

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE LLC,
Petitioner,

v.

138 EAST LCD ADVANCEMENTS LIMITED,
Patent Owner.

IPR2024-00956
Patent 8,355,574 B2

Before KRISTEN L. DROESCH, GEORGE R. HOSKINS, and
BRIAN P. MURPHY, *Administrative Patent Judges*.

MURPHY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Google LLC (“Petitioner”) filed a Petition pursuant to 35 U.S.C. § 311 requesting institution of *inter partes* review of claims 1–12 of U.S. Patent No. 8,355,574 B2 (Ex. 1001; “the ’574 patent”). Paper 1 (“Pet.”). 138 East LCD Advancements Limited (“Patent Owner”) timely filed a Patent Owner Preliminary Response. Paper 6 (“Prelim. Resp.”).

We have jurisdiction under 35 U.S.C. § 314, which provides that an *inter partes* review may not be instituted “unless . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Under § 314, the Board may not institute review on fewer than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). If the Board institutes a review, it will institute “on all of the challenged claims and on all grounds of unpatentability asserted for each claim.” 37 C.F.R. § 42.108(a). Upon consideration of the Petition, the Preliminary Response, and the evidence of record at this stage of the proceeding, for the reasons set forth below, we determine Petitioner has demonstrated a reasonable likelihood it would prevail in showing the unpatentability of at least one challenged claim in the ’574 patent. Accordingly, we institute *inter partes* review of claims 1–12 of the ’574 patent.

A. Real Parties-in-Interest and Related Matters

Petitioner identifies itself, Google LLC, as the real party-in-interest. Pet. 79. Petitioner further states that “Google LLC is a subsidiary of XXVI Holdings Inc., which is a subsidiary of Alphabet Inc. XXVI Holdings Inc. and Alphabet Inc. are not real parties-in-interest to this proceeding.” *Id.* n.4.

Patent Owner identifies itself, 138 East LCD Advancements Limited, and Longitude Licensing Limited, the exclusive licensee of the '574 patent, as real parties-in-interest. Paper 3, 1.

Petitioner and Patent Owner identify the following related matters:

Longitude Licensing Ltd. v. Google LLC, 3:23-cv-03046-VC, (N.D. Cal.), currently on appeal to the Court of Appeals for the Federal Circuit, No. 24-1202, filed November 28, 2023.

Id.; Pet. 79.

*B. The '574 Patent*¹

The '574 patent, titled “Determination of Main Object On Image and Improvement of Image Quality According to Main Object,” is directed to an image processing device and method “that determines the main object characterizing an image,” and “that adjusts the picture quality of the image data.” Ex. 1001, 1:16–18. The '574 patent states that, because existing techniques for adjusting picture quality assume “the main object characterizing the image has been correctly determined,” improperly determining the main object can “result in poor picture quality.” *Id.* at 1:28–32. The '574 patent seeks “to properly identify the main object characterizing an image” and “improve the picture quality of the main object.” *Id.* at 1:52–56.

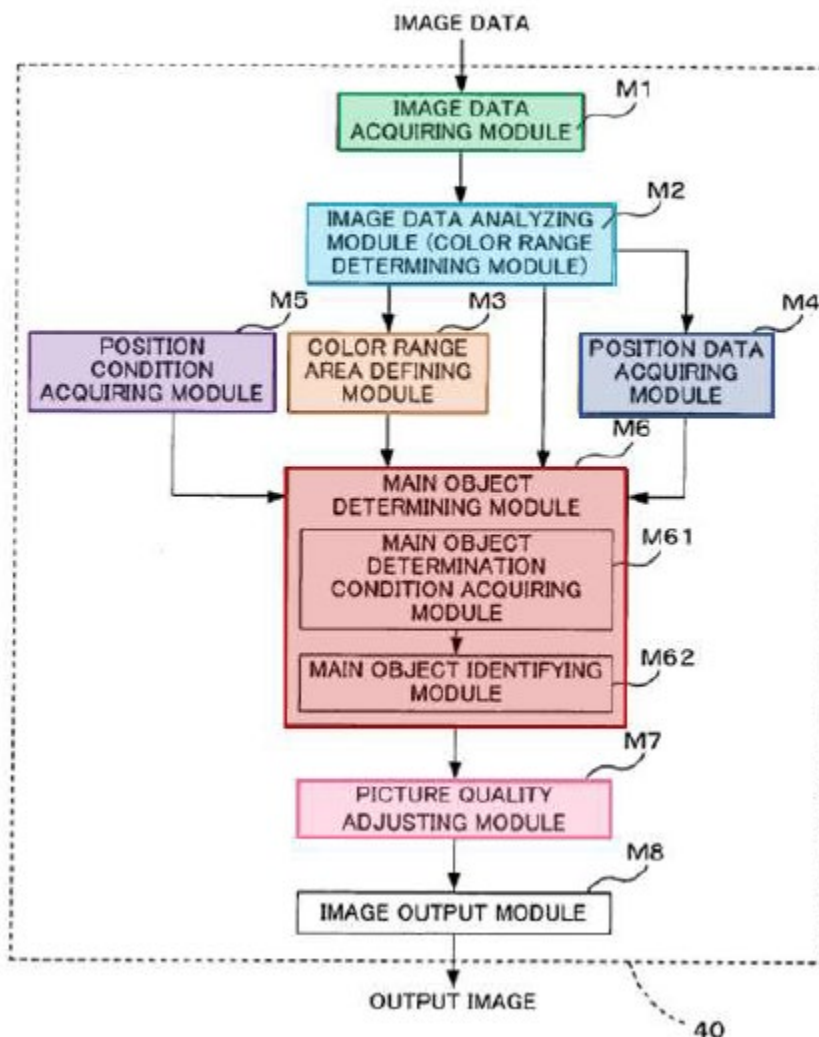
1. The “First Embodiment”

The “First Embodiment” of the claimed image processing device and method is a color printer that includes a control circuit programmed to determine

¹ The patent application leading to issuance of the '574 patent is a continuation of application No. 11/075,380 that issued as US Patent No. 7,668,365. Ex. 1001, code (63). The claims of US Patent No. 7,668,365 have been challenged by Petitioner in IPR2024-00955.

the main object characterizing an image to be printed. Ex. 1001, 7:27–14:14.
“[T]he functional modules realized by the control circuit of the color printer” are depicted in Figure 3, reproduced below in color-annotated form:

Fig.3



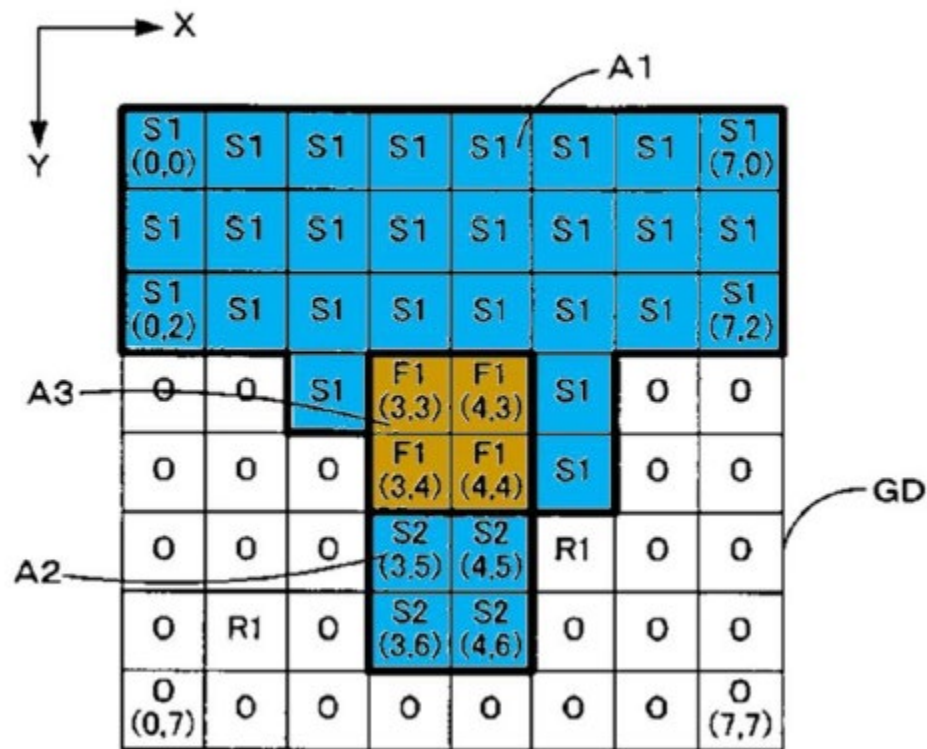
Id. at 7:32–33, Fig. 3 (annotated).² In Figure 3, the image data acquiring module M1 acquires image data from the image to be printed and sends the image data to

²Quotations from patent documents may omit or de-emphasize bold numerals.

the image data analyzing module (color range determining module) M2. *Id.* at 7:37–40.

The color range determining module M2 “splits the image data into a plurality of areas (plurality of pixel data groups), and determines the color range of the split areas.” *Id.* at 7:41–43, 8:51–53. For example, module M2 splits the image of interest into 64 pixel data groups (8 columns x 8 rows) to determine the color range in each pixel data group, as depicted in color-annotated Figure 6, below:

Fig. 6



Prelim. Resp. 4 (citing Ex. 1001, Fig. 6 (color-annotated)). In color-annotated Figure 6, a “color range” is, e.g., a “color value” or “hue,” such as “flesh tones,” “green,” “sky blue,” or “red.” Ex. 1001, 9:8–11, 9:39–42. The color range area

defining module M3 “forms color range areas by associating adjacent image data areas exhibiting the same color range using the determined color range data.” *Id.* at 7:46–49. For example, the pixel data groups labelled S1 and S2 form “two color range areas (A1, A2) exhibiting sky blue color range [],” and pixel data group F1 forms “one color range area (A3) exhibiting a flesh toned color range.” *Id.* at 10:24–26. Color range areas A1 (blue sky) and A2 (blue shirt) may be distinguished by comparing the position data of the color range area with position conditions that stipulate the area corresponding to the main object “sky,” as further described below. *Id.* at 10:63–11:15.

The position data acquiring module M4 “acquires position data ... for [the] color range areas formed using the results of the analysis of the image data.” *Id.* at 7:49–53. The position data acquired in the First Embodiment includes the plurality of pixel data groups (plurality of x-y coordinates) for the image of interest (e.g., “sky”) and for each color range area within the image. *Id.* at 8:55–58, 10:43–47. “[T]he position data is used, for example, to specify the boundaries between the color range areas [and] to obtain position data on the color range area,” as shown for color range areas A1–A3 in Figure 6. *Id.* at 10:41–47. Exemplary position data include the x-y coordinates for one pixel data group located in area A1 (e.g., S1 (7,2) specifies sky blue color located at position column 7, row 2) and in area A2 (e.g., S2 (3,5) specifies sky blue color located at position column 3, row 5). Thus, in the First Embodiment, each color range area is defined by position data comprising the x-y coordinates of a plurality of color-associated pixel data groups. *Id.* at 8:51–66, 10:8–47.

The position condition acquiring module M5 “acquires position conditions stipulating where objects exhibiting specific color range to be present.” *Id.* at 7:53–55. The position conditions (also called “object-determining conditions”) are

“conditions used to determine whether or not the color range areas correspond to a certain object by means of the color range and position data of the color range areas.” *Id.* at 10:50–55. The position conditions stipulate a limited range of positions (pixel data group x-y coordinates) where an object that corresponds to a specific color range is validated to be present. The position conditions may be stored in tabular form, as depicted in Figure 11 below:

Fig.11

OBJECT	HUE	POSITION	
SKY	SKY BLUE/ RED	TOP OF IMAGE AND TOUCHING EDGES OF IMAGE	AREA(x,0), (0,y), (7,y) $0 \leq x \leq 7, 0 \leq Y \leq 2$
VEGETATION	GREEN	BOTTOM OF IMAGE AND TOUCHING EDGES OF IMAGE	AREA(x,7), (0,y), (7,y) $0 \leq x \leq 7, 4 \leq Y \leq 7$
PEOPLE	FLESH TONE	MIDDLE OF IMAGE	AREA(x,y) $2 \leq x \leq 5, 2 \leq Y \leq 5$

Id.

In Figure 11, the position conditions stipulate a limited range of areas where selected image objects, such as the “sky,” “vegetation,” and “people” are validated to be present. For example, the “SKY” object has a hue of “SKY BLUE/RED” at the “TOP OF IMAGE AND TOUCHING EDGES OF IMAGE” such that “the position conditions stipulate that the sky is any of area (x,0): $0 \leq x \leq 7$ ³ [**columns 0-7, row 0 at top**], area (0,y): $0 \leq y \leq 2$ [**column 0, rows 0-2 at top**], or area (7,y): $0 \leq 5$ ⁴.”

³ Based on Figure 11.

⁴ We note Figure 11 stipulates SKY position “y” as “ $0 \leq y \leq 2$.”

Id. at 10:67–11:5 (emphases added). The “VEGETATION” object has a “GREEN” hue at the “BOTTOM OF IMAGE AND TOUCHING EDGES OF IMAGE” such that “[g]reen is stipulated as being any of area (x,7): $0 \leq x \leq 7$ [**columns 0-7, row 7 at bottom**], area (0,y): $4 \leq y \leq 7$ [**column 0, rows 4–7 at bottom**], or area (7,y): $4 \leq y \leq 7$ ⁵ [**column 7, rows 4–7 at bottom**]. *Id.* at 11:5–6 (emphases added). “People are stipulated as being (x, y): $2 \leq x \leq 5$ and $2 \leq y \leq 5$.” *Id.* at 11:6–7.

The stored position conditions are used to stipulate or validate a location for an image object by comparing the acquired color range *position data* for the image object to the *stipulated position conditions* for that object:

The CPU then compares the position data of color range areas A1 and A2 [Fig. 6] with the position data corresponding to the sky [position conditions] to determine the main object . . . and the process routine is complete. (Ex. 1001, 10:63–66);

More specifically, position data and color range of areas which are met by pixel data corresponding to a certain main object are stipulated as position conditions (object-determining conditions), and the position data and color range of the areas are compared. (*Id.* at 13:53–57).

For example, by comparing acquired position data to stored position conditions, color range area A1 in Figure 6, above, is determined to be sky “because the color range area A1 includes an area, such as area (0,0), which meets the position conditions. The color range area A2, meanwhile, does not include areas meeting the position conditions.” *Id.* at 11:8–15 (“area A2 corresponds to sky blue clothing”).

By determining the color range areas in an image to be printed, acquiring position data corresponding to those color range areas, and comparing the acquired

⁵ Based on Figure 11.

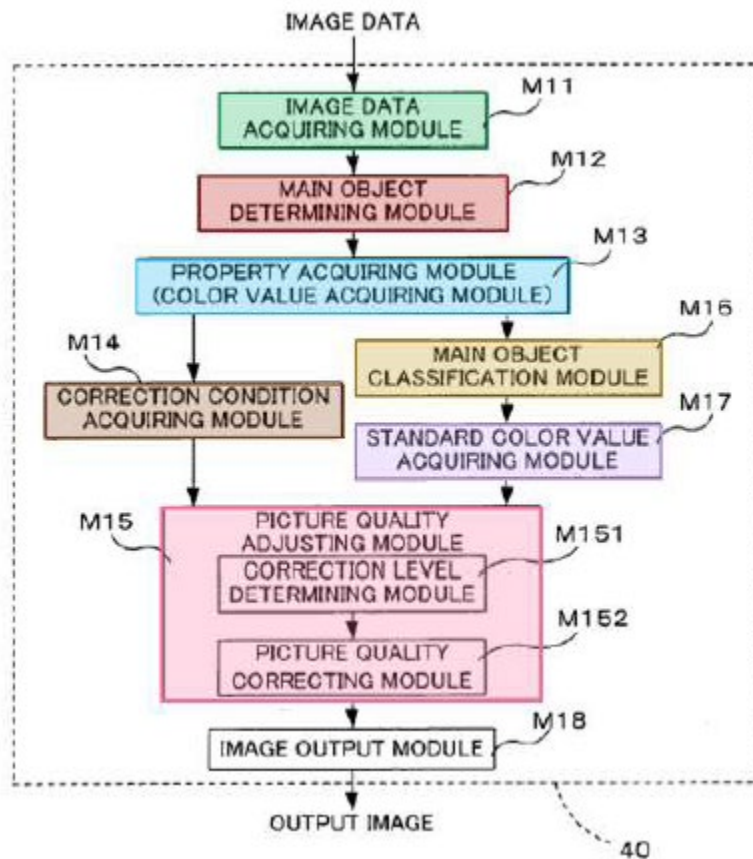
position data to the stipulated position conditions, the First Embodiment can more accurately differentiate among main objects that exhibit the same color range: “[T]he main object can be determined more accurately from the standpoint of both the color range and positions.” *Id.* at 13:53–59. As a result, “[i]t is thus possible to make more accurate determinations, that is, to reduce determination errors, compared to when the main object is determined using just color range data.” *Id.* at 11:31–34.

2. *The “Second Embodiment”*

The “Second Embodiment” of the claimed image processing device and method is a color printer that includes a control circuit programmed to provide improved picture quality adjustments to main objects of an image. Ex. 1001, 3:50–4:2, 4:26–40, 17:54–18:9. The Second Embodiment improves picture quality adjustments by analyzing properties (such as color and statistical values) of the image data for a determined main object and comparing the analyzed properties to selected “correction conditions.” The selected correction conditions correspond to the properties that have been acquired, such as acquired color values, and stipulate ideal values corresponding to the acquired properties of the image data. *Id.* at 3:42–61. The claimed device and method are designed “to improve the picture quality of the main object characterizing the image.” *Id.* at 4:1–2.

The control circuit acquires image data that is split into a plurality of pixel data groups for obtaining color range and position data and determines the main object characterizing the image (e.g., the First Embodiment). The control circuit then acquires “properties” of the main object image data, such as “statistical values and color values.” *Id.* at 14:49–52, Fig. 13. “The property values (statistical values) include, for example, maximum and minimum luminance, and histograms of R, G, and B components in the main object image data.” *Id.* at 16:25–31.

The control circuit also “acquires correction conditions corresponding to the acquired properties.” *Id.* at 14:53–59. “Correction conditions” are “correction standard values [that] stipulate the ideal values of the various parameters in relation to detailed main objects,” not unlike “position conditions” in the First Embodiment stipulate limited areas corresponding to acquired position data to validate certain image objects. *Id.* at 16:19–21. Such correction conditions include values for image data parameters related to image quality, such as “shadow, highlight, brightness, contrast, color balance, and memory color correction parameters.” *Id.* at 16:21–24. Color-annotated Figure 13 is reproduced below:



Ex. 1001, 14:44–15:11, Fig. 13 (color annotated). Figure 13 depicts the process of determining a main object in an image (M12, highlighted in red), acquiring the image data properties representing the main object (M13, highlighted in green),

and then acquiring correction conditions corresponding to those acquired properties (M14, highlighted in blue). Module M14 acquires correction conditions based on the acquired properties of a main object's image data, such as color and statistical values, to enable the main object to be classified in more detail "to implement better picture quality adjustment of the main object image data." *Id.* at 15:53–64; *see also id.* at 15:64–16:24 ("more detailed classification of the sky into clear sky (few clouds), ordinary sky, and dim sky (overcast summer sky)'), Figs. 14, 15.

Figure 15, reproduced below, depicts an example of detailed Classified Main Objects—different types of "BRIGHT, ORDINARY, and DARK SKY":

Fig.15

CLASSIFIED MAIN OBJECT	CLASSIFICATION COLOR VALUE	CORRECTION STANDARD LEVEL
BRIGHT SKY	Hcsb, Scsb, Bcsb	CONTRAST b, BRIGHTNESS b, COLOR BALANCE b
ORDINARY SKY	Hcsn, Scsn, Bcsn	CONTRAST n, BRIGHTNESS n, COLOR BALANCE n
DARK SKY	Hcsd, Scsd, Bcsd	CONTRAST d, BRIGHTNESS d, COLOR BALANCE d

Id. at 15:64–16:24. In Figure 15, each type of sky has a Classification Color Value based on acquired color value properties, such as Hue, Saturation, and Brightness. *Id.* The control circuit then acquires correction conditions—CORRECTION STANDARD LEVEL—corresponding to the acquired color value properties (Contrast, Brightness, and Color Balance). *Id.* at 16:13–24, Fig. 15. The control circuit "uses the property values of the main object image data and the acquired correction standard values to calculate the correction level so as to reduce or eliminate the difference between the two." *Id.* at 16:32–35.

The '574 patent describes the process carried out by picture quality adjusting module, M15 in Figure 13 above, as follows:

When there is a plurality of main objects, the picture quality adjusting module M15 carries out a picture quality adjusting process on the image data areas corresponding to each of the main objects. The picture quality adjusting module M15 may access correction standard values as the correction conditions, determine the correction level so as to *eliminate or reduce differences between the correction standard values and the property values of the main object image data*, and adjust the picture quality of the main object image data by applying the correction level that has been determined.

Id. at 14:63–15:5 (emphasis added). By way of example:

When, for example, the sky is the main object, there would be different standards with more attractive, higher picture quality for bright sky, ordinary sky, dark sky, brilliant sky, overcast sky, clear sky, and red sky, respectively. The main object can thus be made to look more attractive by specifying sky in greater detail in terms of what kind of sky it is, and *carrying out the optimal picture quality adjusting process on the specified sky*.

Id. at 18:1–8 (emphasis added); *see also id.* at 18:65–19:3 (examples of picture quality adjustment for face and vegetation color values).

Independent claims 1, 3, 5, 7, 9, and 11 of the '574 patent recite variations of the Second Embodiment.

C. Illustrative Claim

Independent claim 1, reproduced below, illustrates the claimed subject matter of the Second Embodiment:

1[p]⁶ A method of image processing, the method comprising:

1[a] determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is

⁶ We adopt Patent Owner's claim limitation numbering system for convenience.

implemented by determining whether the image includes the human face;

1[b] acquiring properties of the determined main object;

1[c] acquiring correction conditions corresponding to the acquired properties; and

1[d] adjusting image quality of the main object using the acquired correction conditions, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and

1[e] wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.

Ex. 1001, 27:54–28:3.

D. Asserted Grounds of Unpatentability

Petitioner asserts claims 1–12 are unpatentable on the following Grounds:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/ Basis
1, 3, 5, 7, 9, and 11 (Ground 1)	103 ⁷	Luo-250 ⁸ and Hibi ⁹
2, 4, 6, 8, 10, and 12 (Ground 2)	103	Luo-250, Hibi, and Terashita ¹⁰
1–12 (Ground 3)	103	Yano ¹¹ and Terashita

Pet. 2. Petitioner relies on the declaration of Mr. Kenneth Parulski in support of the Petition. Ex. 1003. Patent Owner relies on the declaration of Dr. Nikolaos Papanikolopoulos in support of the Preliminary Response. Ex. 2001.

⁷ The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”) includes revisions to 35 U.S.C. §§ 102, 103 that became effective after the filing date of the application that led to issuance of the challenged patent. Hence, this *inter partes* review is governed by the pre-AIA provisions of 35 U.S.C. §§ 102, 103.

⁸ US 2003/0108250 A1, Pub. June 12, 2003 (Ex. 1005, “Luo-250”).

⁹ Certified English Translation of Japanese Patent Publication No. JP2003-248825 to Hibi, Pub. Sept. 5, 2003 (Ex. 1006, “Hibi”).

¹⁰ US 2004/0239963 A1, Pub. Dec. 2, 2004 (Ex. 1007, “Terashita”).

¹¹ US Patent No. 7,358,994 B2 to Yano, Filed July 16, 2003 (Ex. 1008, “Yano”).

II. CLAIM CONSTRUCTION

A. Level of Ordinary Skill in the Art

Petitioner states that a person of ordinary skill in the art (“POSITA”) “would have had a [B]achelor’s degree or equivalent in electrical engineering, computer science, or a related field, in addition to three years in research, design, or development in digital image processing.” Pet. 19 (citing Ex. 1003 ¶ 68). Patent Owner does not dispute Petitioner’s characterization of a POSITA “[f]or purposes of this Preliminary Response only” and otherwise reserves its rights. Prelim. Resp. 16.

In determining the level of ordinary skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). “These factors are not exhaustive but are merely a guide to determining the level of ordinary skill in the art.” *Daiichi Sankyo Co. v. Apotex, Inc.*, 501 F.3d 1254, 1256 (Fed. Cir. 2007). There is uncontested evidence in the record before us that reflects the knowledge and experience of a POSITA.

We determine that no express finding is necessary, on the present record, and that the level of ordinary skill in the art is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

B. Claim Construction

For purposes of this proceeding, Petitioner and Patent Owner both advocate for the “plain and ordinary meaning” of the claim terms without further analysis.

Pet. 19; Prelim. Resp. 15–16. On the present record, we determine that no explicit construction of claim terms is necessary to determine whether to institute an *inter partes* review in this case. *See, e.g., Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

III. OBVIOUSNESS ANALYSIS

A. Asserted Obviousness of Claims 1, 3, 5, 7, 9, and 11 Over Luo-250 and Hibi (Ground 1)

Petitioner contends that independent claims 1, 3, 5, 7, 9, and 11 of the ’574 patent would have been obvious to a POSITA in view of Luo-250 and Hibi pursuant to 35 U.S.C. § 103 (Ground 1). Pet. 20–47 (citing Ex. 1003 ¶¶ 109–183). Claims 1, 5, and 9 comprise a first set of method, apparatus, and computer program product claims, respectively, that recite the same limitations for one variation of the Second Embodiment (picture quality adjustment) described in the ’574 patent. Claims 3, 7, and 11 comprise a second set of method, apparatus, and computer program product claims, respectively, that recite the same limitations for another variation of the Second Embodiment. Although there are similarities between the two claims sets, a significant difference is that claims 3, 7, and 11 do not include Limitation 1[b] “*acquiring properties of the determined main object*” and Limitation 1[c] “*acquiring correction conditions corresponding to the acquired properties.*”

For independent claim 3, the Petition relies on cross-references to its argument that claim 1 would have been obvious over Luo-250 and Hibi. Pet. 33–34. Given the difference in claim scope, noted above, and the Petition’s

use of cross-referenced arguments for claims 1 and 3, we analyze the Petition's contention that independent claim 3 would have been obvious to a POSITA in view of Luo-250 and Hibi. On the present record at this stage of the proceeding, we determine Petitioner has demonstrated a reasonable likelihood that it would prevail in showing independent claims 3, 7, and 11 are unpatentable as obvious over Luo-250 and Hibi. At this stage, we need not make a determination on the merits regarding claims 1, 5, and 9. Patent Owner is free to address whether the Petition has adequately supported its assertion that Luo-250 and Hibi disclose, teach, suggest, or otherwise render obvious claims 1, 5, and 9 in the Response and Sur-Reply.

1. Legal Standards

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to the patent owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A patent claim is unpatentable under 35 U.S.C. § 103 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) (cited hereafter as “*KSR*”). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of

ordinary skill in the art; and (4) objective evidence of nonobviousness, if made available in the record, which has not happened here. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

2. *Luo-250 (Ex. 1005)*

Luo-250 discloses a system that detects “target” and “background” subject matter in an image, then enhances the image “based on the subject matter in the image.” Ex. 1005, code (57), ¶ 1. Luo-250’s image enhancement system is based on calculations that determine probability values to indicate the likelihood that a pixel is part of an image object, such as sky, grass, fabric, or skin. *Id.* ¶¶ 31–38, 45. Each pixel in an image is assigned a probability value for a target area, and the results of the probability calculations are used to generate “belief maps” for an image. *Id.* ¶¶ 17, 32, 33, 43, 44; Ex. 2001 ¶¶ 74–77. “The result is a subject matter belief map, indicating the belief that particular pixels or regions of pixels belong to a given target subject matter.” *Id.* ¶ 32.

Luo-250 Figure 5 depicts a belief map for lawn grass. Figure 5 is reproduced below:

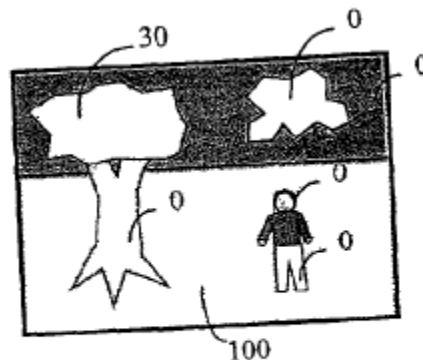


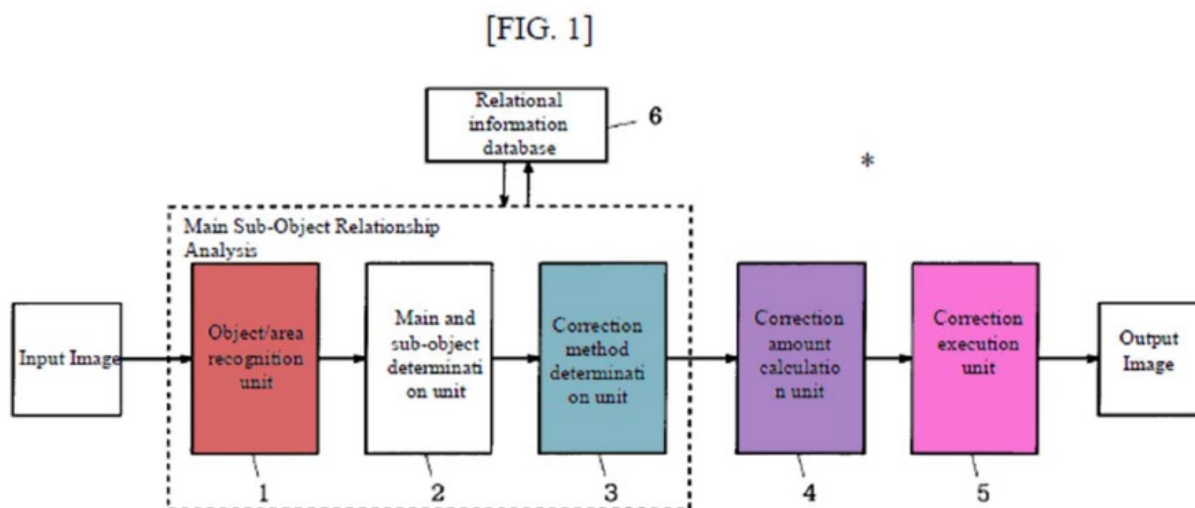
FIG. 5

Id. ¶ 79, Fig. 5. Figure 5 depicts a belief map for “a typical snapshot image containing a person, . . . foliage, cloud sky, clear blue sky, and lawn grass.” *Id.*

The belief map shows “the grass having a belief value of 100 and the tree leaves having a belief value of 30.” *Id.* The remaining subject matter targets—cloud sky, clear blue sky, and the person—have belief values of zero. *Id.* ¶¶ 23, 79.

3. *Hibi* (Exhibit 1006)

Hibi discloses an image processing device and method where “a plurality of objects are recognized from an image, and a correction method is determined for those objects based on the recognition results of the scene of the image.” Ex. 1006 ¶ 10. Hibi’s image processing device and method “can be realized in a personal computer ... that provides such image processing” on an image “taken with a digital camera.” *Id.* ¶¶ 14, 48. We reproduce below a color-annotated version of Hibi Figure 1 from the Petition:



Hibi, FIG. 1 (annotated).

Pet. 10 (citing Ex. 1006 ¶ 15, Fig. 1 (color-annotated)).

Hibi Figure 1 depicts an embodiment where the “object/area recognition unit 1 [red] recognizes a plurality of objects from the entered images,” such as “people and faces . . . recognized by . . . detecting skin color areas and facial

structures.” Ex. 1006 ¶ 15. From the recognized objects, a “main and sub-object determination unit 2 [white] determines the main object and the sub-object.” *Id.* ¶ 16. A “correction method determination unit 3 [blue] . . . recognizes the scene of the image and determines a correction method for each object based on the recognition result.” *Id.* ¶ 17. Using the determined correction method, a “correction amount calculation unit 4” [purple] extracts a specified object’s “feature amount” and calculates a “correction amount” from the feature amount. *Id.* ¶¶ 18, 46. “[T]he correction amount of the object to be corrected is calculated from the feature amount of the specified object, based on the feature quantity calculation data and correction data obtained by searching the relational information database 6 in the correction method determination unit 3.” *Id.* ¶ 46. “The correction execution unit 5 [pink] performs the actual correction processing, for the input image.” *Id.* ¶ 19.

4. Obviousness of claims 3, 7, and 11 over Luo-250 and Hibi

Petitioner asserts that independent claims 3, 7, and 11 would have been obvious to a POSITA over Luo-250 and Hibi. Pet. 33–34, 42–43, 46–47 (citing Parulski Declaration Ex. 1003 ¶¶ 138–141, 162–167, and 180–183). Our analysis of method claim 3 applies equally to the corresponding apparatus and computer program claims 7 and 11. For the reasons articulated below, on the present record at this stage of the proceeding, we determine Petitioner has established a reasonable likelihood of showing that claims 3, 7, and 11 are unpatentable over Luo-250 and Hibi.

Limitation 3[p]: “*A method of image processing, the method comprising:*”

Petitioner contends that, if the preamble is limiting, Luo-250 discloses or suggests “[a] *method of image processing*” that includes “applying image enhancement to the digital image by varying the control signal” according to “a

belief map indicating the degree of belief that pixels in the image belong to target subject matter.” Pet. 20–21 (citing Ex. 1003 ¶¶ 108–109; Ex. 1005 ¶¶ 17, 30, Fig. 1), 33 (referencing Limitation 1[p]). Petitioner emphasizes that Luo-250 Figure 1 “illustrates a method of image processing ‘to obtain an enhanced output image.’” *Id.* at 20–21 (citing Ex. 1005 ¶ 30, Fig. 1). The flow chart in Luo-250 Figure 1 begins with step 10, Input Digital Image, and includes method steps such as “apply subject matter detector,” “Produce a Subject Matter Belief Map,” and “Apply the Selected Enhancement Operation” “to the input digital image 10 to produce an [E]nhanced [I]mage 70.” Ex. 1005 ¶¶ 32, 45, Fig. 1.

Patent Owner does not address this limitation. Prelim. Resp. 17–31.

On the present record, Luo-250 and the Parulski Declaration adequately support Petitioner’s contention that Luo-250 discloses or suggests Limitation 3[p].

Limitation 3[a]: “*determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face;*”

Petitioner contends that Luo-250 discloses obtaining “a digital color image” and applying a “subject matter detector” to identify a “primary,” or “target,” subject matter in the image (“*determining a main object in an image*”). Pet. 21–22, 33 (citing Ex. 1003 ¶¶ 111, 139; Ex. 1005 ¶¶ 32, 41–42). The Petition emphasizes that Luo-250 discloses a human face as one of the pre-determined “target subject matters” of an image and further discloses using a face detection algorithm “to find human face regions in the input color digital image” and then extracting “[r]egions of skin-tone colors.” *Id.* at 22 (citing Ex. 1005 ¶ 38). The Petition further cites to Hibi as disclosing techniques for recognizing human faces in a digital color image. *Id.* at 23 (citing Ex. 1006 ¶ 15). The Petition asserts “[t]hese face-detection techniques teach that ‘the determining of the main object is implemented by

determining whether the image includes the human face,’ as recited in claim 1.”
Id. (citing Ex. 1003 ¶¶ 112–113; Ex. 1005 ¶¶ 32, 38, 40).

The Petition recognizes that Luo-250 does not expressly disclose the source for generating a digital color image to be processed, but relies on Hibi to fill the gap. *Id.* (citing Ex. 1003 ¶ 114). A determination of obviousness, however, requires more than a mere showing that the prior art includes separate references covering each separate limitation in a claim under examination. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). “Often, it will be necessary for a court to look to interrelated teachings of multiple patents . . . and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418. A party who petitions the Board for a determination of obviousness must show that “a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.” *Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (quoting *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007)). We assess Petitioner’s evidence and argument according to the above-referenced standard.

Hibi discloses the use of a programmable personal computer to process an image “taken with a digital camera.” Pet. 23–24 (citing Ex. 1003 ¶ 114; Ex. 1006 ¶¶ 14, 47–48). Hibi’s apparatus and method includes a recognition unit that recognizes “people and faces” in the image by applying “known techniques, such as detecting skin color areas and facial structures.” *Id.* at 24 (citing Ex. 1003 ¶ 115; Ex. 1006 ¶ 15). The Petition also relies on Mr. Parulski’s Declaration

testimony that a POSITA would have been motivated to apply Luo-250's image processing method to an image generated by a digital camera, as disclosed in Hibi, "because such images were ubiquitous at the time, and applying Luo-250's image processing would have improved the image enhancement 'depending on detecting different objects or subject matters contained within the image.'" *Id.* at 24 (citing Ex. 1003 ¶ 116; Ex. 1005 ¶¶ 16–17). The Petition further argues that a POSITA would have had a reasonable expectation of success in applying Luo-250's belief map image processing technique to an image generated by a digital camera as disclosed in Hibi. *Id.* at 25 (citing Ex. 1003 ¶ 118). Petitioner cites to Terashita as evidence that such a combination "would have required applying only conventional techniques for transferring image data from a digital camera to a personal computer (e.g., using a memory card) that were well within the skill of a POSITA." *Id.* (citing Ex. 1003 ¶ 118; Ex. 1007 ¶¶ 4, 38–39).

Patent Owner does not address this limitation. Prelim. Resp. 17–31.

On the present record, Luo-250, Hibi, and the Parulski Declaration adequately support Petitioner's contention that Limitation 3[a] would have been obvious to a POSITA based on Luo-250 and Hibi.

Limitation 3[b]: *"adjusting image quality of the main object using correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and;"*

For Limitation 3[b], Petitioner cross-references the argument that Luo-250 discloses or suggests Limitations 1[b]–1[d]. Pet. 26–31 (citing Ex. 1003 ¶¶ 119–131; Ex. 1005 ¶¶ 45–46, 49–51), 34 (for Limitation 3[b], cross-referencing "the reasons explained for" Limitations 1[b]–1[d]). We first note the claim language distinction that Limitation 3[b] does not recite adjusting image quality of the main

object in an image using “*the acquired*” correction conditions corresponding to “*the acquired*” properties of the determined main object, as recited in Limitations 1[c] and 1[d]. Rather, Limitation 3[b] recites adjusting image quality “*using correction conditions corresponding to properties of the determined main object.*” The distinction is significant because claim 3, unlike claim 1, is not limited to adjusting image quality based on “acquired” properties of the determined main object in an image and “acquired” correction conditions corresponding to the “acquired” properties. Therefore, we analyze the Petition’s argument made for Limitations 1[b]–1[d] in view of the claim language recited in Limitation 3[b].

The Petition contends that Luo-250 discloses or suggests a method of “*adjusting image quality of the main object*” by selecting a “[pre-determined] image enhancement operation[]” that controls “the amount of selected enhancement appropriate for the target subject matter.” *Id.* at 29 (quoting Ex. 1005 ¶ 45). “The selected image enhancement according to the controlling signal is applied to the input digital image to produce an enhanced image.” *Id.* (citing Ex. 1003 ¶ 128; quoting Ex. 1005 ¶ 45). The Petition argues that execution of the pre-determined image enhancement operation disclosed in Luo-250 satisfies the “*adjusting image quality of the main object*” element in Limitation 3[b]. *Id.* The Petition provides several examples of how Luo-250 executes the image enhancement operation “*using correction conditions corresponding to properties of the determined main object*” as recited in Limitation 3[b]. *Id.* at 29–31.

As one example, Luo-250 discloses “modify[ing] the colors (color re-mapping) of certain target subject matters,” such as a human face, that involves modifying “the color of skin regions . . . in the direction of a predetermined ‘preferred’ or ‘memory’ color of the skin (e.g., tanned skin).” *Id.* at 29–30 (citing Ex. 1005 ¶¶ 45–46, quoting from ¶ 49). The Petition argues that a “POSITA

would have understood that this teaches adjusting the image quality of the face using . . . memory color of the skin (. . . correction conditions), wherein a parameter used in adjusting the image quality is memory color.” *Id.* at 30 (citing Ex. 1003 ¶ 129). Thus, the Petition asserts that Luo-250 teaches the use of a pre-determined “*memory color*” “*parameter*” for a person’s face as a “*correction condition[] corresponding to properties of the determined main object*” to adjust the skin color (a “*property*”) of the person’s face in the image.

As another example, Luo-250 discloses adjusting “the scene balance (brightness and color balance) based on the color and brightness of certain target subject matters.” *Id.* at 30 (quoting Ex. 1005 ¶ 50). Luo-250 discloses using “the color and brightness of the skin (face) region . . . to determine the overall scene balance or local scene balance if there are multiple light sources.” *Id.* (quoting Ex. 1005 ¶ 50). The Petition argues that a POSITA would have understood Luo-250 teaches the use of “brightness and color balance (. . . correction conditions), wherein parameters used in adjusting the image quality are brightness and color balance.” *Id.* (citing Ex. 1003 ¶ 130). Thus, the Petition asserts that Luo-250 teaches the use of pre-determined “*brightness*” and “*color balance*” “*parameter[s]*” for a person’s face as “*correction conditions corresponding to properties of the determined main object*” to adjust overall scene balance or local scene balance, as recited in Limitation 3[b].

As another example, Luo-250 discloses selectively adjusting “the contrast and tone scale of face regions in an image . . . in the direction of a predetermined ‘preferred’ or ‘memory’ tone scale of faces (e.g., that of studio portraits).” *Id.* at 30 (quoting Ex. 1005 ¶ 51). The Petition argues that a POSITA would have understood Luo-250 teaches the use of “contrast and tone scale (. . . correction conditions), wherein a parameter used in adjusting the image quality is contrast.”

Id. at 30–31 (citing Ex. 1003 ¶ 131). Thus, the Petition asserts that Luo-250 teaches the use of pre-determined “*contrast*” “*parameter*” and tone scale for a person’s face as “*correction conditions corresponding to properties of the determined main object*” to adjust the image quality of the person’s face, as recited in Limitation 3[b]. *Id.*; *see also id.* at 26–29 (citing Ex. 1003 ¶¶ 119–126; Ex. 1005 ¶¶ 45–46, 49–51).

Patent Owner provides a one-paragraph, conclusory response to the Petition’s arguments regarding claim 3. Prelim. Resp. 28–29; *see also id.* at 29–31 (repeating same paragraph for claims 7 and 11). The Preliminary Response refers back to its response to Limitations 1[b]–[d], but without acknowledging the specific claim language used in Limitation 3[b]. *Id.* In particular, Patent Owner does not acknowledge or address the absence in claim 3 of “*acquiring properties of the determined main object*” and “*acquiring correction conditions corresponding to the acquired properties*,” as recited in Limitations 1[b] and 1[c].¹²

For claim 3, Patent Owner simply repeats its argument that the “Petition fails to show that Luo-250 discloses or renders obvious ‘acquiring properties of the determined main object’ as claimed in 1[b], ‘acquiring correction conditions corresponding to the acquired properties’ as claimed in 1[c], and ‘adjusting image quality of the main object using the acquired correction conditions’ as claimed in 1[d].” Prelim. Resp. 28. Patent Owner then concludes, without explanation, that “[a]ccordingly, the Petition fails to show that Luo-250 discloses or renders obvious” Limitation 3[b], “and thus fails to show that Luo-250 and Hibi disclose or render obvious all elements of claim 3.” *Id.* at 29; *see also id.* at 30 (same

¹² Claims 7 and 11 do not include the “*property acquirer*”/“*correction condition acquirer*” and “*computer readable code for acquiring properties*”/“*acquiring correction conditions*” elements recited in claims 5 and 9, respectively.

response for claim 7), 31 (same response for claim 11). We are not persuaded by Patent Owner's conclusory argument.

On the present record, Luo-250 and the Parulski Declaration adequately support Petitioner's contention that Luo-250 teaches Limitation 3[b].

Limitation 3[c]: *“wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.”*

For Limitation 3[c], Petitioner cross-references the argument that Luo-250 discloses or suggests Limitation 1[e]. Pet. 31–33 (for Limitation 1[e], citing Ex. 1003 ¶¶ 132–137; Ex. 1005 ¶¶ 17, 90; Ex. 1006 ¶¶ 2–4, 10, 14), 34 (for Limitation 3[c], cross-referencing “the reasons explained for” Limitation 1[e]). Petitioner contends that Luo-250 and Hibi render obvious Limitation 3[c]. Pet. 31–34. Petitioner notes Luo-250's disclosure that its image processing method is executed “in a computer program product,” which may include any “physical device or media employed to store a computer program having instructions for controlling one or more computers to practice the method.” *Id.* at 31 (quoting Ex. 1005 ¶ 90). Petitioner acknowledges that Luo-250 does not expressly disclose the type of computer to use, but argues that a “POSITA would have looked to Hibi for implementation details.” *Id.* (citing Ex. 1003 ¶ 133).

Petitioner cites Hibi's disclosure that “an image processing program that allows a computer to execute the[] image processing method . . . can be realized in a personal computer . . . that provides such image processing.” *Id.* (citing Ex. 1003 ¶ 134; Ex. 1006 ¶ 14). Petitioner argues a “POSITA would have found it obvious to implement Luo-250's computer program product on a personal computer in view of Hibi,” because “Luo-250 already discloses executing each step of its image processing method on a ‘computer’ based on instructions provided by the computer

program product.” *Id.* at 32 (citing Ex. 1003 ¶ 135; Ex. 1005 ¶¶ 17, 90). Petitioner asserts a POSITA would have had a motivation to execute Luo-250’s image processing method on a personal computer “because these [personal computers] were commonly owned by photographers desiring to adjust their images captured via a camera and would have provided a convenient and user-friendly device for these photographers to use.” *Id.* (citing Ex. 1003 ¶ 136; Ex. 1006 ¶¶ 2–4). Petitioner further asserts a POSITA would have reasonably expected success in implementing Luo-250’s image processing method on a personal computer. *Id.* at 33 (citing Ex. 1003 ¶ 137).

Patent Owner does not address this limitation. Prelim. Resp. 17–31.

On the present record, Luo-250, Hibi, and the Parulski Declaration adequately support Petitioner’s contention that Limitation 3[c] would have been obvious to a POSITA based on Luo-250 and Hibi.

5. Conclusion for Ground 1

For the reasons given above, at this stage of the proceeding we are persuaded that Petitioner’s arguments and evidence demonstrate a reasonable likelihood Petitioner would prevail in showing the unpatentability of claims 3, 7, and 11 as obvious over Luo-250 and Hibi.

B. Asserted Obviousness of Claims 2, 4, 6, 8, 10, and 12 over Luo-250, Hibi and Terashita (Ground 2)

Petitioner contends dependent claims 2, 4, 6, 8, 10, and 12 are unpatentable as obvious over Luo-250, Hibi, and Terashita. Pet. 47–53 (citing Ex. 1003 ¶¶ 184–191). Claims 2, 4, 6, 8, 10, and 12 depend from independent claims 1, 3, 5, 7, 9, and 11, respectively. Dependent claims 2, 4, 6, 8, 10, and 12 all recite the same additional limitation: “*wherein the correction conditions are different when the main object is determined as a night time scene and a human face and when*

the main object is determined as a human face.” Ex. 1001, 28:4–7, 28:22–25, 28:47–51, 29:1–5, 30:1–5, 30:23–27.

Petitioner emphasizes Terashita’s disclosure of an image processing apparatus containing a scene inference means that “infers the photography scene based on the image information M and the photography information T.” Pet. 48 (citing Ex. 1007 ¶¶ 39, 47, Fig. 1). The image information M includes an indication of whether the image includes “a main part like a human face.” *Id.* (citing Ex. 1007 ¶¶ 20, 42). If the image information M indicates the presence of a face, then the scene may be inferred as a portrait in normal lighting or a portrait at nighttime outdoors, depending on whether certain specified criteria attached to the image data are satisfied. *Id.* at 48–50 (citing Ex. 1003 ¶ 186; Ex. 1007 ¶¶ 39, 47–48, Fig. 2). The inferred scenes in Terashita’s system correspond to different sets of image processing conditions, which are stored in memory and used to carry out specified image processing functions. *Id.* at 49–50 (citing Ex. 1003 ¶¶ 186–187; Ex. 1007 ¶¶ 50–51, Fig. 2).

Petitioner argues a “POSITA would have found it obvious to implement Terashita’s use of different image processing conditions, depending on whether the inferred scene is a human face or a human face at nighttime outdoors, in the image processing of Luo-250 and Hibi discussed for Ground 1.” *Id.* at 50–51 (citing Ex. 1003 ¶ 188). Petitioner also argues a POSITA “would have been motivated to do so to more accurately process the image based on the scene, including whether the image was photographed at night, thus ‘enabl[ing] reproduction of a high-quality image.’” *Id.* at 51 (citing Ex. 1003 ¶ 188; Ex. 1007 ¶ 54). Petitioner further contends a POSITA would have reasonably expected success in such a combination because (i) “of the similarity between Luo-250, Hibi, and Terashita” and (ii) “both Hibi and Terashita teach accessing memory to acquire different

correction conditions, depending on the scene,” which would have been executed by “Luo-250’s computer program product.” *Id.* at 52 (citing Ex. 1003 ¶ 190; Ex. 1006 ¶ 45; Ex. 1007 ¶¶ 39, 50–51).

Patent Owner relies on the same arguments raised in Ground 1 for the independent claims, which we have addressed in Section A., above. Prelim. Resp. 31 (citing Pet. 48–53).

On the present record, Luo-250, Hibi, Terashita, and the Parulski Declaration adequately support Petitioner’s contention that claims 4 (depends from claim 3), 8 (depends from claim 7), and 12 (depends from claim 11) are unpatentable as obvious over Luo-250, Hibi, and Terashita.

C. Obviousness of Claims 1–12 over Yano and Terashita (Ground 3)

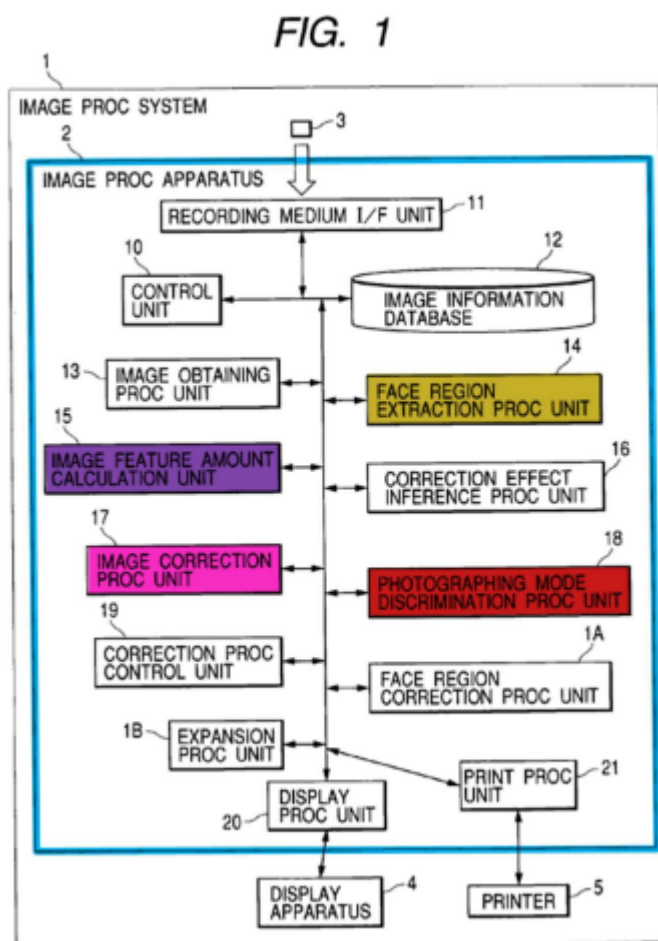
Petitioner contends claims 1–12 are unpatentable as obvious over Yano and Terashita. Pet. 54–76 (citing Ex. 1003 ¶¶ 192–264). Patent Owner focuses its Preliminary Response on distinguishing Yano from Limitations 1[c] and 1[d], and does not separately address the dependent claim limitations. Prelim. Resp. 32–41 (citing Ex. 2001 ¶¶ 90–100). We analyze the arguments and evidence in the Petition and Preliminary Response addressed to claim 1 as representative of independent claims 1, 3, 5, 7, 9, and 11. On the present record at this stage of the proceeding, we determine Petitioner has demonstrated a reasonable likelihood that it would prevail in showing claims 1–12 of the ’574 patent are unpatentable as obvious over Yano and Terashita.¹³

We begin with a discussion of Yano.

¹³ The Petition provides adequate argument and evidence to support the contention that claims 2–12 are unpatentable over Yano and Terashita. Pet. 62–76 (citing Ex. 1003 ¶¶ 213–264).

1. Yano (Ex. 1008)

Yano discloses “using an image processing apparatus which displays and prints a person image photographed (or shot) by a digital camera” to “automatically correct image data and thus output the person image of an optimum characteristic.” Ex. 1008, 1:65–2:2. Yano Figure 1 depicts “the functional structure” of Yano’s image processing apparatus, and color-annotated Figure 1 is reproduced below from the Petition:



Pet. 15–16 (citing Ex. 1008, 2:15–19, Fig. 1 (color-annotated)). Figure 1 is a block diagram showing the functional structure of image processing system 1 including image processing apparatus 2, display apparatus 4, and printer 5. Ex. 1008, 2:67–3:2.

Face region extraction processing unit 14 (gold) “extracts the face region of the person from the image data obtained by the image obtaining processing unit 13.” *Id.* at 4:34–37. Image feature amount calculation unit 15 (purple) “calculates, as the image feature amount, a lightness distribution of the pixels in a flesh color region and an area of the face region, on the basis of the image data.” *Id.* at 4:44–47. Correction effect inference processing unit 16 (uncolored) “infers whether or not a correction effect can be obtained by correcting characteristics (lightness, hue, etc.) of the image data,” based on “the image feature amount calculated by . . . unit 15.” *Id.* at 4:56–61. If unit 16 infers the correction effect can be obtained, then image correction processing unit 17 (pink) “corrects the characteristic of the image data on the basis of the image feature amount, and then outputs the post-correction image data.” *Id.* at 5:4–9.

When the photographing mode discrimination processing unit 18 (red) determines the photographing mode is in “person mode,” “correction process control unit 19 performs control to cause” units 14–17 “to perform the image data correction process.” *Id.* at 5:16–24. Yano’s image processing apparatus only operates when the photographing mode is in person mode “to avoid erroneously applying the correction process to a landscape image or the like.” *Id.* at 12:23–28. Alternately, Yano discloses using “various methods of discriminating that a person (particularly a face portion of the person) is included in the image data.” *Id.* at 7:47–54.

2. Obviousness of claims 1–12 over Yano and Terashita

Limitation 1[p]: “A method of image processing, the method comprising:”

Petitioner contends that, if limiting, Yano discloses or suggests Limitation 1[p]. Pet. 54 (citing Ex. 1003 ¶¶ 192–193). Yano discloses “an image processing

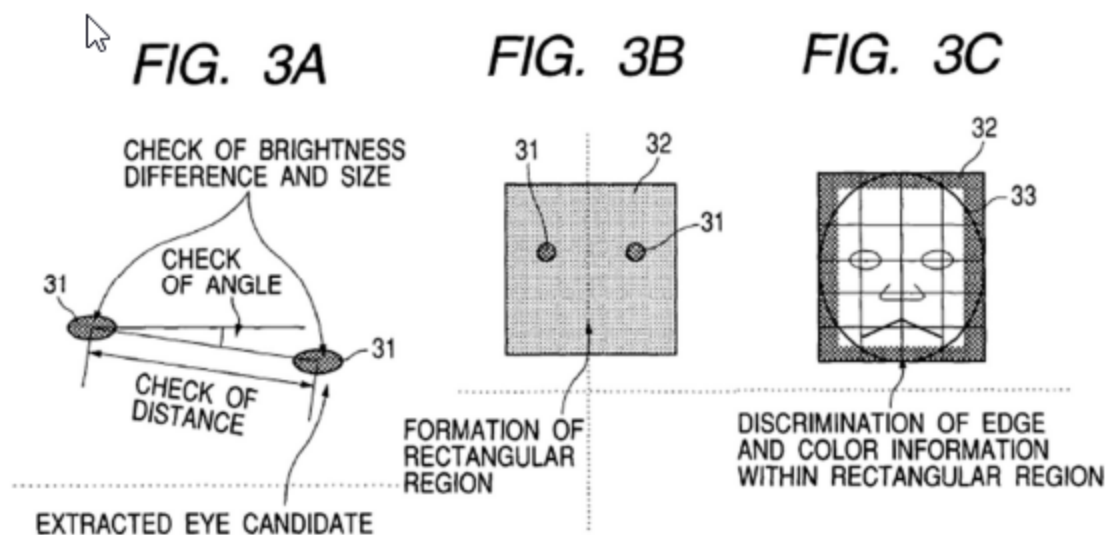
apparatus which corrects gradation and color reproduction characteristics of an image photographed (or shot) by a digital camera or the like” and “an image processing method which is applied to the image processing apparatus.” Ex. 1008, 1:9-15; Ex. 1003 ¶ 193. Yano expressly discloses an apparatus and method for image processing.

Patent Owner does not address this limitation. Prelim. Resp. 32–38.

On the present record, Yano and the Parulski Declaration adequately support Petitioner’s contention that Yano discloses or suggests Limitation 1[p].

Limitation 1[a]: “*determining a main object in an image generated by an image generating apparatus, wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face;*”

Petitioner contends Yano and Terashita render obvious Limitation 1[a]. Pet. 54–59 (citing Ex. 1003 ¶¶ 194–201). As discussed, when Yano’s digital photographic image is obtained in person mode, an extraction processing unit extracts the face region from the image data, depicted in Figures 3A–3C below:



Id. at 55 (citing Ex. 1003 ¶ 196; Ex. 1008, 6:4–60, 7:55–58, Figs. 3A–3C). If the image is not obtained in person mode, Yano further discloses “it is preferably

possible to use various methods of discriminating that a person (particularly a face portion of the person) is included in the image data.” *Id.* at 56 (citing Ex. 1003 ¶ 198; Ex. 1008, 7:51–54). The Petition argues that the Yano disclosures cited above satisfy Limitation 1[a]. *Id.*

The Petition also argues that a “POSITA would have looked to Terashita for implementation details on one such method” of determining a human face as a main object in an image. *Id.* (citing Ex. 1003 ¶ 198). The Petition emphasizes Terashita’s disclosure of an image processing method that includes “obtaining image information on an image represented by the image data,” where the image information includes “information on presence or absence of a human face in the image represented by the image data.” *Id.* at 56–57 (citing Ex. 1003 ¶ 199; Ex. 1007 ¶¶ 10–15, 20–21). The Petition further notes Terashita’s disclosure that “a skin-color area is extracted from the image data S0 and the image is judged to include a human face if an area of the skin-color area is not smaller than a predetermined threshold value.” *Id.* at 57 (citing Ex. 1007 ¶ 42). Thus, on the present record at this stage of the proceeding, the Petition sufficiently supports the assertion that Terashita, like Yano, discloses, teaches, or suggests “*determining a main object in an image ... wherein the main object includes at least a human face, and wherein the determining of the main object is implemented by determining whether the image includes the human face,*” as recited in Limitation 1[a].

Petitioner contends a POSITA would have been motivated to combine Yano and Terashita to determine whether a digital color image includes a human face, “because doing so would have improved the accuracy of determining that a person is included in the image.” Pet. 57 (citing Ex. 1003 ¶ 200). Petitioner argues that Terashita provides additional motivation by solving the problem identified in Yano of a user erroneously setting the photography mode, whereby Terashita

“determin[es] the presence of a face without referencing the photography mode.” *Id.* (citing Ex. 1003 ¶ 200; Ex. 1007 ¶¶ 8, 42). Petitioner further argues a POSITA would have reasonably expected success in the combination, because Terashita’s process “relies on a similar comparison of ‘an area of skin color’ to ‘a predetermined area after carrying out skin color extraction processing or the like on the image data.’” *Id.* at 58 (citing Ex. 1003 ¶ 201; Ex. 1007 ¶ 21; Ex. 1008, 8:13–39). On the present record at this stage of the proceeding, the Petition articulates sufficient reasoning with a rational underpinning to support the asserted combination of Yano and Terashita.

Patent Owner does not address this limitation, other than indirectly. *See* Prelim. Resp. 33–34 (“Yano’s image processing system only advances to its next step if the photographing information indicates the image data was obtained in ‘person’ mode.” (citing Ex. 1008, 7:33–47)).

On the present record, Yano, Terashita, and the Parulski Declaration adequately support Petitioner’s contention that Yano and Terashita render obvious Limitation 1[a].

Limitation 1[b]: “*acquiring properties of the determined main object;*”

Petitioner contends Yano discloses or suggests Limitation 1[b]. Pet. 59 (citing Ex. 1003 ¶¶ 202–203). The Petition notes Yano’s image processing apparatus includes an image feature amount calculation unit that “calculates the image feature amount being the *feature amount of the image within the face region* extracted by the face region extraction processing unit.” *Id.* (citing Ex. 1003 ¶ 203; Ex. 1008, 7:58–62) (emphasis added). The Petition also cites to Yano’s disclosure that the image feature amount may include “histograms,” including “the lightness and hue histograms in regard to each pixel,” “average values and distribution values of the lightness, hue and the like in regard to each pixel of the face region,”

and “the total number of pixels included in the face region.” *Id.* (citing Ex. 1008, 7:62–8:12, 10:36–61). Thus, the Petition contends that Yano’s feature amount calculation unit calculates the lightness and hue histograms for pixels (“*acquir[es] properties*”) in the face region of the extracted image (“*of the determined main object*”), and therefore discloses or suggests Limitation 1[b].

Patent Owner does not address this limitation. Prelim. Resp. 32–38.

On the present record, Yano and the Parulski Declaration adequately support Petitioner’s contention that Yano discloses or suggests Limitation 1[b].

Limitation 1[c]: “*acquiring correction conditions corresponding to the acquired properties;*”

Petitioner contends Yano discloses or suggests Limitation 1[c]. Pet. 59–60 (citing Ex. 1003 ¶¶ 204–205). The Petition emphasizes Yano’s disclosure of a method to correct the face region of a person in an image by providing “optimum lightness” and “an appropriate flesh color that human beings feel desirable.” *Id.* at 59 (citing Ex. 1003 ¶ 205; Ex. 1008, 8:23–25, 10:14–22). The Petition asserts Yano executes such correction using the image correction processing unit that “stores the center value and distribution value for both the ‘range of lightness [brightness] of the flesh color’ and the ‘range of hue of the flesh color that human beings feel desirable.’” *Id.* at 59–60 (citing Ex. 1003 ¶ 205; Ex. 1008, 9:23–57, 11:29–61). The Petition argues that the stored “optimum” brightness and hue values for pixels in the face region of a person are “*correction conditions corresponding to the acquired properties [of the determined main object]*.” *Id.*

The Petition emphasizes Yano’s disclosure that the image correction processing unit uses the stored “optimum” center and distribution values to calculate corrected brightness and hue values for the image data of a person’s face. *Id.* Yano further discloses that the image correction processing unit also “obtains

the parameters necessary . . . from the image feature amount of the face region,” which are calculated by the image feature amount calculation unit from the image data of the extracted face region. The Petition asserts that Yano’s image correction processing unit uses the stored “optimum” center and distribution values to correct the lightness (brightness) and hue (color) pixel values of the image data acquired from the face region of the extracted image. *Id.* at 9:23–25, 11:29–31. The Petition argues that a POSITA would have understood the image correction processing unit must “first acquire[] the center and distribution values of each range from memory,” in satisfaction of the “*acquiring*” element of Limitation 1[c]. *Id.* at 60 (citing Ex. 1008, 9:35–49, 11:42–51; Ex. 1008 ¶ 205).

Patent Owner contends that Yano does not disclose the claimed “*correction conditions corresponding to the acquired properties [of the determined main object]*,” but instead “uses ‘a target value’ to correct the brightness and color (hue) of ‘the flesh color in the face region.’” Prelim. Resp. 35 (citing Ex. 1008, 9:24–50, 11:30–41). For example, Yano describes a process where the center value and distribution value for the brightness of human flesh tones “are parameterized as a target value of the lightness (brightness) and stored in the image correction processing unit.” Ex. 1008, 9:35–39. Similarly, Yano’s center value and distribution value for the color (hue) of human flesh tones “are parameterized as a target value of the hue and stored in the image correction processing unit.” *Id.* at 11:36–41. Yano’s image correction processing unit then calculates corrected values for brightness and color of the pixels in the face region by applying the target values to equations (1) and (3). *Id.* at 9:39–50, 11:42–54.

Patent Owner reasons that, although Yano’s target values may be “*correction conditions*” as recited in Limitation 1[c], “Yano’s target value is not a ‘correction condition[] *corresponding* to [the properties of the determined main

object]’ because Yano’s target value does not correspond to the brightness or hue (color) properties of face region.” *Id.* at 36–37 (citing Ex. 2001 ¶¶ 98–99).

At this stage of the proceeding based on the present record, the Petition has explained and adequately supported the assertion that the center and distribution values for brightness and color of face region pixels are “*acquired*” from memory for use in Yano’s image correction processing unit. Patent Owner also does not appear to dispute that Yano’s target values for brightness and color are “parameterized” derivatives of the center and distribution values, which the Petition and Mr. Parulski assert do correspond to the acquired brightness and hue values (“*properties*”) of the face region in the image. The parties are directed to address the competing testimony of Mr. Parulski (Ex. 1003 ¶ 205) and Dr. Papanikolopoulos (Ex. 2001 ¶¶ 98–99) regarding Limitation 1[c] during the *inter partes* review proceeding.

On the present record at this stage of the proceeding, Yano and the Parulski Declaration adequately support Petitioner’s contention that Yano discloses or suggests Limitation 1[c].

Limitation 1[d]: “*adjusting image quality of the main object using the acquired correction conditions corresponding to properties of the determined main object, wherein a parameter used in adjusting the image quality is a highlight, a shadow, brightness, contrast, color balance, or memory color, and;*”

Petitioner contends Yano discloses performing a “lightness correction from the image feature amount of the face region” and “correcting the face region of the person to generate the image of an appropriate flesh color that human beings feel desirable,” in satisfaction of Limitation 1[d]. Pet. 60 (citing Ex. 1003 ¶ 207; Ex. 1008, 9:23–57, 10:19–22, 11:29–61). The Petition explains Yano’s image correction processing unit uses the center and distribution values in equations (1)

and (3) to calculate new pixel values for corrected brightness and color of the face region pixels in the image (“*using the acquired correction conditions corresponding to the acquired properties of the determined main object*” from Limitation 1[c]). *Id.* at 60–61 (citing Ex. 1003 ¶¶ 207–208; Ex. 1008, 9:23–57, 11:42–61). The Petition states that “[a]fter determining the corrected hue values, ‘the image correction processing unit obtains the R, G and B component values in regard to each pixel’ such that they maintain the original lightness and saturation values but include the corrected hue value based on the above equation.” *Id.* at 61 (citing Ex. 1003 ¶ 209; Ex. 1008, 11:56–60). The Petition asserts that a “POSITA would have understood that this adjusting of the hue values of the pixels in the entire image based on a target flesh color discloses using color balance in adjusting the image quality,” as well as using memory color. *Id.* at 61–62 (citing Ex. 1003 ¶ 209; Ex. 1008, 12:30–42).

Patent Owner refers back to its argument made in connection with Limitation 1[c], which we have addressed above. Prelim. Resp. 37–38 (citing Ex. 1001, 1:38–46; Ex. 2001 ¶ 100).

On the present record, Yano and the Parulski Declaration adequately support Petitioner’s contention that Yano discloses or suggests Limitation 1[d].

Limitation 1[e]: “*wherein each operation of the method of image processing is executed by one of a personal computer, a printer, or a display device.*”

Petitioner contends Yano discloses or suggests Limitation 1[e]. Pet. 62 (citing Ex. 1003 ¶¶ 211–212). The Petition asserts that Yano discloses an image processing method “based on an application program installed in an image processing apparatus such as a PC” (personal computer). *Id.* (citing Ex. 1003 ¶ 212; Ex. 1008, 1:17–23, 2:36–43).

Patent Owner does not address this limitation. Prelim. Resp. 32–38.¹⁴

On the present record, Yano and the Parulski Declaration adequately support Petitioner’s contention that Yano discloses or suggests Limitation 1[e].

3. *Conclusion for Ground 3*

For the reasons given above, we are persuaded that Petitioner’s argument and evidence demonstrate a reasonable likelihood Petitioner would prevail in showing the unpatentability of claims 1–12 of the ’574 patent as obvious over Yano and Terashita.

IV. CONCLUSION

For the foregoing reasons, we determine the Petitioner has established a reasonable likelihood of prevailing in its challenge to the patentability of at least one claim in the ’574 patent. Therefore, we institute *inter partes* review of all challenged claims (1–12) on all grounds of unpatentability asserted in the Petition. 37 C.F.R. § 42.108(a).

At this stage of the proceeding, the Board has not made a final determination as to the patentability of any challenged claim or any underlying factual or legal issues. A final determination will be made based on the record as developed during the *inter partes* review. Any argument not asserted in a timely-filed brief, such as a response to the Petition, may be deemed forfeited or waived, even if that argument appears in the Preliminary Response.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of

¹⁴ For claims 2–12, Patent Owner refers back to its arguments addressing claim 1 in view of Yano and Terashita. Prelim. Resp. 38–41.

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claims 1–12 of the '574 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4(b), *inter partes* review of the '574 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

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