

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

POWER2B INC.,
Patent Owner.

IPR2022-00334
Patent 8,816,994 B2

Before BARBARA A. PARVIS, JOHN D. HAMANN, and
JASON W. MELVIN, *Administrative Patent Judges*.

PARVIS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively “Petitioner”) filed a petition for *inter partes* review of claims 6–9 (the “challenged claims”) of U.S. Patent No. 8,816,994 B2 (Ex. 1001, “the ’994 patent”). Paper 3 (“Pet.”). Power2B, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 10) relating to whether Petitioner correctly identifies an exhibit, and Patent Owner filed a Preliminary Sur-reply in response to the Preliminary Reply (Paper 11). On July 18, 2022, we instituted an *inter partes* review of the challenged claims of the ’994 patent. Paper 13 (“Decision on Institution” or “Dec. on Inst.”).

Subsequently, Patent Owner filed a Patent Owner Response (Paper 16 (“Resp.”)); Petitioner filed a Reply (Paper 21 (“Reply”)); and Patent Owner filed a Sur-reply (Paper 27 (“Sur-reply”)). The oral hearing was held on March 29, 2023. A copy of the hearing transcript has been entered into the record as Paper 39. After the hearing, we authorized the parties to file additional briefing relating to claim construction. Paper 29. With this authorization, Petitioner and Patent Owner simultaneously filed opening claim construction briefs (Paper 32, “Pet. Open. Br.”) and (Paper 33, “PO Open. Br.”), and simultaneously filed responsive claim construction briefs (Paper 35, “Pet. Resp. Br.”) and (Paper 34, “PO Resp. Br.”).

We have authority to hear this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision issues pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We determine that Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable.

A. Real Parties-in-Interest

The parties identify themselves as the real parties-in-interest. Pet. 1–2; Paper 5, 2.

B. Related Matters

The parties identify *Power2B Inc. v. Samsung Electronics Co.*, Case No. 2:21-cv-00348 (E.D. Tex.) as a matter that may affect, or be affected by, a decision in this proceeding. Pet. 2; Paper 5, 2. Patent Owner asserts and Petitioner does not dispute that U.S. Patent No. 7,952,570 (“the ’570 patent”) and U.S. Patent No. 8,547,364 B2 (“the ’364 patent”) are grandparent and parent patents, respectively, to the ’994 patent. Resp. 6. Petitioner has filed petitions for *inter partes* review of the ’570 patent (IPR2022-00300); the ’364 patent (IPR2022-00405); and two additional patents that are related to the ’994 patent, i.e., U.S. Patent No. 10,664,070 B2 (IPR2022-00315) and U.S. Patent No. 9,946,369 B2 (IPR2022-00325).

C. The Challenged Patent

The ’994 patent relates to computer navigation and particularly, to facilitating navigation of software stored on an apparatus where its display is small. Ex. 1001, 1:18–21. According to the ’994 patent, “[i]t is known to provide small, hand-held computer devices such as pocket organisers, Personal Digital Assistants . . . , cellular phones or the like.” *Id.* at 1:23–25. “Smaller devices are more easily carried and generally require reduced power supply,” however, “the reduced size forces a reduction in the size of the user interface, and particularly in the size of the screen or display used to display information or data stored on or processed by the device.” *Id.* at 1:25–31. “Those familiar with such pocket devices will appreciate the problem of displaying all of the necessary information on a relatively small

display, particularly where the user is able to select specific functions from a large number of options.” *Id.* at 1:40–43.

The ’994 patent discloses that “[c]onventionally, the selection of one option, for example, results in a new ‘window’ opening which displays further options and sub options.” *Id.* at 1:44–46. And “devices having smaller screens tend to use data ‘layers’ or ‘levels’ whereby the selection of one option having a number of sub options causes the full screen to display the sub options fully eclipsing the original menu.” *Id.* at 1:48–52. According to the ’994 patent, “[i]t would be advantageous to provide a pocket computer or hand held device which incorporates means for enabling easier access to data on the device and improves the user interface of the device.” *Id.* at 1:55–58.

Figure 4, shown below, illustrates an embodiment of the ’994 patent. *Id.* at 2:30–33.

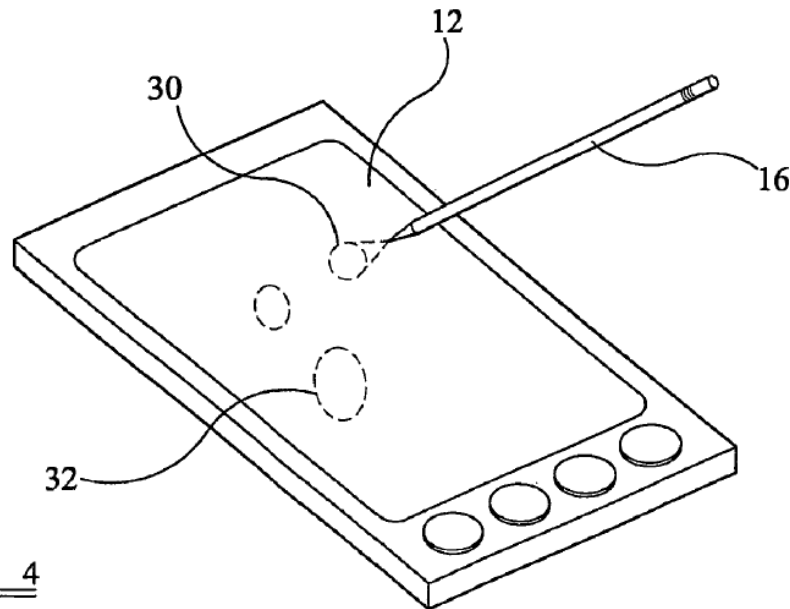


FIG 4

Figure 4, above, “shows illustratively one embodiment in which the stylus when moved closer to the display produces a circle or ellipse of smaller dimensions than the circle or ellipse formed when the stylus is moved

away.” *Id.* As illustrated, “the stylus 16 is a so-called ‘smart stylus’ which contains a source of electromagnetic radiation,” and “emits a beam of light, for example infrared or other spectrum light, from a circular, spherical, or other shaped tip.” *Id.* at 4:43–48. “The light is sensed by a sensitive layer (not shown) positioned over, or incorporate[d] in, the display 12.” *Id.* at 4:48–50. The ’994 patent discloses that “[a]s the stylus 16 is moved across the display 12, only certain parts of the sensitive layer will be illuminated by the beam of light emitted by the stylus 16 and this will be detected by the sensitive layer.” *Id.* at 4:52–55. “The sensitive layer determines the appropriate X-Y coordinates of the stylus 16” *Id.* at 4:55–56.

In addition, as illustrated, “[t]he stylus 16 when moved closer to the display produces a circle or ellipse 30 of smaller dimensions than the circle or ellipse 32 formed when the stylus is moved away.” *Id.* at 4:59–62. According to the ’994 patent, “[t]he same eccentricity of the ellipse means that the input stylus is at the same angle to the display and the size of the area indicates the distance of the stylus from the display.” *Id.* at 4:62–65. “In a different embodiment, . . . the device 10 is provided with a plurality of light sensors 20 positioned around the perimeter of the display 12 . . . such that as the stylus 16 moves towards or away from the display 12, different or segments or layers of the light sensors will be illuminated by the conical beam emitted by the stylus 16.” *Id.* at 6:18–24.

D. Challenged Claims

Among the challenged claims, claims 6, 8, and 9 are independent. Claim 7 depends directly from claim 6. The independent claims read as follows:

6. [6

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]]1 A method for making an electronic input device, comprising:
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[6[A]] providing an input object;

[6[B]] providing a physical input area;

[6[C]] providing a sensor array positioned at least partially circumscribing and immediately proximate the input area;

[6[D]] projecting electromagnetic radiation from the input object on to the input area to create an electromagnetic radiation pattern on the input area;

[6[E]] sensing a portion of the electromagnetic radiation by the sensor array;

[6[Fi]] providing an output indication of position and [6[Fii]] at least two of orientation, shape, and size of the sensed portion of the electromagnetic radiation; and

[6[Gi]] providing input circuitry that receives the output indication and provides an electronic input [6[Gii]] representing at least one of two-dimensional position, three-dimensional position, and orientation of the input object.

Ex. 1001, 8:32–49.

8. [8

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]] An electronic input device, comprising:
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[8[A]] an input area;

[8[B]] an input object projecting a beam of electromagnetic radiation on the input area;

[8[Ci]] a sensor array positioned outside the input area [8[Cii]] operative to sense and provide an output indication of position and [8[Ciii]] at least two of orientation, shape and size of said electromagnetic radiation pattern on the input area produced by the input object;

¹ Petitioner’s designations to reference the elements of the claims 6, 8, and 9 are set forth in brackets. Pet. 26–43. Herein we refer to the elements of the independent claims using Petitioner’s designations.

[8[D]] wherein the electromagnetic radiation pattern includes an elliptical shape having a size that is a function of the distance of the input object relative to the input area; and

[8[Ei]] input circuitry receiving the output indication and providing an electronic input [8[Eii]] representing at least one of two-dimensional position, three-dimensional position, and orientation of the input object.

Id. at 8:54–9:2.

9. [9[pre]] An electronic input device, comprising:

[9[A]] an input object emitting electromagnetic radiation;

[9[B]] an input area;

[9[Ci]] a sensor array positioned outside the input area [9[Cii]] operative to sense and provide an output indication of position and [9[Ciii]] at least two of orientation, shape, and size of an electromagnetic radiation pattern on the input area produced by the input object;

[9[Di]] input circuitry receiving the output indication and providing an electronic input [9[Dii]] representing at least one of two-dimensional position, three-dimensional position and orientation of the input object;

[9[E]] wherein the electronic input representing orientation includes an electronic input representing angular orientation of the input object relative to the input area; and

[9[Fi]] the input object includes a source of the electromagnetic radiation, and [9[Fii]] wherein the sensing array senses the electromagnetic radiation pattern correlating to an elliptical pattern produced by a conical beam that intersects the input area in a pattern forming the ellipse having properties that are a function of at least one of position, distance and orientation of the input object.

Id. at 9:3–10:4.

E. Asserted Grounds of Unpatentability

Petitioner asserts that claims 6–9 of the ’994 patent are unpatentable based on the following grounds:

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
6–9	103(a)	Bird, ³ Ishii ⁴
6–9	103(a)	Geaghan, ⁵ Ishii

Pet. 3. Petitioner submits the Declaration of Benjamin B. Bederson, Ph.D. in support of its arguments (Ex. 1002).

II. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962–63 (Fed. Cir. 1986)). “[O]ne or more factors may predominate.” *Id.*

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the ’994 patent issued from an application having an effective filing date before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.

³ US 5,959,617, issued Sept. 28, 1999 (Ex. 1009, “Bird”).

⁴ EP 0572182 B1, issued Sept. 20, 2000 (Ex. 1010, “Ishii”).

⁵ US 2005/0110781 A1, published May 26, 2005 (Ex. 1013, “Geaghan”).

Petitioner argues that one of ordinary skill in the art “would have had a bachelor’s degree in electrical engineering, computer engineering, computer science, or a related field, and at least two years of experience in the research, design, development, and/or testing of touch and/or proximity sensors, human-machine interaction and interfaces, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa.” Pet. 5 (citing Ex. 1002 ¶¶ 32, 53–63). In our Decision on Institution, we adopted Petitioner’s assessment of the level of skill for one of ordinary skill in the art, except we declined to adopt “at least” as that language is vague and open-ended. Dec. on Inst. 14.

Patent Owner proposes a different definition for one of ordinary skill in the art, but does not specifically address any deficiencies in Petitioner’s proposed definition. Resp. 20.

Because Petitioner’s definition of the level of skill in the art (excluding “at least”) is consistent with the ’994 patent and the asserted prior art, we maintain it for purposes of this Final Written Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). Our analysis herein, however, does not turn on which of the parties’ definitions we adopt.

III. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent

disclosure. *Phillips*, 415 F.3d at 1312–13. “In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

The parties agree for this proceeding that the terms of the claims have their plain and ordinary meaning. *See, e.g.*, Pet. 13–14; Resp. 20. Based on the complete record now before us, we provide further discussion regarding two terms — “outside” and “input area.”

We start with the term “outside” recited in claims 8 and 9. In particular, each of claims 8 and 9 recites “a sensor array positioned *outside* the input area” (emphasis added). In connection with our discussion of “outside,” we also discuss “at least partially circumscribing and immediately proximate the input area” recited in claim 6.

At the institution stage, we addressed Patent Owner’s argument that Petitioner “argues the term ‘outside’ means the same thing as ‘at least partially circumscribing and immediately proximate the input area,’” which was based on Petitioner’s statement that “[a] POSITA would have understood that Ishii’s photosensors (red) are positioned both ‘outside’ and ‘at least partially circumscribing and immediately proximate to’ the input area.” Prelim. Resp. 11 (citing Pet. 49). In our Decision on Institution, we stated “[t]hat Petitioner asserts the prior art teaches two different recitations does not mean Petitioner argues implicitly those recitations have the same meaning.” Dec. on Inst. 15–16. We determined that we did not need to make further determinations regarding construction of the term “outside” at the institution stage. *Id.*

In its Patent Owner Response, Patent Owner argues “[f]or purposes of this proceeding,” it “does not seek express construction of any terms” in the ’994 patent. Resp. 20. Patent Owner, however, argues “the Examiner, and Power2B (*e.g.*, a POSITA) understood the plain meaning of ‘outside’ refers to the ‘exterior,’ ‘any area *not* inside,’ or ‘*not within*.’” Resp. 12 (citing Ex. 2018, 4; Ex. 1010 ¶¶ 12–19; Ex. 2020 ¶ 43). Patent Owner argues “a POSITA would have understood the plain meaning of ‘periphery’ and ‘circumscribing’ to refer to different types of ‘outside’—*e.g.*, ‘*the outside of anything*’ or an *outer* ‘enclosing’ boundary.” *Id.* at 17 (citing Ex. 2018, 4, 7, 9, 11).

Based on the complete record now before us, we determine that the plain meanings of “outside” recited in claims 8 and 9 and “at least partially circumscribing and immediately proximate the input area” recited in claim 6 are clear and no construction is necessary. Nonetheless, we determine that our analysis and determinations herein would be the same using the meanings provided by Patent Owner. *See* Resp. 12, 17; Ex. 2018. Based on the complete record now before us, we need not make further determinations or provide an express construction regarding the term “outside” or “at least partially circumscribing and immediately proximate the input area” to resolve a dispute between the parties. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

We turn to the term “input area” recited in each of independent claims 6, 8, and 9. Although the parties agree for this proceeding that the terms of the claims have their plain and ordinary meaning (*see, e.g.*, Pet. 13–14;

Resp. 20), the parties' dispute regarding elements 6[B], 8[A], and 9[B] centers on a dispute over the plain and ordinary meaning of "input area." To resolve the parties' dispute regarding elements 6[B], 8[A], and 9[B], we need to resolve the parties' dispute regarding the meaning of "input area." *See Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d 1314, 1318 (Fed. Cir. 2016) (finding that disputes between the parties over the plain and ordinary meaning of a term should be resolved as a matter of claim construction).

To assist our analysis, subsequent to the hearing, we authorized further briefing on this claim construction issue. *See* Paper 31. Patent Owner argues our authorization of this post-hearing briefing is unfairly prejudicial to Patent Owner and we should, instead, decide Petitioner has not met its initial burden. Paper 33, 1–3. Patent Owner, more specifically, argues that the Petition is deficient in failing to identify with particularity how to construe the term "input area" and Petitioner should not be given the opportunity to correct errors in its Petition with additional briefing. *Id.*

A. Authorizing Additional Briefing

In our Order authorizing additional briefing, we provided our reasoning for the authorization. Paper 31, 2. In particular, we stated the following:

In their initial papers, the parties submitted that no terms require an express construction. Paper 3 (Pet.) 15; Paper 14 (PO Resp.) 15.

The parties' responsive papers, however, dispute what is the plain and ordinary meaning of "input area," when used in the challenged claims. *E.g.*, Paper 20 (Pet. Reply) 1–5; Paper 25 (PO Sur-reply) 14–19. In light of this dispute, and based on arguments presented at the oral hearing, we determine that additional briefing may be helpful to the Board. Specifically, we authorize additional briefing for the parties to address what is the

plain and ordinary meaning of “input area,” in the context of the challenged claims.

*Id.*⁶ By allowing additional briefing regarding claim construction, we better ensured that the parties would be afforded an opportunity to fully address their dispute as to the plain and ordinary meaning of “input area” before we issued this Final Written Decision. *See Belden, Inc. v Berk-Tek LLC*, 805 F.3d 1064, 1080–82 (Fed. Cir. 2015); *TQ Delta, LLC v. DISH Network LLC*, 929 F.3d 1350, 1355–56 (Fed. Cir. 2019).

Patent Owner argues that “Petitioner failed at the outset to bear its burden to identify with particularity how to construe” the term “input area.” PO Open. Br. 1. In its Petition, Petitioner states that it “interprets the claims of the ’994 [p]atent according to the *Phillips* claim construction standard,” and that “[t]o resolve the particular grounds presented in this Petition, Petitioner does not believe that any term requires explicit construction.” Pet. 13–14.

Contrary to Patent Owner’s argument, we find that the Petition sufficiently complies with 35 U.S.C. § 312(a)(3) and 37 C.F.R. § 42.104(b)(3). As we explain above, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.100(b). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. The

⁶ The citations in our Order are to the parties’ papers filed in IPR2022-00300 as representative of papers filed in each of the related proceedings, including the instant proceeding. *Id.* at 2 n.2.

statements in the Petition are consistent with our Consolidated Trial Practice Guide (Nov. 2019) (“CTPG”).⁷

If a petitioner believes that a claim term requires an express construction, the petitioner must include a statement identifying a proposed construction of the particular term and where the intrinsic and/or extrinsic evidence supports that meaning. On the other hand, a petitioner may include a statement that the claim terms require no express construction.

CTPG 44. By stating that no terms require an “*explicit* construction” (Pet. 14 (emphasis added)), Petitioner complied with 37 C.F.R. § 42.104(b)(3) as to “[h]ow the challenged claim[s are] to be construed.”

In its Patent Owner Response, Patent Owner argues “[f]or purposes of this proceeding,” Patent Owner “does not seek express construction of any terms” in the ’994 patent. Resp. 20. In its arguments in its Patent Owner Response, however, Patent Owner argues that “integrated displays” are “input areas.” *Id.* at 31–32. Patent Owner argues that Petitioner applies an interpretation “to create a new ‘input area’ limited to a specific portion of Ishii’s integrated display” and that interpretation is incorrect. *Id.* at 32. In its Reply, Petitioner responds “to the extent ‘input area’ even needs construction, the meaning cannot be ‘display input area.’” Reply 2. Petitioner argues “an ‘input area’ is an area for input, regardless of any relationship that ‘input area’ may or may not have with a ‘display.’” *Id.* That Petitioner responds in its Reply is consistent with the CTPG, which states “[t]he petitioner may respond to any such new claim construction issues raised by the patent owner.” CTPG 45. In its Sur-reply, Patent Owner argues “the ‘input area’ corresponds to the display itself for integrated input

⁷ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

displays” and “the challenged claims do *not* cover integrated or combined display input areas.” Sur-reply 18–19.

Petitioner argues “it is routine Board practice to resolve claim construction disputes that become apparent from the parties’ papers or the hearing.” Pet. Resp. Br. 2–3 (citing *Microsoft Corp. v. D3D Techs.*, IPR2021-00878, Paper 39 at 2–3 (PTAB Nov. 8, 2022); *Volkswagen Gp. of Am., Inc. v. Stratosaudio, Inc.*, IPR2021-00721, Paper 63 at 40 (PTAB Jan. 24, 2023); *Dell Techs. Inc. v. WSOU Invests., LLC*, IPR2021-00272, Paper 30 at 2 (PTAB June 27, 2022)). We agree with Petitioner that the post-hearing briefing we authorized is routine. Based on the circumstances here, for the reasons given in our Order (Paper 31) as well as above, we maintain our reasoning and determination in our Order regarding the authorization of the additional briefing regarding the meaning of the term “input area.” Upon consideration of Patent Owner’s arguments, we determine that the additional briefing was not unfairly prejudicial to Patent Owner.

Although not necessary for our determination that our authorization of additional briefing is not prejudicial to Patent Owner, we note that for the reasons given below, we adopt Petitioner’s construction in its Reply (Reply 2) and Patent Owner had opportunities to present written arguments disputing Petitioner’s Reply construction in Patent Owner’s Sur-reply, in Patent Owner’s post-hearing opening claim construction brief (PO Open. Br.), and in its post-hearing responsive claim construction brief (PO Resp. Br.). We have considered all Patent Owner’s arguments presented in those papers and during this proceeding and are not persuaded Patent Owner’s arguments undermine Petitioner’s showing for the reasons given below.

B. Plain Meaning of Input Area

We start with the constructions proposed by the parties for the term “input area.” In the Petition, Petitioner argues the plain meaning of the term applies and an “explicit construction” is not needed. Pet. 13–14. As indicated above, in response to the Patent Owner Response, Petitioner argues “to the extent ‘input area’ even needs construction, the meaning cannot be ‘display input area.’” Reply 2. Petitioner argues “an ‘input area’ is an area for input, regardless of any relationship that ‘input area’ may or may not have with a ‘display.’” *Id.* In its opening post-hearing brief, Petitioner argues that the plain and ordinary meaning of “input area” “is the *area onto which the input object directs electromagnetic radiation.*” Pet. Open. Br. 1. Petitioner argues “the only issue is whether the Ishii prior art has photosensors positioned outside its ‘input area.’” *Id.* at 6. In its responsive post-hearing brief, Petitioner reiterates in part its position in its Reply arguing that “an ‘input area’ is an *area* onto which the input object directs electromagnetic radiation, *regardless of any relationship that ‘input area’ may or may not have with a ‘display.*” Pet. Resp. Br. 5 (emphasis omitted, emphasis added).

We turn to Patent Owner’s claim construction proposals. In its Patent Owner Response, Patent Owner argues that “integrated displays in the asserted references” are “input areas.” Resp. 31–32. Patent Owner argues that Petitioner applies an interpretation “to create a new ‘input area’ limited to a specific portion of Ishii’s integrated display” and that interpretation is incorrect. *Id.* at 32. In its Sur-reply, Patent Owner argues “the ‘input area’ corresponds to the display itself for integrated input displays” and “the challenged claims do not cover integrated or combined display input areas.” Sur-reply 18–19.

In its opening post-hearing brief, Patent Owner argues “the plain meaning of the standalone ‘input area’ term refers to an input display itself and coextensive input displays do not satisfy the claimed ‘sensor array’/‘input area’ recitals.” PO Open. Br. 5; *see also id.* at 6 (arguing “a POSITA would have understood the plain meaning of the standalone ‘input area’ term refers to an integrated or coextensive display itself”). In its responsive post-hearing brief, Patent Owner argues “in the relevant context of integrated displays” the “claimed ‘*input area*’ and *display area* ‘*co-exist*’ and thus, ‘*the input area is also a display area.*’” PO Resp. Br. 1. Patent Owner argues the “plain meaning is dispositive” because Petitioner asserts “integrated input display teachings for every ground.” *Id.* at 4.

Patent Owner makes various arguments regarding the “relevant context” for construing the term “input area.” For instance, Patent Owner argues the “relevant context” is “integrated or coextensive input displays.” PO Open. Br. 4; *see also id.* at 5 (argument regarding “the relevant input display context”), 6 (argument regarding “in proper context”). In its responsive post-hearing brief, Patent Owner similarly makes arguments regarding the “plain meaning” of the term “input area” “in the relevant context.” *See, e.g.*, PO Resp. Br. 2 (arguing “in the relevant context, the plain meaning of the claimed ‘input area’ refers to the coextensive display input area or the integrated display itself”); *see also id.* at 4 (arguing “in the relevant context, the plain meaning of the claimed ‘input area’ refers to the coextensive display input area or the integrated display itself”). Patent Owner faults Petitioner for “not explain[ing] why it would be incorrect, ‘contrary to claim construction principles,’ ‘confusing,’ ‘irreconcilable,’ ‘an unproductive side-show,’ or ‘not necessary’ to interpret the meaning of the

‘input area’ in the relevant context of the asserted integrated display teachings.” *Id.* at 3 (citing Pet. Open. Br. 1, 3, 5–6).

We find Patent Owner’s arguments about the relevant context unavailing. The meaning of a claim term does not change based on what art is asserted against it. Below we apply a *Phillips*-based analysis in construing “input area” and we address the parties’ arguments, starting with the intrinsic evidence.

1. *Claim Language*

Petitioner argues that “[i]nput area’ is not defined, but the surrounding claim limitations make plain its meaning.” Pet. Open. Br. 1–2 (citing *Phillips*, 415 F.3d at 1314). More specifically, Petitioner argues that claim 9 recites (i) an “input object emitting electromagnetic radiation,” (ii) “‘an input area’ and ‘a sensor array’ outside of it,” and (iii) that “[t]he sensor array ‘senses’ the ‘radiation pattern *on* said input area *produced by* said input object.’” *Id.* at 2 (quoting Ex. 1001, 9:3–10:4) (alterations in original). Petitioner argues “[t]he input object thus directs radiation onto a specific area—the ‘input area’ is this ‘area onto which the radiation is directed.’” *Id.* “Thus, the claims are plain, unambiguous, and internally consistent: the ‘input object’ directs input radiation onto an area (the ‘input area’), a sensor array outside the input area senses the input radiation on the input area.” *Id.*

Patent Owner does not explain how the language of the independent claims supports Patent Owner’s proposed construction that “the ‘input area’ corresponds to the display itself for integrated input displays” (Sur-reply 18–19) and that the term “input area” does not encompass a portion of an “integrated display” (Resp. 32). *See generally* Resp.; Sur-reply; PO Open. Br.; PO Resp. Br. Patent Owner argues that Petitioner’s plain and ordinary

meaning of “input area,” which “is the area onto which the input object directs electromagnetic radiation” (Pet. Open. Br. 1) “captures any-and-all components of a device within an unbounded radiation area.” PO Resp. Br. 4.

We agree with Patent Owner that Petitioner’s proposal in its post-hearing opening claim construction brief has ambiguity, but not for the reason Patent Owner advances. Under Petitioner’s claim construction, any area—including areas away from the device—onto which the input object directs electromagnetic radiation arguably falls within the scope of “input area.” As Petitioner acknowledges, “[t]he sensor array ‘senses’ the ‘radiation pattern *on* said input area *produced by* said input object.’” Pet. Open. Br. 2

The language of the independent claims supports Petitioner’s Reply construction, i.e., that “an ‘input area’ is an area for input, regardless of any relationship that ‘input area’ may or may not have with a ‘display.’” Reply 2. In its opening post-hearing brief, Petitioner argues “the only issue is whether the Ishii prior art has photosensors positioned outside its ‘input area.’” Pet. Open. Br. 6. Patent Owner argues that Petitioner applies an interpretation “to create a new ‘input area’ limited to a specific portion of Ishii’s integrated display” and that interpretation is incorrect. Resp. 32. We determine that Petitioner’s Reply construction is sufficient for purposes of this Final Written Decision, and we now turn to the parties’ dispute over whether “input area” must include a display. *See Realtime Data*, 912 F.3d at 1375 (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs.*, 200 F.3d at 803)).

Petitioner argues that “claim 9 has no ‘display,’” which “is only added in dependent claim 2, which depends from claim 1.” Pet. Open. Br. 3; Reply

2. Claim 2 recites “[a]n electronic input device according to claim 1, wherein the device further comprises a display providing a visually sensible output which is responsive to the input object.” Ex. 1001, 8:6–8. Petitioner adds that “[d]isplay areas and input areas are two distinctly described and claimed concepts,” and that “[a] construction that couples displays and input areas is contrary to claim construction principles.” Pet. Open. Br. 3–4.

We agree with Petitioner—the language of claims 1 and 9 does not recite a display and, with respect to claim 1, the recitation of “display” is added by dependent claim 2. *Compare* Ex. 1001, 7:54–8:4, *with id.* at 8:6–8. Hence, we determine that the language of the claims also supports that the meaning of input area is not impacted by “any relationship that ‘input area’ may or may not have with a ‘display.’” *See* Reply 2; *Phillips*, 415 F.3d at 1315 (“[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.”); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) (“[W]here the limitation that is sought to be ‘read into’ an independent claim already appears in a dependent claim, the doctrine of claim differentiation is at its strongest.”).

2. *The ’994 Patent Specification*

Petitioner asserts and Patent Owner does not dispute that the ’994 patent Specification does not use the term “input area.” *See, e.g.*, Reply 3; Pet. Open. Br. 2; Sur-reply 13–15; PO Resp. Br. The parties agree that the ’994 patent discloses embodiments having a coextensive input area and display. *E.g.*, Pet. Open. Br. 2–3; Sur-reply 13–15. Some of these embodiments have sensors within the coextensive input area and display (e.g., Fig. 4), and some have the sensors positioned outside of the

coextensive input area and display (e.g., Fig. 3). Ex. 1001, Figs. 3–4; Reply 2–4; Pet. Open. Br. 2–3.

Notably, the '994 patent also teaches an embodiment having an input area and no display. In particular, the '994 patent discloses the following:

While the above described embodiments talk of sensing the position of the stylus 16 relative to the display 12 of the device 10, it will be appreciated that the three-dimensional position of the stylus 16 relative to any other part of the device 10 or relative to any fixed location could be used for the same purpose. In this regard, the invention may provide only a stylus 16 and a sensing “pad” or the like which is able to determine the three-dimensional position of the stylus 16 relative thereto. The pad could be connected for communication with the electronic device 10 by any suitable means which will be well understood. Such an embodiment may enable the stylus 16 and “pad” to be used with conventional desk top or laptop computers in place of the more conventional mouse, scratch pad or tracker ball.

Ex. 1001, 7:18–31. In other words, the '994 patent discloses, in accordance with its invention, providing only a stylus and a sensing pad—without a display—to determine the three-dimensional position of the stylus. *Id.*

Patent Owner’s proposed construction for input area, which includes a display, would exclude embodiments following this sensing pad teaching, which cuts against Patent Owner’s proposed construction. *See SynQor, Inc. v. Artesyn Techs., Inc.*, 709 F.3d 1365, 1378–79 (Fed. Cir. 2013) (“A claim construction that ‘excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support.’”).

Accordingly, we determine that the '994 patent Specification supports Petitioner’s proposed construction that whether there is a display is immaterial to the meaning of input area. In other words, “input area” does not require, nor preclude, a display, coextensive or otherwise.

3. *Prosecution History*

We now turn to the prosecution history of the '994 patent, and discuss portions thereof relevant to the construction of “input area.” The prosecution history “can often inform the meaning of the claim language by demonstrating how the inventor understood the invention.” *Phillips*, 415 F.3d at 1317.

The parties agree that the prosecution history of the '570 patent is relevant to the meaning of the term “input area” recited in claims 6, 8, and 9. *See, e.g.*, Resp. 9; Reply 2–3; Pet. Open. Br. 4; PO Resp. Br. 6–7. Indeed, Patent Owner states “[t]he '994 patent is a direct continuation of the '364 patent, which is a direct continuation of the parent '570 patent.” Resp. 6. We agree with Patent Owner’s description of relationship between the '994 patent and the '570 patent. We also agree with the parties that the prosecution history of the '570 patent is relevant to the meaning of the term “input area” recited in claims 6, 8, and 9.

In the application that issued as the '570 patent, the claims as filed did not recite an “input area.” Ex. 2022 ('570 file history), 14. Rather, claim 1 recited, in relevant part, a “sensor array operative to sense . . . an electromagnetic radiation pattern on said sensor array.” *Id.* The Examiner rejected claim 1 as being anticipated by Bird. *Id.* at 342. As reflected by the Examiner in an interview summary, the Examiner and the applicant discussed amending claim 1 to “include a sensor array outside the display area.” *Id.* at 387.

The applicant instead amended claim 1 by (i) adding “an input area,” (ii) changing “radiation pattern on said sensor array” to “radiation pattern on said input area,” and (iii) adding “said sensor array comprising at least one sensor positioned outside said input area.” *Id.* at 390. The applicant stated

that “[s]upport for the amendment is found, inter-alia, in Fig. 3 and the description thereof, specifically on page 9, lines 8–9 and in the paragraph bridging pages 10 and 11 of the application as filed.” *Id.* at 396. Notably, this bridging paragraph includes the same text as the paragraph from the ’994 patent that we quote above that describes the sensing pad embodiment that has no display. *Compare id.* at 12–13, with Ex. 1001, 7:18–31; *see also* Pet. Resp. Br. 7. We determine that the prosecution history of the ’570 patent supports that the input area need not include a display, contrary to Patent Owner’s arguments.

In addition, we find unavailing Patent Owner’s argument that the applicant canceling claim 4 in the application that issued as the ’570 patent at the same time as amending claim 1 to recite a sensor positioned outside the input area confirms that “input area” must include a display. *E.g.*, Sur-reply 15–16; *see also* Resp. 13 (making same argument). Claim 4 recited “[a]n electronic input device according to claim 3 and wherein said display is generally coextensive with said sensor array.” Ex. 2022, 14. We do not find this argument persuasive, especially because claim 5 was canceled at the same time. *Id.* at 390. Claim 5 recited “[a]n electronic input device according to claim 3 and wherein said display is generally non-coextensive with said sensor array.” *Id.* at 14. Claims 4 and 5 depended from claim 3, which recited “a display” and depended from claim 1, which did not recite the term “display.” *Id.* We find that the amendments support whether a display is coextensive with an input area has nothing to do with where the sensors are located.

Accordingly, we determine that the prosecution history of the ’570 patent supports Petitioner’s proposed construction that whether there is a display is immaterial to the meaning of input area.

4. *Extrinsic Evidence*

Patent Owner cites to the testimony of Dr. Cairns in support of its arguments throughout its papers. We have reviewed the expert testimony Patent Owner cites, but we give it little, if any, weight as to claim construction issues in light of the clear disclosure of the intrinsic evidence. *See Wi-LAN, Inc. v. Apple Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016) (finding extrinsic evidence “is generally of less significance than the intrinsic record” in matters of claim construction); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (finding that when “an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term[,]. . . it is improper to rely on extrinsic evidence”).

In addition, we find unavailing Patent Owner’s arguments concerning purported admissions or agreements by Petitioner. First, we view these arguments as directed to extrinsic evidence, which is of less significance given the clear intrinsic evidence. *See Wi-LAN*, 811 F.3d at 462; *Vitronics Corp.*, 90 F.3d at 1583. Second, we agree with Petitioner and find that there were no such admissions or agreements. *See, e.g.*, Pet. Resp. Br. 3–5 (refuting purported admissions and agreements).

5. *Summary*

We adopt Petitioner’s construction in its Reply (Reply 2) and conclude that “input area” means an area for input, regardless of any relationship that input area may or may not have with a display.

IV. PRINCIPLES OF LAW

“In an [*inter partes* review], 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 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (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 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 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 of the invention to a person having ordinary skill in the art. *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) objective evidence of non-obviousness, if present.⁸ *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must “determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

V. OBVIOUSNESS OVER BIRD AND ISHII

Petitioner argues that the combination of Bird and Ishii renders claims 6–9 obvious. Pet. 3. For the reasons that follow, we determine that Petitioner shows by a preponderance of the evidence that the combination of Bird and Ishii renders these claims obvious.

A. *Summary of Bird*

⁸ Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* Resp.

Bird “relates to a light pen input system comprising a light pen which emits a light beam and a light sensing device comprising a planar array of light sensing elements in rows and columns over which the light pen is moved, the light beam emitted from the light pen producing a light spot on the array which is sensed by the sensing elements.” Ex. 1009, 1:4–10. Bird teaches that objects of its invention are “to provide a light pen input system which is capable of offering greater flexibility in use,” and “in which the light pen offers more functionality.” *Id.* at 2:13–18. Figure 1, shown below, illustrates an embodiment of Bird’s invention. *Id.* at 3:40–41.

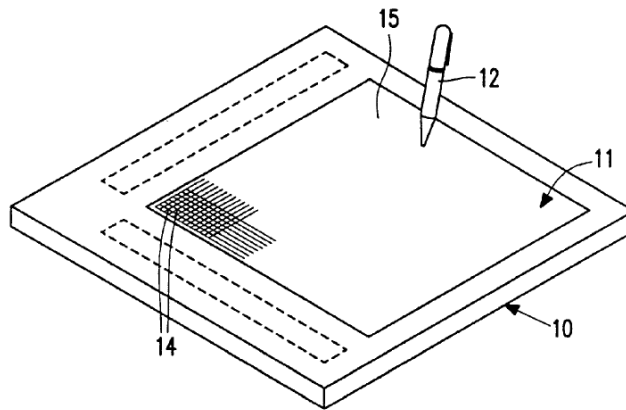


FIG. 1

Figure 1, above, “shows schematically an embodiment of a light pen input system according to the invention” of Bird. *Id.* As shown in Figure 1, Bird teaches a “system [which] comprises a light sensing device 10 which consists of a large area two-dimensional X-Y array of light sensing elements 14 defining a sensing area 11 having a writing surface over the surface of which a light pen 12 can be moved by a user to input information.” *Id.* at 3:59–63. Bird teaches that “[t]he light sensing device can be of any known kind having a row and column, planar, array of light sensing elements.” *Id.* at 4:12–13. “In this particular embodiment [of Figure 1], the device 10 is of

the type in which the light sensing element array is integrated in a liquid crystal display panel to form a single unit 15 providing input and display output functions.” *Id.* at 4:15–19. “The sensing elements may comprise any suitable photosensitive device such as a photoresistor or photodiode.” *Id.* at 4:14–15. Bird also teaches that instead “the light sensing element array may be of a kind which does not use a photoelectric device at each sensing element location but instead uses sets of row and column light waveguides which define at the intersections a planar array of light sensing elements and which conduct input light to peripheral light sensors.” *Id.* at 4:43–49.

Bird teaches that “light pen 12 includes a light source, for example an LED or a semiconductor laser.” *Id.* at 4:51–52. “Light from the light source, which may be visible or non-visible, for example, infra-red light, is emitted from the pen in the form of a shaped light beam by optical means contained in the pen.” *Id.* at 4:59–62. “The light beam emitted from the pen is such that with the pen, and thus the main optical axis of the emitted beam, perpendicular to the plane of the array, the light spot produced on the array by the beam in operation is substantially non-circular.” *Id.* at 4:63–67. Bird teaches, for example, that “the shapes of the spots [can be] rectangular, elliptical, elongated (isosceles) triangular, ovoid, and non-rectangular parallelogram.” *Id.* at 6:38–40.

Bird teaches that “[t]he light beam emitted by the light pen 12 causes a response in the sensing elements.” *Id.* at 3:64–66. “The X-Y position of the light spot on the array and movement of the light spot in X-Y directions over the sensing element array corresponding to movement of the light pen are detectable” *Id.* at 2:40–44. Moreover, “[b]y monitoring the sensing elements outputs the changing pattern of illuminated elements can be detected and the direction of rotation of the beam determined, which

information can then be used to provide functionality in addition to that obtained in the conventional manner of use merely by moving the light pen over the array and sensing the pen's position on the array in two coordinates.” *Id.* at 5:65–6:5.

B. Summary of Ishii

Ishii “relates to a display unit of an input integral type for a handwriting input used in an office automation (OA) equipment and an audio visual device.” Ex. 1010 ¶ 1. Ishii’s invention provides “a display unit having a liquid crystal display panel and an input means[,] the liquid crystal display panel comprising two substrates, . . . wherein the input means comprises signal conductors arranged in a matrix of X-conductors and Y-conductors . . . [that] are optical waveguides for guiding light parallel to the surfaces of the substrates.” *Id.* ¶ 23. The waveguides are “formed in the shape of a matrix and approximately guide[] light having a predetermined wavelength in parallel with a surface of a display substrate,” and thus, “the position of an optical pen can be detected by an inputting operation thereof.” *Id.* ¶ 24.

C. Independent Claims 6, 8, and 9

1. Electronic Input Device—Preambles

Each independent claim recites an “electronic input device” in the preamble and Petitioner points to Bird’s teaching for this recitation. Pet. 26. More specifically, Petitioner argues that Bird teaches an electronic input device as “light sensing device 10.” *Id.* (citing Ex. 1009, 3:59–60, Fig. 1; Ex. 1002 ¶¶ 83–84).

Based on our review of Petitioner’s arguments and evidence, which are not addressed by Patent Owner (*see generally* Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Bird teaches

an “electronic input device.” In light of our finding, we need not, and thus do not, reach whether the preambles of the independent claims are limiting.

2. *Input Object—Elements 6[A], 6[D], 8[B], 9[A], and 9[Fi]*

Petitioner argues that the combination of Bird and Ishii teaches elements 6[A], 6[D], 8[B], 9[A], and 9[Fi]. Pet. 25, 27–28, 32–33. Each of elements 6[A], 8[B], and 9[A] recites “an input object.” Petitioner argues that Bird teaches “‘light pen 12’ that is an input object used by a user to input information.” *Id.* at 27. (citing Ex. 1009, 3:62–63). Petitioner argues that “[t]he light pen includes a light source such as ‘an LED or a semiconductor laser’ and a power supply for the light source.” *Id.* at 28. (citing Ex. 1009, 4:51–52, Fig. 9).⁹

Each of elements 6[D], 8[B], and 9[A] recites that the input object projects or emits electromagnetic radiation. Element 6[D] recites that the electromagnetic radiation is projected “on to the input area to create an electromagnetic radiation pattern on the input area.” Element 8[B] recites that the input object projects “a beam of electromagnetic radiation on the input area.” Element 9[Fi] recites “the input object includes a source of the electromagnetic radiation.”

According to Petitioner, Bird teaches that “[a] light source is a source of electromagnetic radiation.” *Id.* (citing Ex. 1009, 1:58–60). Petitioner also asserts that Bird teaches that the “light is projected onto an input area, specifically sensing area 11.” *Id.* (citing Ex. 1009, 3:62). Petitioner also points to Bird’s disclosure that “[t]he beam of light is directed through the

⁹ Although not necessary for our determinations herein, we find Ishii similarly teaches “an optical pen having a light emitting element such as a laser, an LED, etc.” Ex. 1010 ¶ 53.

pen tip 24 via an optical system 25 which includes an aperture 26 that determines the required shape of the light spot.” *Id.* at 32–33 (citing Ex. 1009, 7:40–43, Fig. 9). As discussed below, we find that Petitioner has shown that the combination of Bird and Ishii describes “the input area” recited in elements 6[D], 8[B], and 9[Fi], which derives antecedent basis from “a physical input area” and “an input area” recited in elements 6[B], 8[A], and 9[B] discussed below. *See* § V.C.3.

In addition, as discussed with respect to the sensor array elements (*see* § V.C.4), we find persuasive Petitioner’s argument that one of ordinary skill in the art would have found it obvious to include positioning of Ishii’s photosensor display in Bird’s light input system in light of Bird express teaching to use Ishii. Pet. 31 (citing Ex. 1009, 4:46–50). We also credit Dr. Bederson’s testimony in that regard (Ex. 1002 ¶ 93) as it is consistent with the evidence of record.

Based on our review of Petitioner’s arguments and evidence, which are not addressed by Patent Owner (*see generally* Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that the combination of Bird and Ishii teaches elements 6[A], 6[D], 8[B], 9[A], and 9[Fi]. For the reasons given below (*see* § V.C.4), we also are persuaded by a preponderance of the evidence that Petitioner provides sufficiently articulated reasoning with rational underpinning to support Petitioner’s combining of Bird’s and Ishii’s teachings for these limitations.

3. *Input Area—Elements 6[B], 8[A], and 9[B]*

The recitation of “an input area” is in each of elements 6[B], 8[A], and 9[B]. We agree with Petitioner and find that the combination of Bird and Ishii teach these limitations. Pet. 25, 28–29; Reply 9–11.

We agree with Petitioner’s arguments and credit the testimony of Dr. Bederson regarding the input area elements 6[B], 8[A], and 9[B] (Pet. 25, 28–29; Reply 9–11; Ex. 1002 ¶¶ 82, 88–89, 92–93) because Petitioner’s arguments and Dr. Bederson’s testimony are consistent with and supported by the evidence of record. For instance, Bird teaches “a large area two-dimensional X-Y array of light sensing elements 14 defining a sensing area 11 having a writing surface over the surface of which a light pen 12 can be moved by a user to input information.” Ex. 1009, 3:60–63, Fig. 1 (cited in Pet. 29). Also, Bird teaches that “[t]he light sensing element array may be of a kind which . . . uses sets of row and column light waveguides which define at the intersections a planar array of light sensing elements,” as described in Ishii. Ex. 1009, 4:44–50 (cited in Pet. 25).

Also, Ishii’s teachings are consistent with and supportive of Petitioner’s arguments and Dr. Bederson’s testimony. For instance, we find that Ishii teaches forming optical waveguides in an X direction on a substrate and in a Y direction on another substrate such that the waveguides cross. *E.g.*, Ex. 1010 ¶ 45, Fig. 9 (cited in Pet. 17, 31). More specifically, Ishii teaches providing “input means compris[ing] signal conductors arranged in a matrix of X-conductors and Y-conductors,” where “the signal conductors are optical waveguides for guiding light parallel to the surfaces of the substrates.” *Id.* ¶ 23; Reply 11.

Patent Owner disputes Petitioner’s arguments and evidence. *See, e.g.*, Resp. 34–51. Patent Owner’s arguments and the testimony of Dr. Cairns are premised on Patent Owner’s overly narrow construction of “input area,”

which we decline to adopt for the reasons given above with respect to claim construction. *See* § III.B.¹⁰

Instead, we agree with Petitioner and find that in view of Bird’s and Ishii’s teachings, one of ordinary skill in the art would have understood that the waveguides¹¹ define the extent of the input area. Ex. 1009, 3:59–63, 4:43–50; Ex. 1010 ¶¶ 23, 45, 51, Fig. 9; Ex. 1002 ¶¶ 92–93. In addition, we find persuasive Dr. Bederson’s testimony on this point as Dr. Bederson’s testimony is consistent with the references’ teachings. *Compare* Ex. 1009, 3:59–63, 4:43–50 *and* Ex. 1010 ¶¶ 23, 45, 51, Fig. 9, *with* Ex. 1002 ¶ 92.

Patent Owner characterizes Petitioner’s arguments as including an “annotated arbitrary boundary that separates the ‘input area’ from ‘sensors 20.’” PO Resp. Br. 5. We find Patent Owner’s characterization unavailing. Patent Owner’s characterization pertains to “input area,” as well the sensor array elements (*see* § V.C.4) and the parties’ arguments regarding the sensor array elements are discussed more fully below.

With respect to “input area,” Ishii describes that the waveguides define an area. *See, e.g.*, Ex. 1010 ¶ 23 (describing that “the *input means* comprises signal conductors arranged in a *matrix of X-conductors and Y-conductors*” and that “the signal conductors are optical waveguides for guiding light” (emphases added)), ¶ 43 (describing that “waveguides in X-axis and Y-axis directions are formed on a substrate”) (cited in Pet. 17). Petitioner’s further contentions, including an annotated version of Figure 9

¹⁰ Certain of Patent Owner’s arguments pertain to “input area” and the sensor array elements (*see* § V.C.4) and are discussed more fully below. *Id.*

¹¹ We refer to waveguides as Petitioner does. As we discuss further below, we find that in the asserted art the peripheral light sensors and photosensing circuits connected to the waveguides are separate from, and not a part of, the waveguides. *See* § V.C.4.

of Ishii, as well as Ishii's teachings relating to Figure 9 describing an area of waveguides in X-axis and Y-axis directions, are discussed below. *See* § V.C.4.

As discussed above with respect to the input object elements (*see* § V.C.2), the independent claims recite “electromagnetic radiation” or “an electromagnetic radiation pattern” that is “on the input area.” Ishii describes light (electromagnetic radiation) on the area defined by the waveguides. *See, e.g.*, Ex. 1010 ¶ 53 (describing “[w]hen an optical pen having a light emitting element such as a laser, an LED [light emitting diode], etc. comes in contact with an upper substrate,” light “is guided along an optical waveguide formed on the glass substrate and an optical waveguide formed on the silicon substrate such that this optical waveguide is perpendicular to the optical waveguide on the glass substrate”). As is discussed more fully below (*see* §§ V.C.4, V.C.5), the combination of Bird and Ishii teach providing “an output indication of position and at least two of orientation, shape, and size” based on that electromagnetic radiation. *See, e.g.*, Ex. 1010 ¶ 53 (describing that light is guided along the optical waveguides and “[t]hus, X and Y coordinates of the contact portion are determined”).

We find unavailing Patent Owner's argument that Dr. Bederson's testimony merely copies and pastes attorney argument. Resp. 31 (comparing Pet. 31 with Ex. 1002 ¶ 92); *see also id.* (citing Ex. 2020 ¶ 88) (arguing no evidence supports Petitioner's arguments). We find that Dr. Bederson's testimony is consistent with Bird's and Ishii's teachings. Moreover, Dr. Bederson further supports this testimony by citing to portions of Ishii that discuss, *inter alia*, waveguides and how they relate to the sensor portions. *See* Ex. 1002 ¶ 92 (citing Ex. 1010 ¶¶ 45, 51, Fig. 9).

In addition, as discussed with respect to the sensor array elements (*see* § V.C.4), we find persuasive Petitioner’s argument that one of ordinary skill in the art would have found it obvious to include positioning of Ishii’s photosensor display in Bird’s light input system in light of Bird express teaching to use Ishii. Pet. 31 (citing Ex. 1009, 4:46–50). We also credit Dr. Bederson’s testimony in that regard (Ex. 1002 ¶ 93) as it is consistent with the evidence of record.

Based on our review of the complete record now before us, we are persuaded by a preponderance of the evidence that Petitioner (i) demonstrates that the combination of Bird and Ishii teaches elements 6[B], 8[A], and 9[B]; and (ii) provides sufficiently articulated reasoning with rational underpinning to support Petitioner’s combining of Bird’s and Ishii’s teachings for these limitations. We determine Petitioner’s showing is not undermined by Patent Owner’s arguments and evidence for the reasons given herein.

4. *Sensor Array—Elements 6[C], 8[Ci], and 9[Ci]*

Element 6[C] recites “providing a sensor array positioned at least partially circumscribing and immediately proximate the input area.” Each of elements 8[Ci] and 9[Ci] recites “a sensor array positioned outside the input area.” We agree with Petitioner and find that the combination of Bird and Ishii teach these limitations. Pet. 30–31; Reply 7–8, 11–13.

Petitioner argues that the combination of Bird and Ishii teaches elements 6[C], 8[Ci], and 9[Ci]. Pet. 30–31. Petitioner acknowledges that the sensor array illustrated in Figure 1 is not positioned outside the input area. Pet. 30 (citing Ex. 1009, 3:60–61, 3:66–4:4, Fig. 1). Petitioner, instead, relies on Bird’s disclosure that ““the light sensing element array may be of a kind which . . . uses sets of row and column waveguides . . . and *which*

conduct input light to peripheral light sensors, for example as described in aforementioned EP-A-0572 182 [Ishii].” *Id.* (quoting Ex. 1009, 4:44–50) (alterations in original).

As to Ishii, Petitioner argues that Ishii teaches a photosensor “formed in an end portion of each of the optical waveguides on the silicon substrate in the X and Y directions.” *Id.* (quoting Ex. 1010 ¶ 51). Petitioner adds that Ishii teaches “[a]n optical waveguide 36, an X (or Y)-sensor portion 34 and a Y (or X)-sensor portion 35 formed in an end portion.” *Id.* at 31 (quoting Ex. 1010 ¶ 45). Petitioner’s arguments regarding Ishii will be discussed further below.

In addition, Petitioner argues that one of ordinary skill in the art “would have found it obvious to include such positioning of Ishii’s photosensor display in Bird’s light input system because Bird expressly teaches using Ishii’s ‘sets of row and column light waveguides,’ ‘which conduct input light to peripheral light sensors.’” *Id.* (citing Ex. 1009, 4:46–50). According to Petitioner, one of ordinary skill in the art “would have found it obvious to follow this express teaching.” *Id.* (citing Ex. 1002 ¶ 93).

We find, based on the complete record, that Petitioner demonstrates that the combination of Bird and Ishii teaches elements 6[C], 8[Ci], and 9[Ci]. Pet. 30–31. We agree with Petitioner and find that Bird teaches “us[ing] sets of row and column light waveguides . . . which conduct input light to peripheral light sensors.” Ex. 1009, 4:44–50. In other words, Bird teaches a sensor array (i.e., the peripheral light sensors) that is positioned outside the input area (i.e., the rows and columns of waveguides whose intersections constitute a planar array of light sensing elements). *Id.* Bird also teaches that an example of this light sensing element array is described by Ishii. *Id.*

We also agree with Petitioner regarding Ishii's teachings. Petitioner annotates Figure 9, reproduced below, in support of its arguments. Pet. 31.

Fig. 9

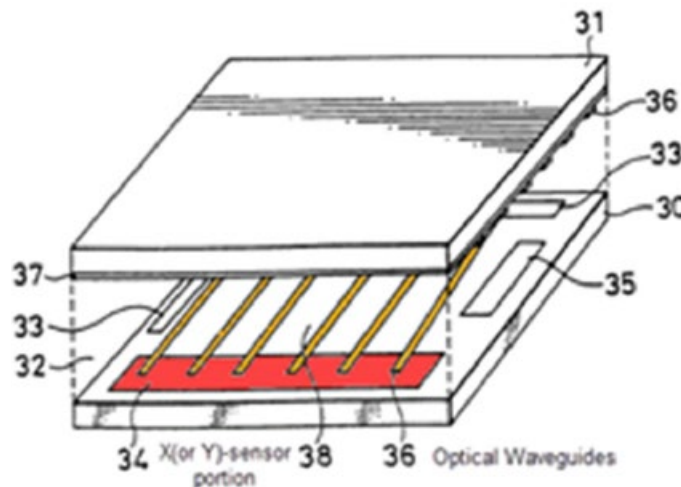


Figure 9 is a perspective view showing a display unit in accordance with an embodiment of Ishii's invention. Ex. 1010 ¶ 27. As shown, Petitioner (i) labels reference numeral 34 with "X (or Y)-sensor portion" and colors the portion in red, and (ii) labels reference numeral 36 with "Optical Waveguides" and colors them in orange. Pet. 31 (annotating Ex. 1010, Fig. 9). According to Petitioner, one of ordinary skill in the art "would have understood that Ishii's photosensors (red) are at the end of each optical waveguides (orange) and the optical waveguides define the extent of the input area." *Id.* (citing Ex. 1002 ¶¶ 92–93). Petitioner argues that the photosensors thus are positioned "both 'at least partially circumscribing and immediately proximate' and 'outside' the input area," as recited in elements 6[C], 8[Ci], and 9[Ci], respectively. *Id.* at 31.

With respect to Figure 9, Ishii teaches that "a silicon monocrystal substrate 30 and a glass substrate 31 are opposed to each other and a liquid crystal 32 is sealed into a clearance between the silicon monocrystal

substrate 30 and the glass substrate 31.” Ex. 1010 ¶ 44. Ishii teaches that “[a]n optical waveguide in the Y or X direction is formed in the glass substrate 31 opposed to the silicon monocrystal substrate 30 such that this optical waveguide crosses the optical waveguide of the silicon monocrystal substrate 30.” *Id.* ¶ 47. Figure 9 further illustrates “[a]n optical waveguide 36, an X(or Y)-sensor portion 34 and a Y(or X)-sensor portion 35 [which] are formed in an X or Y direction between the picture element electrode portions 38.” *Id.* ¶ 45. These disclosures further support the discussion above (*see* § V.C.3), explaining that Ishii’s waveguides define the extent of the input area.

We agree with Petitioner and find that Ishii teaches that the sensor portions are positioned outside the input area. Pet. 30–31; Reply 7–8, 11–13. In particular, Ishii teaches the following:

A photosensor is formed in an end portion of each of the optical waveguides on the silicon substrate in the X and Y directions. An end portion of the optical waveguide formed on the glass substrate in the Y or X direction is recessed or projected to leak light onto the silicon substrate. The photosensor on the silicon substrate is formed in a position for receiving this leaked light.

Ex. 1010 ¶ 51. Ishii’s sensor array (i.e., the photosensors in the X direction (sensor portion 34) and the photosensors in the Y direction (sensor portion 35)) is positioned outside the input area (i.e., the photosensors are positioned at the end of the waveguides for receiving leaked light from the ends of the waveguides). *Id.* ¶¶ 45, 51, 53, 76–79, Fig. 9. The sensor portions 34 and 35 positioned at the end of the waveguides receive light from the ends of the waveguides. *Id.* ¶ 51 (describing a photosensor receiving “leaked light” from an “end portion of the optical waveguide formed on the glass substrate”), ¶ 53 (describing light guided along optical waveguides and that “X and Y

coordinates” thus “are determined by a photosensor located in each of X and Y positions of end portions of the optical waveguides”), ¶¶ 76–79 (describing a “photosensor” that is formed “in an end portion of the optical waveguide”).

We also credit and give significant weight to the testimony of Dr. Bederson that one of ordinary skill in the art “would have understood that Ishii’s photosensors (red) are at the end of each optical waveguides (orange) and the optical waveguides define the extent of the input area,” as we find his testimony consistent with Ishii’s teachings. *Compare* Ex. 1002 ¶¶ 92, *with* Ex. 1010 ¶¶ 45, 51, 78, 79, Fig. 9. We also credit and give significant weight to the Dr. Bederson’s testimony that Ishii’s photosensors “are thus positioned both ‘at least partially circumscribing and immediately proximate’ and ‘outside’ the input area.” *Id.*

In addition, based on the complete record now before us, we find that Petitioner has provided sufficiently articulated reasoning with rational underpinning to support Petitioner’s modifications of Bird with Ishii. *See Kahn*, 441 F.3d at 988. In particular, we agree with Petitioner and find that Bird expressly teaches “us[ing] sets of row and column light waveguides which define at the intersections a planar array of light sensing elements and which conduct input light to peripheral light sensors, for example as described in” Ishii. Ex. 1009, 4:46–50. We also agree with Petitioner and find that one of ordinary skill in the art would have found it obvious to follow this express teaching.

Patent Owner disputes Petitioner’s arguments and evidence. Certain of Patent Owner’s arguments and Dr. Cairns’s testimony are premised on Patent Owner’s overly narrow construction of “input area,” which we decline to adopt for the reasons given above with respect to claim

construction. *See* § III.B. In light of the overlap in Patent Owner’s arguments relating to the input area and sensor array elements, we discuss certain of Patent Owner’s arguments above (*see* § V.C.3) and other arguments here.¹² Also, as discussed in further detail below, Patent Owner’s arguments and Dr. Cairns’s testimony are not consistent with evidence of record showing distinctions between waveguide and sensor technologies and Patent Owner’s arguments and Dr. Cairns’s testimony fail to address the teachings of Bird and Ishii as a whole. *See, e.g.*, Resp. 34–51.

We find unavailing Patent Owner’s argument that “Petitioner argues waveguides are not sensors based on an incorrect distinction between electrical/optical components.” Sur-reply 27 (citing Reply 7–8, 11–14). And we disagree with Patent Owner that “lightguides or waveguides *are* indeed sensors” in the context of the ’994 patent. *Id.* As Bird and Ishii teach, “waveguides” and “light guides” just “conduct” or “guide” light to their ends. Ex. 1009, 1:28–31, 4:44–50; Ex. 1010 ¶¶ 23–24, 53, 58; *see also* Ex. 1042 (Cairns Depo.), 77:11–78:1 (testifying that light guides are “useful for moving light around”).¹³ In particular, Bird teaches that “[t]he sets of light guides are connected at their ends to respective photosensing circuits which produce an electrical signal in response to light being conducted

¹² For instance, we find unavailing Patent Owner’s arguments that incorrectly conflate *display* and *input area*. *See generally* Resp.; Sur-reply (weaving conflation of display and input area throughout many arguments). Simply put, arguments concerning a display (or display substrates) are inapposite to claims 6, 8, and 9. *See supra* § III.B (construing input area). Claims 6, 8, and 9 do not recite “display.”

¹³ Petitioner’s arguments also are consistent with and supported by Dr. Bederson’s testimony that “Ishii *collects* light at the display surface.” Ex. 1002 ¶ 103. Dr. Bederson does not testify that Ishii’s waveguides sense light. *See generally* Ex. 1002.

thereto by the light guides.” Ex. 1009, 1:28–31. Bird also teaches that the “sets of row and column light waveguides . . . conduct input light to *peripheral light sensors*.” *Id.* at 4:43–50 (emphasis added). Similarly, Ishii teaches that a photosensor is formed in an end portion of each of the optical waveguides on the silicon substrate in a position for receiving leaked light. Ex. 1010 ¶ 51. In other words, Bird’s and Ishii’s photosensing circuits or sensors sense the light, while the light guides or waveguides guide the light to the sensors. Ex. 1009, 1:28–31, 4:43–50; Ex. 1010 ¶¶ 51, 53.

As is discussed more fully below (*see* § V.C.5), the combination of Bird and Ishii teach that the sensor array is “operative to sense and *provide an output indication of position and at least two of orientation, shape, and size*” recited in claims 8 and 9. In contrast to the recited output of the sensing array, Ishii describes that the output of the optical waveguides is light. *See, e.g., id.* ¶ 51 (describing that the end portion of the optical waveguide “is recessed or projected to *leak light*” (emphasis added)), ¶ 53 (describing that light is “guided along” the optical waveguides to photosensors in the end portions).¹⁴

¹⁴ Although not necessary for our determinations herein, we find that Petitioner’s arguments are consistent with and supported by the ’994 patent’s disclosure of “CCD or CMOS” and a “photodiode” as exemplary sensor array technologies. Ex. 1001, 4:50–52, 4:66–5:2. CCD sensors and CMOS sensors produce an electrical signal in response to light. *See* Ex. 1025, 32 (explaining that a CMOS sensor is based on a transistor that is “inherently light sensitive” and that “the current through the transistor will be proportional to the light incident on it”); *see also id.* (explaining that a CCD sensor “work[s] by accumulating charge, proportional to the incident light, in an electronic ‘bucket[,] which] must accumulate (or integrate) charge before it can be read out”). Photodiodes similarly generate an output, electrical signal, for example, indicating the presence of an object. Ex. 1035,

We also find unavailing Patent Owner’s argument that “Petitioner fails to provide any evidence or testimony that demonstrates the claimed ‘sensor array’ structure cannot include multiple components.” Sur-reply 32–33 (citing Reply 7 n.11). Patent Owner’s attempt to create a broader “structure” to add components to the claimed sensor array is misplaced. As we find above, Bird’s peripheral light sensors and Ishii’s sensor portions, which constitute the array of photosensors at the end of the waveguides, teach the claimed sensor array. Ex. 1009, 4:44–50; Ex. 1010 ¶¶ 51, 53, 78–79, Fig. 9. As we also find above, the waveguides are distinct from the sensor array, and simply guide light to the sensor array. Ex. 1009, 1:28–31, 4:44–50; Ex. 1010 ¶¶ 53, 58, 78–79. We recognize that the claims use “comprising” as the transitional phrase, and thus, do not exclude having additional components from their scope. *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501 (Fed. Cir. 1997). That the claims allow for additional components (e.g., waveguides, traces, electrical wires) does not mean that those additional components are part of the claimed components (e.g., a sensor array).

We also find unavailing Patent Owner’s argument that Ishii teaches that “the photosensor portions/circuits are part of the same sensor array structure (optical waveguide) and are created during waveguide fabrication.” Sur-reply 34. In particular, Patent Owner argues that Ishii “teaches forming X-Y direction waveguides in between picture elements and then forming a ‘photosensor’ ‘in an end portion of the optical waveguide’ and connecting it ‘to the optical waveguide on the silicon substrate . . . through a light leaking

1–3; *see also* Ex. 1009, 1:16–21 (stating that a photodiode is a photoelectric element for light sensing).

portion.” *Id.* at 33–34 (citing Ex. 1010 ¶¶ 76–79) (alteration in original). Patent Owner argues Ishii “teaches forming photosensor circuits ‘in’ each respective waveguide itself.” PO Resp. Br. 6 (citing Ex. 1010 ¶¶ 43, 51, 53, 78). Patent Owner argues that “[t]he relative positions of these sub-structures inside respective waveguides do not matter,” and that “Ishii’s photosensing circuitry is an internal part of its waveguides/‘sensor array.’” *Id.* at 7.

We disagree with Patent Owner. Ishii teaches that the photosensors are distinct from the waveguides. Ex. 1010 ¶ 45 (“An optical waveguide 36, an X(or Y)-sensor portion 34 and a Y(or X)-sensor portion 35 are formed in an X or Y direction . . .”). Ishii also teaches that waveguides for a direction (e.g., the Y direction) are formed in the glass substrate, which is above the silicon substrate. *Id.* ¶¶ 47, 51, 78, Fig. 9. For these glass substrate waveguides, Ishii teaches that an end portion of the waveguide “is recessed or projected to leak light onto the silicon substrate” with “[a] photosensor on the silicon substrate . . . arranged below,” and opposed to, this light leaking portion. *Id.* ¶¶ 51, 79. Ishii teaches for the waveguides formed on the silicon substrate that their photosensors are formed in an end portion of the waveguides and are “connected” to the waveguides through a light leaking portion. *Id.* ¶ 78. Hence, Ishii teaches that waveguides and photosensors are separate and distinct. Moreover, as we discuss herein, waveguides conduct light to their ends and the photosensors sense the light and produce an output, electrical signal—two separate functions.

We also find unavailing Patent Owner’s argument that Petitioner incorrectly “excludes the ends of Ishii’s optical waveguides/photosensor circuits as if they would be prevented from receiving light over the corresponding portion of the display.” PO Resp. Br. 7 (citing Pet. Open. Br. 7). According to Patent Owner, “Ishii’s waveguide structure, including

photosensor circuitry . . . directly receives and senses light over the entire coextensive display input area.” *Id.* (citing, e.g., Ex. 1010 ¶¶ 1, 62). That light, such as ambient light, is present near photosensor circuits does not support that Ishii’s waveguides are part of its sensor array structure. Ishii, for example, describes separating “an optical output signal from ambient light” using “a wavelength of light of the optical pen.” Ex. 1010 ¶¶ 54–55. Also contrary to Patent Owner’s arguments, Bird teaches that in Ishii the photosensing circuits sense light “conducted thereto by the light guides,” rather than receiving incident light directly. Ex. 1009, 1:24–35; 4:43–50. Likewise, Ishii teaches that its photosensors received light leaked from the ends of the waveguides, rather than receiving incident light directly. Ex. 1010 ¶¶ 51, 78–79. As discussed above (*see* § V.C.3) and herein, Ishii’s waveguides define an “input area,” and Bird and Ishii teach that the photosensors are outside the waveguides.

We also find unavailing Patent Owner’s argument that Dr. Cairns explains that “lightguides or ‘optical fibers’ are well known sensors, were widely used as sensors, ‘certainly [one of ordinary skill in the art] would consider that optical fibers acted as sensors,’ and ‘people often call optical fiber “optical fiber sensors.””” Sur-reply 27–28 (quoting Ex. 1042, 72:6–73:14, 79:10–23; 75:12–14). We give Dr. Cairns’s testimony (*see, e.g.,* Ex. 1042, 72:6–73:14, 75:12–14, 79:10–23) little to no weight because he does not disclose the underlying facts or data on which his opinion is based. *See* 37 C.F.R. § 42.65 (a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”) We also give Dr. Cairns’s testimony little to no weight because his testimony is inconsistent with Bird’s and Ishii’s teachings of having the light guides guide light to photosensing circuits or sensors, which do the

sensing. *See* Ex. 1009, 1:28–31, 4:43–50; Ex. 1010 ¶¶ 51, 53. His testimony also is inconsistent with the other evidence of record of CCD sensors, CMOS sensors, and photodiodes, which each produce an electrical signal in response to sensing the light. *See* Ex. 1025, 32 (explaining that a CMOS sensor is based on a transistor that is “inherently light sensitive” and that “the current through the transistor will be proportional to the light incident on it”); *see also id.* (explaining that a CCD sensor “work[s] by accumulating charge, proportional to the incident light, in an electronic ‘bucket[,] which] must accumulate (or integrate) charge before it can be read out”); Ex. 1035, 1–3 (describing that photodiodes generate an output, electrical signal, for example, indicating the presence of an object); Ex. 1009, 1:16–21 (stating that a photodiode is a photoelectric element for light sensing).

We also find unavailing Patent Owner’s argument that waveguides are sensors in view of Ishii’s teaching that “the position of an optical pen can be *detected by forming an optical waveguide* within a display panel.” Sur-reply 28 (quoting Ex. 1010 ¶ 64; citing *id.* at code (54), ¶¶ 23, 77–79); *see also id.* at 33 (making same argument). Patent Owner takes Ishii’s teachings out of context. As an initial matter, one of the teachings relied on by Patent Owner relates to a different embodiment than that relied on by Petitioner, specifically a handwritten character recognizing device. Ex. 1010 ¶¶ 61–64. For this embodiment, Ishii teaches “[a]n optical pen position detecting section 61 [which] detects a position of the optical pen on the display panel 60 on the basis of a signal transmitted from the display panel 60 in accordance with light from the optical pen.” *Id.* ¶ 62. Patent Owner does not address this teaching. Sur-reply 28. Contrary to Patent Owner’s argument (*id.*), Ishii teaches that the optical waveguides guide light to photosensors,

but Ishii does not teach that an optical waveguide itself detects position.
Ex. 1010 ¶¶ 51, 53.

We also find unavailing Patent Owner’s argument that Bird’s waveguides are sensors because “Bird states optical waveguides define ‘sensing elements’ multiple times.” Sur-reply 27 (citing Ex. 1009, 1:25–34, 4:43–50); *see also* Resp. 38–40 (referring to Bird’s use of the term “sensing elements”).¹⁵ For Bird’s embodiment employing peripheral sensors, the phrase “sensing elements”¹⁶ refers to a matrix or array of the intersections of the rows and columns of the waveguides. Ex. 1009, 1:25–34, 4:43–50. Bird referring to these intersections as sensing elements does not alter Bird’s teaching that the waveguides conduct incident light to their ends for the peripheral light sensors to sense. *Id.* We focus on what Bird and Ishii teach as to functionality and structure of the waveguides (and their intersections), rather than what Bird calls the intersections (i.e., “sensing elements”). *Cf. In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (a reference does not have to satisfy an *ipsis verbis* test to disclose a claimed element).

We also find unavailing Patent Owner’s argument that the Petition is deficient because Bird’s “‘peripheral sensors’ are part-of Ishii’s planar array

¹⁵ Although not necessary for our determinations and findings herein, we note that Bird uses the phrases “sensing elements” and “light sensing elements” (*id.*), not “sensor” or “sensor array,” as are recited in elements 6[C], 8[Ci], and 9[Ci].

¹⁶ Bird also uses the term “sensing elements” in referring to other embodiments which instead use photosensitive devices (e.g., photoresistors or photodiodes) “arranged regularly-spaced in a row and column matrix array.” *See, e.g.*, Ex. 1009, 3:59–4:6, 4:12–15, Fig. 1. Hence, in light of Bird’s varied embodiments, we view Bird as using the term “sensing elements” broadly to teach arrays having elements for the light sensing devices, rather than teaching for all embodiments that the elements themselves are “sensing.”

itself.” Resp. 22 (citing Ex. 1009, 4:46–50); *see also, e.g., id.* at 33–34 (citing, e.g., Ex. 2020 ¶ 92), 37–42 (making similar arguments) (citing Ex. 1009, 1:4–16, 1:24–31). We disagree with Patent Owner and find that Bird does not teach that the peripheral light sensors are part of its planar array. Rather, the passage at column 4, lines 45 through 50 of Bird clearly teaches that the “light sensing element array” is a planar array of light sensing elements, where each element is an intersection of a row and column of the sets of light waveguides. Ex. 1009, 4:43–50; *see also id.* at 1:25–29 (describing “two sets of optical light guides are provided extending in X and Y directions respectively, which define at their intersections a two-dimensional, X-Y, matrix of sensing elements”). Importantly, Bird also teaches conducting “input light to *peripheral light sensors*.” *Id.* at 4:43–50 (emphasis added). Furthermore, Bird teaches “[t]he sets of light guides are *connected at their ends to respective photosensing circuits which produce an electrical signal in response to light being conducted thereto by the light guides*.” Ex. 1009, 1:28–32 (emphasis added).

We also find unavailing Patent Owner’s arguments that relate to Bird’s embodiments that have the sensors positioned in the input area. *See, e.g.,* Resp. 29–31, 36–37. Petitioner acknowledges that Bird teaches such embodiments, but Petitioner clearly relies on Bird’s embodiment that employs peripheral sensors. *See, e.g.,* Pet. 30–31 (contrasting Bird’s embodiment illustrated in Figure 1 with photosensitive devices as the matrix array’s elements—which Petitioner does not rely on—with Bird’s embodiment employing peripheral sensors, such as taught in Ishii). Thus, these arguments from Patent Owner are inapposite.

We also find unavailing Patent Owner’s argument that “[n]otably, the words “peripheral light sensors” only appear once in Bird (not Ishii) and

only in the context of Bird describing Ishii as an additional exemplary integrated display.” Resp. 41 (citing Ex. 1009, 4:12–50). Rather, we find Bird’s description of Ishii teaching peripheral light sensors to be correct. Ex. 1009, 4:43–50. In particular, Bird describes conducting “input light to peripheral light sensors.” *Id.* at 4:48–50. This is, in fact, what Ishii teaches. *See, e.g.*, Ex. 1010 ¶ 51 (“A photosensor is formed in an end portion of each of the optical waveguides on the silicon substrate in the X and Y directions.”), ¶ 53 (describing that light is “guided along” optical waveguides and “X and Y coordinates” are “determined by a *photosensor located in each of X and Y positions of end portions of the optical waveguides*”) (emphases added), Fig. 9.

We also find unavailing Patent Owner’s arguments concerning “parallax” problems. *See, e.g.*, Resp. 33, 43, 48; Sur-reply 22–23. Patent Owner’s arguments are inapposite because they relate to the “display” and Patent Owner’s incorrect conflating of input area and display to argue that the claims exclude having a coextensive display and input area. As we discuss above, Patent Owner incorrectly excludes coextensive input areas and displays. *See supra* Section III.B (construing “input area”). Moreover, Ishii clearly teaches that the waveguides are within the display (hence addressing the parallax concerns) and that the photosensors are at the ends of the waveguides (i.e., outside the input area). Ex. 1010 ¶¶ 51, 53, 78–79, Fig. 9. Whether the photosensors are within the display substrates is immaterial.

We also find unavailing Patent Owner’s arguments that “Ishii’s LCD substrates incorporate or contain Ishii’s sensors (34, 35),” “Ishii’s integrated display provides no clearance for [Petitioner’s] alleged ‘peripheral sensors’ to be anywhere but inside Ishii’s display input area,” and related arguments. Resp. 43–51 (citing, e.g., Ex. 1010 ¶¶ 44–55, 58, 62, 74–80, Figs. 5, 9;

Ex. 2020 ¶¶ 111–124). Also, we do not credit Dr. Cairns’s testimony in that regard. Patent Owner’s arguments and Dr. Cairns’s testimony are premised on Patent Owner’s overly narrow construction of “input area” and that the display defines the input area. As we explain above, the term “input area” means an area for input, *regardless of any relationship that input area may or may not have with a display*. See § III.B. Also, the teachings of Bird and Ishii are contrary to Patent Owner’s arguments (Resp. 43–51) and Dr. Cairns’s testimony (Ex. 2020 ¶¶ 111–124). For instance, Bird itself describes the embodiment relied on by Petitioner as having “peripheral light sensors.” Ex. 1009, 4:49. Bird also describes that the “sets of light guides are connected *at their ends* to respective photosensing circuits.” *Id.* at 1:28–30 (emphasis added). Ishii similarly describes a “photosensor is formed in an end portion of each of the optical waveguides.” Ex. 1010 ¶ 51; *see also id.* ¶ 53 (describing “X and Y coordinates of the contact portion are determined by *a photosensor* located in each of the X and Y positions of *end portions* of the optical waveguides” (emphases added)). Figure 9 of Ishii similarly illustrates sensor portion 34 and sensor portion 35 outside Ishii’s input area. *Id.* at Fig. 9.

We turn to Patent Owner’s argument that Petitioner’s reliance on the papers from the reexamination of the ’994 patent is misplaced. Sur-reply 30–31 (citing Reply 5, 8, 10, 11, 14, 16; Ex. 1043 (Order Granting Request for *Ex Parte* Reexamination); Ex. 1045 (Office Action in *Ex Parte* Reexamination)). The reexamination process is ongoing and the office action is non-final. Ex. 1045, 1. Patent Owner submits that it is in the process of responding to the office action. Sur-reply 31. We do not rely on the papers from this reexamination.

We also do not rely on Patent Owner’s definition of fiber-optic sensor obtained from Wikipedia, which Patent Owner provides for the first time by linking to the definition in its Sur-reply. *Id.* at 32. Such a link constitutes new evidence, which is not allowed for a Sur-reply. *See* CTPG 73 (“The sur-reply may not be accompanied by new evidence other than deposition transcripts of the cross-examination of any reply witness.”).

Based on our review of the complete record now before us, we are persuaded by a preponderance of the evidence that Petitioner (i) demonstrates that the combination of Bird and Ishii teaches elements 6[C], 8[Ci], and 9[Ci]; and (ii) provides sufficiently articulated reasoning with rational underpinning to support Petitioner’s combining of Bird’s and Ishii’s teachings for these limitations. We determine Petitioner’s showing is not undermined by Patent Owner’s arguments and evidence for the reasons given above.

5. *Operative to Sense and Provide an Output Indication—Elements 6[E], 6[Fi], 6[Fii], 8[Cii], 8[Ciii], 9[Cii], and 9[Ciii]*

Each of elements 6[E], 6[Fi], 8[Cii], and 9[Cii] recite sensing by the sensor array and providing an output indication or that the sensor array is operative to sense and provide an output indication. We agree with Petitioner and find that the combination of Bird and Ishii teaches these limitations. Pet. 33–36; Reply 16. Petitioner provides the testimony of Dr. Bederson, which we credit as being consistent with and supported by the evidence of record, as discussed further below. Ex. 1002 ¶¶ 96–103.

As an initial matter, we agree with Petitioner and find that the combination of Bird and Ishii teaches that the sensor array is operative to sense and provide an output indication of a pattern’s position. Petitioner

argues that “Bird senses the electromagnetic radiation and provides an output of the stylus position.” Pet. 33. Petitioner argues Bird teaches sensing “[t]he X-Y position of the light spot on the array and movement of the light spot in X-Y directions over the sensing element array corresponding to movement of the light pen are detectable.” *Id.* (quoting Ex. 1009, 2:40–44). Petitioner adds that “[b]y incorporating the alternative peripheral light sensor array of Ishii, the Bird-Ishii combination also detects the X and Y positions of the light incident on the display surface.” *Id.* (citing Ex. 1010 ¶ 53).

We agree with Petitioner’s arguments and credit the testimony of Dr. Bederson because Petitioner’s arguments and Dr. Bederson’s testimony are consistent with and supported by the evidence of record. For instance, we find that Bird teaches sensing “[t]he X-Y position of the light spot on the array and movement of the light spot in X-Y directions over the sensing element array corresponding to movement of the light pen.” Ex. 1009, 2:40–44. Also, we find that Ishii teaches that “X and Y coordinates of the [light incident to a] contact portion are determined by a photosensor located in each of X and Y positions of end portions of the optical waveguides.” Ex. 1010 ¶ 53.

Each of elements 6[Fii], 8[Ciii], and 9[Ciii] recites that the output indication is of “position and at least two of orientation, shape[, /]and size” of the electromagnetic radiation. Petitioner argues that Bird teaches elements 6[Fii], 8[Ciii], and 9[Ciii]. Although the claims recite sensing “at least two of” orientation, shape, and size of the electromagnetic radiation, Petitioner argues “Bird discloses all three.” Pet. 34; *see also* Ex. 1002 ¶ 99 (testimony of Dr. Bederson supporting Petitioner’s argument). We agree with Petitioner’s arguments and credit the testimony of Dr. Bederson on this point

because Petitioner's arguments and Dr. Bederson's testimony are consistent with and supported by the evidence of record.

First, we agree with Petitioner find that Bird teaches sensing orientation. Regarding sensing "orientation," Petitioner argues that "Bird explains that the sensor array provides an output of the 'rotation of the pen/light beam around its axis' which 'can readily be detected by virtue of different sensing elements 14.'" Pet. 35 (quoting Ex. 1009, 6:46–48); *see also id.* (citing Ex. 1009, Fig. 5). Bird's teachings are consistent with and support Petitioner's argument. In particular, Bird teaches "rotation of the pen/light beam around its axis can readily be detected by virtue of different sensing elements 14 away from the centre of the spot becoming illuminated and non-illuminated during such rotation." Ex. 1009, 6:46–50; Fig. 5.

Second, we agree with Petitioner and find that Bird teaches sensing the spot's "shape." Regarding sensing the "shape," Petitioner argues that Bird teaches that "[b]y tilting the light pen away from the perpendicular, the shape of the light spot produced on the array can be distorted so as to elongate (or further elongate) the spot or contract the spot if desired thus providing additional flexibility to an operator." Pet. 35 (quoting Ex. 1009, 7:28–31). Petitioner argues that "[t]he sensors thus detect whether the shape of the illumination spot is 'elongated' to provide additional user flexibility." *Id.* Bird's teachings are consistent with and support Petitioner's argument. In particular, Bird teaches that "[b]y tilting the light pen away from the perpendicular, the shape of the light spot produced on the array can be distorted so as to elongate (or further elongate) the spot or contract the spot if desired thus providing additional flexibility to an operator." *Id.* at 7:28–31.

Third, we agree with Petitioner and find that Bird teaches sensing the "size" of the spot. Regarding sensing the "size" of the spot, Petitioner argues

that Bird teaches that “the size of the incident light spot on the array relative to the sensing elements may be varied.” Pet. 36 (quoting Ex. 1009, 8:25–26). According to Petitioner, “Bird explains that the ‘spot size on the array could conceivably be such as to cover just two adjacent sensing elements in the row direction and one element in the column direction.’” *Id.* (quoting Ex. 1009, 8:31–34). Bird’s teachings are consistent with and support Petitioner’s argument. In particular, Bird teaches that “the size of the incident light spot on the array relative to the sensing elements may be varied.” *Id.* at 8:25–26. Bird explains that the “spot size on the array could conceivably be such as to cover just two adjacent sensing elements in the row direction and one element in the column direction.” *Id.* at 8:31–34.

The teachings of Bird above apply to the asserted Bird and Ishii combination. In particular, we find persuasive Petitioner’s argument that “[b]y incorporating the peripheral light sensor array of Ishii, which Bird teaches as an alternative, the Bird-Ishii combination also detects orientation, shape, and size of the light incident on the display surface.” Pet. 36 (citing Ex. 1010 ¶¶ 58–60, Fig 11 (64)). As discussed with respect to the sensor array elements (*see* § V.C.4), we find persuasive Petitioner’s argument that one of ordinary skill in the art would have found it obvious to include positioning of Ishii’s photosensor display in Bird’s light input system in light of Bird’s express teaching to use Ishii. Pet. 31 (citing Ex. 1009, 4:46–50). We also credit Dr. Bederson’s testimony in that regard (Ex. 1002 ¶ 93) as it is consistent with the evidence of record.

Patent Owner argues that Petitioner “divides [this] element . . . into three subparts and attempts to piecemeal together a collection of isolated prior art disclosures, without demonstrating the disparate features satisfy the entire claimed invention in a single embodiment.” Resp. 57–58 (citing *F5*,

Inc. v. Sunstone Info. Defense, Inc., IPR2022-00484, Paper 11 at 22 (PTAB Aug. 9, 2022) (non-precedential)); *see also id.* (citing Ex. 2020 ¶ 139). More specifically, Patent Owner argues that Petitioner “divorces the claimed ‘sens[ing] and provid[ing] an output indication of position’ from the ‘at least two of orientation, shape and size’ recitals.” *Id.* (citing Pet. 34–36, 53–54) (alterations in original).

We find Patent Owner’s argument unavailing. Patent Owner’s reliance on *F5* is misplaced. Resp. 57–58. In *F5*, the limitation at issue required “determining a prediction . . . based on” three parameters. IPR2022-00484, Paper 11 at 22. The panel in *F5* found that the petitioner alleged that (i) a reference taught making the determination based on two of the parameters, and (ii) another reference taught making the determination based on the third parameter. *Id.* Notably, the panel found that using all three parameters at once for the determination was not shown. *Id.* at 22–23. Furthermore, the panel found that the petitioner provided no explanation how the combination of references “results in satisfaction of all three . . . at the same time in a single embodiment.” *Id.* at 22. In other words, in *F5*, none of the references taught the limitation (i.e., determining a prediction based on three parameters), nor did the petitioner explain how the references together taught the limitation. *Id.* at 22–23.

In contrast, here Petitioner shows that the combination of Bird and Ishii teaches that the sensor array is operative to sense position, as well as orientation, shape, and size of the light spot. *See supra*. Moreover, Bird’s teaching about sensing position is within Bird’s description of “the present invention,” and is not limited to a particular embodiment. Ex. 1009, 2:18–64. Also, the cited teachings in Bird about sensing the orientation, shape, and size of a light spot are described in connection with example shapes

relating to Bird’s invention, but not as relating to separate embodiments. *See id.* at 6:46–50, 7:28–31, 8:25–26, 8:31–34.

We also find unavailing Patent Owner’s argument that Petitioner’s “reliance on the Examiner’s findings related to Bird as disclosing ‘sensing’ and ‘providing an output indication of position and at least two of orientation, shape, and size’ of the electromagnetic radiation pattern is fatal to ground 1.” Resp. 58 (citing Pet. 34–36). Petitioner provides additional argument and evidence that were not before the Examiner, including the testimony of Dr. Bederson, which we credit as being consistent with and supported by the evidence of record. Ex. 1002 ¶¶ 96–103.

Dr. Bederson testifies, for example, with respect to shape, that Bird’s sensors “detect whether the shape of the illumination spot is ‘elongated’ to provide additional user flexibility,” which we find supports Petitioner’s position. Ex. 1002 ¶ 101 (citing Ex. 1009, 7:28–31). Similarly, Dr. Bederson testifies regarding Bird’s teachings for determining orientation and size, which supports Petitioner’s position. *See, e.g., id.* ¶¶ 100, 102. Furthermore, for the reasons given herein, Petitioner has shown that the Examiner erred in not finding claims 6, 8, and 9 unpatentable over the combination of Bird and Ishii.

Based on our review of the complete record now before us, we are persuaded by a preponderance of the evidence that Petitioner (i) demonstrates that the combination of Bird and Ishii teaches elements 6[E], 6[Fi], 6[Fii], 8[Cii], 8[Ciii], 9[Cii], and 9[Ciii]; and (ii) provides sufficiently articulated reasoning with rational underpinning to support Petitioner’s combining of Bird’s and Ishii’s teachings for these limitations. We determine Petitioner’s showing is not undermined by Patent Owner’s arguments and evidence for the reasons given above.

6. *Input Circuitry—Elements 6[Gi], 6[Gii], 8[Ei], 8[Eii], 9[Di], 9[Dii], and 9[E]*

Each of elements 6[Gi], 8[Ei], and 9[Di] recite “input circuitry” that receives “the output indication” and provides “an electronic input.”

Petitioner argues that the combination of Bird and Ishii teaches elements 6[Gi], 8[Ei], and 9[Di]. Pet. 37. More specifically, Petitioner argues that Bird’s “Figure 10 discloses ‘detection circuitry 40’ as input circuitry.” *Id.* (citing Ex. 1009, 8:2–7, Fig. 10). According to Petitioner, Bird states that the “[i]nput information to the light sensing array [] is detected by the associated detection circuit, here referenced at 40, which detects X-Y position and twist of the pen and provides outputs accordingly to a central processing unit 42 via an input/output interface 41.” *Id.* (quoting 1009, 8:2–7). Petitioner adds that “Ishii similarly discloses circuit 61 for determining output indication and providing an input to character recognizing section 64.” *Id.* (quoting Ex. 1010 ¶ 62, Fig. 11).

Each of elements 6[Gii], 8[Eii], and 9[Dii] recites the electronic input “representing at least one of two-dimensional position, three-dimensional position[, /] and orientation of the input object.” Petitioner argues that the combination of Bird and Ishii teaches elements 6[Gii], 8[Eii], and 9[Dii]. Pet. 38–40. Petitioner argues that “Bird discloses an electronic input representing both a two-dimensional position and orientation of said input object.” *Id.* at 39 (citing Ex. 1002 ¶¶ 106–109). Petitioner argues, for example, that “Bird discloses that ‘[t]he X-Y position of the light spot on the array and movement of the light spot in X-Y directions over the sensing element array corresponding to movement of the light pen are detectable.” *Id.* (quoting Ex. 1009, 2:40–44); *see also id.* (citing Ex. 1009, Fig. 5).

In addition, Petitioner argues that “Bird also teaches determining ‘orientation’ when it senses that . . . ‘the direction of rotation of the beam [is] determined’ by monitoring the sensing elements outputs.” *Id.* at 40 (quoting Ex. 1009, 5:65–6:5). According to Petitioner, “Bird explains that the sensing elements provide[] an output of the ‘rotation of the pen/light beam around its axis’ which ‘can readily be detected by virtue of different sensing elements 14.’” *Id.* (quoting Ex. 1009, 6:46–48). Petitioner argues that “[t]he Bird-Ishii combination also detects the X and Y positions of the light incident on the display surface and orientation, which is same as the position of the input object on the surface.” *Id.* (citing Ex. 1010 ¶¶ 53, 58–60). According to Petitioner, one of ordinary skill in the art “would have adapted the input circuitry of Bird to respond to the sensor configuration of Ishii.” *Id.* (citing Ex. 1002 ¶ 109).

Element 9[E] recites “wherein the electronic input representing orientation includes an electronic input representing angular orientation of the input object relative to the input area.” Petitioner asserts “that 9[E] is only reached if the ‘electronic input representing at least one of’ is the ‘orientation of input object.’” Pet. 39 n.8.

Based on our review of Petitioner’s arguments and evidence, which are not addressed by Patent Owner (*see generally* Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that the combination of Bird and Ishii teaches elements 6[G_i], 6[G_{ii}], 8[E_i], 8[E_{ii}], 9[D_i], and 9[D_{ii}]; we agree with Petitioner’s undisputed arguments regarding 9[E]; and we determine Petitioner provides sufficiently articulated reasoning with rational underpinning to support Petitioner’s combining of Bird’s and Ishii’s teachings for these limitations.

7. *Electromagnetic Radiation Pattern (Elliptical)—
Elements 8[D] and 9[Fii]*

Element 8[D] recites “wherein the electromagnetic radiation pattern includes an elliptical shape having a size that is a function of the distance of the input object relative to the input area.” Element [9[Fii]] recites “wherein the sensing array senses the electromagnetic radiation pattern correlating to an elliptical pattern produced by a conical beam that intersects the input area in a pattern forming the ellipse having properties that are a function of at least one of position, distance and orientation of the input object.”

Petitioner argues that Bird teaches elements 8[D] and 9[Fii]. Pet. 41–43. First, Petitioner argues that Bird teaches that the beam is conical and produces an elliptical pattern or shape. *Id.* at 41–42 (citing Ex. 1009, Fig. 9 (annotating and labeling the figure showing a light path)). Petitioner argues that Bird teaches that “[t]he beam of light is directed through the pen tip 24 via an optical system 25 which includes an aperture 26 that determines the required shape of the light spot.” *Id.* at 41 (quoting Ex. 1009, 7:40–43). Petitioner adds that “[t]he beam has an elliptical shape.” *Id.* (citing Ex. 1009, 6:38–46, 9:6–7 (claim 6)).

Second, Petitioner asserts that “it is a matter of basic geometry that, as the distance from the input area to input object increases, the conical beam of the light pen (like that of a flashlight) widens in diameter.” Pet. 41 (citing Ex. 1002 ¶ 111). Petitioner provides annotations to Figure 9 of Bird, reproduced below, to illustrate the widening of diameter as the distance from the input area to input object increases.

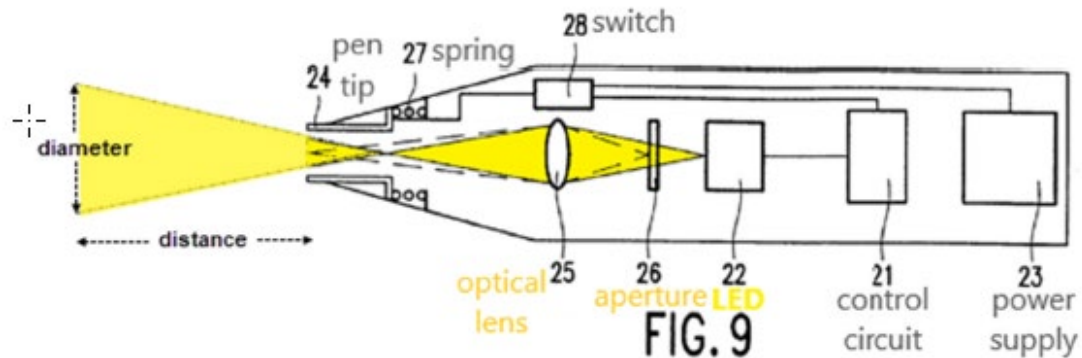


Figure 9, above, shows schematically the components of light pen 12 including power supply 23 from which power is supplied via control circuit 21 to light source 22, such as a light emitting diode (LED) or semiconductor laser, that upon being energized emits a beam of light. Ex. 1009, 3:46–48, 7:36–40. Petitioner’s annotation of Figure 9 includes yellow highlighting of light from light source 22 passing from aperture 26 via optical lens 25 through the end of tip 24. *Id.* at 7:40–45; Pet. 41–42. Petitioner’s annotations of Figure 9 also include yellow highlighting of the conical beam extended beyond the end of tip 24 to a location that Petitioner indicates is an “arbitrary distance” from the end of tip 24. Pet. 42. Petitioner’s annotations of Figure 9 further include the label “distance” for the “arbitrary distance” and “diameter” for the diameter of the light incident on a plane at that arbitrary distance away from the end of tip 24. *Id.*

Third, Petitioner argues “the ellipse has properties based on the orientation of the input object.” *Id.* More specifically, Petitioner argues that Bird teaches that “[i]t will be understood, of course, that if the pen is held inclined to that plane, the shape of the light spot produced is distorted.” *Id.* (quoting Ex. 1009, 3:24–26) (alteration in original). Petitioner argues Bird teaches that “[b]y tilting the light pen away from the perpendicular, the shape of the light spot produced on the array can be distorted so as to

elongate (or further elongate) the spot or contract the spot.” *Id.* (quoting Ex. 1009, 7:28–32); *see also id.* at 43 (Petitioner annotating Ex. 1009, Fig. 5).

Petitioner also argues that “as a matter of geometry, that elongating the ellipse increases its eccentricity, while contracting it decreases the eccentricity.” *Id.* at 42 (citing Ex. 1002 ¶ 113). Petitioner argues that Bird teaches that “in the case of an elliptical spot, the spot may be distorted to approximate a circular spot.” *Id.* (quoting Ex. 1009, 3:28–30). And “[a] circle is an ellipse of eccentricity zero,” according to Petitioner. *Id.* (citing Ex. 1002 ¶ 113; Ex. 1001, 5:8–10 (arguing that the ’994 patent teaches that “eccentricity of 0 is indicative of a circle”)). Petitioner argues “[t]hus, the eccentricity of Bird’s elliptical light spot depends on (‘is a function’ of) the light pen’s (‘input object’) orientation.” *Id.* at 43.

At the institution stage, Patent Owner disputed Petitioner’s showing for elements 8[D] and 9[Fii]. Patent Owner does not maintain its dispute at this final stage. *See generally* Resp. Based on the complete record now before us, we maintain our analysis as to why Patent Owner’s pre-institution arguments are unavailing and why we find Petitioner has shown that Bird teaches elements 8[D] and 9[Fii]. Dec. on Inst. 35–37.

Based on our review of the complete record now before us, we are persuaded by a preponderance of the evidence that Petitioner demonstrates that Bird teaches elements 8[D] and 9[Fii].

8. *Summary*

After consideration of the arguments and the evidence in the complete record now before us, we determine that Petitioner has shown that the combination of Bird and Ishii teaches all recitations in claims 6, 8, and 9. Also, we are persuaded that Petitioner has articulated reasoning with rational underpinning as to why one of ordinary skill in the art would have combined

the teachings of Bird and Ishii in the manner recited in claims 6, 8, and 9. We also are persuaded that Petitioner has demonstrated that such person would have had a reasonable expectation of success. We determine Patent Owner's arguments do not undermine Petitioner's showing.

Accordingly, based on our review of the complete record now before us, we conclude that Petitioner has established by a preponderance of the evidence that claims 6, 8, and 9 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Bird and Ishii.

D. Dependent Claim 7

Claim 7 depends from claim 6 and further recites "wherein the electromagnetic radiation pattern is created on the input area and includes an elliptical shape having a geometry which is a function of the location of the input object relative to the input area." Ex. 1001, 8:50–53. Petitioner relies on its contentions for elements 8[D] and 9[Fii]. Pet. 43 (citing Section XIII.A.2.j corresponding to page 41–43 of the Petition discussing elements 8[D] and 9[Fii]).

At the institution stage, Patent Owner disputed Petitioner's showing for claim 7. Patent Owner does not maintain its dispute at this final stage. *See generally* Resp. Based on the complete record now before us, we maintain our analysis as to why Patent Owner's pre-institution arguments are unavailing and why we find Petitioner has shown that Bird teaches the further recitation in claim 7. Dec. on Inst. 35–37.

Based on our review of the evidence and arguments in the complete record now before us, we find that Petitioner demonstrates by a preponderance of the evidence that claim 7 would have been obvious to one of ordinary skill in the art over the combination of Bird and Ishii.

VI. OBVIOUSNESS OVER GEAGHAN AND ISHII

Petitioner argues that the combination of Geaghan and Ishii renders claims 6–9 obvious. Pet. 3. This ground of unpatentability challenges claims which we already determine are unpatentable. Under the circumstances of this case, analyzing additional grounds challenging the same claims, which we have determined to be unpatentable, would not be an efficient use of the Board’s time and resources. *See Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (“We agree that the Board need not address issues that are not necessary to the resolution of the proceeding.”); *see also 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”).

Accordingly, we do not reach these remaining grounds. *Cf. In re Gleave*, 560 F.3d at 1338 (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (determining once a dispositive issue is decided, there is no need to decide other issues).

VII. CONCLUSION

The outcome for the challenged claims is set forth below.¹⁷ In summary:

¹⁷ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. §§ 42.8(a)(3), (b)(2).

Claims Challenged	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatent- able	Claims Not Shown Unpatent- able
6–9	103(a)	Bird, Ishii	6–9	
6–9	103(a)	Geaghan, Ishii ¹⁸		
Overall Outcome			6–9	

VIII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 6–9 of U.S. Patent No. 8,816,994 B2 have been proven to be unpatentable; and

FURTHER ORDERED that 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.

¹⁸ Because we determine that the challenged claims are unpatentable on another ground, we decline to address them for this ground.

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