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Paper 13
Entered: February 9, 2022

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALIGN TECHNOLOGY, INC.,
Petitioner,

v.

3SHAPE A/S,
Patent Owner.

IPR2021-01310
Patent 10,383,711 B2

Before FRANCES L. IPPOLITO, JAMES J. MAYBERRY, and JASON M. REPKO, *Administrative Patent Judges.*

REPKO, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Align Technology, Inc. ("Petitioner") filed a petition requesting *inter partes* review of claims 1, 2, 9–11, 23, 24, 40, and 42 of U.S. Patent No. 10,383,711 B2 (Ex. 1001, "the '711 patent"). Paper 1 ("Pet."). 3Shape A/S ("Patent Owner") filed a Preliminary Response. Paper 8 ("Prelim. Resp.").

To institute an *inter partes* review, we must determine "that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." 35 U.S.C. § 314(a). For the reasons discussed below, Petitioner has shown a reasonable likelihood that it would prevail with respect to at least one challenged claim. And we have not been provided a sufficient reason to exercise our discretion to deny institution. Thus, we institute an *inter partes* review.

A. Related Matters

According to the parties, the '711 patent has been asserted in *Align Technology, Inc. v. 3Shape A/S*, No. 6:20-cv-00979 (W.D. Tex.). Pet. 10–11; Paper 4, 1 (Mandatory Notices).

Petitioner filed a second petition challenging the '711 patent. Paper 3, 1 (Petitioner's Explanation of Multiple Petitions).

B. The '711 Patent

The '711 patent relates to generating a digital three-dimensional (3D) representation of a scanned object. Ex. 1001, 1:22–23, 2:25–27. Figure 1, below, shows a handheld scanner with components inside housing 100. *Id.* at 15:64–65.

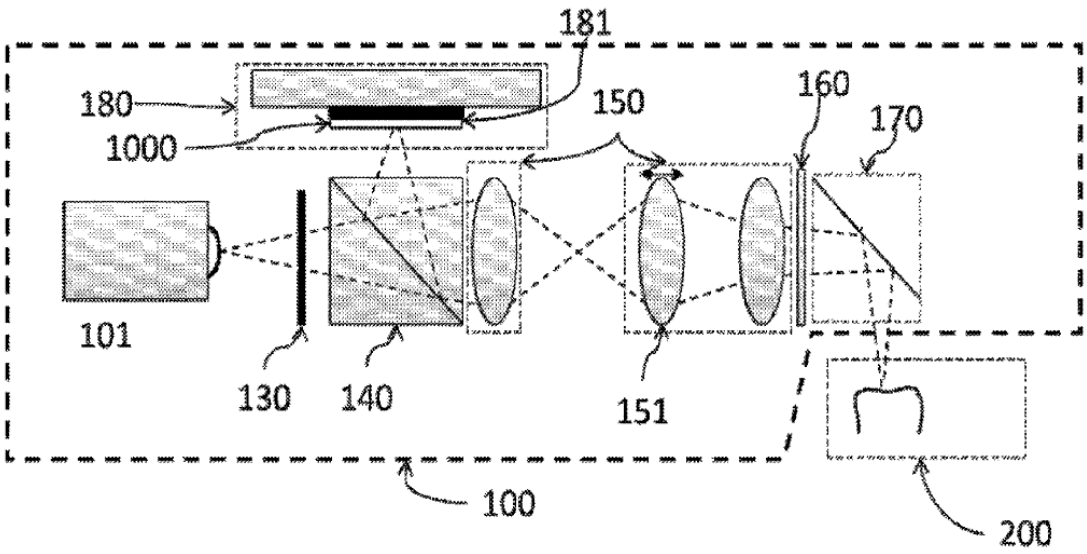


Fig. 1

Figure 1 shows system 100 scanning object 200, which is a patient's tooth. *Id.* at 16:7–24. Color-image sensor 180, including image sensor 181, captures two-dimensional (2D) images from the light reflected from object 200. *Id.* Image sensor 181 has color filter array 1000. *Id.* at 16:21. The array typically has a single color filter for every pixel. *Id.* at 16:25–29. The color filters can be arranged in a regular pattern, such as a Bayer color-filter pattern. *Id.* at 9:39–41.

Figure 4 is a diagram of a color filter array. *Id.* at 16:3.

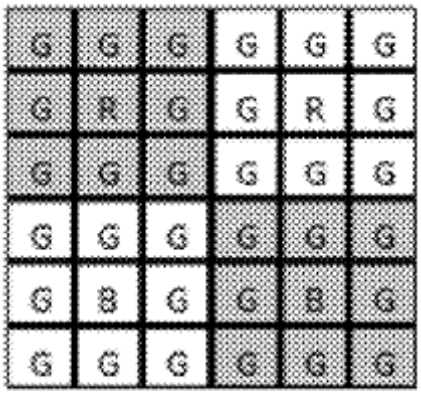


Fig. 4

The figure above represents cells of a 6×6 color filter as a grid. *Id.* at 17:58–62. Each square in the grid is marked with a letter corresponding to its color filter: Pixels marked *B* have a blue filter, pixels marked *G* have a green filter, and pixels marked *R* have a red filter. *Id.* at 17:33–35.

One embodiment obtains the surface geometry from only the green light. *Id.* at 17:35–38. Figure 4's color filter array has a greater fraction of green pixels than a Bayer pattern has. *Id.* at 17:57–58. Thus, when the green part of the light is used to obtain surface geometry, Figure 4's filter will purportedly provide better quality surface geometry than a Bayer pattern filter. *Id.* at 17:63–67. But improved surface geometry may come at the expense of color resolution. *Id.* To improve the color resolution, some embodiments use demosaicing. *Id.* at 10:48–43.

C. Claims

Claim 1, below, is independent.

> 1. A scanner system for recording surface geometry and surface color of an object, the scanner system comprising:
>
> a multichromatic light source configured to provide a multichromatic probe light for illumination of the object,

> a color image sensor comprising an array of image sensor pixels to capture one or more 2D images of light received from the object, the color image sensor comprising a color filter array, and
>
> a data processing system configured to derive surface geometry information for a first set of image pixels within a block of the image sensor pixels from a series of 2D images recorded by the color image sensor,
>
> the data processing system further configured to derive surface color information for a second set of image pixels within the block of the image sensor pixels from at least one 2D image recorded by the color image sensor, wherein the surface color information is obtained by demosaicing the second set of the image sensor pixels,
>
> wherein the first set of the image sensor pixels is different from the second set of the image sensor pixels.
>
> Ex. 1001, 19:44–65.

D. Evidence

Name	Reference	Exhibit No.
Fisker	US 2012/0092461 A1, published Apr. 19, 2012	1006
Colonna de Lega	WO 2013/105922 A2, published July 18, 2013	1007
Min	US 2011/0085063 A1, published Apr. 14, 2011	1008
Yamada	US 2007/0035641 A1, published Feb. 15, 2007	1010

E. Asserted Grounds

Petitioner asserts that claims 1, 2, 9–11, 23, 24, 40, and 42 are unpatentable on the following grounds. Pet. 11–12.

Claims Challenged	AIA[1] 35 U.S.C. §	Reference(s)/Basis
1, 2, 9–11, 40, 42	103(a)	Fisker

[1] Congress amended § 103 when it passed the Leahy-Smith America Invents Act (AIA). Pub. L. No. 112–29, § 3(c), 125 Stat. 284, 287 (2011). Here, Petitioner asserts that the previous version of § 103 applies. Pet. 11–12.

Claims Challenged	AIA[1] 35 U.S.C. §	Reference(s)/Basis
23, 24	103(a)	Fisker, Yamada
1, 9–11, 40, 42	103(a)	Colonna de Lega, Min
23, 24	103(a)	Colonna de Lega, Min, Yamada

II. ANALYSIS

A. Parallel Litigation

Under § 314(a), the Director has discretion to deny institution of a petition for *inter partes* review. *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016). In determining whether to exercise that discretion, the Board considers an early trial date in related litigation in an assessment of all relevant circumstances of the case—including the merits—to balance considerations such as system efficiency, fairness, and patent quality. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 5 (PTAB Mar. 20, 2020) (precedential) ("*Fintiv* Order"). Under this assessment, the Board evaluates the following factors ("*Fintiv* factors"):

> 1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
>
> 2. proximity of the court's trial date to the Board's projected statutory deadline for a final written decision;
>
> 3. investment in the parallel proceeding by the court and the parties;
>
> 4. overlap between issues raised in the petition and in the parallel proceeding;
>
> 5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
>
> 6. other circumstances that impact the Board's exercise of discretion, including the merits.

Fintiv Order 5–6. In evaluating the *Fintiv* factors, "the Board takes a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review." *Id.* at 6.

1. First Factor: Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted

"A district court stay of the litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts. This fact has strongly weighed against exercising the authority to deny institution under *NHK*." *Id.* (referring to *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 (PTAB Sept. 12, 2018) (precedential)).

Here, the parallel litigation has not been stayed. *See, e.g.*, Pet. 64. Petitioner, though, asserts that it will request a stay if Patent Owner does as well. *Id.* Absent specific evidence, we decline to predict how the District Court would rule on a stay request. *See Sand Revolution II LLC v. Cont'l Intermodal Grp.*, IPR2019-01393, Paper 24, 7 (PTAB June 16, 2020) (informative, designated July 13, 2020). No specific evidence in this case suggests that the District Court will grant a stay. Thus, the first *Fintiv* factor is neutral.

2. Second Factor: Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision

"If the court's trial date is earlier than the projected statutory deadline, the Board generally has weighed this fact in favor of exercising authority to deny institution under *NHK*." *Fintiv* Order 9.

According to the district court's scheduling order here, the trial date is October 3, 2022—four months before the projected statutory deadline. Ex. 1025, 3. The record lacks any specific evidence showing that the trial

date is in doubt. Thus, the second *Fintiv* factor weighs in favor exercising discretion to deny institution.

3. Third Factor: Investment in the parallel proceeding by the court and the parties

"The Board also has considered the amount and type of work already completed in the parallel litigation by the court and the parties at the time of the institution decision." *Fintiv* Order 9. "[M]ore work completed by the parties and court in the parallel proceeding tends to support the arguments that the parallel proceeding is more advanced, a stay may be less likely, and instituting would lead to duplicative costs." *Id.* at 10.

Here, the District Court held a *Markman* hearing. Ex. 1026 (transcript of the *Markman* hearing). So at least some of the work related to invalidity has been completed. But, at this stage, the claim terms of the '711 patent that were construed in the District Court do not appear to be in dispute in the grounds of unpatentability before the Board. *See* Prelim. Resp. 5; Ex. 1026. On the record before us, the investment by the District Court and the parties in this regard is not substantial. According to the district court's scheduling order, fact discovery is still ongoing. Ex. 1025.

The third *Fintiv* factor also considers Petitioner's diligence in filing: "If the evidence shows that the petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under *NHK*." *Fintiv* Order 11. Here, Petitioner argues that it filed the Petition "nearly five months before the statutory deadline, demonstrating Petitioner's diligence in requesting IPR." Pet. 65. This mitigates the investment somewhat.

In our overall assessment, the third *Fintiv* factor weighs slightly against exercising discretion to deny.

4. Fourth Factor: Overlap between issues raised in the petition and in the parallel proceeding

"[I]f the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding, this fact has favored denial." *Fintiv* Order 12.

Petitioner "agrees not to pursue in the parallel action any specific ground that the Board institutes." Pet. 65.

In Patent Owner's view, Petitioner's "statement does not even preclude a materially identical ground from being raised." Prelim. Resp. 59. Patent Owner argues that Petitioner's narrow statement provides no protection against duplication of issues. *Id.* We disagree.

Petitioner's stipulation here is similar to the stipulation in *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 11–12 (PTAB June 16, 2020) (informative). In *Sand II*, the Petitioner stipulated that it "will not pursue the same grounds in the district court litigation." *Id.* at 12. The Board in *Sand II* determined that, under the circumstances in that case, the stipulation marginally weighed against denial. *Id.* To be sure, a broader stipulation, such as agreeing not to "pursue any ground raised or that could have been reasonably raised," might better address the concerns over duplication to a greater degree. *See id.* at 12 n.5. Nevertheless, like in *Sand II*, the fourth *Fintiv* factor marginally weighs against denial because Petitioner's stipulation mitigates duplication of effort at least to some degree. *Id.*

5. Fifth Factor: Whether the petitioner and the defendant in the parallel proceeding are the same party

If the petitioner is the defendant in the parallel proceeding, this factor weighs in favor of denial. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper

15 at 55 (PTAB May 13, 2020) (informative) (applying the fifth *Fintiv* factor); *see also Sand II*, Paper 24 at 12–13 (informative) ("Although it is far from an unusual circumstance that a petitioner in *inter partes* review and a defendant in a parallel district court proceeding are the same, or where a district court is scheduled to go to trial before the Board's final decision would be due in a related *inter partes* review, this factor weighs in favor of discretionary denial.").

Here, Petitioner is the defendant in the parallel litigation. *See, e.g.*, Pet. 64–65. Thus, the fifth *Fintiv* factor weighs in favor of exercising discretion to deny institution.

6. Sixth Factor: Other circumstances that impact the Board's exercise of discretion, including the merits

When considering whether to exercise discretion to deny a petition, the Board assesses "all the relevant circumstances in the case," including the Petition's merits. *Fintiv* Order 14–16. Strong merits typically favor granting institution. *Id.* Weak merits favor denial. *Id.*

Petitioner has shown a reasonable likelihood of prevailing as to the unpatentability of at least one of the challenged claims. *Infra* § III. Here, the sixth *Fintiv* factor is neutral.

7. Fintiv *Factors: Conclusion*

We consider the *Fintiv* factors in a holistic analysis. *Fintiv* Order 6. Under that analysis, the factors weigh against exercising our discretion to deny institution of *inter partes* review. Thus, we decline to exercise our authority to deny institution of *inter partes* review based on the parallel litigation.

B. Parallel Petitions

In deciding whether to institute *inter partes* review, we consider the guidance in the Consolidated Trial Practice Guide, which sets forth the following:

> Parallel Petitions Challenging the Same Patent. Based on the Board's experience, one petition should be sufficient to challenge the claims of a patent in most situations. Two or more petitions filed against the same patent at or about the same time (e.g., before the first preliminary response by the patent owner) may place a substantial and unnecessary burden on the Board and the patent owner and could raise fairness, timing, and efficiency concerns. *See* 35 U.S.C. § 316(b).

Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019) 59, https://www.uspto.gov/TrialPracticeGuideConsolidated ("TPG").

Petitioner filed one other petition requesting *inter partes* review of the '711 patent. Paper 3 (Explanation of Multiple Petitions, identifying the present Petition ("the 1310 Petition") and the petition in IPR2021-01309 ("the 1309 Petition")). Petitioner argues that the two petitions present materially distinct challenges to unique subsets of claims and are necessary because of the large number of claims that were initially asserted in district court litigation. *Id.* at 2. Petitioner argues, "All but one of the claims challenged in the present petitions were identified by Patent Owner as asserted in its initial infringement contentions." *Id.* (citing Ex. 1024, 5). The record shows that, in the related litigation, Patent Owner later narrowed its assertion to nine claims of the '711 patent: claims 1, 4, 6, 9, 24, 40, 42, 43, and 46. Ex. 2002, 1 (Narrowed List of Asserted Claims).

Patent Owner contends the Board should exercise its discretion to deny the Petition in view of the parallel petition. Prelim. Resp. 46. Petitioner's two petitions collectively challenge seventeen claims, most of

which fall into the narrowed list of asserted claims. *Id.* at 47. In Patent Owner's view, this does not "constitute a 'rare' situation warranting two petitions." *Id.* Patent Owner argues that Petitioner has not adequately explained why the challenges could not have been presented in a single petition. *Id.* at 48–52.

We disagree with Patent Owner's arguments, and we find Petitioner's explanation for filing two petitions challenging claims of the '711 patent to be sufficient. Paper 3. Given the complexity and differences in subject matter recited in the claims, we agree that the use of a single petition was not practical. *See id.* We also are persuaded by Petitioner's arguments about fairness and efficiency in considering the challenges presented in both petitions concurrently. *Id.*

Patent Owner argues that the word limit itself does not weigh against discretionary denial, and Patent Owner cites other Board decisions to argue that seventeen claims is not an extraordinary number. *Id.* at 48–49. But instead of considering the word limit or whether the number of challenged claims falls above or below a threshold, we consider all the facts in a given case in reaching a decision, accounting for fairness, timing, and efficiency concerns. *See* TPG, 59. Here, the number of claims as well as the complexity and differences in subject matter recited in the claims have been considered. *See id.*

In particular, Petitioner asserts that "[t]he second petition is not submitted to present additional grounds of challenge or invalidity theories for the same claims addressed in first petition." Paper 3, 3. We find Petitioner's argument persuasive because the overlapping challenges to the independent claims provide the necessary foundation for challenging the subject matter recited in dependent claims, which do not overlap. *Id.* For

example, claims 7 and 8 recite subject matter involving different sensors and filter arrays from those recited in claim 2, but both sets of claims require the features recited in independent claim 1. *See* Ex. 1001; Pet. Here, Petitioner used two different rationales to address the subject matter recited in each claim set. *See* Pet. In this way, we agree with Petitioner that the petitions present materially different challenges, each to a unique subset of '711 patent claims. Paper 3, 1.

We disagree with Patent Owner's argument that "Petitioner happened to divide the subject matter of the two petitions based on claims instead of grounds does not excuse Petitioner from having to demonstrate a need for multiple petitions." Prelim. Resp. 50. Rather, Petitioner's grounds cover separate sets of claims and different subject matter. *See id.* at 47. For example, the 1309 Petition addresses claim 8 under the Fisker ground alone, not with Colonna de Lega-Min, and the 1310 Petition addresses claim 2 under the Fisker ground alone. *See id.* Similarly, claim 7 is addressed only by the Colonna de Lega-Min ground in the 1309 Petition. *Id.* So, even if Petitioner divided the Petitions by grounds instead of claims (e.g., covering all Fisker-based grounds with one Petition), there would still be two Petitions.

For all the reasons discussed in this section, we do not exercise our discretion to deny the Petition in view of the parallel petition.

C. Discretionary Denial Under 35 U.S.C. § 325(d)

Section 325(d) provides that the Director[2] may "reject the petition" on the basis that "the same or substantially the same prior art or arguments

[2] The Board institutes trial on behalf of the Director. 37 C.F.R. § 42.4(a).

previously were presented to the Office." In determining whether to exercise that discretion, the Board applies a two-part framework:

> (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and (2) if either condition of [the] first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH, IPR2019-01469, Paper 6, 8 (PTAB Feb. 13, 2020) (precedential).

In applying this framework, the Board considers the following non-exclusive factors:

> (a) the similarities and material differences between the asserted art and the prior art involved during examination;
>
> (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
>
> (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
>
> (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
>
> (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
>
> (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8, 17–18 (Dec. 15, 2017) (precedential as to § III.C.5, first paragraph).

Patent Owner argues that we should deny the Petition under § 325(d) because Fisker was cited in an IDS[3] considered by the examiner during prosecution. Prelim. Resp. 52–58. Patent Owner also argues that Yamada was considered during prosecution. *Id.* at 57–58.

Patent Owner's arguments are directed only to Fisker and Yamada. *See id.* Yet the Petition also challenges the patent with a combination of references that was not previously presented to the Office: Colonna De Lega and Min. *See* Pet. 63–64 (citing Ex. 1005, 214–215). Ground 3 is solely based on that combination, not on Fisker or Yamada, and Ground 4 relies primarily on Colonna De Lega and Min. *Id.* at 40. So a substantial part of the Petition does not rely on the same or substantially the same prior art or arguments that were previously presented to the Office under part one of the *Advanced Bionics* framework. *See Advanced Bionics,* Paper 6, 8. Thus, we decline to exercise our discretion to deny this petition under section 325(d). *See id.*

D. Level of Ordinary Skill in the Art

Petitioner asserts that a person having ordinary skill in the art

> in the relevant field prior to February 13, 2013, would include someone who had: (1) at least a bachelor's degree in electrical engineering, computer engineering, physics, or an equivalent field, as well as at least one or two years of experience in optical scanning; or (2) at least five years of comparable experience in optical scanning; or (3) an equivalent combination of academic study and work experience. A POSA would have been aware of 3D imaging systems, color imaging apparatuses, image processing techniques, and their known uses.

[3] Information Disclosure Statement

Pet. 10 (citing Liang Decl. ¶¶ 51–55).[4] Patent Owner does not dispute Petitioner's assertion. *See* Prelim. Resp.

Considering the types of problems and solutions described in the '711 patent and the cited prior art, we preliminarily agree with Petitioner's proposed definition of the level of ordinary skill in the art. Pet. 10. If Patent Owner proposes a different definition, the parties are encouraged to explain how the differences between their definitions affect the unpatentability analysis.

E. Claim Construction

For petitions filed on or after November 13, 2018, we use the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of the claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *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, 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)). The Petition was filed on July 23, 2021. Paper 1. So we apply the claim construction standard from *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc).

Under the *Phillips* standard, claim terms are generally given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution

[4] The Declaration of Rongguang Liang Ph.D. ("Liang Decl.") is Exhibit 1002.

history, other claims, and even extrinsic evidence. *Id.* at 1312–17. But extrinsic evidence is "less significant" than the intrinsic record. *Id.* at 1317. The specification is the "single best guide" to a disputed term's meaning. *Id.* at 1315. It "may reveal a special definition given to a claim term." *Id.* at 1316. Or it may reveal "an intentional disclaimer, or disavowal, of claim scope." *Id.*

Petitioner asserts that asserted constructions of a "multichromatic probe light for illumination of the object" are: a "light having more than one color at the same time, that strikes the object" or "a probe light with more than one color, or shade of color, at the same time that illuminates the object." Pet. 12–13 (citing Ex. 1017, 5; Ex. 1021, 4).

Petitioner asserts that the terms "image pixels" and "image sensor pixels" should be construed to refer to the same thing: "pixels on the image sensor." *Id.* at 13 (citing Ex. 1017, 7).

Petitioner asserts that the terms "block of the image sensor pixels" and "blocks of image sensor pixels" should be construed as "two or more adjacent pixels on the image sensor." *Id.* (citing Ex. 1017, 11; Ex. 1018, 10).

Petitioner asserts that the term "data processing system" is "not a means-plus-function term, but, if considered a means-plus-function term," the corresponding structure is "'one or more processors, or one or more processors and computer readable medium; and algorithm(s)' that performs the functions expressly recited in the claims (e.g., 'for deriving surface color for a second set of pixels on the image sensor within the block')." *Id.* at 13–14 (citing Ex. 1017, 15; Ex. 1018, 11, 14).

Petitioner asserts that the term "low weight" includes "zero weight." *Id.* at 14 (citing Ex. 1002 ¶ 63).

Patent Owner does not contest any of the Petitioner's asserted claim constructions. *See* Prelim. Resp. 5.

Patent Owner, though, argues that "Petition should be denied because the Petition fails to comply with the requirements of 37 C.F.R. § 42.104(b)(3)." *Id.* at 43. According to that rule,

> Where the claim to be construed contains a means-plus-function or step-plus-function limitation as permitted under 35 U.S.C. 112(f), the construction of the claim must identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function.

37 C.F.R. § 42.104(b)(3). In Patent Owner's view, Petitioner contends that "data processing system" is a means-plus-function term, but the Petition fails to identify the description of the corresponding structure, material or acts, as required by the rule. *See* Prelim. Resp. 43–44. We disagree.

Petitioner's primary construction is that the recited "data processing system is '*not* a means-plus-function term.'" Pet. 13–14. Patent Owner does not provide arguments directed to this construction or otherwise specifically rebut this assertion. Prelim. Resp. 43–44. For the purposes of institution, Petitioner's construction of "data processing" system is adequately supported. *See* Pet. 13–14. Thus, we apply that construction here and do not deny the Petition on the basis of 37 C.F.R. § 42.104(b)(3).

F. Obviousness over Colonna de Lega and Min

Petitioner asserts that claims 1, 9–11, 40, and 42 are unpatentable as obvious over Colonna de Lega and Min. Pet. 40–55.

1. Colonna de Lega

Colonna de Lega produces a three-dimensional image of an object. Ex. 1007, 1:16–17, 1:30–2:2. Some embodiments combine height

information with color or other surface information. *Id.* at 2:24–25, 27:20–26. Figure 1, below, shows an example system. *Id.* at 6:20–21, 7:30–31.

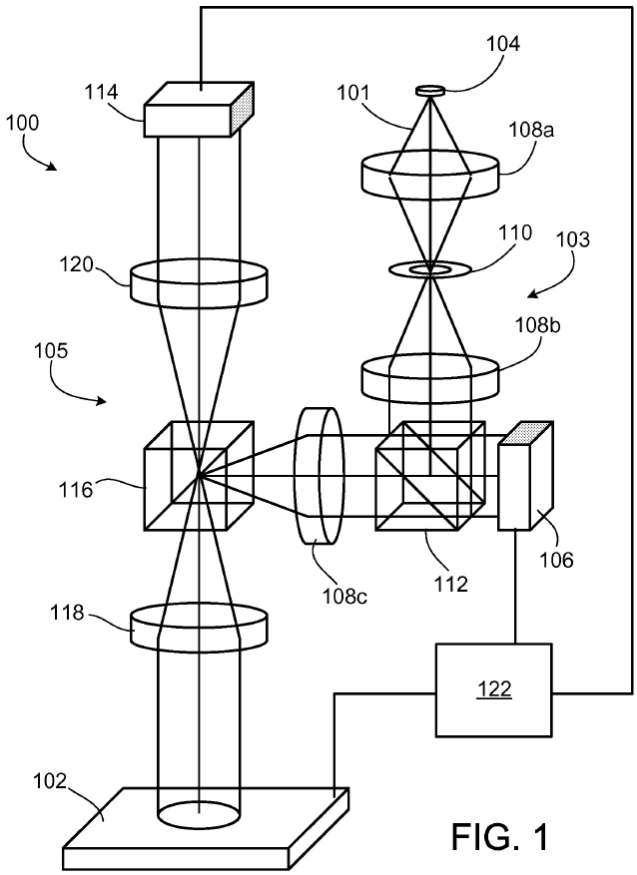


FIG. 1

Figure 1, above, shows that illumination portion 103 illuminates object 102. *Id.* at 7:31–33, 8:6–20. Illumination source 104 which may be a white-light LED or an array of monochromatic LEDs. *Id.* at 7:31–32, 28:1–4. In the monochromatic-LED array, each LED emits light of a different wavelength in the visible spectrum. *Id.*

Imaging portion 105 records the light reflected by object 102. *Id.* 8:1–2, 8:19–25. To obtain object 102's surface topology, the captured light intensity signals are processed using pattern matching techniques. *Id.* at 9:17–19. The topographical data is combined with color image to produce the object's 3D visualization. *Id.* at 28:5–14; *see id.*, Figs. 19A–19C.

2. Min

Min uses a color filter array in an image sensor that detects both color image information and depth information. Ex. 1008 ¶ 2; *see id.* ¶ 57. Figure 3, below, shows exemplary color filter array. *Id.* ¶¶ 27, 34.

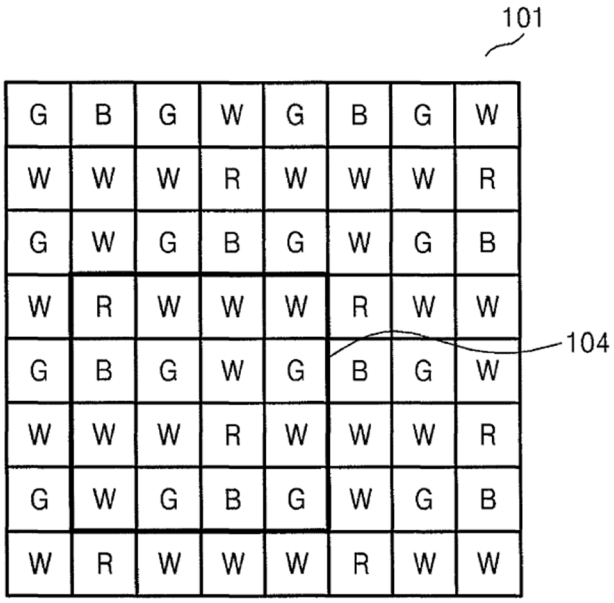


FIG. 3

Figure 3, above, shows arrangement of the red, green, blue, and white filters, which are labeled as *R*, *G*, *B*, and *W*. *Id.* As shown in Figure 3, 4×4 matrix 104 of color matrix 101 includes eight white filters, two red filters, four green filters, and two blue filters. *Id.* ¶ 35. The red, green, and blue filters are color filters. *See id.* ¶¶ 41, 52, 57. The white filters are used for depth information. *Id.* The filters are arranged over respective corresponding photoelectric conversion units, forming respective corresponding pixels. *Id.* ¶¶ 37–38; *see id.* ¶ 30, Fig. 4.

3. Claim 1

a) Deriving Geometry and Color Information

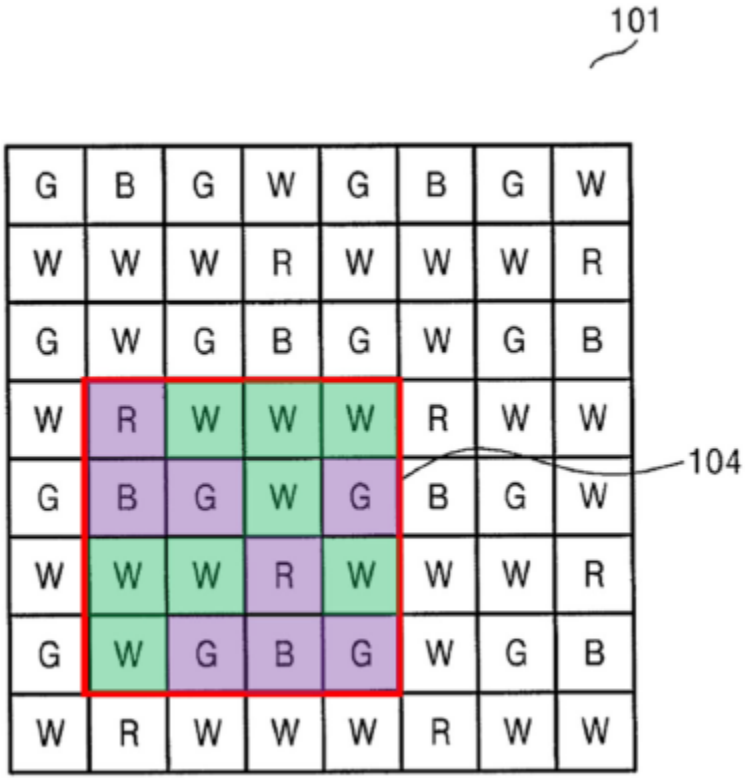
Petitioner asserts that the subject matter of claim 1 would have been obvious over Colonna de Lega and Min. Pet. 41–49.

According to Petitioner, "Colonna de Lega teaches a scanner system configured to derive an object's surface geometry and surface color information where a multichromatic light source and a color image sensor having a color filter array are used to illuminate and image the object." Pet. 40 (citing Liang Decl. ¶¶ 156–57). Petitioner asserts that Colonna de Lega teaches that the data processing system derives color information from a light intensity signal captured at each pixel. *Id.* at 46 (citing Ex. 1007, 27:20–28; Liang Decl. ¶ 181). Petitioner, though, asserts that "Colonna de Lega does not expressly state that geometry and color information are derived for first and second sets of pixels, respectively" (*id.* at 40), as recited in claim 1:

> a data processing system configured to derive surface geometry information for a *first set* of image pixels within a block of the image sensor pixels from a series of 2D images recorded by the color image sensor,
>
> the data processing system further configured to derive surface color information for a *second set* of image pixels within the block of the image sensor pixels from at least one 2D image recorded by the color image sensor . . . *wherein the first set of the image sensor pixels is different from the second set of the image sensor pixels.*

Ex. 1001, 19:53–65 (emphasis added).

Petitioner asserts that Min teaches a color image sensor with a color filter array having a unit matrix comprising three types of color filters (red, green, and blue) for deriving color information (highlighted in purple below). Pet. 45. Min's figure showing the color filters is reproduced below with Petitioner's annotations. *Id.*



The figure above shows Min's *W* filters in green and a subset of color filters in purple. *Id*.

Petitioner asserts that "Min demonstrates the known use of a color image sensor in which one set of pixels is used to capture data for deriving surface geometry information and another set is used to capture data for deriving surface color information." *Id.* at 40 (citing Liang Decl. ¶¶ 158–59). According to Petitioner, a person of ordinary skill in the art "would have sought to use a color image sensor having a color filter array like that taught by Min in a scanner system like Colonna de Lega in order to derive both surface geometry information and surface color information from the same 2D image." *Id.* (citing Liang Decl. ¶¶ 26–23, 160–61); *see also id.* at 41–49 (Petitioner's element-by-element analysis).

For the reasons discussed in the sections that follow, we determine that Petitioner has sufficiently shown that the Colonna de Lega-Min combination teaches or suggests the recited data processing system, at this stage and on this preliminary record.

b) Min's Filter Array

Petitioner asserts that it would have been obvious to a person of ordinary skill in the art "to use a color image sensor having a color filter array like Min in a scanner system like Colonna de Lega." Pet. 45.

Patent Owner disagrees and argues that Colonna de Lega's system would be unable to obtain depth information using Min's filter array. Prelim. Resp. 26–31. According to Patent Owner, Colonna de Lega's system detects intensity at each pixel of the image-recording device, and its depth-profiling capability "arises from" this type of detection. *Id.* at 28–29 (citing Ex. 1007, 9:33–10:4). In Patent Owner's view, Petitioner's proposal to use Min's filter array would be contrary to Colonna de Lega's intended purpose and principle of operation. *Id.* at 29–31.

According to Patent Owner, Min uses only half of the filters to obtain depth data, and the Petition does not explain how this would provide sufficient depth data. *Id.* at 31–32 (citing Ex. 1008 ¶¶ 25, 35). In Patent Owner's view, Colonna de Lega emphasizes the importance of using each pixel. *Id.* at 31 (citing Ex. 1007, 9:14, 9:23–26, 9:33–10:4, 13:1–5, 13:15–19). Patent Owner argues that Petitioner had the burden of explaining (1) how the proposed combination would make up for the missing depth pixels and (2) why one of ordinary skill in the art would have used Min's filter array despite this shortcoming. *Id.* at 31–32.

Patent Owner's arguments (*id.* at 29–32) are not rooted in any limitation that requires depth at each pixel. Rather, the basis for Patent

Owner's argument is a feature from Colonna de Lega (depth from every pixel) that is not part of Petitioner's obviousness analysis. *Id.* So at this stage and on this record, it is not apparent that Petitioner needed to cover the details of how proposed combination would make up for the missing depth pixels. *Id.* at 31–32.

Nor is does the preliminary record suggest that using Min's filter array would be contrary to Colonna de Lega's intended purpose and principle of operation. *Id.* at 29–31. For example, Patent Owner does not argue or produce sufficient evidence that Colonna de Lega requires the "missing depth pixels." *Id.* at 31–32. It is possible that a fully developed record here will show that one of ordinary skill in the art would have been able to compensate for the fact that Min uses only half of the filters to obtain depth data. *Id.* Patent Owner's argument, though, appears to assume that the ratio of filters is the only parameter that is capable of being changed. *Id.*

As for the sufficiency of Petitioner's obviousness analysis, the claim does not require a specific number of depth pixels. So, at this stage and on this preliminary record, we disagree that Petitioner needed to explain how one of ordinary skill in the art would allocate enough filters to obtain depth information. *Id.*

Petitioner further asserts that "a color image sensor having a color filter array like Min would *perform the same functions* as the image sensor taught by Colonna de Lega." Pet. 55 (emphasis added).

Patent Owner disagrees. Prelim. Resp. 40 (quoting Pet. 55). Patent Owner argues that a person of ordinary skill in the art would not have expected that Colonna de Lega's image sensor would provide the same functions if the Bayer filter array were replaced with Min's. *Id.* at 39–42. According to Patent Owner, "The use of Min's filter array with Colonna de

Lega would not function in the 'same' manner because it would utilize less pixels, resulting in color resolution degradation, as explained above." *Id.* at 40.

Yet we disagree with Patent Owner's argument, on this preliminary record and at this stage, because Petitioner stated that Min's array would "perform the same functions" (Pet. 55), not perform in the "function in the 'same' manner" (Prelim. Resp. 40). The test for obviousness does not require that Min perform the same functions in the same way individually and in combination. Nor does that test require that a single reference must teach or suggest all claimed limitations, as Patent Owner's argument suggests.

c) Signal-to-Noise Ratio

Petitioner asserts that using Min's filter array with Colonna de Lega would "avoid a decrease in signal-to-noise ratio, allowing the system to obtain accurate depth information." Pet. 54 (citing Ex. 1008 ¶¶ 5–7; Liang Decl. ¶ 160).

Patent Owner disagrees and argues that Colonna de Lega does not have the problems that Min's array purports to address. Prelim. Resp. 32–37. According to Patent Owner, Min teaches that signal-to-noise ratio decreases when reducing the size of the depth-detecting pixels, yet Petitioner does not explain why Colonna de Lega' pixel size would decrease or otherwise suffer from this issue in the first place. *Id.* at 32–33 (citing Ex. 1008 ¶ 5). Patent Owner argues that, in fact, one of ordinary skill in the art would not have reduced pixel size in view of Min's teachings. *Id.* at 33.

We disagree with Patent Owner's argument because it takes the Petitioner's statement about the signal-to-noise ratio out of the context in which it was presented. In particular, Petitioner's reasoning about the signal-

to-noise ratio is cumulative to the other reasons discussed above. *See* Pet. 54 ("*In addition*, and consistent with Min's express teachings, a POSA would have understood this combination would avoid a decrease in signal-to-noise ratio, allowing the system to obtain accurate depth information . . ."") (emphasis added). That is, Petitioner explains that Min can confer other advantages that Petitioner discussed while avoiding the signal-to-noise ratio decrease, not that the decrease was the only reason for adding Min. *See id.* By taking the statement out of the context in which other advantages were discussed, Patent Owner mischaracterizes Petitioner's obviousness rationale. *See* Prelim. Resp. 32–36.

At this stage, Petitioner's showing is sufficient for the purpose of institution, and we leave the issues about the signal-to-noise ratio raised by Patent Owner's arguments to be resolved on a fully developed record. *See id.*

d) Simultaneous 3D and Color Imaging

Petitioner asserts that it would have been obvious to "to incorporate a color image sensor having a filter array like Min into a scanner system like Colonna de Lega so as to enable simultaneous 3D and color imaging." Pet. 54 (citing Liang Decl. ¶ 160).

In response, Patent Owner argues that (1) this rationale does not overcome the fundamental problem with the combination, i.e., depth is not obtained at each pixel, (2) Petitioner does not provide any reason why simultaneous imaging is desirable in Colonna de Lega, and (3) the Petition lacks evidence that Min provides simultaneous imaging. Prelim. Resp. 35–36.

At this stage and on this record, we disagree with arguments (1) and (2) for the reasons discussed above. *See supra* § II.F.3.b). As for (3), the

Petition explains that Min's *W* filters are used in capturing data for surface geometry and *R*, *G*, and *B* filters are used to capture data for color. Pet. 45, 54. For example, Petitioner asserts that applying Min's filter array and interpolation method would provide "a complete data set for each pixel." *Id.* at 54.

This "complete data set" includes both color data (*RGB* values) and topography data (from the *W* values). *Id.* (citing Liang Decl. ¶¶ 41–42, 160). And we preliminarily determine that Petitioner has shown that Min captures the data at a focus position. *See, e.g.*, *id.* Thus, Petitioner's assertions about the complete data set are adequately supported at this stage and on this record. *See id.*

Patent Owner argues that Min's filter array is incompatible with Colonna de Lega's illumination pattern. Prelim. Resp. 37–38. In Patent Owner's view, the incompatibility is that Min's filter array would mask the sensor pixels associated with *R*, *G*, and *B*, which would be used for color and not depth. *Id.* According to Patent Owner, Colonna de Lega's spatial light modulator (SLM) changes the illumination pattern over time, but Min's *W* filters would have to coincide with this pattern to receive light. *Id.* at 38. Patent Owner argues that Petitioner failed to meet its burden by not explaining how Colonna de Lega's SLM would work with Min's array. *Id.* at 37–38.

But it is well settled that "a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements." *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citations omitted). Nor is the test for obviousness whether a secondary reference's features can be bodily incorporated into the structure of the primary reference. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. *Id.*

On this preliminary record, Patent Owner's argument here appears to assume that Petitioner's combination requires substituting Min's teachings into Colonna de Lega without further modification. Prelim. Resp. 37–38. Although Patent Owner's argument (*id.*) might benefit from a fully developed record, we disagree at this stage because the argument appears to incorrectly assume that bodily incorporation is the test for obviousness. *Keller*, 642 F.2d at 425. Even so, the record at this preliminary stage does not indicate that incorporating Min's filter array in Colonna de Lega would have been uniquely challenging or beyond the capabilities of one of ordinary skill in the art.

e) Demosaicing

Claim 1 recites, in part,

> the data processing system further configured to derive surface color information for a second set of image pixels within the block of the image sensor pixels from at least one 2D image recorded by the color image sensor, *wherein the surface color information is obtained by demosaicing the second set of the image sensor pixels,*

Ex. 1001, 19:57–63 (emphasis added).

As for this limitation, Petitioner asserts that Min obtains surface-color information by demosaicing in the way recited in the claims. Pet. 47. According to Petitioner, "Min uses 'a bilinear demosaic algorithm' to interpolate a color signal output for a particular image sensor pixel (e.g., a green signal output) based on neighboring pixel signals associated with the particular color filter (e.g., image sensor pixels associated with green filters)." *Id.* at 47–48 (citing Ex. 1008 ¶¶ 47, 51–52; Liang Decl. ¶ 184).

According to the Petition, "This allows each of red, blue, and green signals to be interpolated to each pixel in the color image sensor, which allows the system to derive full color information from the captured 2D image." *Id.* at 48 (citing Liang Decl. ¶ 184). Petitioner also asserts that Min performs an interpolation method (i.e., a demosaicing process) on each light signal from the pixel array to estimate color and depth. *Id.* at 53.

Patent Owner argues that Min does not teach, nor does the Petition explain, how the *R* and *B* signals are interpolated. Prelim. Resp. 40–42. Patent Owner also argues that the Petition does not shown why "a POSA would have reasonably expected that interpolation would yield functionally the 'same' color information as that obtained using a Bayer filter array disclosed by Colonna de Lega." *Id.* at 42.

We disagree with Patent Owner's argument, on this preliminary record and at this stage, because Petitioner stated that Min's array would "perform the same functions" (Pet. 55), not perform in the "function in the 'same' manner" as Patent Owner argues (Prelim. Resp. 40). The test for obviousness does not require that Min perform the same functions in the same way individually and in combination. *See Keller*, 642 F.2d at 425.

We also disagree with Patent Owner's argument about Min's *R* and *B* interpolation for at least the reason that Patent Owner does not provide sufficient evidence on this record that one of ordinary skill in the art would not understand how to perform this interpolation from Min's teachings. *See* Prelim. Resp. 40–42. Rather, Min discloses equations (1) through (3) for interpolating the missing green pixels. *See, e.g.*, Ex. 1008 ¶¶ 48–50, *discussed in* Prelim. Resp. 41. A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton. *KSR*, 550 U.S. at 421. One must account for "the inferences and creative steps that a person of ordinary

skill in the art would employ." *Id.* at 418. We disagree with Patent Owner's arguments for the additional reason that the arguments do not account for these inferences and steps. *See* Prelim. Resp. 40. At this stage, Petitioner's showing is enough for the purpose of institution, and we leave Patent Owner's questions about the sufficiency of Min's disclosure to be resolved on a fully developed record. *See* Pet. 42–44.

f) "special demosaic algorithm"

Petitioner asserts that the Colonna de Lega-Min combination would avoid "the need for a special demosaic algorithm to achieve signal interpolation." Pet. 54 (citing Ex. 1008 ¶¶ 5–7; Liang Decl. ¶ 160). In the cited passage, Min teaches that "when filters that constitute the color filter array are not uniformly distributed, the image sensor needs a special demosaic algorithm in order to achieve signal interpolation." Ex. 1008 ¶ 5.

Patent Owner disagrees with Petitioner's rationale and argues that Colonna de Lega does not use or need a special demosaic algorithm. Prelim. Resp. 33–35. According to Patent Owner, Colonna de Lega uses a Bayer filter array that is not any more non-uniformly distributed than Min's filters, which have the added complexity of using *W* filters. *Id.* Patent Owner illustrates this point with the diagram shown below. *Id.* at 34.

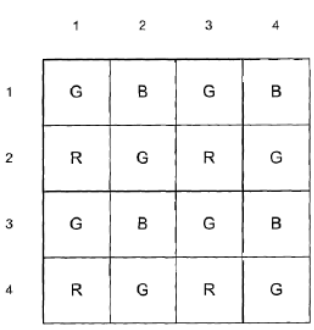


Figure 1 of Acharya (Exhibit 1009)

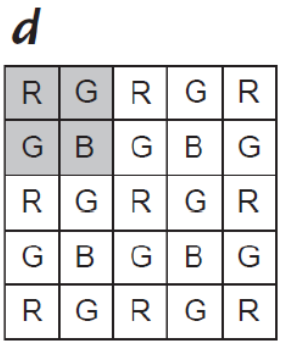


Figure 7.20d of Jahne (Exhibit 1020)

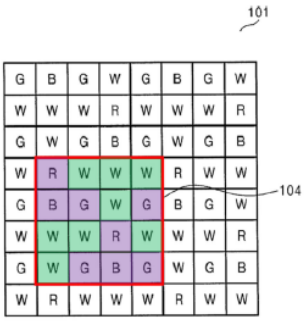


Figure 3 of Min (Exhibit 1008, Annotated by Petitioner)

The figure above shows Patent Owner's comparison of Acharya's Figure 1, Jahne's Bayer filter array (Fig. 7.20d), and Min's filter array that is annotated by Petitioner. *Id.* Patent Owner argues that these figures show that Min's filter array actually is more non-uniformly distributed than a Bayer filter array as shown by Jahne. *Id.* In Patent Owner's view, the *R*, *G*, and *B* filters in Min repeat less frequently than in the Bayer filter array, as shown in these figures. *Id.* at 35.

On this preliminary record, we disagree with Patent Owner's argument because it takes Petitioner's statement about special algorithms out of the context in which it was presented. *See id.* In particular, Petitioner's reasoning about the "special demosaic algorithm" is cumulative to the other reasons discussed above. *See* Pet. 54 ("*In addition* . . . a POSA would have understood this combination would . . . avoid the need for a special demosaic algorithm to achieve signal interpolation.") (emphasis added). That is, Petitioner explains that Min can confer the other advantages that Petitioner discussed without the need for a special algorithm, not that the lack of a special algorithm was the sole basis for adding Min. *See id.* By taking the statement about special algorithms out of the context in which

other advantages were discussed, Patent Owner mischaracterizes Petitioner's obviousness rationale. *See* Prelim. Resp. 33–35.

Also, Patent Owner does not present sufficient evidence about the degree of non-uniformity that would require, or benefit from, a special demosaic algorithm. *Id.* On the preliminary record, Patent Owner's argument appears to be premised on a mischaracterization of Petitioner's obviousness rationale. *See id.*

For the reasons discussed above, Petitioner sufficiently articulates why one of ordinary skill in the art would have combined Colonna de Lega and Min on this record and at this preliminary stage.

g) Remaining Limitations and Claims

We have reviewed Petitioner's arguments and evidence about the remaining limitations from claim 1 and claims not discussed above. *See* Pet. 40–55. We determine that Petitioner's showing is sufficient at this stage and on this record.

At this stage of the proceeding, we determine that the Petition shows a reasonable likelihood that Petitioner would prevail with respect to claim 1 on this ground.

G. Obviousness over Colonna de Lega, Min, and Yamada

Petitioner asserts that claims 23 and 24 are unpatentable as obvious over Colonna de Lega, Min, and Yamada. Pet. 55–59.

1. Yamada

Yamada generally relates to false-color pixel correction. Ex. 1010 ¶ 121. In photography, false color is a phenomenon in which a color shift from chromatic aberration appears around a white-saturated portion. *Id.* ¶¶ 2–3, 84. This shift creates a false color, such as purple. *Id.* Yamada's technique classifies pixels in a captured image as white-saturated

pixels, false-color (purple fringe) pixels or pixels that are neither a white-saturated nor purple-fringe pixels. *Id.* ¶ 122. Yamada's correction processing uses the surrounding pixel value to set the value for the identified false-color pixels. *Id.* ¶ 217.

2. Claims 23 and 24

Claim 23 recites, "The scanner system according to claim 1, wherein the data processing system is configured to: detect a saturated pixel in 2D images recorded by the block of the image sensor pixels; and mitigate or remove the error in the derived surface color information or the sub-scan color caused by the saturated pixel." Ex. 1001, 21:28–34.

Petitioner asserts that Colonna de Lega and Min teach a scanner system having a data processing system configured to derive surface-color information. Pet. 55. According to Petitioner, "A POSA would have understood that configuring such a data processing system to detect a saturated pixel and mitigate or remove the error caused by the saturated pixel was a common method routinely used when generating color images, as illustrated by Yamada." *Id.* at 56 (citing Liang Decl. ¶¶ 223–29).

Petitioner asserts that "Yamada teaches a data processing system that is configured to detect a saturated pixel (e.g., a white-saturated pixel) in 2D images recorded by the block of image sensor pixels, and mitigate or remove error (e.g., false color) in the derived surface color information or the sub-scan color caused by the saturated pixel." *Id.* (Liang Decl. ¶ 225).

Similarly, claim 24 recites, "The scanner system according to claim 23, wherein the error caused by the saturated pixel is mitigated or removed by assigning a low weight to the surface color information of the saturated pixel in the computing of the smoothed sub-scan color and/or by assigning a

low weight to the sub-scan color computed based on the saturated pixel." Ex. 1001, 35–40.

Petitioner asserts that Yamada corrects the color value for false-color pixel 302 by interpolating the pixel color based on the pixel values of neighboring pixels 303 (i.e., neither white-saturated nor false-color pixels). Pet. 58 (citing Ex. 1010 ¶¶ 123–24, Fig. 10B). Petitioner asserts that Yamada excludes the surface-color information of saturated pixels from the calculations by interpolating the new color values for the false-color pixels. *Id* (citing Ex. 1010 ¶¶ 123–25). Petitioner asserts that "Yamada teaches mitigating or removing false color errors caused by saturated pixels by assigning a low weight (i.e., assigning no or zero weight) to the surface color information of the saturated pixel in the computing of the sub-scan color, as recited in claim 24." *Id.* (citing Liang Decl. ¶ 231).

Patent Owner argues that "Petitioner fails to satisfy its burden with respect to the challenged dependent claims for at least the reasons discussed above with respect to independent claim 1." Prelim. Resp. 43 (citing Section V.C. of the Response). We disagree for the same reasons discussed above. *See supra* § II.F.

Patent Owner further argues that Petitioner fails to demonstrate a reasonable likelihood of success with respect to Ground 4 based on Colonna de Lega, Min, and Yamada. Prelim. Resp. 42.

On this preliminary record and at this stage, we disagree with Patent Owner. *Id.* Patent Owner does not provide additional substantive arguments specifically addressing Petitioner's assertions regarding Yamada. *See id.*

Also, Petitioner's assertions are adequately supported on the preliminary record and for the purpose of institution. For example, Petitioner explains that there would have been a reasonable likelihood of success

because a person of ordinary skill in the art "would have understood that Min's white filters would not impact Yamada's method because the processing would be expected to act only on the color values of each pixel, not the captured or interpolated depth values." Pet. 58 (citing Liang Decl. ¶ 227). According to the Petition, one of ordinary skill in the art "would have had a reasonable expectation of success in using a method like Yamada in a scanner system like Colonna de Lega with a color image sensor like Min because it would involve routine components and the application of conventional methods having predictable results." *Id.*

On this preliminary record and at this stage, Petitioner has sufficiently shown that there would have been a reasonable expectation of success with respect to the combination of Colonna de Lega, Min, and Yamada. *Id.* at 57–58.

H. Remaining Claims and Grounds

Petitioner has demonstrated a reasonable likelihood of prevailing in showing that at least the above-discussed claims are unpatentable as obvious. Thus, we will institute on all grounds and all claims challenged in the Petition. At this preliminary stage of the proceeding, we need not discuss every ground raised by Petitioner in detail. In the following sections, we provide guidance for trial concerning the Petition's remaining challenges.

1. Obviousness based on Fisker

Petitioner asserts that claims 1, 2, 9–11, 40, and 42 are unpatentable as obvious over Fisker, and claims 23 and 24 are unpatentable as obvious over Fisker and Yamada. Pet. 14–39.

2. Fisker

Fisker's scanner obtains the 3D geometry for the surface of an object. Ex. 1006 ¶ 23, code (57). In some embodiments, the scanner also registers the color of the individual surface elements with the surface topology. *Id.* ¶ 151. Figure 9, reproduced below, is a schematic presentation of an exemplary scanning device. *Id.* ¶ 228.

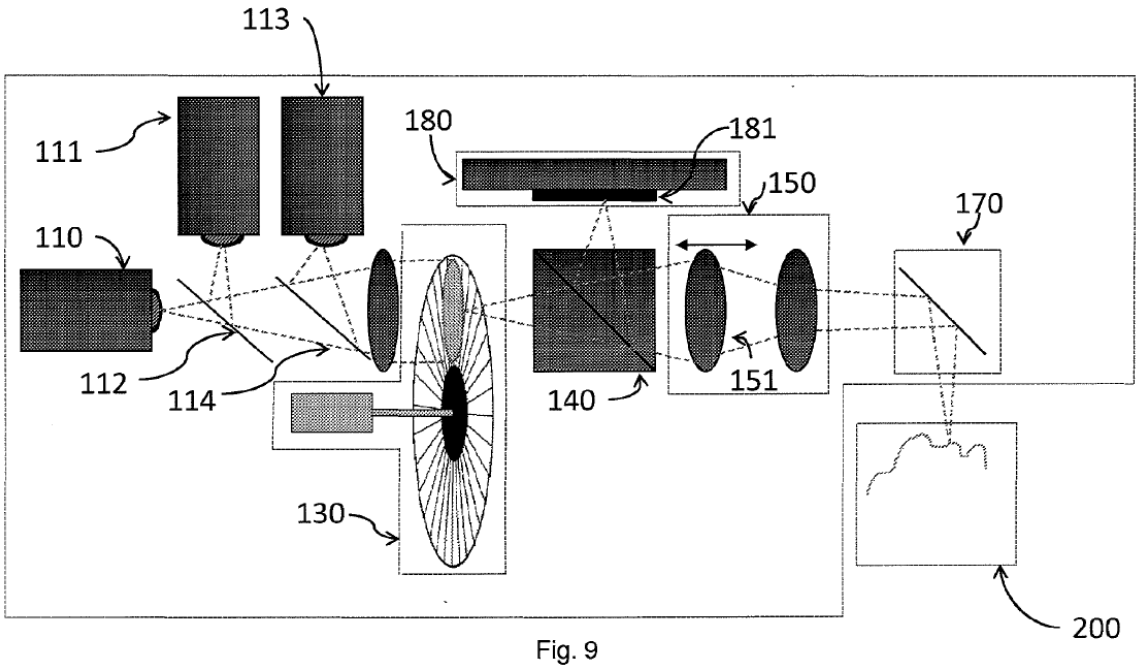


Fig. 9

As shown in Figure 9, three light sources 110, 111, and 113 emit red, green, and blue light, which are patterned, via pattern 130, onto object 200 scanned by image sensor 181. *Id.* ¶ 279; *see id.* ¶ 244. The focal imaging plane of the pattern on object 200 is shifted by adjusting focusing element 151 by physically moving a lens back and forth along an optical axis. *See id.* ¶¶ 244, 246, 279.

3. The Petition

Claim 1 recites, in relevant part,

> a data processing system configured to derive surface geometry information for a first set of image pixels within a block of the

image sensor pixels from a series of 2D images recorded by the color image sensor,

Ex. 1001, 19:53–56.

Petitioner asserts that Fisker suggests using the image-sensor pixels associated with one color-filter type in the color filter array for deriving surface-geometry information. Pet. 15–16. According to Petitioner, "Dr. Liang explains that, in this case, a POSA would have understood that the image sensor pixels associated with one color filter type in the color filter array (e.g., one of red, green, or blue filters, as would be found in a conventional color filter array) would be used to register the light signal amplitude at each focus plane position." *Id.* at 21. Petitioner asserts that, in this way, Fisker provides the data for deriving surface geometry. *Id.* (citing Liang Decl. ¶¶ 30–31, 93).

Patent Owner argues that the cited paragraphs from the Liang Declaration are about using a color filter array for color data, not geometry information. Prelim. Resp. 23–24. In Patent Owner's view, Petitioner cites only Dr. Liang's testimony for its assertions about using a color filter array for deriving surface geometry, and Dr. Liang's testimony is unsupported by the evidence of record. *Id.* at 24.

On this issue, the parties are invited to address, during trial, whether the Petition's citations to Fisker's discussion about how the scanner derives 3D geometry from 2D images (*see, e.g.*, Ex. 1006 ¶¶ 9–22, 28–32, 121, 192–93, 296, *cited in* Pet. 20–21) teach or suggest deriving "surface geometry information for a first set of image pixels within a block of the image sensor pixels from a series of 2D images recorded by the color image sensor," as recited in claim 1 (Ex. 1001, 19:53–56).

For example, the parties may address whether the Board should credit Dr. Liang's explanation about Fisker's registration of the light-signal amplitude at each focus-plane position. *See* Liang Decl. ¶¶ 28, 30–32, 90–94. The parties may also address whether this part of the Liang Declaration is adequately supported by the cited passages from Fisker, such as those related to Fisker's teachings about using one color to reduce the amount of data to be processed. Ex. 1006 ¶¶ 158, 280, *cited in* Pet. 21 (referring to section VI.A.3).

III. CONCLUSION

Petitioner has shown a reasonable likelihood of prevailing as to the unpatentability of at least one of the challenged claims. Patent Owner has not asserted a sufficient reason why we should exercise our discretion to deny institution of trial. Thus, we institute an *inter partes* review on all claims challenged in the Petition and on all grounds in the Petition.

IV. ORDER

It is

ORDERED that, under 35 U.S.C. § 314(a), an *inter partes* review of claims 1, 2, 9–11, 23, 24, 40, and 42 of the '711 patent is instituted for all grounds in the Petition; and

FURTHER ORDERED that, under 35 U.S.C. § 314(a), *inter partes* review of the '711 patent is instituted on this Decision's entry date, and under 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the trial's institution.

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