

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

INTELLECTUAL VENTURES II LLC,
Patent Owner.

IPR2025-00339
Patent 7,916,180 B2

Before KRISTEN L. DROESCH, SCOTT A. DANIELS, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

DROESCH, *Administrative Patent Judge*.

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

I. INTRODUCTION

We have authority to hear this *inter partes* review under 35 U.S.C. § 6, and this Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, Petitioner has shown by a preponderance of the evidence that claims 22, 23, 28, and 30 of U.S. Patent No. 7,916,180 B2 (Ex. 1001, “’180 Patent”) are unpatentable, but has not shown by a preponderance of the evidence that claims 1–3, 10–12, 24, 25, 32, and 33 of the ’180 Patent are unpatentable.¹

A. Background and Procedural History

Tesla, Inc. (Petitioner”) filed a petition requesting *inter partes* review of claims 1–3, 10–12, 22–25, 28, 30, 32, and 33 of the ’180 Patent. Paper 2 (“Pet.” or “Petition”). Intellectual Ventures II LLC (“Patent Owner”) timely filed a preliminary response. Paper 8. Pursuant to our authorization, Petitioner filed a preliminary reply (Paper 11) and Patent Owner filed a preliminary sur-reply (Paper 12) to address issues of claim construction.

Upon review of the parties’ arguments and supporting evidence, we instituted review with respect to all grounds and claims set forth in the Petition. Paper 13 (Institution Decision or “Inst. Dec.”).

Patent Owner filed a response to the Petition (Paper 16, “PO Resp.” or “Response”) to which Petitioner filed a reply (Paper 19, “Pet. Reply” or “Reply”), and Patent Owner filed a sur-reply (Paper 20, “PO Sur-reply”).

¹ This Corrected Judgment corrects errors in the overall outcome of this proceeding in the previously issued Final Written Decision (Paper 28). The previously issued Final Written Decision (Paper 28) inadvertently included claim 33 in the patentability challenge based on Choi, Labaziewicz, and Yu, and incorrectly included claim 33 in the listing of claims determined unpatentable. *See* Ex. 3002. The substantive analysis of the patentability challenges remains unchanged.

In support of the Petition and Reply, Petitioner relies upon declarations of R. Michael Guidash. Exs. 1003, 1069. In support of the Response, Patent Owner relies upon declarations of Dr. Eli Saber. Exs. 2013, 2020. Petitioner filed a transcript of the deposition of Dr. Saber. Ex. 1070.

An oral hearing was held on April 23, 2026, and a transcript of the hearing is included in the record. Paper 27.

B. Real Parties-In-Interest

Petitioner indicates that Tesla, Inc. is the real party-in-interest. Pet. 99. Patent Owner indicates that Intellectual Ventures II LLC is the real party-in-interest. Paper 3, 2.

C. Related Matters

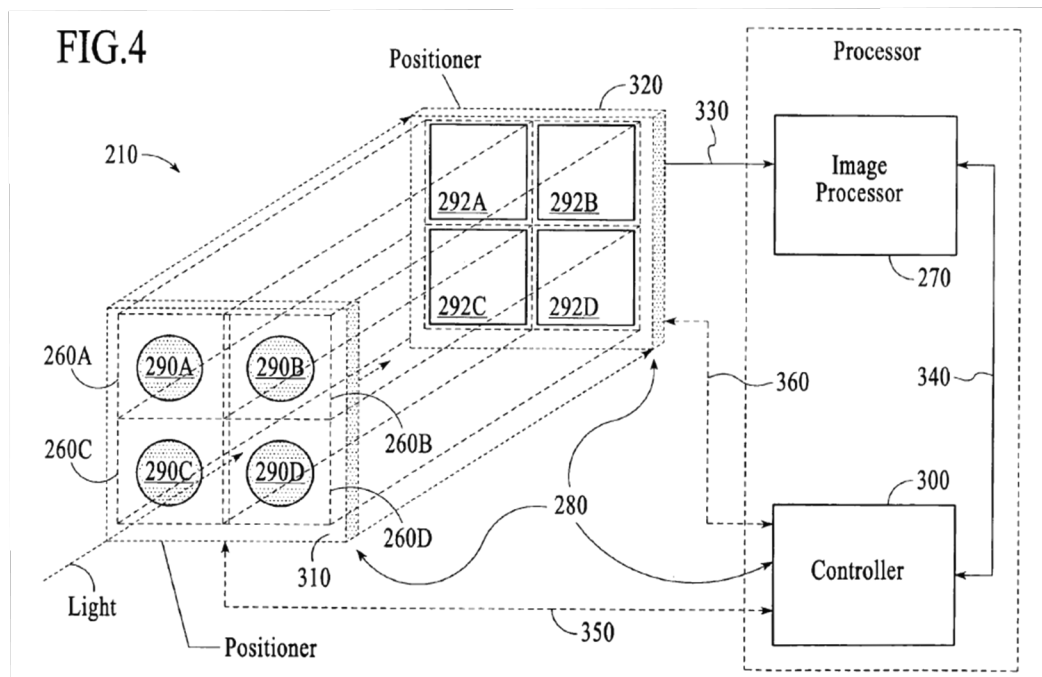
The parties indicate that the '180 Patent is or was involved in the following district court proceedings: *Intellectual Ventures II LLC v. Tesla, Inc.*, 1:24-cv-00390 (W.D. Tex.); *Intellectual Ventures II LLC v. Tesla, Inc.*, 1:24-cv-00884 (W.D. Tex.); and *Intellectual Ventures II LLC v. Tesla, Inc.*, 6:24-cv-00188 (W.D. Tex.). Pet. 99; Paper 3, 2.

D. The '180 Patent (Ex. 1001)

The '180 Patent is directed to “[a] digital camera system and methods . . . in which multiple fields of view (FOV) of an image are simultaneously acquired.” Ex. 1001, 3:21–23. The '180 Patent explains that “[d]igital photography often requires imaging and subsequent display of different fields of views of the same or nearly the same scene,” but that “a system including multiple digital cameras is large and expensive.” *Id.* at 2:1–3, 2:19–20. Accordingly, “a need for a high-performance solid-state digital camera that is capable of simultaneously acquiring imaging having

high resolution using multiple fields of view.” *Id.* at 2:21–23. The ’180 Patent describes a solution in which “[t]he digital camera system includes a digital camera having two or more camera channels each with independent image sensors.” *Id.* at 3:23–25.

Fig. 4 of the ’180 Patent is reproduced below.



“Figure 4 depicts a digital camera system 210 that includes multiple camera channels.” Ex. 1001, 6:14–15. As shown in Figure 4, “[e]ach of the camera channels 260A–260D includes an optics component or portion and a sensor component or portion.” *Id.* at 6:19–22. Namely, channel 260A, for example, includes optics portion 290A and sensor portion 292A, and the other channels have similarly designated optics and sensor portions. *See id.* at 6:21–26. In an embodiment, “[e]ach camera channel . . . provides a different FOV imaging capability relative to at least one other camera channel,” where “the FOV (also referred to as angle of view) describes the angular extent of a given scene that is imaged by a camera.” *Id.* at 6:31–33, 6:63–65. The different FOV for each channel is achieved “by controlling or

varying parameters of the focal length of the photographic lens in combination with parameters of the image sensor.” *Id.* at 7:1–4. “The four camera channels 260A-260D can be operated simultaneously with independent electrical control features such as integration time control and frame rate (in video applications) to name a few.” *Id.* at 5:63–67.

During operations, an optics portion of a first camera channel receives light from within a first field of view and transmits one or more portions of the received light to the corresponding sensor portion that outputs a signal representative of the received light to an image processor which can generate and image or data based at least in part on information of the output signal. *See* Ex. 1001, 8:43–53. Similarly, “[a]n optics portion of a second camera channel receives light from within a second field of view and transmits one or more portions of the received light to the corresponding sensor portion” that “outputs a signal representative of the received light” to an “image processor, which can generate and image or data based at least in part on information of the output signal.” *Id.* at 8:54–63. “The operations of the second camera channel are simultaneous or nearly simultaneous with the operations of the first camera channel.” *Id.* at 8:63–65. The image processor is configured to generate a combined image or data based at least in part on the images from the first and second camera channels. *See id.* at 9:3–5.

E. Illustrative Claim

Claims 1 and 22 are independent, and claims 2, 3, 10–12, 23–25, 28, 30, 32, and 33 depend directly or indirectly therefrom. *See* Ex. 1001, 24:2–26:16. Claim 22 is illustrative and reproduced below:

- [22.0] A method comprising:
- [22.1] configuring a first optics component relative to a first image sensor to form a first channel having a first field of view (FOV) that comprises a first angular width of a scene;
- [22.2] configuring a second optics component relative to a second image sensor to form a second channel having a second FOV that comprises a second angular width of the scene, wherein the first and second angular widths are different;
- [22.3] independently controlling simultaneous data acquisition with each of the first and second channels during a frame; and
- [22.4] combining data received during the frame from one or more of the first and second channels to provide an image.

Ex. 1001, 25:23–25:35 (Petitioner’s limitation labels added in brackets).

F. Asserted Challenges to Patentability and Asserted Prior Art

Petitioner asserts that claims 1–3, 10–12, 22–25, 28, 30, 32, and 33 would have been unpatentable based on the following grounds (Pet. 10):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 10–12, 22, 24, 25, 28, 30, 32, 33	103(a) ²	Matsushima ³ , Yu ⁴
28, 30	103(a)	Matsushima, Yu, Weldy ⁵
22, 23, 28, 30	103(a)	Choi ⁶ , Labaziewicz ⁷ , Yu

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103 effective March 16, 2013. Because the ’180 Patent claims an effective filing date prior to the effective date of the applicable AIA amendment, we refer to the pre-AIA version of § 103.

³ JP 2003-319231, published November 7, 2003 (Ex. 1007, “Matsushima”).

⁴ US 6,611,289 B1, issued August 26, 2003 (Ex. 1005, “Yu”).

⁵ EP 0 858 208 A1, published August 12, 1998 (Ex. 1014, “Weldy”).

⁶ US 2005/0128323 A1, published June 16, 2005 (Ex. 1008, “Choi”).

⁷ US 7,206,136 B2, issued April 17, 2007 (Ex. 1010, “Labaziewicz”).

II. ANALYSIS

A. Claim Construction

In an *inter partes* review proceeding, the Board applies the same claim construction standard as that applied in federal courts in a civil action under 35 U.S.C. § 282(b), which is generally referred to as the *Phillips* standard. See 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). Under the *Phillips* standard, “words of a claim ‘are generally given their ordinary and customary meaning.’” *Phillips*, 415 F.3d at 1312. “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). Under *Phillips*, the starting point for the analysis is the language of the claims themselves. See *Phillips*, 415 F.3d at 1314. “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Extrinsic evidence may be useful, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence. *Phillips*, 415 F.3d at 1317.

Although understanding the claim language may be aided by the explanations contained in the written description, it is important not to import limitations into a claim that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment.

Superguide Corp. v. DirecTV Enters., 358 F.3d 870, 875 (Fed. Cir. 2004); *see also Hill–Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (“While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.”). It is further improper to add to a claim an “extraneous” limitation appearing in the specification, and “extraneous” means a limitation read into a claim from the specification wholly apart from any need to do so. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *E.I duPont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988)).

“independently controlling simultaneous data acquisition with each of the first and second channels during a frame” (Claim 22)

Claim 22 recites “independently controlling simultaneous data acquisition with each of the first and second channels during a frame.” Ex. 1001, 25:31–33. Claim 1 recites a limitation similar in scope, but omits “during a frame.” Ex. 1001, 24:12–15. The parties address several aspects of the construction of this limitation. We address each of these aspects in turn.

“simultaneous”

Patent Owner contends that the plain meaning of “simultaneous” “requires at least some data acquisition with each of the plurality of channels to occur at the same time,” in other words, “requires at least some overlap in the data acquisition windows in each of the plurality of channels.” PO Resp. 15 (citing Ex. 2020 ¶ 62). Citing the ’180 Patent Specification and case law, Patent Owner asserts that the “claim language is not met where image capture with the plurality of channels is ‘nearly simultaneous’ (i.e., close in time) but not actually simultaneous (i.e., at the same time).” *Id.*

at 15–16 (citing Ex. 2020 ¶ 63; Ex. 1001, 3:27–28, 8:63–65; *Johnson & Johnston Assoc. v. R.E. Serv.*, 285 F.3d 1046, 1054 (Fed. Cir. 2002) (en banc); *Eagle Pharms. Inc. v. Slayback Pharma LLC*, 958 F.3d 1171, 1176 (Fed. Cir. 2020); *PSC Computer Prods., Inc. v. Foxconn Int’l*, 355 F. 3d 1353, 1356 (Fed. Cir. 2004)); *see also* PO Sur-reply 1–2 (similar argument, citing PO Resp. 15–16).

As demonstrated in the analysis below, there is no dispute regarding whether a reference discloses or teaches “nearly simultaneous data acquisition” compared to “simultaneous data acquisition.” *See* PO Resp. 21–64; *see also* Pet. Reply 2 (“Petitioner’s grounds demonstrate data acquisition ‘at the same time.’”). Accordingly, we need not explicitly construe “simultaneous” to resolve the issues of patentability. *See 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 apply the ordinary and customary meaning for “simultaneously.”

“during a frame”

Petitioner asserts that “[a] POSITA would have understood ‘simultaneous data acquisition with each of the first and second channels during a frame’ means ‘simultaneous data acquisition of an image frame with each of the first and second channels during a period of time.’” Pet. 6 (citing Ex. 1003 ¶ 69). Petitioner contends that this construction is supported by the ’180 Patent Specification and the surrounding claim language of claim 22. *See* Pet. 7–8 (citing Ex. 1001, 1:7–15, 3:51–54; Ex. 1003 ¶¶ 71–73; Ex. 1051 ¶ 836). According to Petitioner “[a] POSITA

would have understood that ‘*during a frame*’ refers to during a period of time that data for an image frame is acquired.” Pet. 7 (citing Ex. 1003 ¶ 71).

Patent Owner disagrees with Petitioner’s proposed construction. See PO Resp. 16–18. Patent Owner notes that Petitioner’s proposed construction “omits the connection to the period of time that data for an image is acquired.” *Id.* at 17 (citing Ex. 2020 ¶ 65). According to Patent Owner, “the Petition proposes to construe ‘during a frame’ as simply ‘during a period of time’ (namely, any period of time) -- which effectively reads the limitation out of the claim.” *Id.* (citing Pet. 6).

In contrast, Patent Owner asserts that “‘during a frame’ as used in claim 22 means ‘at some point between the beginning and the end of the exposure interval during which an image sensor captures a single image.’” PO Resp. 18; see PO Sur-reply 10 (reiterating this construction, citing PO Resp. 16–21). In support, Patent Owner presents the following arguments: (1) in the context of claim 22, “a ‘frame’ is digital data corresponding to an single image;” (citing Ex. 1001, 20:19–21); (2) “[t]he phrase ‘during a frame’ corresponds to the exposure interval during which an image sensor captures a single image,” (citing Ex. 2006, 6:5–19; Ex. 2009, 11:49–51); and (3) the ’180 Patent Specification includes numerous references to “controlling the ‘frame rate’, which,” according to Patent Owner, “is typically expressed as the number of single images captured by the sensor per second,” (citing Ex. 1001, 4:9–16, 4:57–60, 5:63–66, 7:23–27). PO Resp. 16–17 (citing Ex. 2020 ¶ 64). Patent Owner further contends that “the term ‘during’ imparts a temporal requirement and means ‘at some time between the beginning and the end of a period.’” *Id.* at 18 (citing Ex. 2020 ¶ 66; Ex. 2011, 1; Ex. 2022, 1).

Petitioner disagrees with Patent Owner's proposed construction and urges the Board to reject importing "between the beginning and the end of the exposure interval" into claim 22. *See* Pet. Reply 3 (citing Ex. 1069 ¶¶ 10–21). Petitioner asserts that equating "during a frame" to an exposure interval contradicts the '180 Patent Specification which recognizes that frame rate (related to frame period) and integration time (related to exposure interval) are separate parameters. *See id.* at 3–4 (citing Ex. 1001, 3:57–60, 7:24–25; Ex. 1003 ¶ 50; Ex. 1069 ¶ 11). Petitioner further asserts that there is no basis in the '180 Patent Specification for limiting "during a frame" to only an exposure interval as the '180 Patent Specification "never mentions an "exposure interval, let alone suggests that 'during a frame' is limited to such an 'exposure interval.'" *Id.* at 4–5. Petitioner also contends that Patent Owner's construction contradicts the testimony of its own expert Dr. Saber. *See id.* at 5–6 (citing Ex. 1070, 20:13–17, 21:13–22:21, 64:1–4, 64:14–20, 67:1–4).

Utilizing slightly different wording compared to the Petition, Petitioner reiterates that "'during a frame' refers to the time period during which data of the frame is acquired, not merely the 'exposure interval.'" Pet. Reply 3 (emphasis omitted). In support of its argument that "during a frame" is not limited to an exposure interval, Petitioner contends that "a frame period is for acquiring **digital data** of a frame and [] includes the readout period for generating that digital data." Pet. Reply 4 (citing Ex. 1001, 20:19–20; Ex. 1003 ¶¶ 51–55; Ex. 1069 ¶ 12). Petitioner asserts that the '180 Patent Specification "confirms that the time period for acquiring data of the frame involves a read-out process that includes analog and digital processing, in addition to exposure." *Id.* (citing Ex. 1001, 11:8–11, 11:22–25, 17:32–34, 22:58–59, Fig. 12; Ex. 1069 ¶ 13). Petitioner

contends that a POSITA has “knowledge that ‘frame period’ is defined as ‘the time lapsed between *successive image readouts*,’ which includes the time for both exposure and readout,” and “is confirmed by the ’180 specification.” *Id.* at 5 (citing Ex. 1021, 20; Ex. 1001, 17:32–34; Ex. 1069 ¶¶ 14–17). According to Petitioner, its “construction properly encompasses the period for acquiring data for the frame, consistent with the specification, [Patent Owner’s] own expert’s testimony, and the knowledge in the art.” *Id.* at 6 (citing Ex. 1069 ¶¶ 19–20).

Patent Owner disagrees with Petitioner’s arguments that “during a frame” includes a readout period on the basis that it contradicts the language of claim 22, and the ’180 Patent Specification. *See* PO Sur-reply 2. According to Patent Owner, claim 22 recites “during a frame” in the context of controlling data acquisition with the first and second channels, where each of the first and second channel are expressly defined as having only an optics component and a sensor. *See id.* at 2–4 (citing Ex. 1001, claim 22, 6:19–21; 13:42–45). Patent Owner contends that the ’180 Patent Specification distinguishes an optical channel from downstream processing circuitry that receives the output of the optical channels to generate an image. *See id.* at 4–6 (reproducing Ex. 1001, Fig. 4 (with Patent Owner’s annotations added); citing Ex. 1001, 6:14–26, 14:41–45, 19:59–20:7).

We decline Patent Owner’s invitation to construe “during a frame” of “independently controlling simultaneous data acquisition with each of the first and second channels during a frame” by importing the extraneous limitations “at some point between the beginning and the end of the exposure interval during which the image sensors capture a single image.” As pointed out by Petitioner, Patent Owner’s proposed construction is unsupported by the language of claim 22 and the ’180 Specification because

claim 22 does not recite or require an exposure interval and the '180 Specification does not disclose an exposure interval nor suggest “during a frame” is limited to an exposure interval. Patent Owner and its expert Dr. Saber cite only extrinsic evidence (Exs. 2006, 2009) to support its argument that claim 22 should be limited to an “exposure interval during which the image sensors capture a single image.” *See* PO Resp. 16–17; Ex. 2020 ¶ 64. Similarly, Patent Owner relies only on extrinsic evidence (e.g., Ex. 2011, 1; Ex. 2022, 1; Ex. 2020 ¶ 66) to limit “during” to “at some point between the beginning and the end.” *See id.* at 18. When considered in the context of claim 22 and the '180 Patent Specification which do not limit “during a frame” to an exposure interval, we find that we cannot rely on Patent Owner’s citations to extrinsic evidence to yield a reliable construction for “during a frame.”

As demonstrated in the analysis below, we need not provide an explicit construction for “during a frame” to resolve the parties’ disputes regarding the merits of the patentability challenges. *See Realtime*, 912 F.3d at 1375. We apply the ordinary and customary meaning for “during a frame.” To the extent that an explicit identification of the ordinary and customary meaning may aid the understanding of our analysis, consistent with the language of claim 22 and the '180 Patent Specification, we find that the ordinary and customary meaning for “during a frame” is “during the period of time that data for an image frame is acquired.” *See* Ex. 1001, code (57), 20:6–24, 25:23–35.

*“independently controlling simultaneous data acquisition . . .
during a frame”*

Patent Owner relies on its proposed construction for “during a frame” to assert that “independently controlling simultaneous data acquisition . . .

during a frame” “requires that independent simultaneous data acquisition be controlled at some point between the beginning and the end of the exposure interval during which the image sensors capture a single image.” PO Resp. 18 (citing Ex. 2020 ¶ 67); *id.* at 21 (citing Ex. 2020 ¶ 73); *see* PO Sur-reply 10 (citing PO Resp. 16–21). Patent Owner asserts that Petitioner equates “during a frame” with the prepositional phrase “for a frame” and thereby, “removes the temporal requirement that independent control be applied ‘during the frame’ and erroneously substitutes the more general notion that the purpose of the data acquisition of is ‘for a frame.” PO Resp. 18–19 (citing Pet. 7–8; Ex. 2011, 1; Ex. 2022, 1; Ex. 2023, 1). Patent Owner also disagrees with the Board’s preliminary finding that that “‘during a frame’ [] modifies the immediately preceding recitation of ‘data acquisition with each of the first and second channels, such that it is the data acquisition which occurs during a frame.’” PO Resp. 19 (citing Inst. Dec. 20). According to Patent Owner, “the Board’s interpretation . . . appears to confuse ‘during’ with ‘for,’” and “has effectively rewritten the language of claim 22.” PO Resp. 19–20; *see id.* (citing Ex. 2021, 1 (Cambridge Dictionary) to distinguish “during” and “for”). Patent Owner further argues that

[e]ven if “during a frame” modifies “data acquisition” as suggested by the Board, the claim language nonetheless requires the application of independent control during such data acquisition, i.e., application of independent control at some point between the beginning and the end of the exposure interval during which the image sensors capture a single image. In claim 22, the words “data acquisition” are inextricably tied to the larger phrase that recites “independently controlling simultaneous data acquisition” and thus, if the “data acquisition” occurs “during a frame,” then the application of independent control must also happen “during a frame.”

PO Resp. 20 (citing Ex. 2020 ¶ 71).

Patent Owner also disagrees with the Board’s preliminary finding that there is insufficient support in the ’180 Patent Specification for requiring independent control occur during a frame. PO Resp. 20–21 (citing Inst. Dec. 20). According to Patent Owner,

[t]he ‘180 Patent explained that the integration time control for each sensor can be accomplished using a technique that was known as *rolling mode*. . . . operation of an image sensor in a “rolling mode” involves control *during a frame* of the start and stop times of the integration period for individual rows of pixels in a sensor.

Id. at 21 (citing Ex. 1001, 20:48–50; Ex. 2020 ¶ 71; PO Resp. 4–10). With the aid of disclosures of U.S. Patent No. 8,068,140 (Ex. 2006), U.S. Patent No. 7,804,536 (Ex. 2007), and European Patent Publication EP 1896891 (Ex. 2009), Patent Owner provides the following explanation of rolling shutter mode:

operation of an image sensor in a “rolling mode” involves control *during a frame* of the start and stop times of the integration period for individual rows of pixels in the sensor. . . . An image sensor operating in a “rolling mode” is synonymous with a “rolling shutter,” meaning that the start and end time of the integration interval for each row of the sensor are staggered.

Id. at 6 (citing Ex. 2020 ¶ 42).

To further aid its explanation, Patent Owner reproduces Figure 4 of U.S. Patent No. 8,068,140 (Ex. 2006) with annotations as shown below.

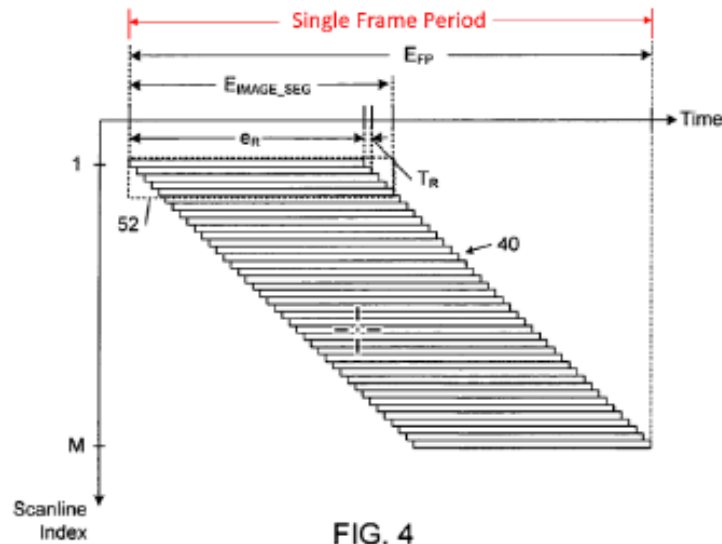


Figure 4 depicts a schematic diagram of scanline exposure intervals during a frame exposure period in accordance with an embodiment of a rolling shutter mode of operating an image sensor. *See* Ex. 2006, 2:25–28. According to Patent Owner, Figure 4 depicts “[t]he vertical axis (labelled scanline index) corresponds to individual rows of pixels (numbered from 1 to M) on the image sensor, while the horizontal axis corresponds to time.” PO Resp. 7 (citing Ex. 2006, 6:1–5; Ex. 2007, Fig. 2A, 1:37–42; Ex. 2020 ¶ 42). Patent Owner contends that the time interval labelled E_{FP} corresponds to the frame exposure period, which extends from the start of the exposure interval of the first row (or scanline) to the stop time of the exposure interval for the last row or scanline and “is also referred to as a ‘*single frame period*’ and corresponds to the continuous exposure time over which any of the entire array of pixels is integrating photons. *See id.* at 8 (citing Ex. 2006, 6:5–19; Ex. 2009, 11:49–51; Ex. 2020 ¶ 44). Patent Owner asserts that the time interval labelled e_R corresponds to the exposure interval for row 1, T_R corresponds to the time when the information in the first row (or first scanline) is read out, and the start time of the interval for each subsequent

row (or scanline) in the sensor is some interval after the start time of the exposure interval for the previous row. *See id.* at 7 (citing Ex. 2006, 6:1–5; Ex. 2020 ¶ 43).

According to Patent Owner, “[i]n this example, the integration period for each row (or scanline) is the same, but the start and stop times for each row (or scanline) are different.” PO Resp. 7 (citing Ex. 2007, 1:42–45; Ex. 2020 ¶ 43). Patent Owner asserts that “[w]hen an image sensor is operating in the rolling mode (or rolling shutter mode), the start and stop time of the integration interval of individual rows (or scanlines) of pixels is controlled during the frame.” *Id.* at 8 (citing Ex. 2020 ¶ 44). Patent Owner asserts that “[i]n embodiments of the ‘180 Patent that use the rolling mode, *independent* integration control *during the frame* is applied to *each* camera channel that is simultaneously acquiring a field of view,” and “such embodiments are the subject of claim 22 of the ‘180 Patent.” *Id.* (citing Ex. 1001, 4:9–15, 5:63–66, 7:23–27, 20:48–50; Ex. 2020 ¶ 44).

Patent Owner also explains “snap shot” mode also disclosed in the ‘180 Patent Specification. *See* PO Resp. 9 (citing Ex. 1001, 20:51). Patent Owner asserts that “[w]hen a snapshot (or global) shutter is used, there is a common exposure period for each of the plurality of rows of pixels which “begins at a common exposure start time ... and ends at a common exposure stop time.” *See id.* (citing Ex. 2019, 19:4–18; Ex. 2020 ¶ 46).

According to Patent Owner,

[i]n contrast to an image sensor operating in the rolling shutter mode where the start and stop times of the integration interval of individual rows of pixels are controlled during the frame -- in the snapshot (or global) shutter mode, common control signals are applied only at the confines of the frame exposure rather than during the frame, i.e., rather than at some point

between the beginning and the end of the exposure interval during which an image sensor captures a single image.

Id. at 10 (citing Ex. 2020 ¶ 46).

In the Reply, Petitioner asserts that Patent Owner’s argument that claim 22 requires integration time control under “rolling” mode fails because it imports a specific example from the specification, and excludes other disclosed alternatives. *See* Pet. Reply 8 (citing Ex. 1069 ¶¶ 28–36; *Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1320 (Fed. Cir. 2005); PO Resp. 8, 20). According to Petitioner, Patent Owner “provides no support from the specification that the term is limited to only integration time control while excluding the other aspects” “of data acquisition such as readout including analog/digital conversion/processing.” *Id.* at 8–9. Patent Owner further asserts that Patent Owner’s arguments that further narrow the claim by requiring integration time control be performed in a “rolling mode” contradicts the ’180 Patent Specification, which “lists ‘rolling mode’ and ‘snap-shot mode’ as *alternatives* using ‘*and/or*,’ and does not suggest excluding one or the other.” *Id.* at 9 (citing Ex. 1001, 20:48–51; Ex. 1069 ¶ 30; *Medrad*, 401 F.3d at 1320; PO Resp. 8, 20).

As explained above, we decline to construe “during a frame” as “at some point between the beginning and the end of the exposure interval during which the image sensors capture a single image.” For the same reasons, we decline to construe “independently controlling simultaneous data acquisition with each of the first and second channels during a frame” to require “independent simultaneous data acquisition be controlled at some point between the beginning and the end of the exposure interval during which the image sensors capture a single image.” We also decline to adopt Patent Owner’s extrapolation of its proposed construction to require

limitations of integration time control, integration time control in a rolling mode (i.e., at some point *between the beginning and the end* of the exposure interval during which the image sensors capture a single image) and exclude integration time control in a snap shot mode (i.e., at the confines of the exposure interval).

Although Patent Owner supplies evidence to demonstrate that the '180 Patent Specification discloses integration time control in rolling mode as an example of “independently controlling simultaneous data acquisition with each of the first and second channels during a frame” where “the independent simultaneous data acquisition be controlled” during a frame, we decline to import limitations from the '180 Patent Specification into the claims. *See Hill–Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (“While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.”). We observe that, when applying the ordinary and customary meaning for “during a frame,” the '180 Patent Specification also discloses integration time control in snap shot mode as another example of “independently controlling simultaneous data acquisition with each of the first and second channels during a frame,” where “the independent simultaneous data acquisition be controlled” during a frame. We also observe that when applying the ordinary and customary meaning for “during a frame,” the '180 Patent Specification discloses numerous examples of “independently controlling simultaneous data acquisition with each of the first and second channels during a frame,” where simultaneous data acquisition with the first and second channels occurs during the frame and there is independent control of the simultaneous data acquisition with the first and second channels. *See* Ex. 1001, 3:49–63, 5:44–5:67, 20:7–19.

As demonstrated in the analysis below, we need not provide an explicit construction for “independently controlling simultaneous data acquisition with each of the first and second channels during a frame” to resolve the parties’ disputes regarding the merits of the patentability challenges. *See Realtime*, 912 F.3d at 1375. We apply the ordinary and customary meaning for “independently controlling simultaneous data acquisition with each of the first and second channels during a frame.”

Other claim terms and phrases

Petitioner also proposes a construction for “data of a frame,” recited in claim 1, as “data of an image frame.” *See* Pet. 8. Patent Owner does not specifically address this claim construction. *See* PO Resp. 14–21. As demonstrated in the analysis below, we need not explicitly construe “data of a frame” or any other claim term or phrase. *See Realtime*, 912 F.3d at 1375.

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person 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 2-3 years of experience in digital imaging systems,” and that “[l]ess experience may be necessary with additional education, and likewise, less education may be necessary with additional work experience.” Pet. 6 (citing Ex. 1003 ¶¶ 16–19). Patent Owner does not dispute Petitioner’s definition. *See generally* PO Resp.

We adopt Petitioner’s definition of a person of ordinary skill in the art because it is consistent with the level of skill reflected by the ’180 Patent Specification and the prior art of record.

C. Principles of Law

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 the invention was made to a person having ordinary skill in the art to which the subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) if in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).⁸

D. Entitlement of Challenged Claims to Benefit of Earlier Filing Date

Petitioner asserts that the earliest effective filing date of the '180 Patent is no earlier than July 1, 2005, the filing date of the Provisional Application 60/695,946 (Ex. 1048, “'946 Provisional Application”). *See* Pet. 4 (citing Ex. 1003 ¶¶ 62–66). Petitioner contends the challenged claims are not entitled to the filing date of the earliest Provisional Application 60/604,854 (Ex. 1047, “'854 Provisional Application”), because there is insufficient written description support for (1) providing multiple channels having different FOVs and (2) configuring multiple optics components relative to multiple sensors respectively to form these multiple channels. *See* Pet. 4 (citing Ex. 1003 ¶ 64; Ex. 1046).

Petitioner meets its initial burden of going forward with evidence (i.e., production) by asserting that the earliest filing date of the '180 Patent is no

⁸ At this stage, the parties do not present evidence or arguments addressing secondary considerations.

earlier than July 1, 2005, presenting Labaziewicz as a prior art basis for unpatentability, and asserting that Labaziewicz is prior art as of its February 18, 2005, filing date. *See* Pet. 4, 9, 70–72; *Dynamic Drinkware*, 800 F.3d at 1379. Thereafter, the burden of production shifts to Patent Owner to argue or produce evidence that the prior art does not render the challenged claims unpatentable or that Labaziewicz is not prior art because the challenged claims of '180 Patent are entitled to the benefit of a filing date prior to the February 18, 2005, filing date of Labaziewicz. *See Dynamic Drinkware*, 800 F.3d at 1380.

Patent Owner contends that the '180 Patent is entitled to the August 25, 2004, filing date of the '854 Provisional Application, and Petitioner's arguments to the contrary lacks merit. *See* PO Resp. 60–64. Patent Owner asserts that the '854 "Provisional Application clearly discloses 'multiple optics components relative to multiple sensors respectively to form multiple channels.'" *Id.* at 63 (citing Ex. 2020 ¶ 154). Patent Owner asserts that the '854 "Provisional Application [] disclosed that each channel could have a lens with a different focal length" and "by disclosing that each channel could have a lens with a different focal length, the Provisional Application inherently disclosed multiple channels with different fields of view." *Id.* at 62 (citing Ex. 1047, 7–8, 12; Ex. 2020 ¶ 153). Patent Owner contends that the '854 Provisional Application discloses circuitry that processes signals from each array and then combines the signals from all of the arrays to produce a composite image "provides clear support for combining data captured with the channels with different FOVs [(fields of view)]." *Id.* at 63–64 (citing Ex. 1047, 4, 7–8, 12; Ex. 2020 ¶ 155).

In the Reply, Petitioner disputes Patent Owner's arguments that the '854 Provisional Application provides written description support for

multiple sensors and multiple channels with different fields of view. *See* Pet. Reply 29–31. In the Sur-reply, Patent Owner contends that the Reply fails to establish that the '180 Patent is not supported by the '854 Provisional Application. *See* PO Resp 25–27. Patent Owner provides additional arguments to show that the '854 Provisional Application provides written description support for multiple sensors and multiple channels with different fields of view. *See id.*

As briefly explained above, the burden of production shifted to Patent Owner to show that Labaziewicz is not prior art because the '180 Patent is entitled to the earliest August 25, 2004, filing date of the '854 Provisional Application. *See Dynamic Drinkware*, 800 F.3d at 1379–1380. For a claim in a later-filed application to be entitled to the filing date of an earlier application, the earlier application must provide written description support for the claimed subject matter. *Anascape, Ltd. v. Nintendo of Am. Inc.*, 601 F.3d 1333, 1337 (Fed. Cir. 2010). To satisfy the written description requirement, “a prior application itself must describe an invention, and do so in sufficient detail that one skilled in the art can clearly conclude that the inventor invented the claimed invention as of the filing date sought.” *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1572 (Fed. Cir. 1997); *see also VasCath v. Mahurkar*, 935 F.2d 1555, 1563–64 (Fed. Cir. 1991) (“[T]he applicant must . . . convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention . . . now claimed.” (emphasis omitted)), *Ariad Pharm. Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) (“[I]t is the specification itself that must demonstrate possession.”).

Patent Owner’s arguments fail to meet this burden of production because, aside from addressing deficiencies of written description support

identified by Petitioner, Patent Owner does not substantively address how the '854 Provisional Application provides written description support for all of the limitations of the claimed invention. *See* PO Resp. 60–64; PO Sur-reply 25–28. Specifically, Patent Owner does not address written description support in the '854 Provisional Application for “independently controlling simultaneous data acquisition with each of the first and second channels during a frame”—limitation [22.3]—the heart of the parties’ claim construction disputes addressed above in Section II.A. *See* PO Resp. 60–64; PO Sur-reply 25–27. Accordingly, Patent Owner has not met its burden of production in coming forward with evidence or argument to show possession of the claimed invention in the '854 Provisional Application. As a result, the burden of production does not shift back to Petitioner, and, therefore, the '180 Patent is not entitled to the benefit of the August 25, 2004, filing date of the '854 Provisional Application.

*E. Challenge to Claims 1–3, 10–12, 22, 24, 25, 28, 30, 32, and 33
over Matsushima and Yu*

1. Overview of Matsushima (Ex. 1007)

Matsushima is directed to “a digital camera that can prevent unnatural boundary regions even when a telephoto captured image is combined in the center of a wide-angle captured image, and that can obtain images at various magnifications using a simple configuration.” Ex. 1007, code (57).

Figure 1 is reproduced below.

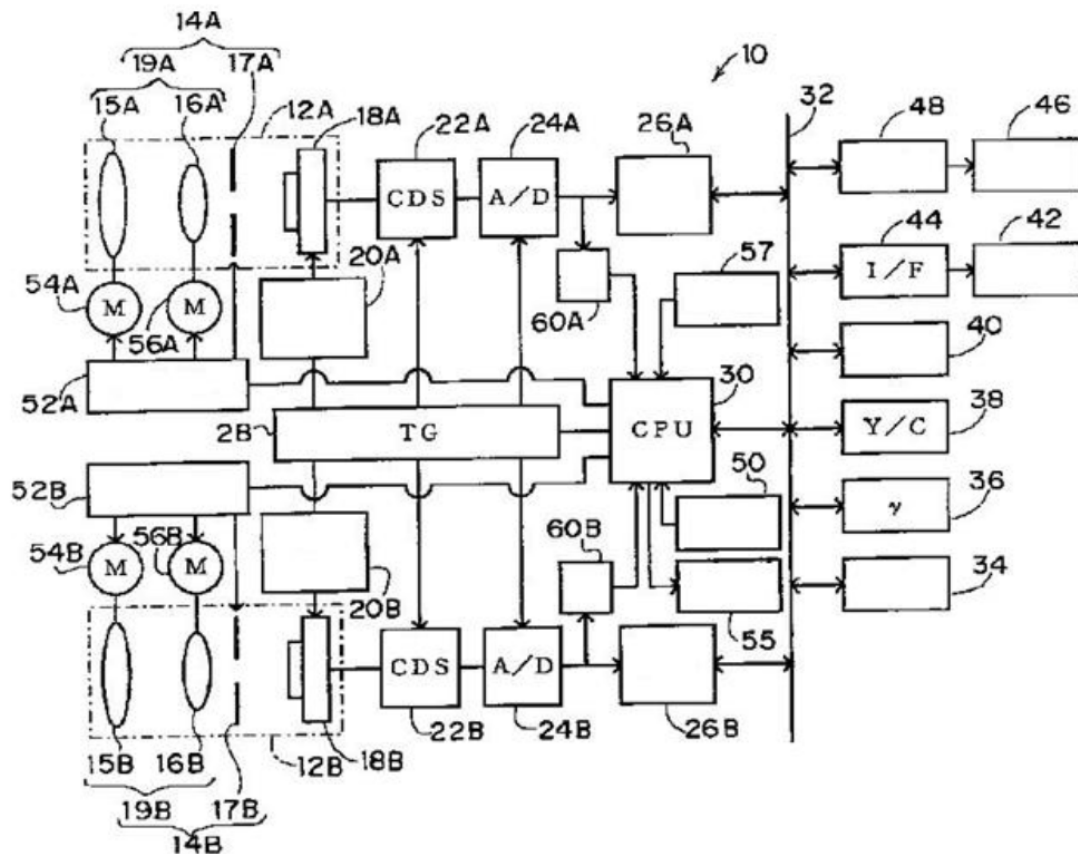


Figure 1 depicts a block diagram of digital camera 10, which “has two independent imaging systems (a first imaging system 12A and a second imaging system 12B),” where “images are formed on the light-receiving surfaces of CCD 18A and 18B via imaging optics 14A and 14B, respectively.” Ex. 1007 ¶ 17. “CCD 18A corresponds to the first image sensor” and “CCD 18B corresponds to the second image sensor.” *Id.* ¶ 22. “Imaging optics 14A are composed of a first lens group 19A with an imaging lens 15A and a focus lens 16A,” and “[s]imilarly, imaging optics 14B are composed of a second lens group 19B with an imaging lens 15B and a focus lens 16B.” *Id.* ¶ 19. “Lens group 19A is a wide-angle single focal length lens,” and “[l]ens group 19B is a telephoto single focal length lens.” *Id.* ¶ 20.

In operation, due to the wider shooting angle of lens group 19A in first imaging system 12A than that of lens group 19B in second imaging system 12B (*see* Ex. 1007 ¶ 20), an image captured with second imaging system 12B can be “scaled down to the same magnification (shooting angle) as” an image captured with first imaging system 12A (*id.* ¶ 49). A synthesis processing replaces the center of the image captured with first imaging system 12A with the scaled down version of the image captured with second imaging system 12B, which “improves image quality in the center of the image.” *Id.* ¶¶ 48–49. Correction data is generated and used for image data on the periphery of the scaled down image in the synthesized images, which “prevents unnaturalness from occurring at the boundary.” *Id.* ¶ 51.

2. Overview of Yu (Ex. 1005)

Yu is directed to “digital cameras [that] use multiple image sensors with multiple lenses,” and in particular, “digital color cameras that use four sensors, three for the tricolor sensing and the fourth for full-color sensing to improve the qualities of digital images therefrom.” Ex. 1005, code (57), 1:7–11. Yu describes that “[w]ith images independently from multiple sensors with multiple lenses, the complementary expansions of the respective dynamic ranges become possible.” *Id.* at 9:50–52. In an embodiment, “each of the image sensors is made responsive to a certain color region of the visible color spectrum,” and “one of the image sensors can be made to be responsive to a full range of the visible color spectrum.” *Id.* at 9:59–65. Further, Yu describes that “each of the image sensors is respectively and independently controlled to expose to the same imaging target.” *Id.* at 9:66–10:1.

3. Analysis of Independent Claim 22

a. [22.0] A method comprising:

[22.1] configuring a first optics component relative to a first image sensor to form a first channel having a first field of view (FOV) that comprises a first angular width of a scene;

[22.2] configuring a second optics component relative to a second image sensor to form a second channel having a second FOV that comprises a second angular width of the scene, wherein the first and second angular widths are different;

Petitioner asserts that Matsushima teaches the preamble [22.0] and limitations [22.1] and [22.2]. *See* Pet. 12–21. More specifically, Petitioner asserts that Matsushima teaches a control routine, and a first imaging optics 14A including a first lens group 19A forming first imaging system 12A having a first field of view comprising the shooting angle α of lens group 19A, and a second imaging optics 14B including a second lens group 19B forming second imaging system 12B having a second field of view comprising the shooting angle β of lens group 19B that is narrower than shooting angle α of lens group 19A. *See id.* (reproducing Ex. 1007, Figs. 1–3 (with Petitioner’s annotations added), Fig. 7; Ex. 1040, Fig. 4.13; citing Ex. 1003 ¶¶ 84–94; Ex. 1007 ¶¶ 14, 17, 20, 22, 62–69, claims 1, 3; Ex. 1040, 48).

Patent Owner does not address Petitioner’s showing for the preamble [22.0] and limitations [22.1] and [22.2]. *See* PO Resp. 21–60. In any event, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378. Based on the entire record developed during trial, we determine that Petitioner demonstrates by a preponderance of the evidence that Matsushima teaches or suggests the preamble [22.0] and limitations [22.1] and [22.2].

b. [22.3] independently controlling simultaneous data acquisition with each of the first and second channels during a frame; and

Petitioner's asserts that Matsushima alone and Matsushima in view of Yu renders obvious limitation [22.3]. *See* Pet. 21–34. More specifically, Petitioner asserts that Matsushima teaches controlling simultaneous data acquisition with the first and second channels during a frame based on Matsushima's disclosure that CPU 30 performs various calculations such as focus evaluation calculations and automatic exposure adjustments calculations based on image signals output from CCD 18A and CCD 18B, and controlling driving circuits 52A and 52B of imaging lenses 15A and 15B, focus lenses 16A and 16B, and apertures 17A and 17B based on these calculations. *See* Pet. 21–22 (reproducing Ex. 1007, Fig. 1 (with Petitioner's annotations added), citing Ex. 1003 ¶¶ 96–102; Ex. 1007 ¶ 31). To address “independently controlling,” Petitioner contends that Matsushima teaches “independent control of automatic exposure including independently controlling charge accumulation times of image sensors 18A and 18B.” *Id.* at 21 (citing Ex. 1003 ¶¶ 96–102; Ex. 1007 ¶ 31). To address “simultaneous data acquisition with each of the first and second channels during a frame,” Petitioner contends that Matsushima teaches “during a period of time, simultaneous data acquisition for image 62A with first imaging system 12A and data for image 62B with second imaging system 12B, ‘when the release button is fully pressed.’” *Id.* (Petitioner's alterations omitted) (citing Ex. 1003 ¶¶ 96–102; Ex. 1007 ¶ 31). According to Petitioner,

Matsushima discloses or renders obvious that images 62A and 62B are acquired by *simultaneous data acquisition with each of the first and second channels during a frame*, because Matsushima describes that image 62B is a **scaled-up** image of

the center of image 62A and therefore images 62A and 6B are captured at the same time to avoid image discrepancies due to motion or other artifacts. . . . As shown in FIGS. 2-3 . . . , Matsushima describes performing *simultaneous data acquisition* of the same subject *during a frame* where control circuits are “**driven synchronously** by timing signals” for capturing image 62A (an image frame from the first channel) and image 62B (image frame from the second channel) of **the same scene**, albeit with different FOVs.

Pet. 23–24 (reproducing Ex. 1007, Figs. 2–3 (with Petitioner’s annotations added); citing Ex. 1003 ¶ 97; Ex. 1007 ¶¶ 21, 27, claim 1). Petitioner points out that Figure 7 of Matsushima discloses “Capture images” step 102 after affirmatively determining if the “release button pressed all the way down?” in step 100. *See id.* at 24–25 (reproducing Fig. 7 (with Petitioner’s annotations added), citing Ex. 1003 ¶ 97; Ex. 1007 ¶¶ 35, 63, 64).

Patent Owner argues that Petitioner’s citation to paragraph 27 of Matsushima does not disclose simultaneous acquisition with a plurality of channels because Matsushima discloses timing signals used to control the retrieval of information from CCDs rather than the acquisition of data by each CCD. *See* PO Resp. 31 (citing Ex. 1007 ¶¶ 23, 27). In support, Patent Owner directs attention to paragraph 23 of Matsushima which discloses “[t]he accumulated signal charges are retrieved by CCD drive pulses applied by CCD drive circuits 20A and 20B, and are sequentially output from CCD 18A and CCD 18B.” *Id.* (citing Ex. 1007 ¶ 23). According to Patent Owner, “[n]ot only does Matsushima *fail* to disclose *simultaneous* data acquisition by its image sensors 18A and 18B, Matsushima points in the opposite direction by expressly disclosing that data is retrieved *sequentially* from the image sensors.” PO Sur-reply 11 (citing Ex. 1007 ¶ 23).

In Reply, Petitioner asserts that “Matsushima teaches simultaneous [data] acquisition as understood by a POSITA.” Pet. Reply 10 (citing Pet. Reply 11–13; Ex. 1069 ¶¶ 37–41, 46; *Sundance, Inc. v. DeMonte Fabricating Ltd.*, 550 F.3d 1356, 1361 n.3 (Fed. Cir. 2008)).⁹ Petitioner asserts that “data acquisition includes retrieval from the CCDs and subsequent processing, not just exposure of the CCDs.” *Id.* at 11 (emphasis omitted) (citing Pet. 25). According to Petitioner, “Matsushima’s synchronized control of retrieval from the CCDs and processing along two data capture paths discloses and renders obvious ‘simultaneous data acquisition.’” *Id.* (citing Pet. 25; Pet. Reply 3–6). Petitioner further argues that “[i]n the imaging context, ‘driven synchronously’ by a timing signal generating circuit (TG) denotes aligned frame timing between channels to capture the two channels in synchronization, which discloses and renders obvious “*simultaneous data acquisition*” from two channels during a frame.” *Id.* at 11–12 (citing Pet. 24; Ex. 1003 ¶ 97; Ex. 1069 ¶¶ 41–43).

We do not agree with Petitioner’s arguments based on retrieval of data from CCD 18A and CCD 18B. Although Matsushima’s CCD drive circuits 20A and 20B are driven synchronously by timing generator 28 (*see* Ex. 1007 ¶ 27), Matsushima discloses that “accumulated signal charges are retrieved by CCD drive pulses applied by CCD drive circuits 20A and 20B, and are *sequentially output* from CCD 18A and CCD 18B as voltage signals (analog image signals) corresponding to each signal charge” (*see* Ex. 1007 ¶ 23) (emphasis added). In other words, regardless of whether CCD drive circuits 20A and 20B are driven synchronously by timing generator 28, Matsushima discloses that voltage signals corresponding to the accumulated

⁹ Petitioner’s citation erroneously includes ¶¶ 34–36 of Exhibit 1069.

signal charges on the CCD 18A and CCD 18B are output or retrieved from CCD 18A and CCD 18B sequentially—not output at the same time or simultaneously.

Patent Owner also asserts that Matsushima does not expressly or inherently disclose that first and second imaging systems 12A and 12B operate at the same time to simultaneously acquire image data. *See* PO Resp. 28 (citing Ex. 2020 ¶ 89); *see id.* at 32 (citing Ex. 2020 ¶ 98). According to Patent Owner, “the term ‘simultaneously’ does not appear in Matsushima, and Matsushima never states that [data for] images 62A and 62B are acquired at the same time.” *Id.* at 28 (citing Ex. 2020 ¶ 87); *see id.* at 28–29 (citing Ex. 1007 ¶¶ 21, 31, claim 1; Ex. 2020 ¶¶ 87–88, 90; Pet. 21, 23–24). Patent Owner further contends that Petitioner’s reliance on block 102 in Figure 7 of Matsushima which states “Capture images” is not an express or inherent disclosure that the images are captured simultaneously. *See id.* at 32 (citing Ex. 2020 ¶ 97).

Patent Owner further challenges Petitioner’s assertion that Matsushima discloses simultaneous data acquisition because images 62A and 62B are captured at the same time to avoid discrepancies due to motion or other artifacts (*see* Pet. 23) because, according to Patent Owner, Matsushima does not “mention images involving motion or motion artifacts,” and “the images 62A, 62B as depicted in Matsushima are still images.” PO Resp. 30 (citing Ex. 2020 ¶ 91). According to Patent Owner, “even if Matsushima had disclosed that it was applicable to motion images (to be clear, it did not), that fact does not compel the conclusion that images 62A, 62B are captured at the same time.” *Id.*

Putting aside our discussion above of Matsushima’s disclosure at paragraph 27, we agree with Patent Owner that Petitioner’s citations to

Matsushima do not sufficiently disclose, teach, or suggest simultaneous or same time data acquisition for image 62A with first imaging system 12A image 62B with second imaging system 12B. *See* Ex. 1007 ¶¶ 21, 31, 35, 63–64, Figs. 1–3, 7, claim 1. Simply put, based on Matsushima’s cited disclosures, we cannot find that Matsushima discloses that the data for image 62A and the data for image 62B are acquired at the same time. *See* Pet. 30–34; Ex. 1007 ¶¶ 1, 7, 8, 14, 17, 20–26, 29, 31–35, 48–51, 62–69; Figs. 1–4, 6, 7, claims 1, 3. We give little weight to Petitioner’s expert Dr. Guidash’s testimony that Matsushima discloses, teaches, or suggests simultaneous or same time data acquisition with first imaging system 12A and second imaging system 12B because it is unsupported by a sufficient underlying factual basis in Matsushima’s disclosure. *See* 37 C.F.R. § 42.65(a); Ex. 1003 ¶ 96.

We also give little weight to Dr. Guidash’s testimony that, because Matsushima describes image 62B as a scaled-up image of the center of image 62A, Matsushima’s images 62A and 62B are captured at the same time to avoid discrepancies due to motion or other artifacts. Dr. Guidash’s testimony does not provide underlying facts to support his testimony as to avoiding discrepancies due to motion or other artifacts. Ex. 1003 ¶ 97. As pointed out by Patent Owner, Matsushima does not address images involving motion or artifacts. *See* PO Resp. 30; Ex. 1007 *generally*. Thus, Dr. Guidash’s testimony based on the avoidance of discrepancies between images due to motion or other artifacts is unsupported by a sufficient underlying factual basis. *See* 37 C.F.R. § 42.65(a); Ex. 1003 ¶ 97.

Petitioner does not present arguments that it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teachings of Matsushima to acquire data for images 62A and 62B at the

same time or simultaneously. *See* Pet. 12–37. Instead, Petitioner generally argues that Matsushima renders obvious this limitation. *See id.* at 21, 23, 30; PO Resp. 33–34 (“[T]he Petition provides no further explanation why Matsushima renders this limitation obvious.”). In the Reply for the first time, Petitioner asserts that “a POSITA would understand that Matsushima’s disclosure, including its multi-channel architecture, synchronous control of channels, and capturing two images that are scaled versions of the same scene, renders obvious simultaneous acquisition during a frame. Pet. Reply 13 (citing Ex. 1069 ¶ 49). We do not consider Petitioner’s belated argument because it exceeds the proper scope of a reply. A reply may only respond to arguments raised in the corresponding patent owner response. *See* 37 C.F.R. § 42.23. As explained in the Trial Practice Guide, “respond” “does not mean proceed in a new direction with a new approach as compared to the positions taken in a prior filing.” Trial Practice Guide at II.I. (December 2025)(citing 37 C.F.R. § 42.23).¹⁰ A reply that raises a new issue or belatedly presents evidence may not be considered. *See id.* For example, a “[p]etitioner may not submit new evidence or argument in reply that it could have presented earlier, e.g. to make out a prima facie case of unpatentability.” *Id.*

Petitioner clarifies that the Petition does not argue inherency. *See* Pet. Reply 10 n.1. Petitioner does not rely on Yu for teaching or suggesting “simultaneous data acquisition with each of the first and second channels.” *See* Pet. 30–34. Yu is instead relied on for teaching the “independently controlling” aspect of limitation [22.3]. *See id.*

¹⁰ Available at <https://www.uspto.gov/patents/ptab/trial-practice-guide>

Accordingly, based on the complete record developed during trial, the preponderance of the evidence does not support Petitioner's showing that Matsushima discloses, teaches or suggests "controlling simultaneous data acquisition with each of the first and second channels" recited in limitation [22.3] not supported by the preponderance of the evidence.

c. Summary

Based on the entire record developed during trial, Petitioner fails to establish by a preponderance of the evidence that the subject matter of claim 22 would have been obvious over the combination of Matsushima and Yu.

4. Analysis of Claim 1

Petitioner largely relies on the same analysis for limitation and [22.3] to address similar limitation [1.2.2] of claim 1. *Compare* Pet. 55–56–59, *with* Pet. 21–30. Different from limitation [22.3], limitation [1.2.2] does not recite "during a frame."

For the same reasons as those explained above addressing claim 22, based on the complete record developed during trial, Petitioner's showings based on Matsushima addressing limitation [1.2.2] are not supported by the preponderance of the evidence. Accordingly, based on the entire record developed during trial, Petitioner fails to establish by a preponderance of the evidence that the subject matter of claim 1 would have been obvious over the combination of Matsushima and Yu.

5. Analysis of Dependent Claims 2, 3, 10–12, 24, 25, 28, 30, 32, and 33

Because each challenged dependent claim incorporates the limitations of the independent claim from which it depends, the deficiency in Petitioner's showing as to claims 1 and 22 extends to their respective

dependent claims—claims 2, 3, and 10–12 (dependent from claim 1); and claims 24, 25, 28, 30, 32, and 33 (dependent from claim 22). Accordingly, based on the entire record developed during trial, Petitioner fails to establish by a preponderance of the evidence that the subject matter of claims 2, 3, 10–12, 24, 25, 28, 30, 32, and 33 would have been obvious over the combination of Matsushima and Yu.

*F. Challenge to Dependent Claims 28 and 30
over Matsushima, Yu, and Weldy*

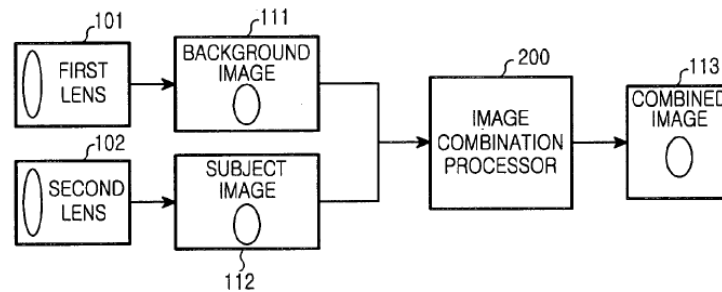
Because dependent claims 28 and 30 incorporate the limitations of claim 22, the deficiency in Petitioner’s showing as to claims 22 extends to dependent claims 28 and 30. Petitioner does not rely on the teachings of Yu and Weldy to remedy the deficiencies of Matsushima identified above in Section II.E. *See* Pet. 61–70. Accordingly, based on the entire record developed during trial, Petitioner fails to establish by a preponderance of the evidence that the subject matter of dependent claims 28 and 30 would have been obvious over the combination of Matsushima, Yu, and Weldy.

G. Challenge to Claims 22, 23, 28, and 30 over Choi, Labaziewicz, and Yu

1. Overview of Choi (Ex. 1008)

Choi is directed to “[a]n image photographing device and method for combining images with different focal lengths to an in-focus image.” Ex. 1008, code (57). In order to “present[] a distortion-free, precise image with front to back scenes brought into focus,” Choi describes “bringing both short-distance and long-distance scenes into focus without distortions using a plurality of images for the short-distance and long-distance scenes that are captured without the Auto Focus (AF) feature.” *Id.* ¶ 45; *see id.* ¶ 15.

Figure 2 is reproduced below.



As depicted in Figure 2,

the image photographing device, which does not have the AF function, is provided with a first lens 101 for capturing an image with a remote background in focus (hereinafter, referred to as background image 111), a second lens 102 for capturing the image with a nearby subject in focus (hereinafter, referred to as a subject image 112), and an image combination processor 200 for combining the two images captured at different focal lengths.

Ex. 1008 ¶ 47. In operation, background image 111 and subject image 112 are captured “at the same time through the first and second lenses 101 and 102,” and “image combination processor 200 joins the images 111 and 112 into a final combined image 113, bringing them into focus.” *Id.* ¶ 48.

2. Overview of Labaziewicz (Ex. 1010)

Labaziawicz has a filing date of February 18, 2005. Labaziewicz is directed to “a digital camera that uses multiple lenses and image sensors to provide an extended zoom range.” Ex. 1010, 1:8–10. In particular, Labaziewicz describes embodiments in which “the multiple lenses and sensors are generally aligned with respect to each other so as to be viewing substantially the same object, albeit with different fields of view.” *Id.* at 6:42–45. A control element allows for selecting among sensor outputs

and is responsive to a “user control that allows a user to select a focal length.” *Id.* at 6:61–7:4.

3. Prior Art Status of Labaziewicz

Labaziewicz qualifies as prior art based on its February 19, 2005, filing date which is before the earliest possible effective filing date of the ’180 Patent based on the July 1, 2005, filing date of the ’946 Provisional Application (Ex. 1048). As explained above in Section II.D., the ’180 Patent is not entitled to the August 25, 2004, filing date of the ’854 Provisional Application.

4. Analysis of Independent Claim 22

a. [22.0] A method comprising:

[22.1] configuring a first optics component relative to a first image sensor to form a first channel having a first field of view (FOV) that comprises a first angular width of a scene;

[22.2] configuring a second optics component relative to a second image sensor to form a second channel having a second FOV that comprises a second angular width of the scene, wherein the first and second angular widths are different;

Petitioner asserts that Choi discloses a method as recited in the preamble [22.0] based on Choi’s disclosure of an image photographing method for combining images with different focal lengths. *See* Pet. 79 (citing Ex. 1003 ¶¶ 217–218; Ex. 1008, claim 9). Petitioner contends that Choi discloses configuring a first lens 101 relative to a first image sensor for providing background image 111, and configuring second lens 102 relative to a second image sensor for providing subject image 112. *See id.* (reproducing Ex. 1008, Fig. 2; citing Ex. 1003 ¶ 220; Ex. 1008 ¶ 47), 84 (citing Ex. 1003 ¶¶ 226–229).

Petitioner further asserts that Labaziewicz describes configuring multiple channels with each channel having a different FOV measured with

different values of 35mm film equivalent focal length. *See* Pet. 79–82 (reproducing Ex. 1032, 43; citing Ex. 1003 ¶¶ 222; Ex. 1010, 11:59–66, 12:1–9; Ex. 1031, 12; Ex. 1033, 17). According to Petitioner,

a POSITA would have been motivated to apply, in Choi, Labaziewicz’s teaching of configuring channels to have different FOVs, with the benefits providing a combined image having (1) a wider scene coverage and (2) more in-focus background portions, by implementing the background image with a wider FOV, and the subject image with a narrower FOV.

Pet. 82 (citing Ex. 1003 ¶ 223; Ex. 1008 ¶ 11; Ex. 1032, 43; Pet. 73–76), *see id.* at 83–84 (reproducing Ex. 1003 ¶ 223, Example 3.1; citing Ex. 1003 ¶¶ 224–225).

Based on the entire record developed during trial, we are persuaded by a preponderance of the evidence that Petitioner provides sufficient articulated reasoning with rational underpinning to support the conclusion that it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the teachings of Choi in view of Labaziewicz in order to provide the benefits of a combined image having wider scene coverage and a more in-focus background. *See* Pet. 73–76, 82; *KSR*, 550 U.S. at 418. We find that the combination of Choi and Labaziewicz teaches the preamble and limitations [22.1] and [22.2]. *See* Pet. 79–82.

Patent Owner does not address Petitioner’s showing for the preamble [22.0] and limitations [22.1] and [22.2]. *See* PO Resp. 31. In any event, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378. Based on the entire record developed during trial, we determine that Petitioner demonstrates by a preponderance of the

evidence that the combination of Choi and Labaziewicz teaches or suggests the preamble [22.0] and limitations [22.1] and [22.2].

b. [22.3] independently controlling simultaneous data acquisition with each of the first and second channels during a frame; and

Petitioner's asserts that the combination of Choi, Labaziewicz, and Yu renders obvious limitation [22.3]. *See* Pet. 84–87 (citing Ex. 1003 ¶¶ 230–234). Petitioner asserts that Choi teaches simultaneous data acquisition with each of the first and second channels during a frame. *See* Pet. 86 (citing Ex. 1008 ¶ 69; Ex. 1003 ¶ 232); *see* Pet. 86–87 (citing Ex. 1003 ¶ 233). Petitioner asserts that Yu teaches independently controlling data acquisition with each of the first and second channels during a frame based on Yu's digital image processing circuitry 228, together with control circuits 342, 344, 346, 348 coupled to a plurality of lens 310, 312, 314, 316, and sensor pairs 302, 304, 306, 308 and Yu's teaching that the control circuits each independently and respectively control image sensors, including independent control of exposure time of each sensor. *See* Pet. 84–85 (reproducing Ex. 1005, Fig. 3 (with Petitioner's annotations added); citing Ex. 1003 ¶ 231; Ex. 1005, 6:52–65, 9:50–52, 9:66–10:2).

Petitioner asserts that

A POSITA would have been motivated to apply, in Choi's digital camera as modified with Labaziewicz, Yu's teaching of independent control of data acquisition with independent control of exposure time for each image sensor, because doing so would provide the benefits of a digital camera with improved image quality by providing for data acquisition with (1) independent control of exposure time; (2) independent control of gain control; and (3) independent control of offset control for data acquisition.

Pet. 76 (citing Ex. 1003 ¶ 212); Ex. 1005, 6:58–61, 9:50–52, 9:66–10:2); *see* Pet. 77 (reproducing Ex. 1003 ¶ 232, Example 3.2), Pet. 85–87 (reproducing Ex. 1003 ¶ 232, Example 3.2); citing Ex. 1003 ¶¶ 232–233; Ex. 1008 ¶ 69). Petitioner contends the combined teachings of Choi, Labaziewicz, and Yu would have been a combination of prior art elements according to known methods to yield the predictable result of varying sensor integration time for exposure control. *See* Pet. 77 (citing Ex. 1003 ¶ 214; *KSR*, 550 U.S. at 416). According to Petitioner, “modifying Choi’s multi-sensor multi-lens digital camera to implement, for each channel, (1) a different FOV as taught by Labaziewicz, and (2) independent control of exposure as taught by Yu would improve a similar device (Choi’s multi-sensor multi-lens digital camera) in the same way.” Pet. 77–78 (citing Ex. 1003 ¶ 215; *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1380–81 (Fed Cir. 2023)).

Patent Owner asserts that Yu fails to meet limitation [22.3] for the same reasons that Yu when combined with Matsushima does not meet limitation [22.3]. *See* PO Resp. 64 (citing Ex. 2003 ¶ 119; PO Resp. 41–42). More specifically, Patent Owner contends that “there is no evidence that integration time control in Yu is applied ‘during the frame,’ i.e., at a point between the beginning and the end of the exposure interval during which the image sensors capture an image.” *Id.* at 41 (citing Ex. 2020 ¶ 118). Patent Owner asserts that “Yu does not disclose that its integration control operates in a ‘rolling mode’ (or using a ‘rolling shutter’) where the start and stop time of the integration interval of individual rows (or scanlines) of pixels is controlled during the frame.” *Id.* (citing Ex. 2020 ¶ 118). According to Patent Owner,

Yu is directed to a digital camera that takes digital photographs (still images) with colors and details that more closely replicate

that of *film* cameras. Thus, Yu's sensor would have been expected to operate in a "snap-shot" mode (also referred to as a "global shutter") where common control signals are applied only at the confines of the frame exposure rather than during the frame, i.e., at some point between the beginning and the end of the exposure interval during which the image sensor captures a single image.

Id. at 41–42 (citing Ex. 2020 ¶ 118; PO Resp. 40–41).

We do not agree with Patent Owner's arguments because they are premised on Patent Owner's proposed claim constructions for "during a frame" and "independently controlling simultaneous data acquisition with each of the first and second channels during a frame," which we do not adopt. As explained above in Section II.A., we decline to adopt Patent Owner's proposed constructions, and further decline to adopt Patent Owner's extrapolation of its construction so as to limit "independently controlling simultaneous data acquisition with each of the first and second channels during a frame" to require the "rolling" mode and exclude the "snap shot" mode disclosed in the '180 Patent Specification. Applying the ordinary and customary meaning for "during a frame" and "independently controlling simultaneous data acquisition with each of the first and second channels during a frame," we find that the combination of Choi and Yu teaches or suggests limitation [22.3]. *See* Pet. 84–87.

Based on the entire record developed during trial, we are persuaded by a preponderance of the evidence that Petitioner provides sufficient articulated reasoning with rational underpinning to support the conclusion that it would have been obvious to one with ordinary skill in the art at the time of the invention to modify the teachings of Choi and Labaziewicz in view of Yu's teachings of independently controlling exposure time for each

image sensor in order to provide the benefit of an improved image quality.
See Pet. 76–78, 85–87; *KSR*, 550 U.S. at 418.

Based on the entire record developed during trial, we determine that Petitioner demonstrates by a preponderance of the evidence that the combination of Choi, Labaziewicz, and Yu teaches or suggests limitation [22.3].

c. [22.4] combining data received during the frame from one or more of the first and second channels to provide an image.

Petitioner asserts that the combination of Choi, Labaziewicz, and Yu renders obvious limitation [22.4]. *See* Pet. 87–88 (citing Ex. 1003 ¶¶ 235–237). More specifically, Petitioner asserts that Choi describes combining background image 111 and subject image 112 to provide combined image 113. *See id.* (reproducing Ex. 1003 ¶ 236, Example 3.2; citing Ex. 1003 ¶¶ 236–237; Ex. 1008 ¶ 47). We find that Choi teaches limitation [22.4]. *See* Pet. 87–88.

Patent Owner does not address Petitioner’s showing for limitation [22.4]. *See* PO Resp. 60–64. In any event, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378. Based on the entire record developed during trial, we determine that Petitioner demonstrates by a preponderance of the evidence that the combination of Choi, Labaziewicz, and Yu teaches or suggests limitation [22.4].

d. Summary

Based on the entire record developed during trial, Petitioner demonstrates by a preponderance of the evidence that the subject matter of

claim 22 would have been obvious over the combination of Choi, Labaziewicz, and Yu.

5. Analysis of Dependent Claims 23, 28, and 30

We have reviewed Petitioner's contentions and cited supporting evidence addressing how Choi, Labaziewicz, and Yu disclose, teach, or suggest the additional limitations of dependent claims 23, 28, and 30. *See* Pet. 88–93. Patent Owner does not substantively address the limitations of claims 23, 28, and 30. *See* PO Resp. 60–64. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware*, 800 F.3d at 1378.

Based on the entire record developed during trial, including the reasons explained above in Section II.G.4., addressing independent claim 22, we determine that Petitioner demonstrates by a preponderance of the evidence that the subject matter of dependent claims 23, 28, and 30 would have been obvious over Choi, Labaziewicz, and Yu.

III. CONCLUSION

For all of the foregoing reasons and based on the entire record developed during trial, Petitioner has demonstrated by a preponderance of the evidence that claims 22, 23, 28, and 30 are unpatentable under 35 U.S.C. § 103, but has not demonstrated by a preponderance of the evidence that claims 1–3, 10–12, 24, 25, 32, and 33 are unpatentable under 35 U.S.C. § 103. Our conclusion is summarized in the following table.

Claim(s)	35 U.S.C. §	Reference(s)/ Basis	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–3, 10–12, 22, 24, 25, 28, 30, 32, 33	103(a)	Matsushima, Yu		1–3, 10–12, 22, 24, 25, 28, 30, 32, 33
28, 30	103(a)	Matsushima, Yu, Weldy		28, 30
22, 23, 28, 30	103(a)	Choi, Labaziewicz, Yu	22, 23, 28, 30	
Overall Outcome			22, 23, 28, 30	1–3, 10–12, 24, 25, 32, 33

IV. ORDER

For the foregoing reasons, it is:

ORDERED that Petitioner demonstrates by a preponderance of the evidence that claims 22, 23, 28, and 30 of the '180 Patent are unpatentable;

ORDERED that Petitioner fails to demonstrate by a preponderance of the evidence that claims 1–3, 10–12, 24, 25, 32, and 33 of the '180 Patent are unpatentable; and

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

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