

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AVER INFORMATION INC. AND IPEVO, INC.,
Petitioner,

v.

PATHWAY INNOVATIONS AND TECHNOLOGIES, INC.,
Patent Owner.

Case IPR2017-02108
Patent 8,508,751 B1

Before JONI Y. CHANG, THOMAS L. GIANNETTI, and
NORMAN H. BEAMER, *Administrative Patent Judges*.

BEAMER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
U.S.C. § 318(a) and 37 C.F.R. § 42.73

DECISION ON MOTION TO AMEND
35 U.S.C. § 316(d) and 37 C.F.R. § 42.121

I. INTRODUCTION

On September 15, 2017, Aver Information Inc. and IPEVO, Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) pursuant to 35 U.S.C. §§ 311–319 to institute an *inter partes* review of claims 1–5, 7–10, 12–14, 16, 18, and 20 of U.S. Patent No. 8,508,751 B1 (Ex. 1001, “the ’751 patent”). On December 27, 2017, Pathway Innovations and Technologies, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we granted Petitioner’s request and instituted an *inter partes* review on claims 1–5 and 7, but not claims 8–10, 12–14, 16, 18, and 20. Paper 9 (“Institution Dec.”). Following the Supreme Court’s decision in *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348 (2018), we modified our Institution Decision to institute trial on all of the claims challenged and all of the grounds presented in the Petition. Paper 10.

Following institution, Patent Owner filed a Response to the Petition (Paper 11, “PO Resp.”) and Petitioner filed a Reply (Paper 16, “Pet. Reply”). Also, Patent Owner filed a Motion to Amend (Paper 12, “Mot. to Amend”). Petitioner filed an Opposition to the Motion (Paper 17, “Mot. Amend Opp.”), Patent Owner filed a Reply (Paper 19, “Mot. Amend Reply”), and Petitioner filed a Sur-Reply (Paper 29, “Mot. Amend Sur-Reply”).

In addition, Patent Owner filed a Motion for Observations on Cross Examination of Vijay Madisetti (Paper 20) and Petitioner filed a Response (Paper 25.) Finally, Patent Owner filed a Motion to Exclude Madisetti Declarations (Paper 23), Petitioner filed an Opposition to the Motion (Paper 26), and Patent Owner filed a Reply (Paper 28.)

During a November 27, 2018 conference held between the panel and counsel for the parties, counsel for Patent Owner confirmed that the Motion to Amend is non-contingent. Paper 27. In addition, on November 30, 2018, we ordered that the Motion to Amend is directed to “proposed substitute claims 21–25, 27–30, 32–34, and 36 set forth in [the Reply to the Motion to Amend], Appendices A and B.” Paper 27, 5. These proposed claims are intended to substitute for challenged claims 1–5, 7–10, 12–14, and 16. Mot. Amend Reply Appendix A.

An Oral Hearing was held on December 13, 2018. The Hearing Transcript (“Tr.”) is included in the record as Paper 30. Having considered the evidence of record, and for the reasons set forth below, we determine that Petitioner has failed to demonstrate by a preponderance of the evidence that claims 18 and 20 of the ’751 patent are unpatentable. In addition, for the reasons that follow, we deny the Motion to Amend as to proposed substitute claims 21–25, 27–30, 32–34, and 36. In addition, we grant the Motion to Amend to order cancellation of claims 1–5, 7–10, 12–14, and 16. We also deny the Motion to Exclude.

II. BACKGROUND

A. The ’751 Patent

The ’751 patent, titled “Capturing Real-Time Video With Zooming Capability And Scanning High Resolution Still Images Of Documents Using The Same Apparatus,” was issued on August 13, 2013, from an application that was filed on April 4, 2012. Ex. 1001 at [10], [22], [45], [54]. The ’751 patent “generally relates to document cameras . . . for both capturing real-time video with zooming capability and scanning high resolution still images.” *Id.* at col. 1, ll. 15–18. The ’751 patent describes a video camera

that acquires both real-time video and still images of, for example, a document, and provides an output video image for display of either the video image or the still image by, for example, a projector. *Id.* at Title, Abstract, col. 3, ll. 18–34. The images are captured at resolutions multiple times larger than the resolution of the output display, to preserve the quality of the image while zooming-in or zooming-out digitally in real-time using computer software. *Id.* at Abstract, col. 6, ll. 34–38.

An embodiment of the document imaging system described in the '751 patent is illustrated in Figure 3a of the patent, reproduced below.

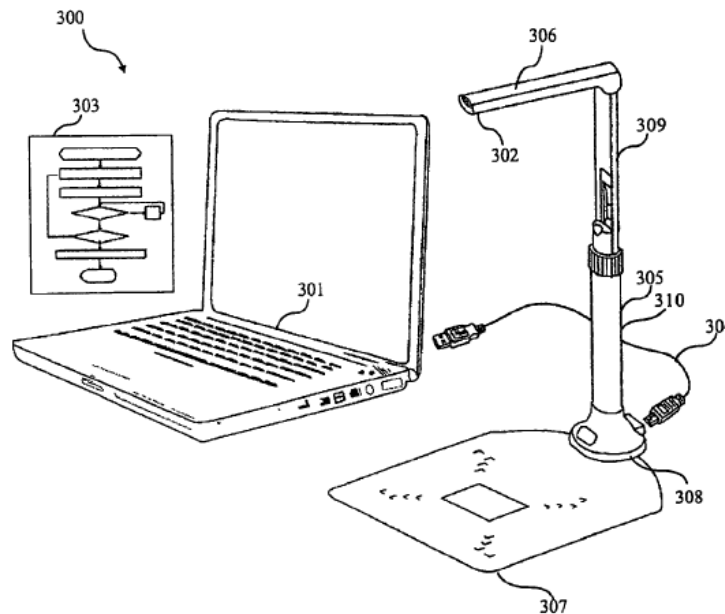


Figure 3a illustrates a document imaging system including personal computer 301 programmed with software 303, and miniaturized video camera 302 mounted so that it can capture images documents placed on surface 307. *Id.* at col. 4, l. 66–col. 5, l. 34. Not shown, but referred to as exemplary output displays, are projector and monitor displays. *See id.* at col. 3, ll. 30–34.

Figure 5 of the '751 patent, reproduced below, is a flow chart that illustrates the image processing and display steps of an exemplary embodiment.

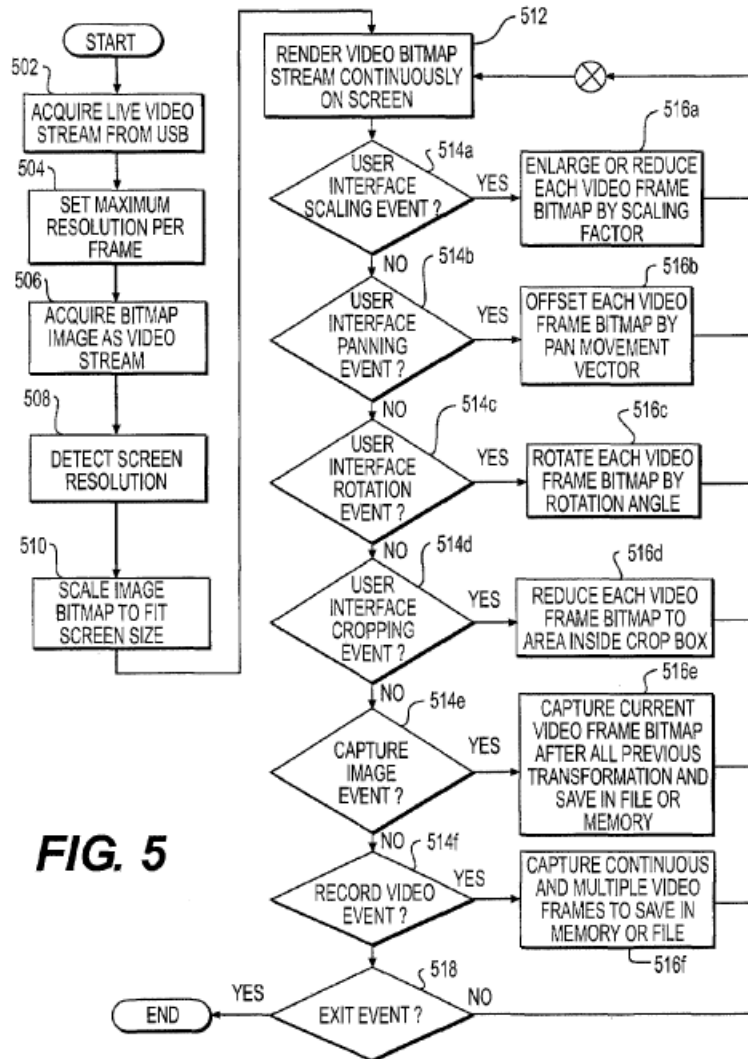


Figure 5 illustrates the acquisition at the computer of a live video stream from the camera via a USB connection, the acquisition of the video stream as a bitmap image, the scaling of the bitmap image to fit the output screen resolution, the rendering of the scaled image on the display, the various image manipulation events performed on the image in real time, including

re-sizing (*i.e.*, zooming in or out), and storage of either the real-time video image or a captured still image. *Id.* at col. 7, ll. 6–47.

The '751 patent provides an example of how an embodiment of the invention can be used:

[A] user can keep the system on a commonly used desk surface, without consuming more than approximately 10 square inches of surface area, and can put a document or a 3D object under the facing-down image sensing unit of virtually any size or shape, and be able to click one button to snap a high resolution image of the object. At the same time, the user can transport the apparatus to a classroom setting to visually present[] instructional materials through a connected projector on a large screen, with real-time video, while maintaining the ability to zoom in and out on the object.

Id. at col. 3, ll. 25–34.

The '751 patent asserts that offloading the processing of zooming functions to digital zooming software on a personal computer eliminates the need for a costly and bulky optical zoom lens assembly in the document camera, and the ability to capture both video and still images fulfills functions of both document camera systems and document scanner devices and presentation and video display devices. *Id.* at col. 7, ll. 56–59, col. 8, ll. 21–24.

B. Illustrative Claims

Challenged claim 18 is reproduced below.

18. A document imaging apparatus comprising:
 - a personal computer containing a software programming unit;
 - a miniaturized digital image sensing unit externally coupled to the personal computer comprising optics having an infinite focal length;

wherein the personal computer is configured to control all actions of the miniaturized digital image sensing unit and cause the digital imaging unit to zoom in or zoom out in real-time while maintaining a resolution of a series of real-time images;

in the case of the resolution of the series of real-time images having a higher resolution than a reference resolution, reducing the resolution of each of the series of real-time images to that of the reference resolution;

a display for displaying the images; and

a suspension arm for supporting the digital imaging unit at a distance from a target to be imaged.

Ex. 1001, col. 10, ll. 35–52.

Proposed substitute claim 21 is reproduced below, with the proposed amendments to issued claim 1 indicated by underlining and strikethroughs.

21. A method of acquiring an image of a target to provide an output video image comprising a plurality of frame images, the method comprising:

connecting a slave digital image sensing unit to a master personal processor, the master personal processor receiving a video stream comprising a series of frame images from the slave digital image sensing unit;

using the master personal processor to manipulate the video stream comprising a series of frame images, including zooming in or out without changing resolution of the video stream comprising a series of frame images;

in the case of the manipulated series of frame images having a higher resolution than a display ~~reference~~ resolution, reducing the resolution of each of the manipulated series of frame images to that of the display ~~reference~~ resolution;

displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images,

wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port; and

at the same time as receiving the video stream comprising a series of frame images, capturing a still image from the manipulated series of frame images in response to a user click of a button displayed in user interface software.

Paper 19, 18–19

C. References

In the Petition, Petitioner relies on the following references. Pet. 20.

Morichika	US 2005/0078052 A1	Pub. Apr. 14, 2005	Ex. 1002	(“Morichika”)
Krisbergh et al.	US 7,239,338 B2	Iss. July 3, 2007	Ex. 1003	(“Krisbergh”)
Hara et al.	US 2001/0012051 A1	Pub. Aug. 9, 2001	Ex. 1004	(“Hara”)
Mitsui et al.	US 7,148,911 B1	Iss. Dec. 12, 2006	Ex. 1005	(“Mitsui”)
Ishii	US 2004/0174444 A1	Pub. Sept. 9, 2004	Ex. 1006	(“Ishii”)

In opposing to the Motion to Amend, Petitioner additionally relies on the following references.¹ Mot. Amend Opp. 3–11, 16–25

Gann et al.	US 6,965,460 B1	Iss. Nov. 15, 2005	Ex. 1007	(“Gann”)
-------------	-----------------	--------------------	----------	----------

¹ Patent Owner argues Petitioner introduces new arguments in opposition to its Motion to Amend that should have been raised in the original Petition. Mot. Amend Rep. 7–8. However, we determine that the addition of the explicit requirements regarding the input of a video stream in the proposed substitute claims, as well as other additional claim limitations discussed below, justifies Petitioner’s reliance on new references and obviousness arguments.

Slatter et al.	US 6,540,415 B1	Iss. April 1, 2003	Ex. 1021	(“Slatter”)
Liang et al.	US 2009/0002548 A1	Pub. Jan. 1, 2009	Ex. 1023	(“Liang”)
Rosenberg et al.	US 6,128,006	Iss. Oct. 3, 2000	Ex. 1024	(“Rosenberg”)

In addition, both parties also rely on declaration testimony. Petitioner provides expert declarations of Dr. Vijay Madiseti. Exs. 1020, 1025 (hereafter “Madiseti Decl.” and “Madiseti 2nd Decl.,” respectively). Patent Owner relies on the expert declaration of Dr. Jeffrey J. Rodriguez. Ex. 2002 (hereafter “Rodriguez Decl.”). The record also includes deposition transcripts for these witnesses.²

D. Asserted Grounds of Unpatentability

Petitioner asserted the following grounds of unpatentability in the Petition. Pet. 20.

Claims	Reference(s)	Basis
1–5, 7, 18, and 20	Morichika	§ 103(a)
8–10, 12, 14, and 16	Krisbergh and Hara	§ 103(a)
13 and 16	Krisbergh, Hara, and Mitsui	§ 103(a)
1–5, 8, and 16	Ishii	§ 103(a)

Because claims 1–5, 7–10, 12–14, and 16 are cancelled, the only remaining original ground to be considered is obviousness of claims 18 and 20 over Morichika.

In opposition to the Motion to Amend, Petitioner asserted the following grounds of unpatentability. Mot. Amend Opp. 3–11, 16–25; Mot. Amend Sur-Reply 3–5.

² Ex. 1022 (“Rodriguez Dep.”); Ex. 2006 (“Madiseti Dep.”).

Claims	Reference(s)	Basis
21–25, 27–30, 32–34, and 36	Morichika and Liang	§ 103(a)
22–25 and 27	Morichika, Liang, and Rosenberg	§ 103(a)

Petitioner also relies on Gann and Slatter as prior art background. Mot. Amend Opp. 3–6.

E. Real Parties in Interest

Petitioner identifies AVer Information Inc., Aver Information Inc., AVer Media Technologies, Inc., IPEVO, Inc., and IPEVO, Corp. as real parties in interest in this proceeding. Pet. 1.

Patent Owner identifies only itself as a real party in interest. Paper 5, 1.

F. Related Proceedings

The parties identify the following proceedings as involving the '751 patent: (1) *In the Matter of Certain Document Cameras and Software for Use Therewith*, 337-TA-967 (USITC); (2) *In the Matter of Certain Document Cameras and Software for Use Therewith*, 337-TA-1045 (USITC); (3) *Pathway Innovations and Technologies, Inc. v. Recordex USA, Inc. et al.*, 3:15-cv-01536 (S.D. Cal.); (4) *Pathway Innovations and Technologies, Inc. v. QOMO Hite Vision, LLC*, 3:15-cv-01540 (S.D. Cal.); (5) *Pathway Innovations and Technologies, Inc. v. IPEVO, Inc.*, 3:17-cv-00312-CAB-BLM (S.D. Cal.); (6) *Pathway Innovations and Technologies, Inc. v. Aver Information Inc.*, 3:17-cv-00315-CAB-BLM (S.D. Cal.); (7) *Pathway Innovations and Technologies, Inc. v. Lumens Integration, Inc.*, 3:17-cv-00316-CAB-BLM (S.D. Cal.); (8) *Qomo Hite*

Vision, LLC v. Pathway Innovations and Technologies, Inc., IPR2016-00661 (PTAB).³ Pet. 1–2; Paper 5, 1–2.

III. CLAIM CONSTRUCTION

The Board interprets claims of an unexpired patent using the broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b) (2017)⁴; *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). The broadest reasonable construction is an interpretation that corresponds with how the inventor describes his invention in the specification, *i.e.*, an interpretation that is “consistent with the specification.” *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997) (citation and internal quotation marks omitted); *see also In re Suitco Surface Inc.*, 603 F.3d 1255, 1259–60 (Fed. Cir. 2010). An inventor may provide a meaning for a term that is different from its ordinary meaning by defining the term in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Otherwise, terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007.)

³ The IPR2016-00661 proceeding was terminated pursuant to a settlement agreement on November 18, 2016. IPR661, Paper 12.

⁴ A recent amendment to this rule does not apply here because the Petition was filed before November 13, 2018. *See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018).

The parties identify a number of claim terms for construction. Pet. 8–13; Prelim. Resp. 8–17. For purposes of this Decision, it is not necessary to resolve all of the parties’ claim construction issues — we consider certain of the parties’ issues below, as well as certain claim terms that the parties do not consider. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

A. “*a video stream comprising a series of frame images*”

Issued claims 1 and 3 require “connecting a slave digital image sensing unit to a master personal processor, the master personal processor *receiving a series of frame images* from the slave digital image sensing unit.” Ex. 1001, col. 8, ll. 49–52, col. 9, ll. 4–7 (emphasis added). In the Decision to Institute *Inter Partes* Review, we concluded this claim language encompassed capturing a series of still frame images and is not limited to capturing video frame images. Institution Dec. 9–13.

Patent Owner seeks to amend the pertinent language of substitute claims 21 and 23 to “connecting a slave digital image sensing unit to a master personal processor, the master personal processor receiving a video stream comprising a series of frame images from the slave digital image sensing unit.” Mot. Amend Reply 19. Therefore, these claims would be limited to capturing video frame images.

However, this raises the issue of the meaning of “frame images,” including the distinction to be made between “a series of frame images” in issued claims 1 and 3, and “a video stream comprising a series of frame

images” in substitute claims 21 and 23. Neither party provides any explicit guidance on this issue. Nevertheless, as confirmed by Patent Owner’s expert, there is no dispute that, broadly but reasonably construed, a single frame image of a video stream is essentially the same as a still frame image for all purposes pertinent here.⁵ Rodriguez Dep. 13:14–19, 14:6–13, 15:12–16, 16:14–20. On the other hand, taking a series of still frame images by capturing them one at a time with a still camera does not necessarily generate a video stream — at least nothing in the record suggests otherwise.⁶ At minimum, in this context, a video stream consists of a series of frame images captured automatically, whereas each still frame image is captured by a user manually clicking on a shutter button or the like. For example, the ’751 patent describes using a camera “capable of capturing real-time video at approximately 30 frames per second” Ex. 1001, col. 5, ll. 40–42. However, the ’751 patent does not limit “video” to any particular frame rate.

The ’751 patent also describes capturing a “continuous stream of frames of images.” *Id.* at col. 6, ll. 13–14. Indeed, substitute claim 28 includes the limitation, “instructing a digital image sensing unit to transmit a

⁵ As discussed further below, some compressed video formats have video frame images that refer to adjacent frame images or are otherwise distinguishable from a standard still frame image. However, nothing in the ’751 patent would limit “frame images” to such formats; instead, at least the disclosed embodiments capture “raw data” in the form of image bits directly from “electronic image sensing technologies, such as CMOS or CCD sensors,” where “[e]ach 2 mega-pixel or above frame of image is captured in one instantaneous snap shot of the entire surface area” — essentially an ordinary still frame image. Ex. 1001, col. 2, ll. 53–54, col. 6, ll. 16–18.

⁶ For example, Petitioner argues it would have been obvious to substitute the still camera of Morichika with a video camera, and does not assert such a still camera itself necessarily generates video. Pet. 20–21.

continuous stream of video frames at a constant rate” Mot. Amend Reply 21. On the other hand, neither of substitute claims 21 or 23 includes the requirement that the video be captured continuously at a constant rate. Therefore, we conclude that the broadest reasonable construction of a “video stream comprising a series of frame images” is a series of frame images captured automatically, but not necessarily continuously at a constant rate. *See Env'tl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 699 (Fed. Cir. 1983) (“It is improper . . . to read into an independent claim a limitation explicitly set forth in another claim.”).

B. “in the case of...”

The phrase “in the case of” appears in issued independent method claims 1 and 3, and corresponding substitute method claims 21 and 23. As Petitioner points out, the Board has issued a precedential opinion holding that the broadest reasonable interpretation of a method claim that has claim limitations including conditions precedent encompasses those instances where the condition is not met. Pet. 10; *Ex parte Schulhauser*, Appeal No. 2013-007847, 2016 WL 6277792, at *3–5 (PTAB Apr. 28, 2016) (precedential); *see also Teradata Operations, Inc. v. Realtime Data LLC*, IPR2017-00557, 2018 WL 3155819, at *8 (PTAB June 25, 2018) (holding *Schulhauser* applies to an *inter partes* review). Thus, prior art that teaches or suggests a process in which the condition precedent is not triggered, but includes the remaining limitations (*i.e.*, the limitations not subject to the conditions precedent), may render the claim obvious. Patent Owner does not dispute this interpretation. PO Resp. 6.

C. “optics having an infinite focal length”

Claim 18 requires “a miniaturized digital image sensing unit externally coupled to the personal computer comprising *optics having an infinite focal length*.” Ex. 1001, col. 10, ll. 38–40 (emphasis added). Petitioner originally proposed construing “infinite focal length” as “focal length ensuring objects appearing under the facing down digital image sensing unit appear focused and sharp even when the digital image sensing unit is substantially far away.” Pet. 11. However, Petitioner no longer supports this construction, but rather, concedes that “[t]he Board correctly decided that the appropriate construction of this term [is] based on its plain meaning.” Pet. Reply 12 (referring to Institution Dec. 14). Patent Owner proposes construing the phrase as “optics having a focal range ensuring objects appear focused even when located one meter or more away from the digital image sensing unit.” PO Resp. 6.

We remain unconvinced that Patent Owner’s proposed construction is consistent with the plain and ordinary meaning. *See Translogic Tech.*, 504 F.3d at 1257 (noting that claim terms are generally given their ordinary and customary meaning). As Patent Owner admits, the ordinary meaning of “optics having an infinite focal length” is optics where the focus of parallel incoming rays is an infinite distance from the optics — for example, in theory a perfectly flat piece of glass has an infinite focal length. Prelim. Resp. 15–16.

Patent Owner relies on the statement in the ’751 patent:

The depth of field of the DISU **302** lens however has a wide range of above 100 cm, ensuring objects appearing under the facing-down DISU **302** appear focused and sharp even when the DISU is substantially far away.

Ex. 1001, col. 5, ll. 45–48; see PO Resp. 14. However, this discussion of depth of field bears no relationship to the meaning of “infinite focal length.” Moreover, the ’751 patent specifically refers to an embodiment with “an infinite focal length digital camera,” and “optics having an infinite focal length.”⁷ *Id.* at col. 7, l. 62, col. 4, l. 29.

Therefore, we conclude that the construction of “optics having an infinite focal length” is “optics where the focus of parallel incoming rays is at an infinite distance from the optics,” consistent with the plain and ordinary meaning of the term. *See also* Ex. 1014, 38.

D. “a non-transitory medium”

Substitute claim 28 includes the requirement “storing the display resolution in a non-transitory medium.” Mot. Amend Reply 21. The ’751 patent at one point describes digital information being stored in “a non-transitory storage medium,” and at another point in “a file or memory.” Ex. 1001, Fig. 5, col. 4, ll. 33–36, col. 7, ll. 35–38. Therefore, we conclude that the construction of “storing the display resolution in a non-transitory medium” encompasses storing the display resolution in a file, such as a file on a disk drive, or a memory, including a random access memory (RAM).

E. “zooming in or out without changing resolution of the video stream comprising a series of frame images”

⁷ Patent Owner asserts, “this refers to the ability to focus at infinity, as is understood in the context of photography, especially given the use of the claim term ‘camera.’” PO Resp. 14. There is no support for this in the record, and the fact that a camera can focus at infinity, or at some other distance, is not the same optical property as either depth of field or focal length.

Substitute claims 21 and 23 require “using the master personal processor to manipulate the series of frame images, including zooming in or out without changing resolution of the video stream comprising a series of frame images.” Mot. Amend Reply 19, 20. The antecedent to the “video stream comprising a series of frame images” is the video stream received by the processor from the image sensing unit. *Id.* at 19. This requirement relates to the purported advance of the ’751 patent — offloading the processing of zooming functions to digital zooming software on a personal computer rather than performing zooming functions in the digital camera. Ex. 1001, col. 7, ll. 56–59. Thus, the “image sensing unit” (*i.e.*, the camera) provides a video stream of a given resolution (preferably a higher resolution than that of the display screen), with the magnification and scaling functions confined to the separate processor. *Id.* at col. 6, ll. 20–26.

Thus, we conclude “zooming in or out without changing resolution of the video stream comprising a series of frame images” means zooming in or out without changing resolution of the video stream received from the slave digital image sensing unit. *See* Ex. 1014, 25.

IV. OBVIOUSNESS OF CLAIMS 18 AND 20 OVER MORICHKA

Petitioner’s sole remaining original ground challenges issued claims 18 and 20 as obvious over Morichika. Pet. 20–44.

A. Obviousness – In General

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 said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007).

The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results (“the *Graham* factors”).⁸ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966)

If the claimed subject matter cannot be fairly characterized as involving the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement, a holding of obviousness can be based on a showing that “there was an apparent reason to combine the known elements in the fashion claimed.” *KSR*, 550 U.S. at 418. Such a showing requires “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *Id.* (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

“[A] combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416. “[I]n many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle. . . . A person of ordinary skill is also a person of ordinary creativity, not an automaton.” *Id.* at 420–421.

“The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference. . . . Rather, the test is what the combined teachings of those

⁸ Patent Owner did not present evidence on the fourth *Graham* factor. We therefore do not consider that factor in this decision.

references would have suggested to those of ordinary skill in the art.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). “Combining the teachings of references does not involve an ability to combine their specific structures.” *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973).

B. Level of Skill

Petitioner submits that a person of ordinary skill in the art of the ’751 Patent as of January 28, 2010 (the earliest possible priority date of the ’751 Patent) would have had a bachelor of science degree in electrical engineering, mathematics, or physics with computer science coursework, or equivalent experience, and at least one year of direct technical experience in capturing real-time video with zooming capability via a portable document camera. Pet. 7 (citing Madisetti Decl. ¶¶ 15–16). Patent Owner agrees with this formulation. PO Resp. 5–6 (citing Rodriguez Decl. ¶ 23). Patent Owner’s expert elaborated on this formulation, testifying that “capturing real-time video” means “capturing video with sufficient processing capability that the capturing could keep up with the incoming frame rate.” Rodriguez Dep. 36:13–17. We find this formulation, including the expert’s elaboration, supported by the record and adopt it.

C. The Morichika Reference

Morichika, titled “Display Image Generating Device Comprising Converting Function Of Resolution,” was filed October 13, 2004, issued April 14, 2005. Ex. 1002 at [22], [43], [54]. Morichika discloses a document camera system in which the camera captures a still frame image at a high resolution and projects the image at a lower resolution, such that the projected image quality is maintained when a portion of the document is projected as a magnified image. *Id.* at Abstract, ¶ 64.

Figure 1 of Morichika, reproduced below, illustrates the components of the document camera system.

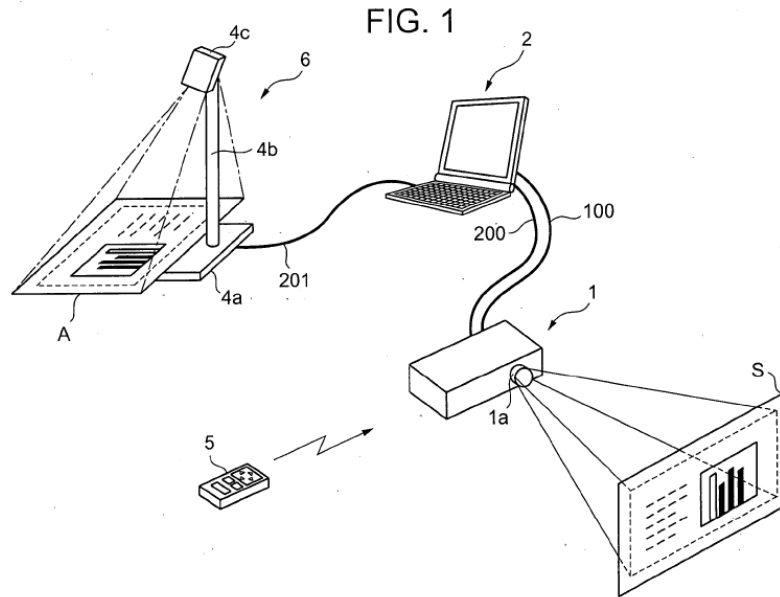


Figure 1 illustrates a “photographed image projection system” including a projector 1, and a personal computer 2 connected to a still camera 4 via a USB cable. Ex. 1002 ¶¶ 17, 28–32. The captured still frame image is sent to the computer via the USB cable, converted to a standard video signal, and sent to the projector via an RGB cable. *Id.* ¶¶ 32, 38–39.

In an illustrative embodiment, the camera captures the still frame image at a resolution of 1,500 x 2,000 pixels (*i.e.*, for a total of 3 megapixels), and the video image is projected at “XGA” resolution, which is 768 x 1,024 pixels (*i.e.*, 786,482 pixels). *Id.* ¶¶ 52, 58, 61–62. When a full size image is projected, the resolution of the captured image is scaled down to the projector resolution. *Id.* at Figs. 7, 8, 9A–9C, ¶¶ 51–57. When an image is magnified — for example, by a factor of 1.25 — only the appropriate portion of the captured image is scaled down to the projector resolution — for example, in the case of 1.25 magnification, a 1,200 x 1,600

pixel portion of the original is scaled down to the display resolution. *Id.* at Figs. 10, 11A–11C, ¶¶ 58–62. This approach preserves image quality during magnification, in contrast to approaches where the captured resolution is the same as or less than the projected resolution. *Id.* ¶¶ 8, 64

D. Claims 18 and 20

In the '751 patent, the preamble of claim 18 calls for a “document imaging apparatus.” The first limitation calls for “a personal computer containing a software programming unit.” As discussed above, Morichika is a “document imaging apparatus” that includes a “personal computer containing a software programming unit,” thus satisfying the requirements of the preamble and first limitation of claim 18. Madisetti Decl. ¶¶ 99–100; Ex. 1001, col. 10, ll. 35–37; Pet. 37–38; Ex. 1002, Fig. 1, ¶ 38.

The second limitation of claim 18 requires “a miniaturized digital image sensing unit externally coupled to the personal computer comprising optics *having an infinite focal length.*” Ex. 1001, col. 10, ll. 38–40 (emphasis added). Petitioner asserts the digital camera of Morichika is a “miniaturized digital image sensing unit.” Pet. 38; Ex. 1002, Fig. 1, element 4c, ¶ 44. However, we are not persuaded that the infinite focal length requirement is met by the optics disclosed in Morichika, or indeed, could be met by any conventional camera optics, as opposed to a flat piece of glass. As discussed above, “optics having an infinite focal length” refers to optics in which parallel incoming rays focus at infinity. Optics such as that disclosed by Morichika do not have infinite focal length. Petitioner’s construction of this phrase, discussed above, is based on the depth of field discussion in the Specification. Pet. 38; Ex. 1001, col. 5, ll. 45–47. The Board rejected this construction and subsequently, Petitioner’s Reply

conceded, “The Board correctly decided . . . the appropriate construction of this term based on its plain meaning.” Pet. Reply 12.

Petitioner presents an alternative argument, consistent with the Board’s construction of “infinite focal length,” that “it would have been obvious to rely on the well-known use of a piece of flat glass as a protective element over the lens/sensor array of the device of Morichika.” Pet. 38–39. We are unconvinced by this argument. The claim requires “optics having an infinite focal length.” Placing a protective surface over optics that have a finite focal length does not satisfy this limitation. Morichika discloses optics that focuses the image on a CCD array, and thus has a finite focal length. Ex. 1002, ¶ 44. In sum, we are directed to nothing in Morichika that teaches or suggests using optics having an infinite focal length.

The third limitation of claim 18 requires, “wherein the personal computer is configured to control all actions of the miniaturized digital image sensing unit and cause the digital imaging unit to zoom in or zoom out in real-time while maintaining a resolution of a series of real-time images.” Ex. 1001, col. 10, ll. 41–45. In Morichika, the digital imaging unit does not perform the zooming functions — those functions are performed by the CPU in the PC. Ex. 1002, ¶ 58. Petitioner provides no support to establish that Morichika teaches or suggests performing zooming in the camera.⁹ Morichika, therefore, does not meet the portion of this limitation requiring “the digital imaging unit to zoom in or zoom out.”

⁹ Indeed, the ’751 patent also does not disclose performing zooming in the camera — rather, it specifically refers to the disadvantages of that approach. Ex. 1001, col. 7, ll. 56–59. Patent Owner describes this advantageous approach of the ’751 patent as “offloading zooming and other video processing functions from the [camera] to the PC.” PO Resp. 4.

However, we are persuaded that Morichika does teach or suggest the latter portion of the third limitation: “zoom in or zoom out in real-time while maintaining a resolution of a series of real-time images.” As discussed above, Morichika discloses real-time zooming, and the output images of Morichika are in the form of a series of video real-time images, the resolution of which is maintained to match the resolution of the output display. Ex. 1002, Figs. 10, 11A–C, ¶¶ 39, 40, 58–65.

Patent Owner disputes that Morichika teaches or suggests this requirement of maintaining a resolution of a series of real-time images, because Morichika uses a still camera rather than a video camera. PO Resp. 24. However (unlike issued claims 1 and 3, or substitute claims 21 and 23), claim 18 does not specify whether the “series of real-time images” referred to are the images originally captured, images that are output to the display, or images being processed within the system. Because Morichika converts still frame images to real-time video, including processing the real-time video frame images, outputs the real-time video frame images to the display, and maintains those frame images to match the display resolution, we find that it satisfies this requirement of claim 18. Madisetti Decl. ¶ 97; *see also* Ex. 1014, 25. Patent Owner’s arguments regarding Petitioner’s alleged failure to show that it would have been obvious to adapt Morichika to use a video camera focus only on the nature of the input images, and therefore are unpersuasive as directed to claim 18.

The fourth limitation of claim 18 requires, “in the case of the resolution of the series of real-time images having a higher resolution than a reference resolution, reducing the resolution of each of the series of real-time images to that of the reference resolution.” Ex. 1001, col. 10, ll. 46–49.

As discussed above, given that the display resolution can be considered a “reference resolution,” we find that Morichika discloses this aspect of the claim. Madisetti Decl. ¶ 110; Ex. 1002, Figs. 10, 11A–C, ¶¶ 58–62.

The fifth and sixth limitations of claim 18 require “a display for displaying the images,” and “a suspension arm for supporting the digital imaging unit at a distance from a target to be imaged.” Ex. 1001, col. 10, ll. 50–52. We find that Morichika discloses these limitations. Madisetti Decl. ¶¶ 111–113; Ex. 1002, Fig. 1.

In sum, although Morichika discloses some of the limitations of claim 18, Petitioner has not shown that Morichika teaches or suggests the claim 18 limitations “optics having an infinite focal length” and “caus[ing] the digital imaging unit to Zoom in or Zoom out.” We therefore determine that Petitioner has not demonstrated by a preponderance of the evidence that claim 18 would have been obvious over Morichika.

Claim 20, which depends from claim 18, additionally requires “wherein the processor is housed in an external personal computing system.” Ex. 1001, col. 10, ll. 56–57. We find that Morichika discloses this limitation. Madisetti Decl. ¶ 115; Ex. 1002, Fig. 1, ¶ 38. Nonetheless, based on the above analysis of claim 18, we determine that Petitioner also has not demonstrated by a preponderance of the evidence that dependent claim 20 would have been obvious over Morichika.

V. MOTION TO AMEND

Patent Owner’s non-contingent Motion to Amend cancels challenged issued claims 1–5, 7–10, 12–14, and 16, and seeks to substitute new claims 21–25, 27–30, 32–34, and 36, respectively.¹⁰ Paper 27.

The currently proposed substitute claims are set forth in Patent Owner’s Reply to the Opposition to the Motion to Amend. Mot. Amend Reply Appendix A.¹¹

A. The Applicable Law

In an *inter partes* review, amended claims are not added to a patent as of right, but rather must be proposed as a part of a motion to amend. 35 U.S.C. § 316(d). The Board must assess the patentability of proposed substitute claims “without placing the burden of persuasion on the patent owner.” *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc); see “Guidance on Motions to Amend in view of *Aqua Products*”

¹⁰ Certain procedural issues regarding Patent Owner’s Motion were resolved by our November 30, 2018 Order Conduct of the Proceedings. Paper 27.

¹¹ The numbering of the proposed substitute claims is different in the Motion to Amend as compared to Appendix A of the Reply to the Opposition to the Motion to Amend, and the latter includes additional claims:

Motion To Amend	Reply Appendix A	Motion To Amend	Reply Appendix A
21	21	--	29
22	22	26	30
23	23	27	32
--	24	28	33
24	25	29	34
--	27	30	36
25	28		

(Nov. 21, 2017) (https://www.uspto.gov/sites/default/files/documents/guidance_on_motions_to_amend_11_2017.pdf) (“Guidance”). Subsequent to the issuance of *Aqua Products* and the Board’s Guidance, the Federal Circuit issued a decision in *Bosch Automotive Service Solutions, LLC v. Matal*, 878 F.3d 1027 (Fed. Cir. 2017) (“*Bosch*”), as well as a follow-up Order amending that decision on rehearing. *See Bosch Auto. Serv. Sols., LLC v. Iancu*, Order on Petition for Panel Rehearing, No. 2015-1928 (Fed. Cir. Mar. 15, 2018).

In accordance with *Aqua Products*, the Board’s Memorandum, and *Bosch*, Patent Owner does not bear the burden of persuasion to demonstrate the patentability of the substitute claims presented in the motion to amend. Rather, ordinarily, “the petitioner bears the burden of proving that the proposed amended claims are unpatentable by a preponderance of the evidence.” *Bosch*, 878 F.3d at 1040 (as amended on rehearing). The Board itself also may justify any finding of unpatentability by reference to evidence of record in the proceeding. *Id.* (citing *Aqua Products*, 872 F.3d at 1311 (O’Malley, J.)). Thus, the Board determines whether substitute claims are unpatentable by a preponderance of the evidence based on the entirety of the record, including any opposition made by the Petitioner.

Notwithstanding the foregoing, Patent Owner’s proposed substitute claims must meet the statutory requirements of 35 U.S.C. § 316(d) and the procedural requirements of 37 C.F.R. § 42.121. *Western Digital Corp. v. SPEX Techs., Inc.*, IPR2018-00082, 2018 WL 1989599, at *2 (PTAB Apr. 25, 2018). Accordingly, Patent Owner must demonstrate: (1) the amendment proposes a reasonable number of substitute claims; (2) the proposed claims are supported in the original disclosure; (3) the amendment

responds to a ground of unpatentability involved in the trial; and (4) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121.

B. Predicate Requirements

1. Reasonable Number of Substitute Claims

By statute, in a motion to amend, a patent owner may propose a reasonable number of substitute claims for each challenged claim. 35 U.S.C. § 316(d)(1)(B). There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim. 37 C.F.R. § 42.121(a)(3). Patent Owner proposes a single substitute claim for each cancelled claim, and therefore meets this requirement. Mot. Amend Reply Appendix A.

2. Support in the Original Disclosure

A motion to amend may not present substitute claims that introduce new subject matter. 35 U.S.C. § 316(d); 37 C.F.R. § 41.121(a)(2)(ii). New matter is any addition to the claims without support in the original disclosure. *See TurboCare Div. of Demag Delaval Turbomach. v. Gen. Elec. Co.*, 264 F.3d 1111, 1118 (Fed. Cir. 2001) (“When [an] applicant adds a claim . . . the new claim[] . . . must find support in the original specification.”). As required, Patent Owner has identified written description support in the originally filed disclosure of the subject patent for each proposed substitute claim. Mot. to Amend 4–12. Petitioner does not assert lack of support for the amended claims.

Focusing on the amended portion of the claims, substitute independent claims 21 and 23 amend issued claims 1 and 3 to require, “connecting a slave digital image sensing unit to a master personal processor, the master

personal processor receiving a video stream comprising a series of frame images from the slave digital image sensing unit,” with corresponding conforming changes to the remainder of those claims as well as claims depending from those claims. Mot. Amend Reply 19–21. Also, substitute independent claim 28 amends issued claim 8 to add “instructing a digital image sensing unit to transmit a continuous stream of video frames at a constant rate and at a maximum resolution of the digital image sensing unit,” also with corresponding conforming changes to the claim and its dependent claims. Mot. Amend Reply 21–23. These amendments (hereafter referred to as “the video amendments”) are supported by the disclosure throughout the original ’751 application of a video camera “capable of capturing real-time video at approximately 30 frames per second with High Definition (HD) resolution” that supplies video to the rest of the system. Ex. 2004, 7:18–20; Mot. to Amend 9–11.

In addition, issued claims 1, 3 and 8 refer to a “reference resolution,” but corresponding substitute claims 21, 23, and 28 instead refer to a “display resolution.” Mot. Amend Reply 19–21. These amendments (hereafter referred to as “the display amendments”) are supported by the disclosure in the original ’751 application of “determining a reference resolution for providing output frame images, and displaying and/or storing the manipulated series of frame images as the output video image.” Ex. 2004, 4:30–32; Mot. to Amend 9–11. Thus, as further discussed below, the reference resolution of the issued claims encompassed both a storage resolution and a display resolution, whereas the amended claims are limited to the latter.

Substitute claims 21 and 23 further amend issued claims 1 and 3 to require “at the same time as receiving the video stream comprising a series of frame images, capturing a still image from the manipulated series of frame images in response to a user click of a button displayed in user interface software.” Mot. Amend Reply 19–21. This amendment (hereafter referred to as “the still capture amendment”) is supported by the disclosure in the original ’751 application of “capturing high resolution still images of documents with one click ‘scan’ processing.” Ex. 2004, 4:11–12; Mot. to Amend 9–10.

Substitute dependent claim 22 and independent claim 23 amend issued claims 2 and 3 to require the image manipulation to be “controlled by the user through a mouse wheel.” Mot. Amend Reply 19–20. This amendment (hereafter referred to as “the mouse wheel amendment”) is supported by the disclosure in the original ’751 application of “using the mouse wheel to enlarge or shrink image sizes.” Ex. 2004, 8:25–26; Mot. to Amend 9–10.

Substitute claim 28 amends issued claim 8 to require, “capturing a ~~video image comprising the~~ continuous stream of video frames ~~series of frame images, wherein each video frame is captured~~ in one instantaneous snapshot of a subject’s entire surface area without line-by-line scanning.” Mot. Amend Reply 21. This amendment (hereafter referred to as “the instantaneous snapshot amendment”) is supported by the disclosure in the original ’751 application by the statement, “[e]ach 2 mega-pixel or above frame of image is captured in one instantaneous snapshot of the entire surface area, without the need of line by line scanning.” Ex. 2004, 8:16–18; Mot. to Amend 11.

Substitute claim 28 adds the requirement, “wherein the digital image sensing unit is removably connected to the external processor via a processor port and USB cable.” Mot. Amend Reply 22. This amendment (hereafter referred to as “the USB cable amendment”) is supported by the disclosure in the original ’751 application, “[t]he [Digital Image Sensing Unit] **302** communicates with the [Software Programming Unit] **303** residing in a PC **301** via a high speed digital connection (named as USB for illustration purpose) **304**, such as USB 2.0, USB 3.0, FireWire/IEEE 1394 400 or IEEE 1394 800.” Ex. 2004, 6:34–7:1; Mot. to Amend 11.

Finally, substitute claim 27 amends issued claim 7 to change the requirement that the resolution of the “output frame images” be unchanged, to a requirement that the resolution of the “video stream comprising a series of frame images” be unchanged. Mot. Amend Reply 21. This amendment is duplicative of the second limitation of claim 23, which was originally present in claim 3. Mot. Amend Reply 20; Ex. 1001, col. 9, ll. 10–11.

3. Responding to a Ground of Unpatentability

37 C.F.R. § 42.121(a)(2)(i) states that “[a] motion to amend may be denied where . . . [t]he amendment does not respond to a ground of unpatentability involved in the trial.” In considering the motion, the entirety of the record is reviewed to determine whether a patent owner’s amendments respond to a ground of unpatentability involved in the trial. Once a proposed claim includes amendments to address a prior art ground in the trial, a patent owner also may include additional limitations to address, for example, Section 112 issues, if necessary. *Western Digital*, 2018 WL 1989599, at *2.

We determine that the above discussed video amendments for claims 21 and 23 meet this requirement. They respond to Petitioner's reliance on Morichika, which discloses processing of still frame images rather than video frame images. Mot. to Amend 14–16. The still capture amendment of claims 21 and 23, and the mouse wheel amendment of claims 22 and 23, also respond to Petitioner's reliance on Morichika, as well as Ishii. Mot. to Amend 16–17, 21. The USB cable amendment of claim 28 responds to Petitioner's original reliance on Krisbergh and Hara. Mot. to Amend 17–18.

Petitioner argues the instantaneous snapshot amendment to substitute claim 28 does not meet this requirement. Mot. Amend Opp. 15 n. 5. Patent Owner argues the instantaneous snapshot amendment distinguishes the Krisbergh, Hara, and Ishii references, and also proposes this amendment to address potential Section 112 issues previously raised regarding issued claim 8. Mot. to Amend 2, 20–21. Given that Patent Owner has also proposed the USB amendment to this claim, which is responsive to unpatentability grounds, at least the Section 112 basis for the instantaneous snapshot amendment is in compliance with this requirement. *Western Digital*, 2018 WL 1989599, at *2.

The remaining amendments, although not responsive to a ground of unpatentability, are permitted given Patent Owner has also proposed amendments to these claims that are responsive to unpatentability grounds.¹² *Western Digital*, 2018 WL 1989599, at *2.

¹² In particular, the video amendments to substitute claim 28 do not respond to a ground of unpatentability, given issued claim 8 is already directed to “capturing a video image.” Ex. 1001, col. 9, l. 53. Nor is there any unpatentability ground to account for the display amendments of substitute claims 21, 23, and 28. Patent Owner provides no other explanation for why

4. *Not Enlarging the Scope of the Claims*

As stated in 35 U.S.C. § 316(d)(3), an “amendment . . . may not enlarge the scope of the claims of the patent.” *See also* 37 C.F.R. § 42.121(a)(2)(ii) (“A motion to amend may be denied where . . . [t]he amendment seeks to enlarge the scope of the claims of the patent.”). “A new claim enlarges if it includes within its scope any subject matter that would not have infringed the original patent.” *Thermalloy, Inc. v. Aavid Eng’g, Inc.*, 121 F.3d 691, 692 (Fed. Cir. 1997).

Petitioner argues the instantaneous snapshot amendment and the display amendments enlarge the scope of claim 28. Mot. Amend Opp. 14–16; Mot. Amend Sur-Reply 1–3. Petitioner summarizes its argument regarding the display amendments:

The genus “resolution” includes various species, including “reference resolution” and “display resolution.” Dr. Madisetti explained that there are circumstances where a “display resolution” is something different from a “reference resolution,” meaning that subject matter not previously captured as a “reference resolution” would nonetheless be captured as a “display resolution.”

Mot. Amend Sur-Reply 1. On review of the record, we are unpersuaded that there is subject matter that would be captured as a “display resolution,” but not captured as a “reference resolution.” As Patent Owner correctly argues:

Simple logic dictates that going from a “reference resolution” covering multiple possibilities (e.g., storage, display, or second) to a “display resolution” with only one possibility (i.e., just display) necessarily narrows the scope of the substitute claims vis-à-vis the challenged claims If the original term can be construed as

these amendments are proposed. Also, the amendment of claim 27, which changes the focus from the output images to the input images, is not responsive to any ground of unpatentability.

display resolution, storage resolution, etc. and it is replaced with a term specifying just one of those resolutions, the proposed new claim is necessarily narrower, not greater in scope.

Mot. Amend Reply 5–6. Put another way, if an apparatus or system has a display, and if the display resolution is used as the “reference resolution” in accord with the issued claims, then it would also be encompassed as the “display resolution” under the substitute claims. If that apparatus or system, even if it had a display, used a storage or some other resolution as the “reference resolution,” it would be encompassed under the issued claims but not under the substitute claims. Thus, the display amendments narrow, rather than enlarge, the scope of the claims.

Regarding the instantaneous snapshot amendment, Petitioner argues it improperly enlarges the scope of substitute claim 28 because it broadly covers a scenario where a plurality of images are captured over a non-instantaneous period of time, whereas the issued Claim 8 more narrowly requires capturing a plurality of images instantaneously. Mot. Amend Opp. 16. In response, Patent Owner argues, “[g]oing from an indefinite scope (where the Board was ‘unable to determine the proper scope of claim 8 without speculation’) to a definite scope (without speculation) is a narrowing amendment, not a broadening one.” Mot. Amend Reply 6, *quoting* Institution Dec. 15.

We determine Patent Owner has not met its burden on this predicate requirement. Issued claim 8 requires, “capturing a video image comprising the series of frame images in one instantaneous snapshot” Ex. 1001, col. 9, ll. 53–54. Substitute claim 28 instead requires, “capturing the continuous stream of video frames, wherein each video frame is captured in one instantaneous snapshot.” Mot. Amend Reply 21. Notably, substitute

claim 28 eliminates the requirement that all the video frames must be captured instantaneously. Therefore, the instantaneous snapshot amendment enlarges the scope of issued claim 8, because an apparatus or system that captures a single video frame simultaneously would fall within the scope of substitute claim 28, but not issued claim 8. Accordingly, the instantaneous snapshot amendment does not satisfy the predicate requirements of a Motion to Amend.¹³

5. Summary

In sum, we determine that Patent Owner has satisfied the predicate requirements for considering a motion to amend as to substitute claims 21–25 and 27, but not claims 28–30, 32–34, and 36.

¹³ As stated in *Lectrosonics v. Zaxcom* IPR2018-01129 (Paper 15), a substitute claim satisfies the requirement to not enlarge the scope of the claims if it is narrower than at least one of the issued claims. If any amended claim contains within its scope any conceivable product or process which would not have infringed the patent, then that claim would be broader than the patent claims. *Tillotson, Ltd. v. Walbro Corp.*, 831 F.2d 1033, 1037 n.2 (Fed. Cir. 1987). Because claim 28 is broader than claim 8, it is also broader than the issued claims that depend from claim 8 — *i.e.*, claims 9–17. Claim 28 is also broader than the other issued claims 1–7 and 18–20 because each of those claims requires “zooming” and a “slave digital image sensing unit,” directly or by dependency, which claim 28 does not. Ex. 1001, 8:46–10:57. Likewise, substitute claims 29, 32–34, and 36, which depend from claim 28, and which do not require zooming or a slave digital image sensing unit, and substitute claim 30, which depends from claim 28, and does not require a slave digital image sensing unit, are broader than any issued claim.

*C. Obviousness of Substitute Claims 21, 28–30, 32–34, and 36 over Morichika and Liang*¹⁴

Petitioner argues claims 21, 28–30, 32–34, and 36 would have been obvious over the combination of Morichika and Liang, as informed by Gann and Slatter as background prior art.¹⁵ Mot. Amend Opp. 2–11, 16–25; Mot. Amend Sur-Reply 4–5. In analyzing Petitioner’s obviousness arguments, we refer to the foregoing discussions of claim construction, the applicable law of obviousness, the level of skill in the art, and the disclosures of the Morichika reference, as well as the following.

1. The Gann, Slatter, and Liang References

Gann, titled “Method And System For Scanning An Image Using A Look-Down Linear Array Scanner,” was filed August 8, 2000, issued November 15, 2005. Ex. 1007 at [22], [45], [54]. Figure 3 of Gann is reproduced below.

¹⁴ Petitioner also argues claims 22–25 and 27 would have been obvious over Morichika and Liang. Mot. Amend Opp. 21–23. However, we consider those claims below under Petitioner’s alternative argument that those claims would have been obvious over Morichika, Liang, and Rosenberg.

¹⁵ See *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013) (explaining that background prior art is “perhaps the most reliable” evidence of “common knowledge and common sense” in the obviousness inquiry). Petitioner’s opposition also relies on arguments originally developed in the Petition and the Madisetti Declarations. Mot. Amend Opp. 17–18, 22–23.

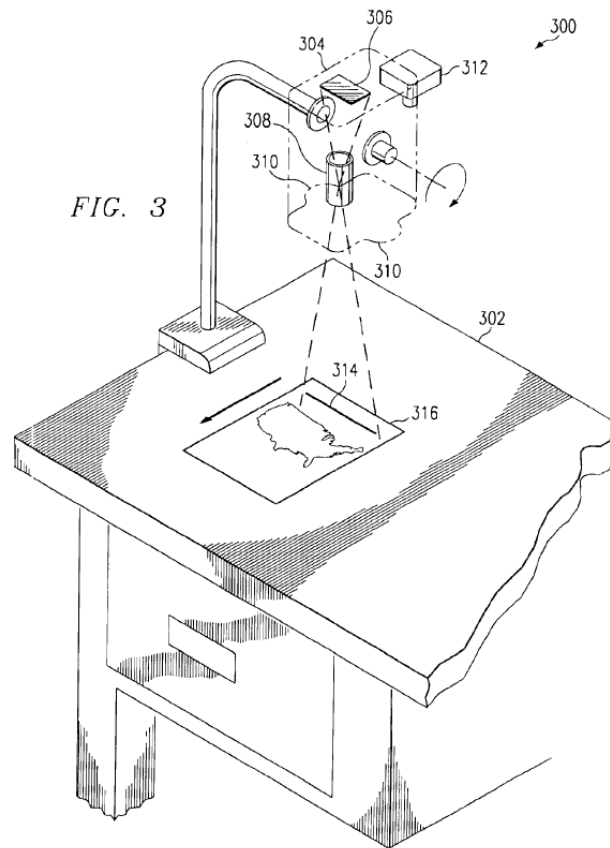


Figure 3 shows a scanner imaging device in housing 304 mounted on an arm to look down on a document, and capture a high resolution digital image by scanning the document line-by-line. Ex. 1007, Fig. 3, Abstract, col. 5, ll. 60–67. A separate video camera 312 (“any suitable digital video camera now known or later developed”) is mounted next to the scanner to feed a real-time image of the target to a display, to aid the user in properly aligning the document within the target area (“the user may preview the video feedback of original 316 to ensure that a high quality digital image of original 316 is captured”). *Id.* at Figs. 3, 5, Abstract, col. 8, ll. 1–12, 19–28, 58–60.

Gann also describes prior art document cameras, illustrated in Figure 2, reproduced below.

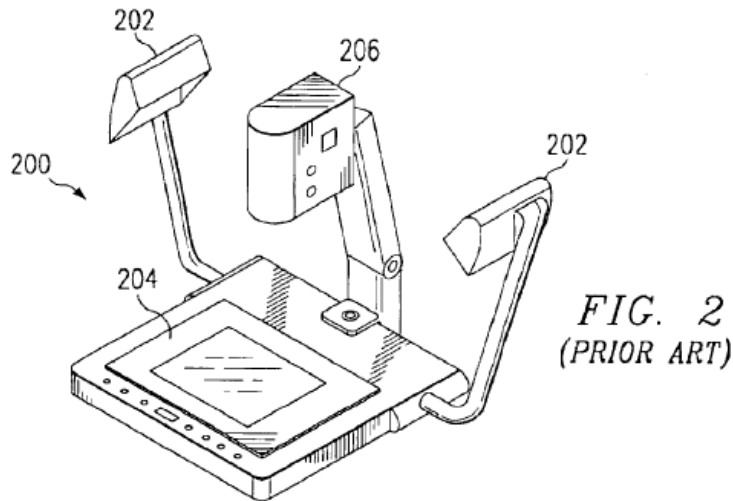


Figure 2 illustrates a digital document camera 206, described as “commercially available,” which “may be a digital camera for capturing still images or it may be a video camera for performing video recording.” *Id.* at Fig. 2, col. 2, l. 62–col. 3, l. 8.

Gann is referenced as background art in the '751 patent, and distinguished as a less advantageous approach due to the complexity of the line-by-line scanning process and the fact that the video camera is a separate component. Ex. 1001, col. 2, ll. 14–39.

Slatter, titled “Document Capture Stand,” was filed August 31, 2000, issued April 1, 2003. Ex. 1021 at. [22], [45], [54]. Figure 8 of Slatter is reproduced below.

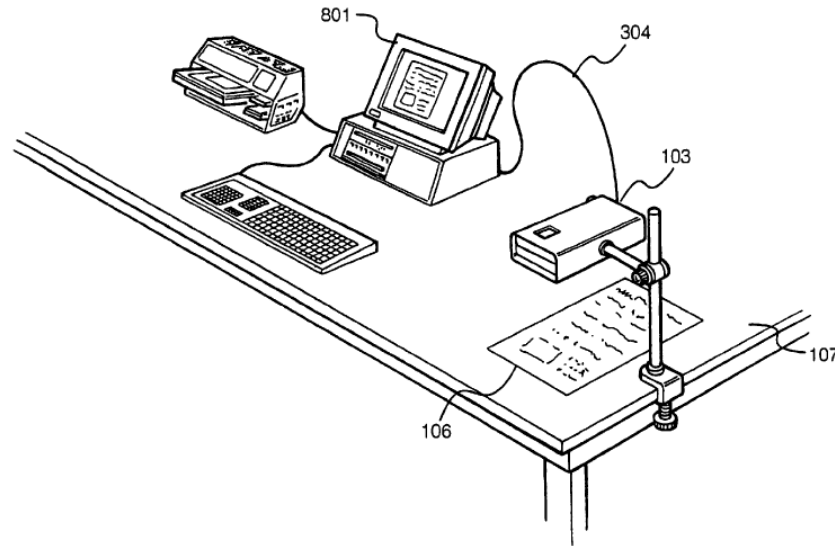


Figure 8 is described as:

[A]n imaging system in which a digital still camera or digital video camera can be placed in retaining means 103 to take a still frame image of the object 106 An image obtained by a camera within retaining means 103 can be downloaded by wires 304 to a personal computer 801 which can adjust, manipulate, etc., the obtained image. The image can also be recorded on a portable recording medium, e.g., a computer disk of computer 801.

Id. at col. 12, ll. 49–62. Slatter further explains that:

[T]he personal computer provides the processing power and algorithms where the digital camera is configured to output image data directly following document capture and does not rely on the digital camera processing the image.

Id. at col. 13, ll. 63–67. Slatter also teaches that “many digital video cameras can be used as a still frame camera as well as for recording moving images.” *Id.* at col. 1, ll. 61–63. Slatter states:

Although still developing, the quality and resolution provided by digital cameras is considerable. In the near future the resolution provided by such digital cameras will be sufficient to accurately

record a digital image of all features of, for instance, a printed page or photograph.

Id. at col. 5, l. 65–col. 6, l. 3.

In addition, Slatter explains that the ability to view the document before capture facilitates obtaining the required image. *Id.* at col. 11, ll. 51–58, col. 12, ll. 42–45.

Slatter is referenced as background art in the '751 patent, and distinguished in that it “may not be adaptable to many possible variations to make a commercial embodiment practical or advantageous in real life applications.” Ex. 1001, col. 2, ll. 40–49.

Liang, titled “Document Camera,” was filed June 29, 2007, issued January 1, 2009. Ex. 1023 at [22], [43], [54]. Liang is directed to “a document camera which takes a visual image of a material (object or document) placed on a surface where the visual image is taken with a video camera, electrically converted to a digital image, and transmitted to an external display device.” *Id.* ¶ 2.

Liang describes the then-existing prior art background of the invention:

With significant improvement of CCD (charge coupled device) and CMOS sensors, document cameras using the CCD or CMOS sensor have been developed and proposed. In such a document camera, a visual image of a material, a sample, or another subject matter placed on a table is taken with a CCD (or CMOS sensor) located above the table. The visual image is output as video signals to a display device, i.e., a computer monitor or a projector, etc.

Id. ¶ 4. Figure 5A of Liang is reproduced below.

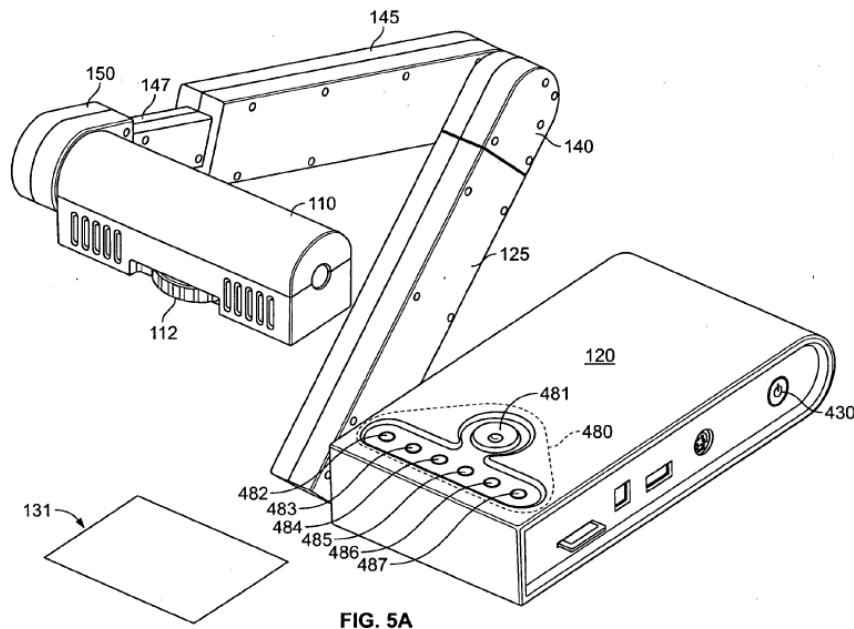


Figure 5A illustrates a document camera with a camera head assembly 110 enclosing a camera with a CMOS or CCD sensor mounted on folding arms 145, 125 and connected to a base 120 that has a control panel 480 including zoom and image capture buttons 483 and 486. *Id.* at Fig. 5A, ¶¶ 56, 62, 65.

As an alternative to the control panel buttons, Liang discloses using a mouse to control zoom, for example. *Id.* at Fig. 19, ¶ 101. The base 120 includes a processor which handles the various image processing functions such as zoom, image capture, and white balance, and transmits the processed image to an external display via an output video port. *Id.* at Fig. 15, ¶¶ 51, 68, 71, 72, 77, 97.

In addition, Liang emphasizes the ability to view a “live display” of the target being imaged. *Id.* ¶¶ 67–68, 70–73.

2. The Combination of Morichika and Liang

Petitioner's overall obviousness argument is that a person of ordinary skill would have found it obvious, in light of Morichika and Liang, to arrive at the subject matter of the proposed substitute claims, including using a video stream input. Mot. Amend Opp. 16–20; Madisetti 2nd Decl. ¶¶ 47–56.

Here, prior to the Motion to Amend, Petitioner submitted expert testimony that if the issued claims were construed to require a video input, one of ordinary skill would have been motivated to substitute a video camera for the still camera of Morichika, and make routine, well-known modifications to accommodate the video input. Madisetti Decl. ¶ 56.

In response to the video amendments in the Motion to Amend, Petitioner supplemented its original obviousness arguments by relying on the combination of Morichika and Liang. The basic argument remains: it would have been obvious to use video imaging input and processing with the approach taught by Morichika, including, for example, (i) using a digital camera to acquire high resolution digital images; (ii) off-loading the image manipulation and processing, including zooming, to a separate computer; and (iii) scaling the image resolution to match a lower resolution display. Mot. Amend Opp. 16–20.

In support of this argument, Petitioner's expert relies on the above discussed disclosures of Liang, as well as the prior art background described in the '751 patent as evidenced by Gann and Slatter, establishing that it was common knowledge at the pertinent time to use either real-time digital video cameras or digital still cameras — or cameras that could switch between capturing video and still frame images — in document camera and document capture applications. Mot. Amend Opp. 3–6; Madisetti 2nd Decl. ¶¶ 15–28,

50, 53–54, 58–59; Ex. 1007, Abstract, Figs. 2, 3, col. 2, l. 62–col. 3, l. 8, col. 8, ll. 1–12; Ex. 1021, Fig. 8, col. 1, ll. 57–63, col. 5, l. 65–col. 6, l. 3, col. 12, ll. 49–62; Ex. 1023, Figs. 5A, 15, ¶¶ 2, 4, 56, 62.¹⁶

As Petitioner’s expert further testifies, and as the background art demonstrates, there was ample motivation to use a video camera in these applications to facilitate proper alignment and preparation of the target document or object during a presentation or prior to capturing a still image of the document. Madisetti Decl. ¶ 56; Madisetti 2nd Decl. ¶ 60; Ex. 1007, Figs. 5, Abstract, col. 8, ll. 58–60 (“the user may preview the video feedback of original 316 to ensure that a high quality digital image of original 316 is captured”); Ex. 1021, col. 12, ll. 42–45; Ex. 1023, ¶¶ 67–68, 70–73 (“live display”).

Patent Owner disputes this motivation, arguing “[m]anual clicking to take images is an explicit desire of the ‘751 patent,” and therefore “Petitioners’ purported motivation is discouraged by the ‘751 Patent because it desires manual clicking to capture still images.” Mot. to Amend 16. Patent Owner also argues there is insufficient proof of a motivation to use a video camera with the Morichika approach because “Morichika is not concerned with moving objects and only references stationary document.” Mot. to Amend 15.

These arguments are unpersuasive because, as the discussion above of the Gann, Slatter, and Liang references demonstrates, whether the final output is a captured still image, or a live video image, it is advantageous to have a live video preview available for alignment and preparation of the

¹⁶ See also Ex. 1006, ¶¶ 54, 62.

target. Likewise, even if the target is static (e.g., a document), it is still useful to be able to align, adjust, mark up and point to the document using a live view. Ex. 1007, 8:19:28. Thus, Petitioner’s motivation argument is consistent with Morichika and the document viewing and one-click still image capture features of the ’751 patent.

Furthermore, we are persuaded by Petitioner’s evidence that circuitry and software required to process video frame images in real time were readily available and well known to persons of ordinary skill in art at the pertinent time period. Madisetti 2nd Decl. ¶¶ 52–56; Rodriguez Dep. 36:13–17 (person of ordinary skill in the art was familiar with “capturing video with sufficient processing capability that the capturing could keep up with the incoming frame rate”). Morichika, although capturing still frame images on the input side, converts them to video frame images for output, and thus demonstrates the capability to handle video-level processing requirements. Madisetti 2nd Decl. ¶ 52; Ex. 1002, Fig. 2, ¶ 39. Slatter uses video images throughout and teaches that a personal computer could provide the processing power and algorithms rather than relying on the digital camera processing the video image. Madisetti 2nd Decl. ¶ 24; Ex. 1021, col. 13, ll. 63–67. Liang provides real-time video with zooming and white balance processing, while maintaining a “live display.” Madisetti 2nd Decl. ¶¶ 53–54; Ex. 1023, ¶¶ 68, 77.

Moreover, as discussed above, the level of skill of the ordinary practitioner in the applicable art at the pertinent time period was high. Pet. 20–21; Pet. Reply 19–20. Such person would have had a Bachelor of Science degree in electrical engineering, mathematics, or physics with computer science coursework, or equivalent experience, and at least one

year of direct technical experience in capturing real-time video with zooming capability via a portable document camera. Pet. 7; PO Resp. 5–6 (citing Rodriguez Decl. ¶ 23). Such person would have had experience “capturing video with sufficient processing capability that the capturing could keep up with the incoming frame rate.” Rodriguez Dep. 36:13–17.

In addition, as discussed above, in the context here, the distinction between capturing a series of still frame images and capturing a video stream of frame images, is that a video stream is made up of a series of frame images that are automatically captured. Whether a camera is capturing a series of still frame images, or a video stream of frame images, we find that a person of ordinary skill would have understood that a system using the approach of Morichika would be performing the same image processing (such as digital zoom) to each image in the series of frame images. Madisetti 2nd Decl. ¶ 51.

Significantly, the ’751 patent provides no circuitry, software, or other disclosure of how to perform the video processing functionality that is claimed. This supports Petitioner’s argument that these techniques were well known, and that one of ordinary skill in the art would have been able to adapt Morichika to accommodate video input. Madisetti 2nd Decl. ¶¶ 26, 61; *see Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1570 (Fed. Cir. 1997) (noting that “the [challenged] patent itself does not disclose the level of detail that [patent owner] would have us require of the prior art”); *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) (explaining that “the Board’s observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board’s finding that one skilled in the art would have known how to

implement the features of the references and would have concluded that the reference disclosures would have been enabling”).

Patent Owner offers expert testimony disputing that one of ordinary skill could have readily adapted the approach of Morichika to video input:

It is significantly more difficult to achieve real-time manipulation of high-resolution video images as compared to still images. In video, the bandwidth and processing demands are much higher. Video frames in a compressed video stream are usually encoded based on the contents of other nearby frames, and careful time synchronization is required; these problems do not arise when processing still images. Adapting the approach of Morichika to substitute a video stream of frame images would not have been obvious to a POSITA, given the complexities of real-time manipulations at the time.

Rodriguez Decl. ¶ 37. However, this is unpersuasive because, as discussed above, a “video stream” does not necessarily entail compression encoding schemes or high frame rates. We find that the image processing circuitry and software required to handle an ordinary stream of video frames was well known and readily implemented by persons of ordinary skill.

Finally, Patent Owner asserts Petitioner fails to explain “what teachings from Liang . . . are actually being introduced into Morichika and why those teaching would be introduced in the first place,” and generally asserts Petitioner has failed to provide a proper obviousness analysis under *Graham*. PO Resp. 23; Mot. Amend Reply 10–11. However, combining the teachings of references does not require combining their specific structures. *In re Nievelt*, 482 F.2d 965, 968 (CCPA 1973). Moreover, as set forth above and in the following claim-by-claim discussions, Petitioner has sufficiently addressed the applicable *Graham* factors: the scope and content of the prior art; the differences between the claimed subject matter and the prior art; and

the level of skill in the art. *See* Mot. Amend Sur-Reply 4–5. In sum, the evidence presented does not persuade us that the resulting combination would be “uniquely challenging or difficult for one of ordinary skill in the art” or “represented an unobvious step over the prior art.” *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418–19).

Therefore, we determine that Petitioner has demonstrated by a preponderance of the evidence that a person of ordinary skill would have been motivated to combine Morichika and Liang to use a video camera, such as is disclosed in Liang, with the high-resolution, off-loading processing approach of Morichika, and that the circuitry and software required to implement this combination would have been within the routine capabilities of a person of ordinary skill in the art. Indeed, it would have been obvious, even in light of Morichika alone, given the level of ordinary skill in the art, to adapt Morichika to use a video camera. Given this obvious combination, we consider the specific requirements of the claims below.

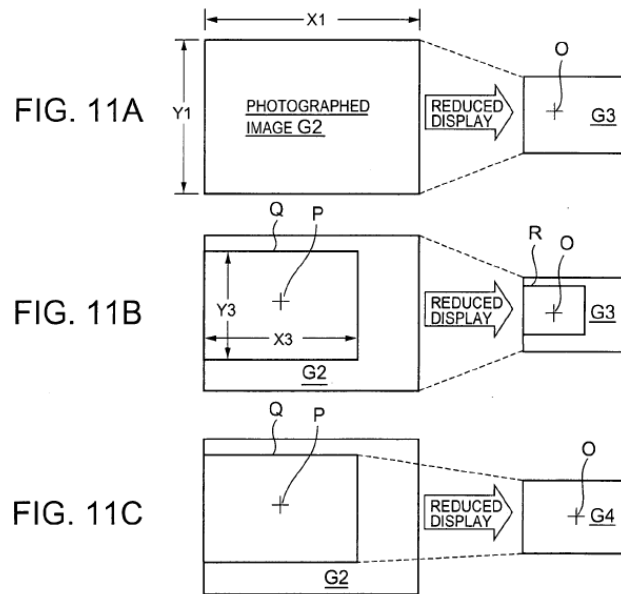
3. Independent Claim 21

In challenging independent claim 21, just as for issued claim 1, Petitioner relies, *inter alia*, on Morichika’s Figure 1 and the accompanying description as teaching or suggesting “acquiring an image of a target to provide an output video image comprising a plurality of frame images,” as recited in the preamble of claim 21. Madisetti Decl. ¶¶ 57–59. Figure 1 shows that camera 4c acquires an image of a target, and computer 2 converts that image to an output video image. Ex. 1002, ¶¶ 32, 39.

The first limitation of claim 21 requires, “connecting a slave digital image sensing unit to a master personal processor, the master personal

processor receiving a video stream comprising a series of frame images from the slave digital image sensing unit.” Mot. Amend Reply 19. Morichika discloses transferring still frame images from the camera to the personal computer. Madisetti Decl. ¶¶ 60–61; Ex. 1002, ¶¶ 32, 45. This includes transferring a series of such images. Madisetti Decl. ¶ 62; Ex. 1002, ¶ 40 (referring to processing of multiple, “to-be-projected images”). As established above, and as Petitioner argues, we are persuaded it would also have been obvious to one of ordinary skill in the art to similarly transfer “a video stream comprising a series of frame images” from the camera to the processor. Mot. Amend Opp. 19–20; Madisetti 2nd Decl. ¶¶ 58–59.

The second claim 21 limitation requires, “using the master personal processor to manipulate the video stream comprising a series of frame images, including zooming in or out without changing resolution of the video stream comprising a series of frame images.” Mot. Amend Reply 19. Petitioner relies on the above-described disclosure in Morichika of zooming capabilities, as adapted to accommodate video input. Madisetti Decl. ¶¶ 63–67; Madisetti 2nd Decl. ¶ 63; Ex. 1002, ¶¶ 58–62. In particular, Petitioner relies on Figures 11A–11C, reproduced below.



Figures 11A–11C illustrate the zooming operation of Morichika, in which an area (indicated as “Q”) of original incoming image G2, which prior to magnification occupies area R on the display, is magnified by scaling the portion Q to fill the entire display area G4. Ex. 1002, ¶¶ 59–62. As discussed, although Figures 11A–11C are in the context of zooming a photographed image, we determine it would have been obvious to use this same technique for a video stream of frame images. Madisetti 2nd Decl. ¶¶ 58–63.

Also, this zooming operation satisfies the requirement that zooming does not change resolution of the video stream comprising a series of frame images. As set forth above, this requirement means zooming in or out without changing resolution of the video stream received from the slave digital image sensing unit. In Morichika, the zooming is performed in the computer, and the separate camera (*i.e.*, the slave digital image sensing unit)

supplies the original captured images at an unchanging high resolution. Ex. 1002, ¶¶ 58–64.

The third element of Claim 21 requires, “in the case of the manipulated series of frame images having a higher resolution than a display resolution, reducing the resolution of each of the manipulated series of frame images to that of the display resolution.” Mot. Amend Reply 19. The resolution of the “manipulated series of frame images” of claim 21 corresponds to the resolution of the portion of the acquired image to be magnified in the example of zooming disclosed in Morichika. Ex. 1002, Fig. 11B (area “Q”). Likewise, the “display” resolution of claim 21 corresponds to the resolution of the Morichika display. Madisetti Decl. ¶ 68; Ex. 1002, Fig. 11C (“G4”). As shown in those figures, the resolution of area Q is reduced to that of display G4. Madisetti Decl. ¶¶ 68–70; Madisetti 2nd Decl. ¶¶ 64–66; Ex. 1002, ¶ 64.

The fourth element of claim 21 requires, “displaying and/or storing the manipulated series of frame images as an output video image without changing resolution of the manipulated series of frame images.” Mot. Amend Reply 19. We determine Morichika teaches or suggests this limitation because, once the personal computer scales the image to the resolution of the output display, it is provided directly to the display without further changes to the resolution. Madisetti Decl. ¶¶ 71–72.

The fifth element of claim 21 requires, “wherein the slave digital image sensing unit is removably connected to the master personal processor via a master personal processor port.” Mot. Amend Reply 19. Petitioner argues this limitation is taught or suggested by the above discussed use in Morichika of a USB cable to connect the camera to the projector. Pet. 29.

As support, Dr. Madiseti testifies that one of ordinary skill in the art would have understood that “a USB cable is removably connected to a USB port.” Madiseti Decl. ¶ 73.

Finally, the last element of claim 21 requires, “at the same time as receiving the video stream comprising a series of frame images, capturing a still image from the manipulated series of frame images in response to a user click of a button displayed in user interface software.” Mot. Amend Reply 19. Petitioner relies on the disclosure in Liang of the ability to capture still frame images. Madiseti 2nd Decl. ¶¶ 68–71; Ex. 1023, ¶¶ 71–72.

In response to Petitioner’s arguments regarding claim 21, Patent Owner argues that it would not have been obvious to combine Morichika with Liang to manipulate a video stream of frame images. Mot. Amend Reply 10. As discussed above, we have determined that Petitioner has met its burden on this issue.

In sum, for the foregoing reasons, we determine that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of substitute claim 21 would have been obvious over the combination of Morichika and Liang.

4. Independent Claim 28

The claim 28 preamble states, “acquiring an image of a target.” Mot. Amend Reply 21. Morichika’s Figure 1 shows that camera 4c acquires an image of a target. Madiseti 2nd Decl. ¶ 89; Ex. 1002, ¶ 32.

The first limitation of claim 28 requires, “instructing a digital image sensing unit to transmit a continuous stream of video frames at a constant rate and at a maximum resolution of the digital image sensing unit.” Mot. Amend Reply 21. As discussed above, Morichika transmits high resolution

images from the camera, and the combination of Morichika and Liang teaches or suggest similarly transmitting a stream of video frames. Pet. 23–24; Mot. Amend Opp. 19–20, 23–24; Madisetti 2nd Decl. ¶¶ 58–59, 90–91; Ex. 1002, ¶¶ 32, 40, 45.

The second limitation of claim 28 requires, “determining a display resolution at which each video frame will be displayed and storing the display resolution in a non-transitory medium.” Mot. Amend Reply 21. As discussed above, this means that the display resolution value encompasses storing in a file or memory. Because, as discussed for the next claim 28 limitation, Morichika teaches that the resolution of the acquired image is reduced to that of the display if the incoming resolution is greater than that of the display, the system must store the display resolution in order to make that comparison and reduction. Madisetti 2nd Decl. ¶¶ 64–66, 92; Ex. 1002, ¶¶ 62, 64.

The third limitation of claim 28 requires, “capturing the continuous stream of video frames, wherein each video frame is captured in one instantaneous snapshot of a subject’s entire surface area without line-by-line scanning and using an external processor to compare a resolution of each video frame of the video image with the display resolution and adjusting the resolution of each video frame to correspond to the display resolution.” Mot. Amend Reply 21. Because both Morichika and Laing use a standard digital camera with CCD or CMOS arrays, and do not use a line-by-line scanning technique, the combination teaches or suggests the instantaneous snapshot limitation. Madisetti 2nd Decl. ¶ 93; Ex. 1002, ¶ 44; Ex. 1023, ¶ 62. As discussed, Morichika also uses an external processor to reduce the resolution of the acquired still frame images to that of the display, and the

combination of Morichika and Liang teaches or suggests the same for a stream of video frames. Madisetti 2nd Decl. ¶¶ 64–66, 92–93; Ex. 1002, ¶ 64

The last limitation of claim 28 requires, “after comparing the resolution of each video frame to the display resolution, storing and/or displaying in real-time each video frame on a display, wherein the digital image sensing unit is removably connected to the external processor via a processor port and USB cable.” Mot. Amend Reply 22. Morichika displays the image, and the camera of Morichika is connected to the computer via a USB cable. Madisetti 2nd Decl. ¶¶ 94–95; Ex. 1002, Fig. 1, ¶¶ 28, 38.

Therefore, we determine that, for the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that the subject matter of substitute claim 28 would have been obvious over the combination of *Morichika and Liang*.

5. Dependent Claims 29, 30, 32–34, and 36

Claim 29 depends from claim 28 and adds the requirement that “the external processor is housed in a personal computer.” Mot. Amend Reply 22. The external processor in Morichika is housed in a personal computer. Madisetti Decl. ¶ 93; Ex. 1002, Fig. 2, ¶¶ 38, 41.

Claim 30 depends from claim 28 and adds the requirement that “when displaying each video frame on a display re-sizing the video image without changing a resolution of the output video frames.” Mot. Amend Reply 22. Morichika’s zooming functions discussed above re-size the image, and regardless of what image manipulations are performed, the resolution of the output images matches that of the display. Madisetti Decl. ¶¶ 63, 97; Ex. 1002, ¶ 62. As discussed above, the combination of Morichika and Liang

teach or suggest this requirement as applied to a stream of video frames. Madisetti 2nd Decl. ¶¶ 84–85, 87.

Claim 32 depends from claim 28 and adds the requirement that “when displaying each video frame on a display panning the video image in a selected direction without changing a resolution of the output video frames.” Mot. Amend Reply 22. Morichika discloses scrolling a displayed image, which would not change the resolution of the output images, and the combination of Morichika and Liang teach or suggest this requirement as applied to a stream of video frames. Madisetti Decl. ¶¶ 63, 97; Madisetti 2nd Decl. ¶¶ 84–85, 87, 100; Ex. 1002, ¶ 63.

Claim 33 depends from claim 28 and adds the requirement that “when displaying each video frame on a display rotating the video image in a selected direction without changing a resolution of the output video frames.” Mot. Amend Reply 22. Morichika discloses rotating a displayed image, which would not change the resolution of the output images, and the combination of Morichika and Liang teach or suggest this requirement as applied to a stream of video frames. Madisetti Decl. ¶ 97; Madisetti 2nd Decl. ¶ 101; Ex. 1002, Fig. 5, ¶ 49.¹⁷

Claim 34 depends from claim 28 and adds the requirement that “when displaying each video frame on a display annotating the image without changing a resolution of the output video frames.” Mot. Amend Reply 22.

¹⁷ The fact that rotating a digital image was a well-known image processing technique is confirmed by Mitsui. Madisetti Decl. ¶¶ 142–145; Ex. 1005, Fig. 3, col. 7, ll. 37–49, col. 8, ll. 49–54.

Liang's split screen function teaches or suggests this feature.¹⁸ Madisetti Decl. ¶ 97; Madisetti 2nd Decl. ¶¶ 86–87, 102.

Claim 36 depends from claim 28 and adds the requirement that “when displaying each video frame on a display, performing an image manipulation selected from the group consisting of: re-sizing the video image, re-sizing a selected portion of each video frame to provide a visual effect of rotating the video image in three dimensions, panning the video image in a selected direction, rotating the video image in a selected direction, and annotating the video image.” Mot. Amend Reply 23. As discussed above for claims 30 and 32–34, the re-sizing, panning, rotating, and annotating manipulations are taught or suggested by the combination of Morichika and Liang.

Therefore, we determine that for the foregoing reasons, Petitioner has demonstrated by a preponderance of the evidence that the subject matter of substitute claims 29, 30, 32–34, and 36 would have been obvious over the combination of Morichika and Liang.

D. Obviousness of Substitute Claims 22–25 and 27 over Morichika, Liang, and Rosenberg

Petitioner argues that claims 22–25 and 27 would have been obvious over the combination of Morichika, Liang, and Rosenberg, and again also relies on Gann and Slatter as background prior art. Mot. Amend Opp. 2–11, 21–23. Petitioner adds Rosenberg to this combination to address Patent Owner's mouse wheel amendment to substitute claims 22 and 23 (and claims 24, 25, and 27 because they depend from claim 23).

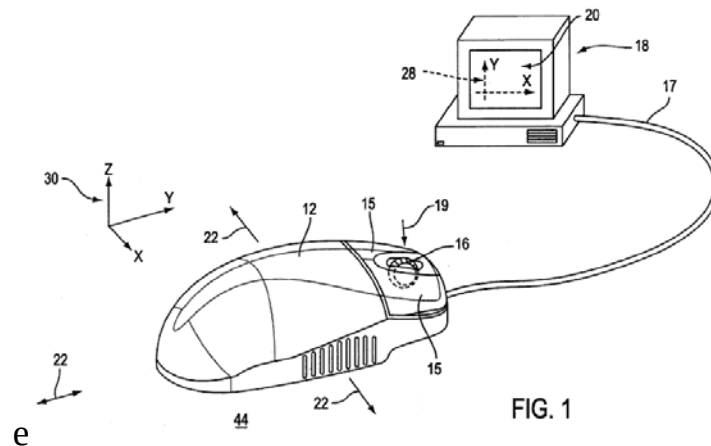
¹⁸ The fact that annotating a digital image was a well-known image processing technique is confirmed by Krisbergh. Madisetti Decl. ¶ 140; Ex. 1003, col. 13, ll. 35–42.

1. The Rosenberg Reference

Rosenberg, titled “Force Feedback Mouse Wheel And Other Control Wheels,” was filed March 26, 1998, issued October 3, 2000. Ex. 1024 at [22], [45], [54]. Rosenberg discloses:

To allow the user easier control of scrolling, zooming, and other like functions when using a mouse, a “scroll wheel” or “mouse wheel” has been developed and has become quite common on computer mice. A mouse wheel is a small finger wheel provided on a convenient place on the mouse, such as between two mouse buttons, which the user may rotate to control a scrolling or zooming function The wheel is most commonly used to scroll a document in a text window without having to use a scroll bar, or to zoom a window's display in or out without selecting a separate Zoom control.

Id. at col. 1, l. 65–col. 2, l. 16. Rosenberg Figure 1, reproduced below, provides an illustration.



Id. at Fig. 1. Figure 1 depicts a mouse 44, with a mouse wheel 16, connected to computer 18. *Id.* at col 4, ll. 17–39. Petitioner submits Rosenberg as evidence that the use of a mouse wheel to control the zooming function in a wide variety of contexts was well known. Mot. Amend Opp. 10–11.

2. Claims 22–25 and 27

Claim 22 depends from claim 21 and adds the requirement “executing the manipulation in response to a user request in real time, wherein the manipulation is controlled by the user through a mouse wheel.” Mot. Amend Reply 19. We determine that this element is met by Morichika. Morichika teaches that the image captured by the camera device can be projected in “real-time.” Ex. 1002, ¶ 65. Also, the fact that the image manipulation functions of Morichika are in response to user commands teaches or suggests real-time response. Madisetti Decl. 75; Madisetti 2nd Decl. ¶ 73. As discussed above, real-time manipulation of a stream of video frames also would have been obvious in light of the combination of Morichika and Liang. Madisetti 2nd Decl. ¶¶ 58–59, 73–74. Morichika discloses user control via an infrared remote control, and Liang discloses controlling zoom using a mouse. *Id.* Rosenberg confirms that controlling zooming using a mouse wheel would have been obvious. *Id.* ¶ 74.

Patent Owner argues the reliance on Laing and Rosenberg to teach or suggest the requirement that “manipulation is controlled by the user through a mouse wheel” is faulty because it is unclear whether those references also teach the requirement of “zooming in or out without changing resolution of the video stream comprising a series of frame images.” Mot. Amend Reply 8, 10. However, as discussed above in connection with the second limitation of claim 21, Morichika teaches or suggests that aspect of the claims. Therefore, this argument is unpersuasive because it focuses on the Liang and Rosenberg references individually, whereas the obviousness grounds are based on a combination of Morichika, Liang, and Rosenberg. *See In re*

Keller, 642 F.2d at 426; *In re Merck & Co., Inc.*, 800 F.2d 1091, 1097 (Fed. Cir. 1986).

Patent Owner also argues Petitioner fails to explain how Rosenberg is to be applied in the asserted combination with Morichika and Liang. Mot. Amend Reply 9–10. However, we understand Petitioner to be offering Rosenberg as confirmation that the use of a mouse wheel to control zooming of images was a well-known user interface option at the pertinent time, supporting the argument that it would have been obvious to use a mouse wheel as the zooming control of Morichika. Mot. Amend Opp. 10–11, 21. We consider Petitioner’s reliance on Rosenberg appropriate and persuasive.

Independent claim 23 replicates the limitations of independent claim 21 and dependent claim 22 in substantially identical language, which limitations have been discussed above.¹⁹ Madisetti Decl. ¶¶ 77–81, 90–91; Madisetti 2nd Decl. ¶¶ 76–80. Claim 23 also includes an additional requirement, “in the case of the manipulated frame image having a lower resolution, as manipulated, than the second resolution, using the processor to further manipulate the frame image to reduce pixilation.” Mot. Amend Reply 18–20. Morichika discloses a system which is specifically designed to prevent the occurrence of this condition. Madisetti Decl. ¶ 89. Neither Liang nor Rosenberg teach or suggest it. However, because this limitation is conditional, and because the combination of Morichika, Liang, and Rosenberg teaches or suggests the remaining limitations of claim 23, the fact

¹⁹ An insubstantial difference is that claim 21 refers to manipulated frame image resolution and display resolution, whereas claim 23 refers to those resolutions as a “first” and “second” resolution, respectively. Mot. Amend Reply 19–20; Madisetti Decl. ¶¶ 82–87.

that this limitation is not taught or suggested by this combination does not preclude our obviousness determination. *See* discussion of *Ex parte Schulhauser, supra*.

Claim 24 depends from claim 23 and additionally requires “wherein the personal processor is housed in an external personal computer, further comprising using an external personal computer to provide the processor used to manipulate the series of frame images.” Mot. Amend Reply 20. As already discussed for claim 29, the personal computer disclosed in Morichika is external to the camera and projector and includes a processor. Madisetti Decl. ¶ 93; Ex. 1002, Figs. 1, 2 (CPU 21), ¶¶ 38, 41.

Claim 25 depends from claim 24 and additionally requires, “wherein the manipulation further comprises at least one of the operations selected from the group consisting of: re-sizing the manipulated series of frame images; panning the manipulated series of frame images in a selected direction; rotating the manipulated series of frame images in a selected direction; and annotating the manipulated series of frame images.” Mot. Amend Reply 21. Petitioner relies on the disclosed zooming and panning capabilities of Morichika. Madisetti Decl. ¶¶ 63, 95; Ex. 1002, ¶¶ 62–63. The combination of Morichika and Liang further teaches or suggests the required manipulation of a video stream of frame images. Madisetti 2nd Decl. ¶¶ 84–87. We are persuaded that this limitation is met.

Claim 27 depends from claim 25 and additionally requires “wherein the at least one operation is conducted without changing a resolution of the video stream comprising a series of frame images.” Mot. Amend Reply 21. As discussed above for the second limitation of claim 21, this requirement means zooming in or out without changing resolution of the video stream

received from the slave digital image sensing unit. In Morichika, the zooming is performed in the computer, and the separate camera (*i.e.*, the slave digital image sensing unit) supplies the original captured images at unchanging resolution. Ex. 1002, ¶¶ 58–64. We are persuaded that this limitation is met.

Therefore, we determine that Petitioner has demonstrated by a preponderance of the evidence that the subject matter of substitute claims 22–25 and 27 would have been obvious over the combination of Morichika, Liang, and Rosenberg.

E. Motion to Amend Summary

After reviewing the entire record, we determine Patent Owner has satisfied the predicate requirements for considering a motion to amend as to substitute claims 21–25 and 27, but not claims 28–30, 32–34, and 36.

Also, we determine Petitioner has demonstrated by a preponderance of the evidence that the subject matter of claims 21, 28–30, 32–34, and 36 would have been obvious over the combination of Morichika and Liang, and that the subject matter of claims 22–25 and 27 would have been obvious over the combination of Morichika, Liang, and Rosenberg.

We therefore deny Patent Owner’s Motion to Amend as to the substitute claims. As the Motion to Amend is non-contingent, we cancel issued asserted claims 1–5, 7–10, 12–14, and 16.

VI. OTHER MATTERS

A. Motion for Observations

Patent Owner has filed a Motion for Observations on Cross Examination of Vijay Madiseti. Paper 20. Petitioner has filed a reply to those observations. Paper 25. We have considered the observations and

reply.

B. Motion to Exclude

Patent Owner has filed a Motion to Exclude Madisetti Declarations. (Paper 23, “Exclude Mot.”). Petitioner has filed an Opposition (Paper 26, “Exclude Opp.”) and Patent Owner has filed a Reply (Paper 28, “Exclude Reply”). Patent Owner’s motion seeks to exclude the declarations of Petitioner’s expert, Dr. Vijay Madisetti (Exs. 1020, 1025).

We have broad discretion to assign weight to be accorded witness testimony. *In re American Academy of Sci. Tech. Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004); *Velandar v. Garner*, 348 F.3d 1359, 1370–71 (Fed. Cir. 2003).

Patent Owner seeks to exclude Dr. Madisetti’s declarations on various grounds, including that the Madisetti Declarations are not credible, that they contain nothing more than “expertized” attorney argument, that Dr. Madisetti was evasive in his testimony, and that he is not qualified as one of ordinary skill in the art. Exclude Mot. 1–3. We have reviewed these objections and determine that they go more to the weight of Dr. Madisetti’s testimony than its admissibility. Patent Owner has cross-examined Dr. Madisetti on his declarations and submitted his deposition transcript. Ex. 2006. We therefore deny the motion.

VII. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has not proved by a preponderance of the evidence that claims 18 and 20 of U.S. Patent No. 8,508,751 B1 are unpatentable;

FURTHER ORDERED that Patent Owner’s Motion to Amend is

denied as to proposed substitute claims 21–25, 27–30, 32–34, and 36;

FURTHER ORDERED that claims 1–5, 7–10, 12–14, and 16 of the U.S. Patent No. 8,508,751 B1 are cancelled;

FURTHER ORDERED that Patent Owner’s Motion to Exclude Madisetti Declarations is denied; 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.

IPR2017-02108
Patent 8,508,751 B1

For PETITIONER:

Jackson Ho
Benjamin Weed
Kevin McCormick
K&L GATES LLP
jackson.ho@klgates.com
benjamin.weed.ptab@klgates.com
kevin.mccormick@klgates.com

For PATENT OWNER:

Trevor Coddington
Donny Samporna
SAN DIEGO IP LAW GROUP LLP
trevorcoddington@sandiegoiplaw.com
donnysamporna@sandiegoiplaw.com