unit 102 and camera 351 having overlapping fields of view does not necessarily mean that they are fixed relative to each other. Sur-reply 11; *see also* Tr. 20:21–21:3 (using visual aids during the oral hearing to support contention that the fields of view can be overlapping despite relative motion of the structure). Patent Owner contends that Numazaki does not disclose unit 102 and camera 351 have or require identical fields of view. *Id.* (citing Ex. 1004, 39:20–60). Citing Mr. Occhiogrosso’s testimony, Patent Owner also argues that only a partial overlap in the fields of view is needed to accomplish the goal of Numazaki’s fifth embodiment and relative movement of unit 102 and camera 351 does not necessarily result in non-overlapping fields of view. *Id.* at 11–12 (citing Ex. 1019, 24:10–24).

We agree with Patent Owner that the Petition does not establish sufficiently that Numazaki’s unit 102 and camera 351 are fixed relative to one another. Without more, the mere fact that unit 102 and camera 351 are arranged in parallel and have overlapping fields of view does not establish that the structures are fixed. At the oral hearing, counsel for Petitioner indicated that Petitioner’s position was not an inherency argument but relied on Dr. Bederson’s analysis and interpretation of Numazaki’s fifth embodiment. Tr. 17:7–15. The Petition, however, does not reference any such analysis in connection with the subject matter of claims 4, 11, and 18.

Pet. 38, 47, 49. The portions of the Petition cited in the Reply (i.e., pages 27–28 of the Petition, which pertain to limitation 1[(a)]) discuss the overlapping fields of view but not assert that overlapping fields of view require the structures to be fixed with respect to one another.

For the foregoing reasons, we determine that Petitioner has not shown by a preponderance of the evidence that the combination of Numazaki and Nonaka renders obvious claims 4, 11, or 18.

6. Dependent Claims 2, 3, 5–7, 9, 10, 12, and 14–17

Petitioner provides reasonable and detailed explanations, supported by the testimony of Dr. Bederson, indicating where in the references the limitations of claims 2, 3, 5–7, 9, 10, 12, and 14–17 are disclosed. Pet. 33–43, 44, 47, 49. Further, Patent Owner offers no arguments particularly directed to these dependent claims. PO Resp. 22, 25, 28.

We have considered the evidence and arguments of record and determine that Petitioner has demonstrated by a preponderance of the evidence that the combination of Numazaki and Nonaka renders obvious claims 2, 3, 5–7, 9, 10, 12, and 14–17 for the reasons discussed in the Petition and as supported by the testimony of Dr. Bederson.

E. Asserted Obviousness Based on Numazaki, Nonaka, and Aviv

Petitioner argues that the combination of Numazaki, Nonaka, and Aviv renders obvious dependent claims 6, 12, and 17. Pet. 50–55. Patent Owner argues only that Aviv does not remedy the alleged deficiencies of Numazaki and Nonaka argued in connection with the independent claims. PO Resp. 28.

Because of our determination that Petitioner establishes by a preponderance of the evidence that claims 6, 12, and 17 would have been unpatentable over the combination of Numazaki and Nonaka, we do not

reach this alternate challenge to claims 6, 12, and 17. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *see also Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (stating that the “Board need not address issues that are not necessary to the resolution of the proceeding,” such as “alternative arguments with respect to claims [the Board] found unpatentable on other grounds”).

F. Jurisdiction over Expired Patents

Patent Owner argues that the USPTO does not have jurisdiction over expired patents. PO Resp. 1–2. Rather, Patent Owner argues, the USPTO only has jurisdiction over patents with claims that can be amended or cancelled. *Id.* Patent Owner states that, as explained by the Supreme Court, “Congress [has] significant latitude to assign [the] adjudication of public rights to entities other than Article III courts,” including for the USPTO to “reexamine—and perhaps cancel—a patent claim in an inter partes review.” *Id.* (quoting *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 138 S. Ct. 1365, 1368, 1374 (2018)) (alterations in original). However, Patent Owner argues that this authority does not extend to expired patents because the public franchise associated with an issued patent no longer exists after expiration. *Id.* at 2. Thus, it is argued, the USPTO no longer has jurisdiction, even though the patent owner “may be entitled to collect damages” for patent infringement, because “the patent owner[] no longer has the right to exclude others” and the USPTO has nothing to cancel or amend. *Id.*

Patent Owner reasons that:

Expiration removes the patent from the [US]PTO's jurisdiction and returns it to the sole jurisdiction of the Article III courts, which have exclusive authority to govern claims for damages. If this were not so, the [US]PTO would purport to have authority to retroactively modify a public franchise that no longer exists, in a setting where the expired public franchise does not enjoy any presumption of validity and in which amendment of claims is no longer permitted.

Id.

Inter partes review of patents, whether expired or not, fits within the USPTO's mandate "for the granting and issuing of patents" (35 U.S.C. § 2(a)(1)), for as the Supreme Court has stated, "[i]nter partes review is 'a second look at an earlier administrative grant of a patent'" (*Oil States Energy Servs.*, 138 S. Ct. at 1374 (quoting *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144 (2016))). Our rules have also made clear *inter partes* review covers expired patents. 37 C.F.R. § 42.100(b); *see also, e.g.*, 83 Fed. Reg. 51341 (Oct. 11, 2018) (Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board)⁸ ("The claim construction standard adopted in this final rule also is consistent with the same standard that the Office has applied in interpreting claims of expired patents and soon-to-be expired patents. *See, e.g., Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1279 (Fed. Cir. 2017) (noting that '[t]he Board construes claims of an expired patent in accordance with *Phillips* . . . [and] [u]nder that standard, words of a claim are generally given their ordinary and customary meaning').").

Further, the statutes governing *inter partes* review do not limit them to non-expired patents. For example, 35 U.S.C. § 311(b), which sets forth the

⁸ Available at <https://www.federalregister.gov/d/2018-22006/p-13>.

scope of *inter partes* review merely refers to patents, with no mention of the expiration date. Further, 35 U.S.C. § 311(c) entitled “Filing Deadline” makes no mention of the expiration date of the patent. Elsewhere, 35 U.S.C. § 315 does limit the filing of IPRs based on civil actions and the serving of complaints, but again makes no mention of the expiration date of the patent. Patent Owner does not identify any statute or legal precedent that expressly limits *inter partes* review to non-expired patents.

Patent Owner fails to adequately explain why the Patent Office’s authority to take a second look at an earlier administrative grant of a patent ends when the patent term expires even though the rights granted by the patent are not yet exhausted.

For all of these reasons, we do not agree that the Board lacks jurisdiction over expired patents.

III. CONCLUSION

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–18	103	Numazaki, Nonaka	1–3, 5–10, 12–17	4, 11, 18
6, 12, 17	103 ⁹	Numazaki, Nonaka, Aviv		
Overall Outcome			1–3, 5–10, 12–17	4, 11, 18

IV. ORDER

In consideration of the foregoing, it is hereby:

⁹ As explained above, we do not reach this alternative ground.

ORDERED that claims 1–3, 5–10, and 12–17 of U.S. Patent No. 8,878,949 B2 are determined to be unpatentable;

FURTHER ORDERED that claims 4, 11, and 18 of U.S. Patent No. 8,878,949 B2 are not determined to be unpatentable; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2021-00921
Patent 8,878,949 B2

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