

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BANK OF AMERICA, N.A.,
Petitioner,

v.

NANT HOLDINGS IP, LLC,
Patent Owner.

IPR2021-01332
Patent 9,324,004 B2

Before JAMESON LEE, THOMAS L. GIANNETTI, and
STEPHEN E. BELISLE, *Administrative Patent Judges*.

LEE, *Administrative Patent Judge*.

JUDGMENT

Final Written Decision
Determining All Challenged Claims Not Unpatentable
35 U.S.C. § 318(a)
Denying Petitioner's Motion to Exclude Evidence
37 C.F.R. § 42.64(c)

I. INTRODUCTION

We instituted an *inter partes* review of claims 1–3, 6, and 18 of U.S.
Patent No. 9,324,004 B2 (Ex. 1001, “the ’004 patent”) owned by Nant

Holdings IP, LLC (“Patent Owner”). Paper 9 (“Decision to Institute” or “Inst. Dec.”).

We have authority to conduct this *inter partes* review under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We determine that Bank of America, N.A. (“Petitioner”) has not proved by a preponderance of the evidence that claims 1–3, 6, and 18 of the ’004 patent are unpatentable.

A. Background

Petitioner filed a Petition (Paper 2 (“Pet.”)) requesting *inter partes* review of claims 1–3, 6, and 18 of the ’004 patent. Patent Owner filed a Preliminary Response.¹ Paper 6. Petitioner filed a Preliminary Reply. Paper 7. Patent Owner filed a Preliminary Sur-Reply. Paper 8. The Decision to Institute was entered on January 11, 2022. Paper 9. Thereafter, Patent Owner filed a Patent Owner Response.² Paper 18 (“PO Resp.”). Petitioner filed a Reply. Paper 25 (“Reply”). Patent Owner filed a Sur-Reply. Paper 33 (“Sur-Reply”). Oral hearing was consolidated with the oral hearing in IPR2021-01081, and was held on October 12, 2022. A copy of the consolidated hearing transcript has been entered into the record as Paper 39 (“Tr.”).

Petitioner filed a Motion to Exclude Evidence. Paper 34. Patent Owner filed an Opposition to Petitioner’s Motion to Exclude Evidence. Paper 35. Petitioner filed a Reply and subsequently a Corrected Reply to

¹ The Preliminary Response was accompanied by a Declaration of Chandrajit Bajaj, Ph.D. (Ex. 2001).

² The Patent Owner Response was accompanied by a Supplemental Declaration of Dr. Bajaj (Ex. 2007).

Patent Owner's Opposition to Petitioner's Motion to Exclude Evidence.
Papers 36, 37.

B. Real Parties in Interest

Petitioner identifies Bank of America, N.A., and Bank of America Corporation as the real parties in interest. Pet. 63. Patent Owner identifies Nant Holdings IP, LLC as the real party in interest. Paper 4, 2.

C. Related Matters

The parties identify the following proceeding in the Central District of California involving the '004 patent: *NantWorks LLC and Nant Holdings IP, LLC v. Bank of America Corporation and Bank of America, N.A.*, No. 2:20-cv-07872 (C.D. Cal.). Pet. 63; Paper 4, 2.

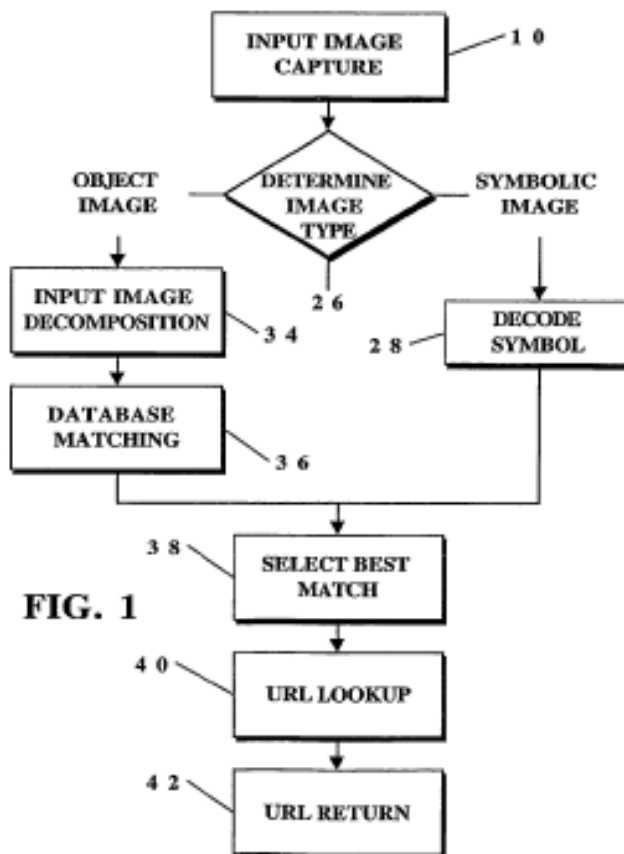
The following *inter partes* review proceedings involve patents related to the '004 patent: IPR2021-01080 (Patent No. 8,463,030 B2), IPR2021-01081 (Patent No. 7,881,529 B2), IPR2021-01304 (Patent No. 8,478,036 B2), IPR2022-01333 (Patent No. 7,899,252 B2), IPR2021-01388 (Patent No. 8,520,897 B2), IPR2021-01389 (Patent No. 9,031,278 B2).

D. The '004 Patent

The '004 patent relates to a method and process for identifying objects from digitally captured images thereof that uses image characteristics to identify an object from a plurality of objects in a database. Ex. 1001, 1:27–33. The '004 patent describes traditional methods for linking objects to digital information that involve applying a barcode, a radio or optical transceiver or transmitter, or some other means of identification, to the object, as well as modifying the image or object so as to encode detectable information. *Id.* at 3:42–48. However, according to the '004 patent, there is a need for detecting, identifying, determining the position and orientation of,

and obtaining other information about an object, without modifying or disfiguring the object, without the need for marks, symbols, codes, barcodes, or characters on the object, and without the need to touch or disturb the object. *Id.* at 1:46–57. The '004 patent states that it responds to this need by describing a system and process for identifying digitally captured images without requiring modification to the object. *Id.* at 4:33–35.

Figures 1 and 2 of the '004 patent, reproduced below, collectively illustrate an embodiment of the patent. The following description will refer to both figures:



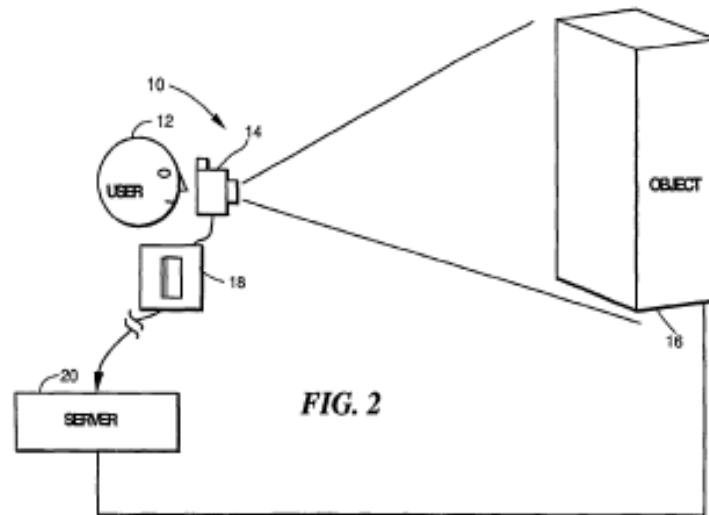


Figure 1 of the '004 patent is a schematic block diagram presenting a top-level algorithm flowchart. Ex. 1001, 4:50–51. Figure 1 shows the overall processing flow and steps in the algorithm. *Id.* at 5:33–35. Figure 2 of the '004 patent is an idealized view of image capture. *Id.* at 4:52.

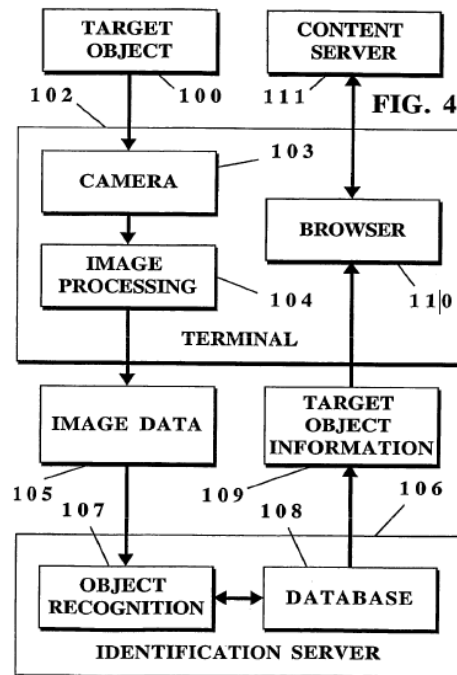
As described in the '004 patent, user 12 uses a computer, mobile telephone, personal digital assistant, or other similar device 14 equipped with an image sensor (such as a CCD or CMOS digital camera). *Id.* at 5:36–39. User 12 aligns the sensor of image capture device 14 with object 16 of interest. *Id.* at 5:39–40. The linking process is then initiated, and device 14 captures digital image 18 of the scene at which it is pointed. *Id.* at 5:41–46. Image 18 is represented as three separate 2-D matrices of pixels, corresponding to the raw RGB (Red, Green, Blue) representation of the input image. *Id.* at 5:46–49. Image 18 is subsequently transferred to image processor/server 20. *Id.* at 5:54–57.

Image type determination 26 is accomplished with a discriminator algorithm which operates on input image 18 and determines whether the input image contains recognizable symbols, such as barcodes, matrix codes, or alphanumeric characters. *Id.* at 5:63–67. If such symbols are found,

image 18 is sent to decode symbol process 28. *Id.* at 5:53–54. In decode symbol process 28, image 18 is analyzed to determine the location, size, and nature of the symbols. *Id.* at 6:13–14. The symbols are analyzed according to their type, and their content information is extracted. *Id.* at 6:14–16.

Image 18 may also or alternatively contain an object of interest, and may therefore also or alternatively be sent to the object image branch of the process flow. *Id.* at 6:3–5. In input image decomposition process 34, a “decomposition” of a high-resolution input image into several different types of quantifiable salient parameters is performed. *Id.* at 6:17–20. According to the ’004 patent, this allows for multiple independent convergent search processes of the database to occur in parallel in the database matching 36, which greatly improves image match speed and match robustness. *Id.* at 6:20–23.

Figure 4 provides an alternative explanation of the process of the ’004 patent and is reproduced below:



Ex. 1001, 4:55–56. Terminal 102 is a computing device that has an “image” capturing device such as digital camera 103 or a video camera. *Id.* at 13:23–26. Image processing software 104 converts the digital imagery into image data 105 for transmission to and analysis by identification server 106. *Id.* at 13:33–35. An example of image data 105 is MPEG video stream created from the raw imagery from camera 103. *Id.* at 13:43–50. Identification server 106 receives image data 105 and passes it to object recognition unit 107. *Id.* at 14:2–4. The ’004 patent describes:

The object recognition [unit] 107 also detects and recognizes images of the target object 100 or portions thereof. This is accomplished by analyzing the image data 105 and comparing the results to other data, representing images of a plurality of known objects, stored in the database 108, and recognizing the target object 100 if a representation of target object 100 is stored in the database 108.

Id. at 14:54–60.

In addition to containing image information, database 108 also contains address information, such as Internet URL, which corresponds to target object 100. *Id.* at 20:30–35. Identification server 106 sends the stored information corresponding to the target object terminal 102, and that information can include the Internet URL. *Id.* at 20:35–41. After receiving target object information 109, terminal 102 performs an action or actions based on the target object information, and that action can be accessing a web site. *Id.* at 20:61–65. Browser 110 can be a web browser which connects to content server 111 located at the information address, which is typically an Internet URL, included in the target object information 109. *Id.* at 21:39–42. Content server then sends content information to terminal 102 and browser 110. *Id.* at 21:56–57.

“This content information usually is pertinent to the target object 100 and can be text, audio, video, graphics, or information in any form that is usable by the browser 110 and terminal 102.” *Id.* at 21:56–60. The ’004 patent describes:

The user can perform ongoing interactions with the content server 111. For example, depending on the embodiment of the invention and the applications, the user can:

Listen to streaming audio samples if the target object 100 is an audio recording (e.g., compact audio disc).

Purchase the target object 100 via on-line transaction, with the purchase amount billed to an account linked to the terminal 102, to the individual user, to a bank account, or to a credit card.

Id. at 22:1–9.

Claim 1 is independent and illustrative. Claims 2, 3, 6, and 18 each depend, directly or indirectly, from claim 1. Claim 1 recites:

1. A method for processing a video stream, comprising:

analyzing, via a mobile device, a scene represented by the video stream for at least one object;

deriving at least one characteristic of the video stream;

recognizing the at least one object in the scene as a target object based at least in part on the at least one characteristic of the video stream;

providing an indication upon recognizing the at least one object as the target object; and

presenting to the user, via an address, content information associated with the target object.

Ex. 1001, 24:23–33.

*E. References and Other Evidence*³

The Petition relies on the following references:

U.S. Patent No. 6,512,919 B2 (Ex. 1005, “Ogasawara”).⁴

U.S. Patent No. 5,546,475 (Ex. 1006, “Bolle”).⁵

U.S. Patent 6,947,571 B1 (Ex. 1022, “Rhoads”).⁶

Petitioner relies on a first Declaration of Jeffrey J. Rodriguez, Ph.D. (Ex. 1003) and a second Declaration of Dr. Rodriguez (Ex. 1050). Patent Owner relies on a Declaration of Dr. Bajaj (Ex. 2001) and a Supplemental Declaration of Dr. Bajaj (Ex. 2007).

F. Asserted Grounds of Unpatentability

Petitioner asserts that the challenged claims are unpatentable on the following grounds:⁷

³ The '004 patent issued from Application 14/100,431, filed Dec. 9, 2013, which claims priority to a series of non-provisional applications the earliest of which was filed on Nov. 5, 2001, and to Provisional Application 60/246,295, filed Nov. 6, 2000. Ex. 1001, codes (21, 22, 45, 60). Petitioner assumes November 6, 2000 is the priority date of the '004 patent. Pet. 12.

⁴ Issued Jan. 28, 2003, from Application 09/281,557, filed March 30, 1999. Ex. 1005, codes (21, 22, 45).

⁵ Issued Aug. 13, 1996.

⁶ Issued Sept. 20, 2005, from Application 09/571,422, filed May 15, 2000. Ex. 1022, codes (21, 22, 45).

⁷ Patent Owner asserts that the Petition “half-heartedly argues that Ogasawara alone renders the claims unpatentable.” Counsel for Petitioner at oral hearing clarified that Petitioner does not assert that any claim would have been obvious over Ogasawara alone. PO Resp. 24; Tr. 65:24–66:17. In other words, according to Petitioner, the combined teachings of Ogasawara and Bolle are necessary to render obvious any challenged claim.

Claims Challenged	35 U.S.C. § ⁸	Reference(s)
1–3, 6, 18	103(a)	Ogasawara, Bolle
1–3, 6, 18	103(a)	Ogasawara, Bolle, Rhoads

Pet. 29, 48.

II. ANALYSIS

A. *The Burden of Proof on Challenged Patent Claims*

Petitioner must demonstrate that the challenged patent claims are unpatentable. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). That burden never shifts to the patentee. *Id.*

In our Institution Decision, we preliminarily found “Petitioner’s cited evidence provides sufficient rational reasons for purposes of institution to combine Ogasawara and Bolle.” Inst. Dec. 39. However, on further review of the Petition and further consideration of the parties’ briefing on this issue and the relevant case law, and based on the complete record before us, we now conclude otherwise. *See Fanduel, Inc. v. Interactive Games LLC*, 966 F.3d 1334, 1340 (Fed. Cir. 2020) (“There is nothing inherently inconsistent about the Board instituting IPR on obviousness grounds and then ultimately finding that the petitioner did not provide preponderant evidence that the challenged claim was obvious.”); *In re Magnum Oil Tools*, 829 F.3d at 1376 (“[T]he decision to institute and the final written decision are ‘two very different analyses,’ and each applies a ‘qualitatively different standard.’” (quoting *TriVascular, Inc. v. Samuels*, 812 F.3d 1056, 1068 (Fed. Cir. 2016))).

⁸ Because the application from which the ’004 patent issued was filed before March 16, 2013, the pre-AIA (“America Invents Act”) versions of §§ 102 and 103 applies. Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011).

In particular, we determine that Petitioner has not proven, by a preponderance of the evidence, that the ordinarily skilled artisan would have had a *rational* reason to combine the relevant teachings of Ogasawara and Bolle to render obvious the invention of independent claim 1. This issue is substantially disputed between the parties (*see* Pet. 22–28; PO Resp. 42–53; Pet. Reply 14–24; PO Sur-Reply 10–25), with Petitioner also seeking to exclude nearly all of the testimony of Patent Owner’s expert, Dr. Bajaj, on this issue (Paper 34), and with Patent Owner arguing that Petitioner’s Reply “improperly raises new theories for the first time” on this issue (PO Sur-Reply 4). Nonetheless, the burden of proving a rational reason (or motivation) to combine such teachings *is on Petitioner* and never shifts to Patent Owner. *Dynamic Drinkware*, 800 F.3d at 1378; *Eli Lilly & Co. v. Teva Pharms. Int’l GmbH*, 8 F.4th 1331, 1348–49 (Fed. Cir. 2021) (“[I]t was, at all times, [petitioner’s] burden to show that the claims would have been obvious.”).

B. Level of Ordinary Skill in the Art

Petitioner contends that “[a]s of November 2000, a POSITA [person of ordinary skill in the art] . . . would have had a range of knowledge roughly equivalent to the knowledge and/or training of a person holding the degree of Bachelor of Science in Electrical Engineering, Computer Science, Computer Engineering, or equivalent, and one to two years of experience working with image processing, image recognition, or a related field.” Pet. 21 (citing Ex. 1003 ¶ 53).

In the Decision to Institute, we determined that Petitioner’s articulation is consistent with the prior art and patent specification and is supported by credible expert testimony. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level

of skill). Inst. Dec. 10–11. Patent Owner, in its Response, states that it “does not contend that an alternative level of ordinary skill in the art should be applied.” PO Resp. 18. Thus, we maintain our adoption of Petitioner’s articulation of the level of ordinary skill in the art.

C. Claim Construction

1. General Principles

We use the same claim construction standard that would be used to construe a 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 such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2020). The claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) is applicable.

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 history, other claims, and extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. Usually, the specification is dispositive, and it is the single best guide to the meaning of a disputed term. *Id.* at 1315. The following guidance from *Phillips* is instructive:

It is a “bedrock principle” of patent law that “the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Innova*, 381 F.3d at 1115; *see also Vitronics*, 90 F.3d at 1582 (“we look to the words of the claims themselves . . . to define the scope of the patented invention”); *Markman*, 52 F.3d at 980 (“The written description part of the specification itself does not delimit the right to exclude. That is the function and purpose of claims.”). That principle has been recognized

since at least 1936, when Congress first required that the specification include a portion in which the inventor “shall particularly specify and point out the part, improvement, or combination, which he claims as his own invention or discovery.” Act of July 4, 1836, ch. 357, § 6, 5 Stat. 117, 119. In the following years, the Supreme Court made clear that the claims are “of primary importance, in the effort to ascertain precisely what it is that is patented.” *Merrill v. Yeomans*, 94 U.S. 568, 570, 24 L.Ed. 235 (1876). Because the patentee is required to “define precisely what his invention is,” the Court explained, it is “unjust to the public, as well as an evasion of the law, to construe it in a manner different from the plain import of its terms.” *White v. Dunbar*, 119 U.S. 47, 52, 7 S.Ct. 72, 30 L.Ed. 303 (1886); *see also Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 419, 28 S.Ct. 748, 52 L.Ed. 1122 (1908) (“the claims measure the invention”); *McCarty v. Lehigh Valley R.R. Co.*, 160 U.S. 110, 116, 16 S.Ct. 240, 40 L.Ed. 358 (1895) (“if we once begin to include elements not mentioned in the claim, in order to limit such claim . . . , we should never know where to stop”); *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339, 81 S.Ct. 599, 5 L.Ed.2d 592 (1961) (“the claims made in the patent are the sole measure of the grant”).

Phillips, 415 F.3d at 1312.

In patent law, “the name of the game is the claim.” *In re Hiniker Co.*, 150 F.3d 1362, 1369 (Fed. Cir. 1998). As the Federal Circuit further explained:

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

Superguide Corp. v. DirecTV Enterprises, Inc., 358 F.3d 870, 875 (Fed. Cir. 2004). *See also Hill–Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (“While we read claims in view of the specification, of which they are a part, we do not read limitations from the embodiments in the specification into the claims.”).

It is improper to add to a claim an “extraneous” limitation appearing in the specification, and “extraneous” means a limitation read into a claim from the specification wholly apart from any need to do so. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994) (citing *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988)); *see also Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 950 (Fed. Cir. 1993).

The specification may reveal a special definition given to a claim term by the patentee, or the specification or prosecution history may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Phillips*, 415 F.3d at 1316. If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998). The disavowal, if any, can be effectuated by language in the specification or the prosecution history. *Poly-America, L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016).

It is inappropriate to construe claim terms as limited to preferred embodiments without a clear intent to redefine the term or a clear disavowal of claim scope. *See, e.g., Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012). In order for prosecution disclaimer to attach, the disavowal must be both “clear and unmistakable.” *3M Innovative Properties Co. v. Tredegar Corp.*, 725 F.3d 1315, 1325 (Fed. Cir. 2013); *Lazare Kaplan Intern., Inc. v. Photoscribe Technologies, Inc.*, 628 F.3d

1359, 1370 (Fed. Cir. 2010); *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1325–26 (Fed. Cir. 2003).

Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

2. “the recognize limitation”

Petitioner asserts that the parties “have offered competing constructions for one term of the ’004 patent before the district court.” Pet. 28. The term is the limitation “recognizing the at least one object in the scene as a target object based at least in part on the at least one characteristic of the video stream.” *Id.* at 33. Hereinafter, this limitation is referred to as “the recognize limitation.”

Petitioner proposes that the recognize limitation means “identifying the at least one object in the scene as a target object at least in part by matching the at least one characteristic to characteristics of objects stored in a database.” *Id.* at 33–34. Petitioner asserts that in the district court “[t]he Patent Owner proposed ‘no construction necessary-plain and ordinary meaning.’” *Id.* at 34. Petitioner also notes that Patent Owner’s plain and ordinary meaning before the district court includes an attempt “to read this limitation for purposes of infringement in the district court to mean recognizing an object (e.g., a check) in the video stream based at least in part on the at least one characteristic of the video stream (e.g., an indication of how steady the depicted image of the check is and/or an alignment of the check within the video stream). Ex. 1010, 19–23 of 41.” *Id.* In this

proceeding, however, Patent Owner has not made the argument that a steady image and/or alignment of the image within the video stream is required.

After filing of the Petition and prior to filing of the Preliminary Response, the district court in the parallel litigation in the Central District of California (*see supra*) entered a *Markman* order construing the recognize limitation, among others. *See* Ex. 2006, 15–16, 18–19.⁹ For that limitation, as here, in district court Patent Owner proposed the construction of “plain and ordinary meaning.” *Id.* at 15.

The district court construed the recognize limitation to mean “recognizing the at least one object in the scene as a target object based at least in part on the at least one characteristic of the video stream by comparing the at least one characteristic with characteristics of objects stored in a database to find a match.” *Id.* at 19. In adopting this construction, the district court remarked: “The Court agrees with Defendants that the ‘recognizing’ step requires querying a database.” *Id.* The district court rejected parts of Petitioner’s proposed construction there, finding no reason to change “recognizing” to “identifying,” and also finding no reason to change “based at least in part on the at least one characteristic” to “matching the at least one characteristic.” Ex. 2006, 17–19. With regard to the requirement of “finding a match,” the district court explained: “The intrinsic evidence consistently emphasizes that the system compares parameters in order to match a target object with an object in a database in order to ‘recognize’ the target.” *Id.* at 18; *see also id.* at 18–19. The district court also did not adopt Patent Owner’s plain and ordinary meaning.

⁹ Unless otherwise specified, citations to exhibits use the page numbers assigned by the parties, not the original page numbers.

In its Preliminary Response, Patent Owner does not articulate its proposed construction for the recognize limitation in this proceeding. Patent Owner states: (1) “the Board should reject Petitioner’s proposed construction”; and (2) “Patent Owner does not object to the Board adopting the District Court’s construction of the ‘recognize’ limitation.” Prelim. Resp. 34–35.

In the Decision to Institute, we determined that for reasons given by the district court the recognize limitation should be given the same construction as determined by the district court. We adopted the district court’s construction for that term. Inst. Dec. 14; Ex. 2006, 19. Specifically, we construed the recognize limitation to mean “recognizing the at least one object in the scene as a target object based at least in part on the at least one characteristic of the video stream by comparing the at least one characteristic with characteristics of objects stored in a database to find a match.” Inst. Dec. 14.

Post institution of review, Patent Owner has not objected to the construction we adopted. Patent Owner states: “Patent Owner and its expert apply [the Board’s construction] in their analysis in the remainder of this IPR, but do not necessarily agree it is correct.” PO Resp. 19. Petitioner also has not objected to the construction we adopted.

We maintain the construction we adopted in the Decision to Institute. Inst. Dec. 14.

3. “*a scene*”

The term “a scene” appears in independent claim 1. Patent Owner asserts:

Claim 1 of the ’004 patent specifies “analyzing, via a mobile device, **a scene** represented by the video stream for at

least one object.” Ex. 1001 (’004 patent) at cl. 1 (emphasis added). A subsequent claim limitation refers to “**the scene**,” the antecedent basis of which is “**a scene**” represented by the video stream. *Id.* (“recognizing the at least one object in **the scene**”) (emphasis added).

“The scene” should be construed to refer to a single scene. Because “the” is a singular modifier, its usage to qualify “the scene” therefore limits that scene to being a single scene. Ex. 2007 (Supplemental Declaration of Chandrajit Bajaj, Ph. D.) (“Bajaj”) ¶¶ 17–18 [other citations omitted].

PO Resp. 20.

Petitioner has not proposed a construction for “a scene” or “the scene.” Petitioner states:

Ogasawara combined with Bolle teaches “analyzing . . . a scene represented by the video stream for at least one object” and “recognizing the at least one object in the scene as a target object,” (Ex. 1001, 24:24–29), both under the terms’ plain-and-ordinary meaning and under PO’s proposed construction that the claimed “scene” refers to the “same, single scene.” POR, 20–23.

Reply 3. Petitioner does not set forth specifically what it contends is the plain and ordinary meaning of “a scene” or “the scene.” Petitioner does, however, explain why it believes the prior art still satisfies Patent Owner’s proposed construction for “a scene” and “the scene.” According to Petitioner, analyzing one scene, a single scene, does not preclude involvement in the analysis of information from a second scene. Paper 25, 4–6. Thus, in Petitioner’s view, “a scene” and “the scene” are met even under Patent Owner’s proposed construction.

In its Sur-Reply, Patent Owner clarifies that, under Patent Owner’s proposed construction, “the analyzing and recognizing steps must occur on a *single* scene (i.e. image); the claims exclude processing that occurs across

multiple images.” Paper 33, 25. This dispute between the parties requires resolution. For reasons discussed below, we disagree with Patent Owner.

Patent Owner is correct that the antecedent basis in claim 1 for “the scene” is the earlier recited “a scene.” Patent Owner is incorrect, however, in characterizing “the” as a singular modifier. The definite article “the” can be used to modify something plural, e.g., “the scenes.” Although in claim 1, “the” is used to modify a “scene,” that does not help the Patent Owner, because nothing in the claim excludes the involvement of additional scenes while one “scene” is analyzed. Patent Owner points to nothing in claim 1 which restricts the analyzing to “only” one scene or “no more” than one scene, and we see none.

Further, claim 1 uses the non-limiting phrase “comprising,” which creates a presumption that the claim is not limited to only those elements expressly recited in the claim. *Crystal Semiconductor Corp. v. TriTech Microelectronics Int’l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001). We recognize that the only embodiment described in the specification of the ’004 patent analyzes only a single scene, but we are not required to construe the claim as limited to just that embodiment. *Innova/Pre Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1121–22 (Fed. Cir. 2004). Such a construction is neither encouraged nor presumed. *Id.* Additionally, Patent Owner points to no expressions of disavowal either in the prosecution history or in the specification of the ’004 patent with regard to “a scene” in which the patent applicant disavows, with clarity, claim scope covering analysis of more than one scene.

For the foregoing reasons, we disagree with Patent Owner, and we determine that analyzing “a scene” as recited in claim 1 does not preclude involvement of additional scene or scenes in the analysis.

*D. Alleged Obviousness of Claims 1–3, 6, and 18
over Ogasawara and Bolle*

1. Principles of Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed invention and the prior art are such that the claimed invention, as a whole, would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which said claimed invention pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). There must be some articulated reasoning with rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

2. Overview of Ogasawara

Ogasawara describes an electronic shopping system that facilitates purchase transactions via a wireless phone. Ex. 1005, code (57). An integral digital camera is attached to the wireless telephone to facilitate the selection of items to be purchased and is controlled to function as a bar code or product icon image capture device. *Id.* Character or pattern recognition software translates the bar or product icon image into an appropriate item identifier. *Id.* Figure 1, reproduced below, illustrates a schematic overview of the electronic shopping system. *Id.* at 4:9–10.

¹⁰ Patent Owner has not presented objective evidence of nonobviousness in this proceeding.

FIG. 1

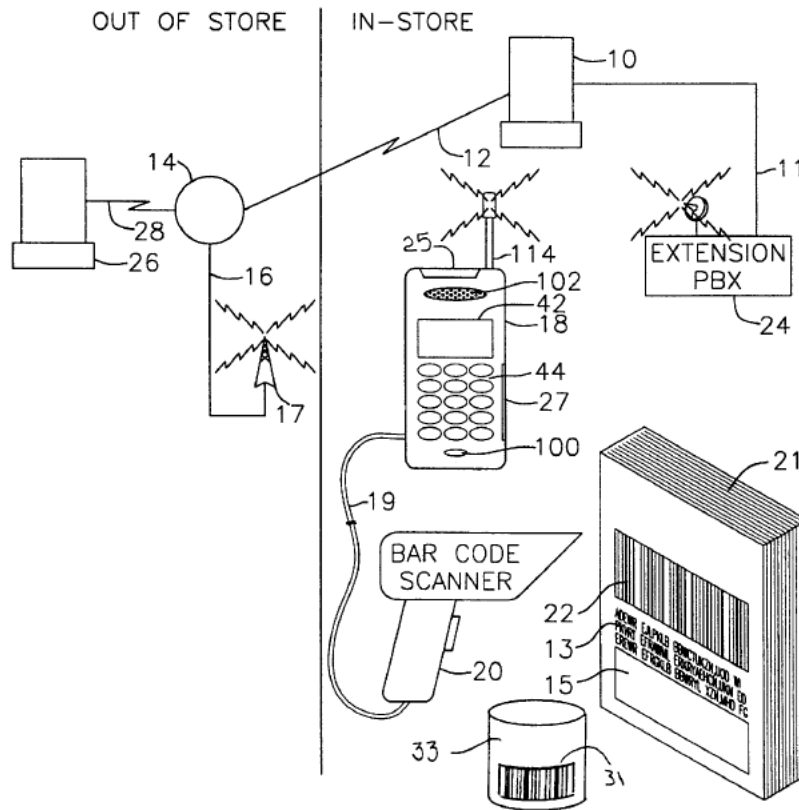


Figure 1 of Ogasawara shows an electronic system comprising store server 10 in communication with a commercial telephone network 14. *Id.* at 4:66–5:2. Commercial telephone network 14 facilitates a connection of store server 10 to wireless telephone 18. *Id.* at 5:10–11. Optionally, external bar code scanner 20 communicates with the wireless telephone 18 via wire connection 19. *Id.* at 5:31–32. Alternatively, a built-in bar code scanner 25 and/or a built-in IC card reader/writer 27 are formed integrally with the wireless telephone 18. *Id.* at 5:36–38. In a store, a bar code on a purchased item 33 is scanned by bar code scanner 20 attached to a wireless telephone 18. *Id.* at 5:38–40. Catalog 21 of the items which can be

purchased contains a bar code 22 for each such item, and preferably also contains descriptive text 13 and a picture 15 of each item. *Id.* at 5:40–43.

Figure 10 of Ogasawara, reproduced below, is a block diagram depicting an electronic shopping system having a wireless videophone. *Id.* at 4:34–36.

FIG. 10

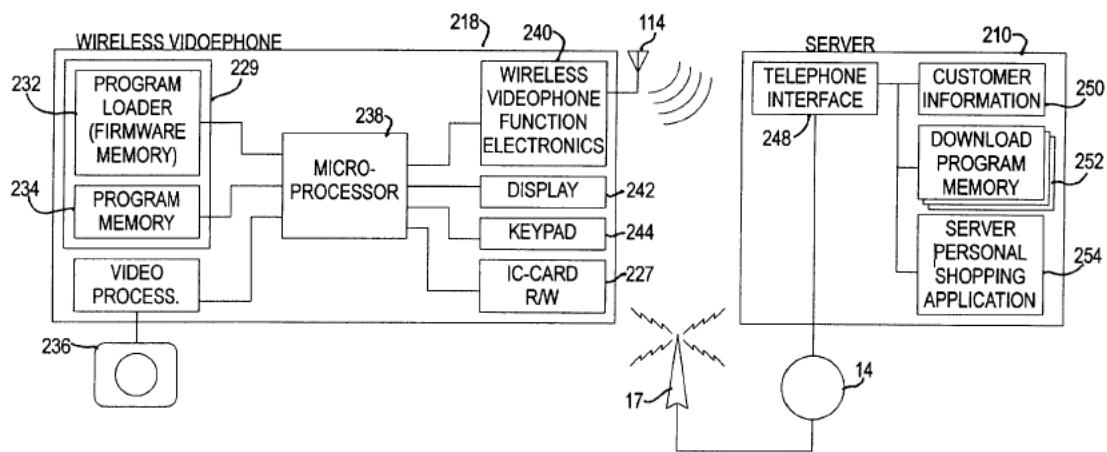


Figure 10 illustrates wireless videophone 218 used in combination with store or remote server 210. *Id.* at 15:55–56. Wireless videophone 218 includes, miniature digital image capture device 236, such as a CCD camera system. *Id.* at 15:63–16:1. Digital camera 236 includes processing circuitry that translates the visual image acquired by the camera’s lens into digital signals suitable for processing by microprocessor 238 into a form that can be broadcast transmitted by functional electronic section 240. *Id.* at 16:7–12.

As described by Ogasawara with respect to the Figure 10 embodiment, digital camera 236 provided to the wireless videophone 218 in place of a bar code scanner, and additional character recognition and/or pattern recognition software and bar code decode software in the tailored

purchase transaction program, allow the wireless videophone to function in a manner similar to the wireless telephone and bar code scanner embodiment illustrated in Figure 1. Ex. 1005, 18:14–21.

Ogasawara also discloses that advanced pattern recognition software is able to enhance the performance of the wireless videophone by offering the capability to capture merchandise information from items that are not identified by either a bar code or an alpha-numeric label. *Id.* at 23:11–15. According to Ogasawara, advanced pattern recognition software allows a consumer to capture a videographic image of an apple, for example, and to have the apple be recognized as such by the pattern recognition software. *Id.* at 23:16–19. “This capability is useful for any merchandise item having a distinct or identifiable shape or other visually identifiable characteristic. Such pattern recognition is accomplished within the wireless videophone, by specialized downloaded software.” *Id.* at 23:19–23. Ogasawara, however, does not provide a specific and detailed description of the “advanced pattern recognition software” with respect to how it works to recognize an item such as an apple without a bar code or an alpha-numeric label.

3. *Overview of Bolle*

Bolle describes a system and apparatus that uses image processing to recognize objects within a scene. Ex. 1006, code (57). An image processing system takes a digitized image of a scene. *Id.* Using an algorithm, an object image is segmented from a background image. *Id.* The object image is then processed and compared to stored reference images. *Id.* The object is recognized when a match occurs. *Id.* Bolle discloses two embodiment, one shown in Figure 1 and another shown in Figure 4. *Id.* at 6:23–24, 6:29–31.

Figure 4 is reproduced below:

FIG. 4

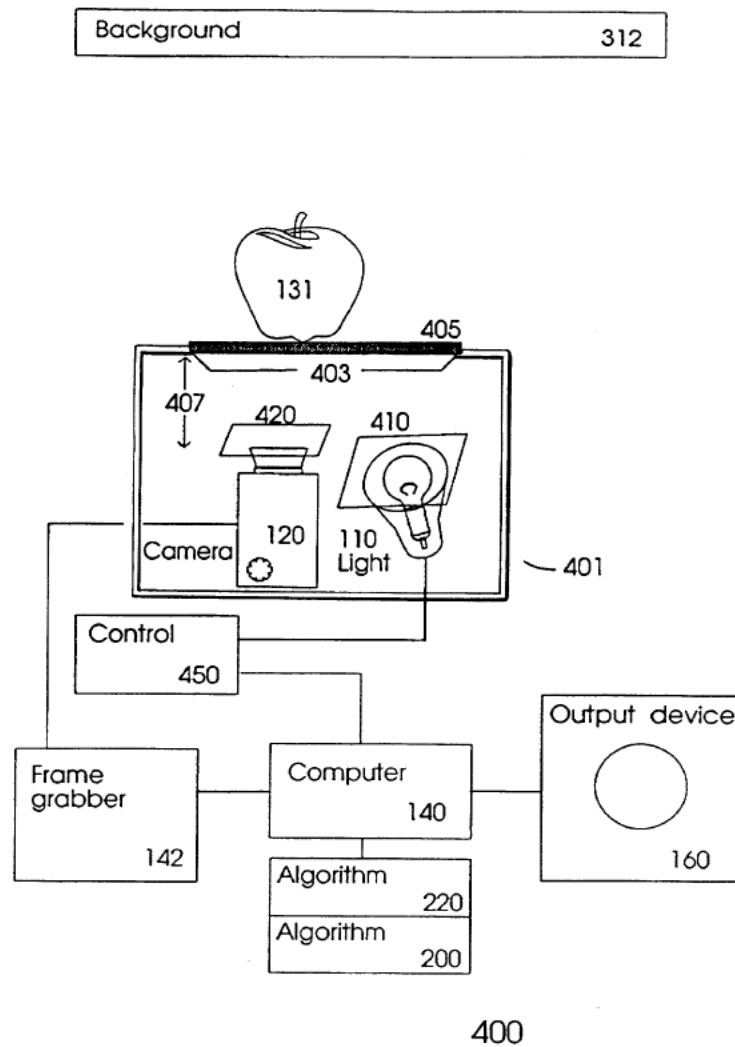


Figure 4 is a block diagram of system 400 for imaging scenes, segmenting object images 130 from their background image 311 of a physical background 312, and recognizing object(s) 131. *Id.* at 9:21–25. When using system 400, one places object 132 on support 405 above light 110 and camera 120 to provide images taken from below. *Id.* at 9:29–33. System 400 comprises opening 403 to allow object 131 to be imaged by camera 120 and illuminated by light 110. *Id.* at 9:39–43. The system further includes a segmenting algorithm for segmenting an image of object 131 from an image of the scene. *Id.* at 10:17–19. After the image is segmented, computer 140

performs a computation to determine features of the target object. *Id.* at 12:58–62. Further, computer 140, via algorithm 200, compares normalized characteristics of the target object 131 to one or more normalized referenced object characteristics. *Id.* at 13:61–63.

Bolle further describes comparison/matching of the target characterization to the reference characterizations that is performed according to one or more matching algorithms, such as a nearest neighbor classification. *Id.* at 15:50–67.

Figure 1 of Bolle is reproduced below:

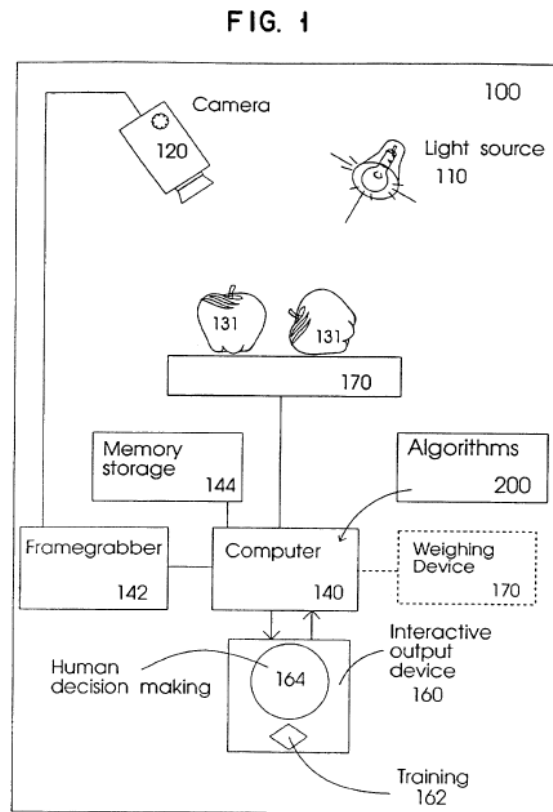


Figure 1 shows an alternative embodiment of Bolle's system. *Id.* at 6:23–24, 6:29–31. In the Figure 1 embodiment, objects are placed below camera 120 and light source 110, and images are taken from above. *Id.* at Fig. 1.

4. *Independent Claim 1*

Petitioner provides an element-by-element analysis of claim 1 in relation to Ogasawara and Bolle. Pet. 29–44. The analysis in the Petition relies on the testimony of Dr. Rodriguez (Ex. 1003 ¶¶ 116–139).

Claim 1 recites, *inter alia*, the following limitations:

“analyzing, via a mobile device, a scene represented by the video stream for at least one object”

“deriving at least one characteristic of the video stream”

“recognizing the at least one object in the scene as a target object based at least in part on the at least one characteristic of the video stream” [previously defined as “the recognize limitation”]

Ex. 1001, 24:24–29.

Petitioner contends the combined teachings of Ogasawara and Bolle satisfy each of the above-identified limitations of claim 1, i.e., the analyzing step, the deriving step, and the recognizing step. Pet. 31–33, 39–40. For the analyzing step, Petitioner explains:

Ogasawara explains that a shopper in a grocery store can use wireless videophone 218 “to capture a videographic image of an apple, . . . and to have the apple be recognized as such by advanced pattern recognition software” using an object’s “distinct or identifiable shape or other visually identifiable characteristic.” Ex. 1005, 23:16–20. A POSITA would have known that object recognition based on shape, for example, involves analyzing the shape of the object in the scene (processing, e.g., using techniques such as edge detection, boundary analysis, eccentricity analysis, etc.). Ex. 1003, ¶¶ 57, 119; *see also* Ex. 1005, 126:1–4, 22:41–51, 20:62–67. The purchase transaction program running on the wireless videophone 218 analyzes the video stream and performs this pattern recognition. *Id.*, 19:46–51 (“videographic image data is received by the system’s digital camera 236 and provided to the system’s microprocessor 238 where the received videographic information is processed by . . . loaded program 306”), [*Id.* at] 20:30–45.

Pet. 31–32 (footnote omitted). Petitioner further asserts that “[a] POSITA would also know that the combined system of Ogasawara and Bolle, as discussed above in §III.E, would analyze the shape of the object in the scene *using segmentation*.” *Id.* at 31 n.2 (emphasis added). Thus, for the analyzing step, Petitioner proposes to use and relies on using Bolle’s segmentation method as Ogasawara’s advanced pattern recognition software, to identify an object and separate it from the background scene by segmentation.

For the deriving step, Petitioner states that “Ogasawara in combination with Bolle expressly discloses deriving at least one characteristic of the video stream.” Pet. 33. Petitioner explains:

Bolle analyzes a video input image to “separate the target object 131 from the background so that the system 100 can compute characteristics of separated object 131 image pixels independently of the background of the scene.” Ex. 1006, 7:18–26, 8:12–20, 10:47. More specifically, Bolle analyzes the segmented image “to determine features of the target object,” which include, for example, “color, shape, texture, density.” *Id.*, 12:60–13:4. As explained above (§III.E), a POSITA would have been motivated to combine Ogasawara and Bolle.

Id. Thus, for the deriving step, Petitioner similarly proposes to and relies on using Bolle’s segmentation method as Ogasawara’s advanced pattern recognition software to identify an object and separate it from the background scene by segmentation.

For the recognizing step, or the recognize limitation, Petitioner explains:

Ogasawara in combination with Bolle expressly discloses this limitation under Petitioner’s construction. Ex. 1003, ¶ 127. For example, Bolle discloses identifying the at least one object (e.g., the apple) in the scene as a target object at least in part by matching the at least one derived characteristic (e.g., color,

shape, texture, or density) to characteristics of objects stored in a database (e.g., memory storage/database 270). *Id.* As explained above (§III.C.3), the derived characteristic is “compared to stored reference images” and “[t]he object is recognized when a match occurs.” Ex. 1006, 6:3–6. Specifically, the count-normalized characterization of the target object is compared with the count-normalized characterizations of reference objects, which are stored in memory storage 270” to determine a match. *Id.*, 8:12–38, 14:1–2, 13:55 (referring to the memory storage 270 as a “database 270”). As explained above (§III.E), a POSITA would have been motivated to combine Ogasawara and Bolle.

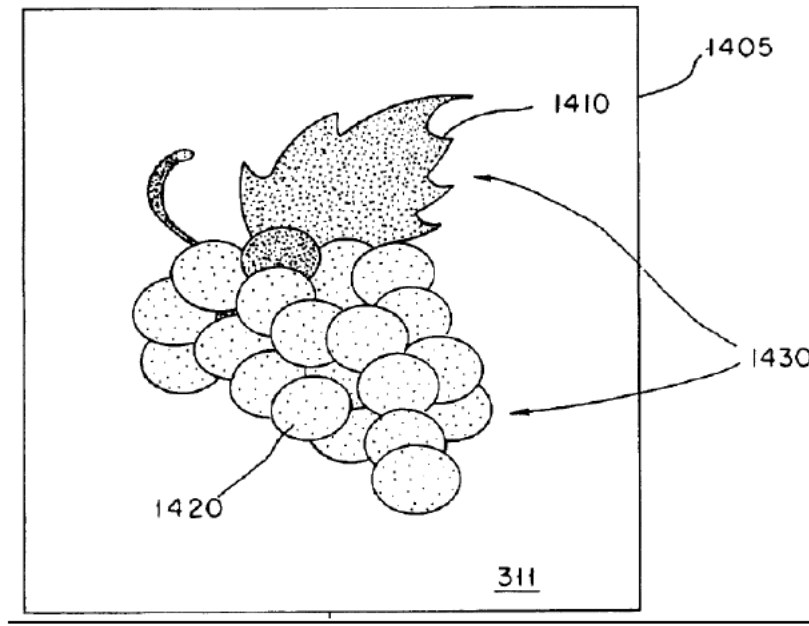
Pet. 40. Thus, for the recognizing step, Petitioner similarly proposes to and relies on using Bolle’s segmentation method as Ogasawara’s advanced pattern recognition software to identify an object and separate it from the background scene by segmentation.

Patent Owner makes two primary arguments: (1) Petitioner has not articulated a sufficient motivation to combine teachings of Ogasawara and Bolle, and (2) Petitioner has not shown a reasonable expectation of success in combining the teachings of Ogasawara and Bolle. PO Resp. 42–55. We address those two issues in Sections II.D.5 and II.D.6 below.

Here, in the remainder of Section II.D.4, we address several other arguments of Patent Owner and a belated argument of Petitioner first set forth in its Reply.

Petitioner argues in its Reply that Bolle discloses segmenting an object in a scene without comparing corresponding pixels of the object in two scenes. Reply 8–9. Specifically, Petitioner asserts:

Figure 14 [of Bolle] (below) discloses segmenting a “first object region” (e.g., leaves 1410) from a “second object region” (e.g., grapes 1420).



[the graphic illustration is a partial reproduction of Bolle's Figure 14 which illustrates an already segmented objected having two distinct regions that can be further segmented relative to each other. Ex. 1006, 6:54–57]

Ex. 1006, 19:16–27 (“The object image 130 [sic 1430] is segmented along its first object region 1410 and its second 1420 object region . . . by using a segmentation algorithm. A preferred algorithm is the use of an area normalized Hue histogram for detecting if there are two or more distinct peaks.”). *This algorithm would separate a scene into separate object and background images just as it separates object regions.* Ex. 1050, ¶¶ 38–46.

Id. at 9 (emphasis added). In that connection, Petitioner asserts that Bolle's claim 32 recites “segmenting [a] target object image from the background image of the scene” without requiring comparing two images. *Id.* at 9–10. According to Petitioner, claim 32 of Bolle confirms that Bolle's segmentation embodiments are not limited to comparing two scenes. *Id.* at 9.

Petitioner's reliance on Bolle's claim 32 is misplaced. That the scope of claim 32 is broad and covers segmentation of an object from the

background by analyzing only one scene is not disclosure of any algorithm to segment an object from the background by analyzing only one scene.

A petition must identify “with particularity” “the evidence that supports the grounds for the challenge to each claim.” 35 U.S.C.

§ 312(a)(3). With regard to Bolle’s Figure 14, Petitioner did not, in the Petition, identify or refer to Figure 14 as an algorithm to segment an object from the background in a scene. Petitioner also identified no disclosure in Bolle which describes the algorithm associated with Figure 14 as segmenting an object from the background in a scene. It is belated for Petitioner to raise this new contention, for the first time in its Reply, that Bolle discloses a Figure 14 embodiment which segments an object from the background in a scene. The argument is not entitled to consideration. If Petitioner wanted to make that argument, Petitioner should have presented the argument in the Petition to provide Patent Owner reasonable notice of the argument. *See* 37 C.F.R. §42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”); 37 C.F.R. § 42.23(b) (“A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, or patent owner response.”); *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1330–31 (Fed. Cir. 2019); *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016).

In any event, even if we do consider the belated argument, we agree with Patent Owner (Sur-Reply 20) that Bolle’s Figure 14 does not show segmenting an object from the background in a scene but only further segmenting an object already previously segmented from the background in a scene into two sub-portions. Bolle clearly states: “segmented object

image 130 has two distinct regions, i.e., the leaves 1410 and the grapes 1420.” Ex. 1006, 19:18–20. Bolle also states: “object image 130 is segmented 220 from the background 311.” *Id.* at 17:1–2. Petitioner’s expert, Dr. Rodriguez, acknowledges that object image 130 is already segmented from the background. Ex. 1050 ¶ 39 (“Figure 14 shows an image 1405 where segmented object image 130 has two distinct regions, i.e., the leaves 1410 and the grapes 1420.”); *id.* ¶ 41 (“The grapes and the leaves are part of a ‘segmented object image 130’ that was previously (prior to Figure 14) segmented from the original background.” (citing Ex. 1006, 19:18–20)).

We recognize that Dr. Rodriguez also testifies that “This type of segmentation algorithm [separating the leaves and the grapes] would separate a scene into separate object and background images just as it separates object regions.” *Id.* ¶ 40. In its Reply, Petitioner asserts the same. Reply 9. To the extent Petitioner is asserting that it would have been obvious to one with ordinary skill in the art to adapt Bolle’s algorithm of Figure 14 for use in segmenting an object from the background image in a scene, that is a new argument first presented in the Reply and is not entitled to consideration.

Patent Owner asserts that Petitioner’s stated combination of Ogasawara and Bolle does not meet the requirements of “analyzing, via a mobile device, a scene represented by the video stream for at least one object” because the image segmentation methods of Bolle requires the imaging of two scenes and subsequent comparison of the two scenes to achieve segmentation of an object from the background. PO Resp. 55–56.

Patent Owner asserts: “Bolle’s system always requires taking two still photographs of a target object, under very specific conditions. In Bolle’s system, the target object must be segmented (i.e., isolated) from the

background before it can be recognized. *Id.* at 2:3–7” PO Resp. 34. Patent Owner further asserts that there are only two disclosed ways for the segmentation process in Bolle’s system to be performed, and that each way requires two different still photographs of a candidate object to be taken and therefore an analysis of two scenes. *Id.* at 36.

For the first way, illustrated in Figure 3a of Bolle (hereinafter “Figure 3a embodiment”), Patent Owner explains:

The first disclosed segmentation method in Bolle is for a first still photograph to be taken of the background without the candidate object present, and then a second still photograph taken of the full scene (*i.e.*, the background plus the candidate object). The difference between the two still images allows the target object to be isolated. Ex. 1006 (Bolle) at 8:53–66 (“Fig. 3a shows two scenes. The first images scene 31, showing an image of a background 311 without any other objects present in the field of view of camera 120. The second imaged scene 320 includes both an image of the scene background 311 and an image 130 of one or more objects 131 A comparison of the scenes 310 and 320, preferably on a pixel by pixel basis, allows the object image 130 to be segmented (separated out) from the background image 311 of the scene.”).

Id. at 37.

For the second way, illustrated in Figure 3b of Bolle (hereinafter “Figure 3b embodiment”), Patent Owner explains:

The second disclosed segmentation method in Bolle is for a first still photograph to be taken under normal illumination conditions, and then for a second still photograph to be taken with an additional light source illuminating the candidate object. Ex. 1006 (Bolle) at 10:20–26 (“In step 510, an image (a first image) of the scene is produced with the light 110 switched on, or at a higher intensity, so as to illuminate object 132 properly. . . . In step 520, a second image of the scene is produced with the light 110 switched off or set to a level below the level in step 510.”); 11:32–42 (“In a preferred embodiment,

the steps 530 and 540 are performed on a pixel by pixel basis for each pixel location in the scene image. The result is that the pixels corresponding to the object 131 are collected in a segmented object image 130. Specifically, in the segmented object image, all pixels from the first image that are substantially brighter than their corresponding pixel in the second image are collected in segmented object image at the position they were in the first image. Therefore the segmented object image corresponds to the desired image of the object removed from the background 312.”).

Id. at 38–39.

Patent Owner’s argument regarding the applied prior art not analyzing only one scene is unavailing because it is based on its incorrect claim construction. As discussed above in Section II.C.3., we do not read analyzing a scene as precluding involvement of an additional scene within the analysis.

Patent Owner further asserts that Ogasawara and Bolle “does not render obvious the “video stream” limitation of claim 1. PO Resp. 56. Patent Owner states: “Although the references mention video-capable hardware, neither reference describes using that hardware to take and analyze a ‘video stream’ in the claimed manner, as opposed to still photographs.” *Id.* The argument is unavailing and does not undermine Petitioner’s accounting for the recited “video stream.”

Specifically, Patent Owner explains:

Petitioner identifies 16:55–60 of Ogasawara as disclosing MPEG video encoding and the capture of a video stream. Petition at 30. But Ogasawara never discloses any such video stream being used to identify an Object. Bajaj ¶ 55. To the contrary, any such video stream is only used as a viewfinder, and object recognition is performed on a distinct still image that is manually taken by the shopping customer. Ex. 1005 (Ogasawara) at 20:42–47 (“[A] purchaser may use the wireless videophone, in particular the

digital camera, to select various items which the customer desires to purchase. Such selection is made by capturing an image of an item's UPC bar code data, or the like, within the image field of the digital camera.”). This is not “analyzing” or “deriving at least one characteristic” of a video stream, but is instead, at most, an operation on a single still image. Consistent with this, Ogasawara discusses how the cell phone display shows the single still image . . . that was captured. *Id.* at 20:48–55.

Id. at 56–57.

As the Petition notes, Ogasawara describes that a shopper in a grocery store uses a wireless videophone “to capture a video-graphic image of an apple, for example, and to have the apple be recognized as such by the pattern recognition software.” Pet. 31 (citing Ex. 1005, 23:16–20).

Although Ogasawara describes that the camera “is most practically implemented as a black-and-white, or color capable, digital still camera system,” Ogasawara further describes that the camera and its associated electronics “could be implemented as a reduced-frame-rate, motion capable, video camera.” Ex. 1005, 16:47–60. This portion of Ogasawara describing the video camera implementation is cited on pages 3, 14, and 31 of the Petition. Patent Owner's expert, Dr. Bajaj, testifies that “all video cameras capture videos on a frame-by-frame basis,” that “[a] frame is a 2D image,” and that the images in a video stream are “interrelated in time because of the time sequence.” Ex. 1063, 125:25–126:25.

In light of the foregoing, it is a reasonable inference that the image analyzed in Ogasawara in the alternative video camera embodiment is one of the multiple frames in the video stream captured by the video camera. That need not be expressly stated by Ogasawara. The teachings of a prior art reference may be inferred by one with ordinary skill in the art. *AstraZeneca*

LP v. Apotex, Inc., 633 F.3d 1042, 1055 (Fed. Cir. 2010); *In re Baxter Travenol Labs.*, 952 F.2d 388, 390 (Fed. Cir. 1991).

Patent Owner further asserts that the combination of Ogasawara and Bolle do not render obvious “a mobile device,” because Bolle’s image segmentation technique requires a stationary mechanism while Ogasawara’s system is a hand-held, portable unit. PO Resp. 58–59. Patent Owner asserts that even if the teachings of Ogasawara and Bolle are combined, the resulting device would have been stationary, rather than mobile. *Id.* at 59. These arguments are misplaced, because they are actually directed to whether there would have been a motivation to combine teachings and whether there would have been a reasonable expectation of success. Ogasawara itself already discloses a mobile device and requires no modification to yield a mobile device. The combination Patent Owner challenges is therefore not the combination proposed by Petitioner.

5. *Motivation to Combine Ogasawara and Bolle
and Reasonable Expectation of Success*

a) *Petitioner’s Assertions in the Petition*

Regarding advanced pattern recognition, Ogasawara states:

Advanced pattern recognition software is able to enhance the performance of the wireless videophone, in accord with the invention, by offering the capability to capture merchandise information from items that are not identified by either a bar code or an alpha-numeric label. Advanced pattern recognition software allows a consumer to capture a video-graphic image of an apple, for example, and to have the apple be recognized as such by the pattern recognition software. This capability is useful for any merchandise item having a distinct or identifiable shape or other visually identifiable characteristic. Such pattern recognition is accomplished within the wireless videophone, by specially downloaded software.

Ex. 1005, 23:11–19 (cited at Pet. 22).

Petitioner explains that although Ogasawara describes a shopping system which uses pattern recognition software to identify objects by their visual appearance,

Ogasawara recognizes, however, that its system benefits from the object in the image “having a distinct or identifiable shape or other visually identifiable characteristic.” *Id.*, 23:20–22. In other words, there may be an object in an image that Ogasawara cannot identify because it cannot detect characteristics of that object that are distinct from other objects in the image or the background. Ex. 1003, ¶ 105. *An object’s shape or other visual characteristic may not be distinct or identifiable due to the distractions from the rest of the image. Id.* For example, parts of an image corresponding to the background may significantly perturb extracted object characteristics, causing pattern recognition to fail. Ex. 1006, 4:34–38. For these situations, Ogasawara’s system would need to modify the product with a “bar code or an alphanumeric label” to definitively identify the product. Ex. 1005, 23:12–16.

Id. at 22–23.

Petitioner also explains (1) that “Bolle solves these issues by segmenting an object from its background in a captured video and matching image characteristics of the segmented object to image characteristics of objects stored in a database,” *id.* at 23 (citing Ex. 1003 ¶ 106); (2) that “Bolle uses image segmentation technology in conjunction with object recognition techniques and a database that stores reference characteristics of target objects to match characteristics of the object in the captured image with characteristics of a target object,” *id.* (citing Ex. 1006, 4:27–34, 4:39–44, 5:14–18, 5:45–47, 6:1–6, 8:12–38, 16:40–45); and (3) that in Bolle a segmented processed image that can be used to characterize features of the object is then compared to stored reference images and the object is recognized when a match occurs. *Id.* (citing Ex. 1006, 6:1–6).

Petitioner further explains that “[o]nce the object is segmented, Bolle derives visual characteristics—e.g., color, shape, and texture—that are then characterized with histograms.” *Id.* at 24 (citing Ex. 1006, 13:1–14, 16:64–19:38). Petitioner asserts:

Bolle’s ability to use these diverse visual characteristics would have expanded the object recognition capability and accuracy of Ogasawara’s system for products without barcodes or symbols. Ex. 1003, ¶ 107. A POSITA would have recognized that these attributes of Bolle allow the object characteristics, e.g., shape, to be more clearly delineated in the image and thus more precisely determined and matched to the stored reference characteristics to identify the object more accurately. *Id.*, ¶ 108. A POSITA would have thus recognized that Bolle would predictably enhance the performance of the Ogasawara system. *Id.*

Id. Petitioner states: “A POSITA would have thus recognized that combining Ogasawara with Bolle would yield predictable benefits and results because the combined image processing system could more accurately identify objects for purchase during shopping, especially those objects without a barcode or label.” *Id.* at 25 (citing Ex. 1003 ¶ 109).

Additionally, Petitioner asserts (1) that both Ogasawara and Bolle are “in the same field and address the same issue in the same context—using image processing systems to identify products, e.g., produce like an apple, for purchase during shopping,” (2) that “Bolle expressly describes the benefits of using its techniques with a system like Ogasawara that does not segment the object from the background and thus cannot perceive the object’s distinct or identifiable shape or other visually identifiable characteristic [citing Ex. 1003 ¶ 109, Ex. 1006, 4:27–45],” and (3) that Bolle expressly states that its segmentation technology in conjunction with its matching techniques further improves the ability to identify objects in a

captured image [citing Ex. 1003 ¶ 109, Ex. 1006, 5:45–51, 6:1–6].” Pet. 24–25.

Finally, regarding a motivation to combine teachings, Petitioner asserts:

Additionally, Bolle explains that it improves image recognition through learning (i.e., referred to as being “trainable,” *see* Ex. 1006, 1:8–10) by adding new reference images to its database to be able to match a greater array of objects. *Id.*, Abstract, 5:8–13, 6:7–12, 8:37–44, 13:32–48, 16:33–51. A POSITA would have been motivated to combine Bolle’s training techniques with Ogasawara’s system to further enhance the capability of the wireless videophone of Ogasawara to recognize a broader array of objects with increased accuracy. Ex. 1003, ¶ 110.

Id. at 25.

Based on the foregoing, Petitioner asserts:

A POSITA would have been motivated to combine Ogasawara and Bolle to achieve a system that could more accurately discern the shape or other visual characteristics of an object in an image to be able to identify that object. *Id.*, ¶¶ 103–115. Combining Ogasawara and Bolle would yield a system that could achieve this by segmenting an object from its background in a captured image and matching the segmented object to images of target objects stored in a database. *Id.*

Pet. 22.

Regarding a reasonable expectation of success, Petitioner asserts that “[a] POSITA would have had a reasonable expectation of success combining Bolle’s image segmentation and matching techniques with Ogasawara’s system. *Id.* (citing Ex. 1003 ¶ 111). Petitioner explains:

A POSITA could have combined Bolle’s image segmentation and matching techniques with Ogasawara’s system using the hardware and techniques already described in each reference, and each system would perform the same in the combined system. *Id.* A POSITA would have recognized that using

Bolle's image segmentation and matching techniques with Ogasawara's system would be nothing more than combining prior art elements according to known methods to yield predictable results or the application of known techniques to improve a known device to yield predictable results. *Id.*

Id. at 25–26 (citing Ex. 1003 ¶ 111).

b) Patent Owner's Assertions in the Response

Patent Owner sets forth numerous reasons why, in its view, Petitioner has not sufficiently established a reasonable motivation to combine the teachings of Ogasawara and Bolle, i.e., to use Bolle's image segmentation method on Ogasawara's mobile videophone. PO Resp. 43–52. Patent Owner also sets forth reasons why, in its view, Petitioner has not sufficiently established a reasonable expectation of success from the viewpoint of one with ordinary skill in the art who attempts to use Bolle's segmentation method on Ogasawara's mobile videophone. *Id.* at 53–55.

First, Patent Owner asserts:

[A] retail customer [in Ogasawara's environment] would not be able to take the necessary photographs to segment an object from the background using Bolle's techniques. Bajaj ¶¶ 23–25. Bolle requires precise pixel-to-pixel correspondence between the two spatially-aligned images in a non-mobile environment, which would be hard—if not impossible—for retail customer to do. Ex. 1006 (Bolle) at 10:31–35; 10:53–55.

Id. at 43. In that regard, Bolle states:

Further, the object 131, the background 312, and the image input device 120 should be at the same position in both step 510 and 520 to assure that the first and second images are in special registration. Suppose each pixel is numbered starting in the upper left corner of the image then proceeding across the first line then down to the second line in the manner of reading a book. Registration means that each numbered pixel in the first image corresponds to the same area of the scene (object(s) and

background 312) as the identically numbered pixel in the second image.

Ex. 1006, 10:31–40.

Second, Patent Owner asserts that Bolle’s second segmentation approach, i.e., the Figure 3b embodiment, which utilizes different illumination to segment a target object from its background, is uniquely unsuited for use in a retail environment, or anywhere else where Ogasawara’s base system is applicable, because it requires particular reflective properties for the foreground object and background that are highly unlikely to be found in a retail environment. PO Resp. 44.

Third, Patent Owner asserts that the hardware used by Ogasawara and by Bolle “is significantly different.” *Id.* Patent Owner states: “Bolle contemplates that the image processing would be performed at the point of sale by a cashier, while Ogasawara contemplates that the image processing would be performed by a customer using their cell phone.” *Id.* Patent Owner asserts: “Ogasawara never describes a cell phone as containing a flash or any other light source, which would have prevented using Bolle’s second, illumination-based segmentation approach.” *Id.* at 45. Patent Owner also asserts that “Petitioner never explains how a POSITA would expect Bolle’s algorithm, which requires specialized hardware like a digital signal processor, to work on Ogasawara’s wireless videophone.” *Id.*

Fourth, Patent Owner asserts that “Bolle’s dual-photograph, stationary system disclosure fundamentally teaches away from Ogasawara’s single-photograph, mobile videophone.” *Id.*

Fifth, Patent Owner asserts that using Bolle’s image segmentation and database matching techniques in the system of Ogasawara would have

defeated a basic objective of Ogasawara of enabling easy and straightforward shopping. *Id.* at 46. Patent Owner explains:

Requiring the shopper to take an additional photograph would increase the time and effort required by the shopper to purchase each object. Taking a second image would have increased the burden on the shopper to purchase an item. Additionally, given that the two photographs must be pixel-perfect, spatially-aligned depictions (*i.e.*, from the same distance, angle, position, etc.), it would be extremely difficult or impossible for the shopping customer to take the required photographs. Faced with the inevitable technical errors that would result from that approach and thus not being able to consummate a purchase, the customer would not have used the system. It would have also defeated the point of giving the user mobility, if the wireless videophone of Ogasawara was made stationary in order to take the two accurate segmentation images required by Bolle.

Id. at 46–47.

Sixth, Patent Owner asserts: “Bolle’s histogram-based approach is incompatible with Ogasawara’s bar code-based approach. Histograms are not an appropriate mechanism to identify matching bar codes for a variety of reasons, as Dr. Bajaj discusses in depth. Bajaj [Ex. 2007] ¶¶ 36–43.” *Id.* at 47.

Seventh, Patent Owner asserts:

Ogasawara is a bar-code based system that does not have a sufficiently detailed disclosure of detecting objects without bar codes, as the Board already found. Paper 9 at 33. By contrast, Bolle is directed to a bar-code-less system that is capable of detecting produce based on pre-programmed non-symbolic information. *E.g.*, Ex. 1006 (Bolle) at 5:47–51. A POSITA would not have considered the two references to have sufficient commonality as “image processing systems” to combine to yield the challenged claims. Bajaj [Ex. 2007] ¶ 45.

Id. at 48.

Eighth, responding to Petitioner's assertion that "Bolle expressly describes the benefits of using its system with a system such as Ogasawara," Patent Owner states that "Petitioner fails to cite any disclosure in Bolle to that effect," and that "Bolle does not contain any such statement ascribed to it by Petitioner." *Id.* Patent Owner further notes that Bolle suggests implementing its system at the point of sale, to be operated by a cashier, rather than in a portable device used by a retail customer such as in Ogasawara's system. *Id.* at 48–49.

Ninth, responding to Petitioner's assertion that Ogasawara cannot always identify an object that lacks a distinct or identifiable shape or other visually identifiable characteristic and that Bolle's segmentation technique could fill this gap, Patent Owner asserts that Petitioner has not identified any deficiency in Ogasawara's system that could be corrected by Bolle and that the problematic conditions Petitioner contends are present in Ogasawara are also problematic for Bolle. *Id.* at 49.

Tenth, responding to Petitioner's assertion that the combined system of Ogasawara and Bolle could more accurately and reliably identify objects captured by image processing systems for purchase, Patent Owner asserts that "Ogasawara's bar-code based product recognition system was highly accurate, and there is no indication in Bolle that its system would be predictably superior to Ogasawara's." *Id.* at 51.

Eleventh, responding to Petitioner's assertion that Bolle's ability to use diverse visual characteristics would have expanded the object recognition capability and accuracy of Ogasawara's system for products without barcodes or symbols, Patent Owner asserts that "Petitioner has not provided any analysis of the comparative advantage of Bolle's technique versus simply adding additional bar codes to more items, as is commonly

done with fruits and vegetables, and it is far from clear that there is any such advantage.” *Id.* at 51–52. Patent Owner asserts also that Petitioner has not “addressed Ogasawara’s disclosure of using a catalogue of bar codes, rather than bar codes physically present on objects, for shopping.” *Id.* at 52.

Twelfth, Patent Owner asserts that “[a] POSITA would not have had a reasonable expectation of success combining Bolle’s segmentation techniques with Ogasawara’s system because an untrained shopping customer using Ogasawara’s mobile phone would not have been able to take the precise dual images required by Bolle’s system.” *Id.* at 54. In that regard, Patent Owner notes that “Bolle’s segmentation technique requires two still photographs without any pixel variation in the background.” *Id.*

Patent Owner explains:

Considering [the] first segmentation technique where one image is of a background without the target object, and the other image is the same exact background with the target object, a shopping customer would not be able to take the two required photographs with their phone. Bajaj [Ex. 2007] ¶ 52. For example, they would not be able to reliably situate themselves to take the necessary photograph from the same perspective, distance, etc.

Id. Patent Owner further explains:

A shopping customer would also not be able to take the two images required by the other segmentation technique, where one image is taken under normal illumination and another picture is taken with an additional light source. *Id.* ¶ 53. For example, Ogasawara does not disclose any additional light source that could be the source of the illumination for the second image. The mobile phone in Ogasawara is not described as having a light or a flash functionality. There is no description in Ogasawara of even taking more than one photograph per target item, much less any disclosure of how the mobile phone could be used to take the required two photographs under specific illumination conditions.

Id. at 54–55.

c) Petitioner's Assertions in the Reply

Petitioner asserts that Patent Owner provides no support for its assertion that a user cannot hold Ogasawara's videophone sufficiently stationary while capturing multiple scenes. Reply 14. Petitioner asserts:

Even if a user could not do so, Bolle expressly teaches that taking the first and second scene in quick succession ensures that the camera, object, and background are in the same relative position in both scenes. Ex. 1006, 10:3144 (“... **Proper registration can be ensured by either acquiring the first and second image in quick succession, or by imaging a stationary object 131 against a stationary background. . . .**”). By capturing scenes in quick succession, any relative movement is insignificant, and thus, the scenes will be sufficiently aligned for segmentation. Ex. 1050, ¶¶ 59–60. PO acknowledges that Bolle's technique allows for **some** movement between images. POR, 40–41.

Id. at 14–15.

Petitioner asserts that Patent Owner mischaracterizes the testimony of Petitioner's expert, Dr. Rodriguez, by implying that he agrees that Bolle's teachings are limited to stationary, non-mobile devices. Reply 15 (citing PO Resp. 33). Petitioner explains: “Dr. Rodriguez was not characterizing Bolle's entire teachings but, instead, was commenting on the specific system shown in Figure 4 [of Bolle]. *Id.* (citing Ex. 2008, 44:14–45:16). Petitioner asserts that Patent Owner omits Dr. Rodriguez's testimony “that Bolle does not require a stationary (mounted) camera and does not require exact alignment between the two scenes.” *Id.* (citing Ex. 2008, 97:22–99:6).

Regarding the additional burden to the shopper in time and effort for taking two pictures, as alleged by Patent Owner, Petitioner asserts that Patent Owner is wrong, and explains as follows:

First, Bolle's Figure 3b embodiment would not take significantly longer to capture two scene images in “quick succession” (Ex. 1006, 10:42–44) compared to one scene image.

Bolle explains that a camera flash or “strobe” may be synchronized with the camera” capturing the two scene images. *Id.*, 10:8–16; *see also id.*, 7:18–65, 9:59–60. When these teachings are combined and incorporated into Ogasawara’s videophone, a POSITA would have been motivated to have the resultant combination capture two scene images (one with the flash and one without) in “quick succession.” Ex. 1050, ¶ 64.

Second, any incremental “burden” on the user would have been offset by the advantages of using Bolle’s segmentation and matching process, as described in detail in the Petition. Petition, 22–28; *see also* Ex. 1050, ¶ 65.

Id. at 16.

Regarding “strict requirements (1) to (4) mentioned in Bolle at 3:64–4:7” as referred to in the Patent Owner Response on pages 36–37, Petitioner asserts that Patent Owner is wrong “because these strict requirements relate to prior art systems and not Bolle’s embodiments.” Reply 16 (citing Ex. 1050 ¶¶ 66–67). Petitioner notes that these requirements (1) to (4) are in the “Background of the Invention” discussing the prior art. *Id.* (citing Ex. 1006, 1:11–4:10).

Disagreeing with Patent Owner, Petitioner asserts that Bolle’s system is not intended to be used in highly controlled environments, and that, instead, it is intended for use in supermarkets, grocery stores, retail stores, or hardware stores. *Id.* at 18. Disagreeing with Patent Owner, Petitioner asserts that Bolle’s system is not designed to be used by highly trained and skilled professionals, and that, instead, “it is designed to prevent cashiers from charging customers the wrong price for an item.” *Id.* Petitioner asserts that “even [Patent Owner] acknowledges that Bolle’s segmentation techniques may be performed by ‘an automated system’ rather than a ‘professional.’” *Id.* at 19. Petitioner asserts that “[b]ecause Ogasawara’s system, like Bolle’s system, is ‘automated,’ both can be operated by retail

shoppers.” *Id.* Petitioner further asserts that “[t]o the extent any ‘training’ is needed, Ogasawara’s videophone provides instructions on how to capture items to be purchased.” *Id.*

Petitioner asserts that Bolle’s and Ogasawara’s systems use the same hardware, not significantly different hardware as alleged by Patent Owner. *Id.* Petitioner asserts that it is immaterial whether Ogasawara’s wireless videophone has specialized hardware like a digital signal processor to process Bolle’s algorithm because Ogasawara’s server hardware can execute Bolle’s segmentation algorithm. *Id.* at 20. Petitioner asserts that Patent Owner does not dispute that Ogasawara’s server hardware is fully capable of running Bolle’s algorithm. *Id.* Petitioner further asserts that Bolle itself expressly states that its algorithm does not require “specialized hardware like a digital signal processor” and can be run on general purpose computers. *Id.* at 20–21 (citing Ex. 1006, 7:49–58, Ex. 1050 ¶ 76). Petitioner also asserts that microprocessor 238 as shown in Ogasawara’s Figure 10 is “specialized hardware like a digital signal processor.” *Id.* at 21. In that regard, Ogasawara states: “The microprocessor 238 may be any one of a number of **conventional** microprocessor or **digital signal processor circuits** suitable for use in wireless telephone or wireless videophone applications.” Ex. 1005, 16:20–23.

Petitioner disagrees with Patent Owner’s expert’s assertion that a wireless videophone available in the late-1990s, like Ogasawara’s videophone, would have significantly less processing power than any of the hardware discussed in Bolle. Reply 21. Petitioner asserts that digital signal processors that were widely used in mobile phones before 2000 had the processing power to execute Bolle’s algorithms. *Id.* (citing Ex. 1050 ¶¶ 77–88, Ex. 1051–1061, 1065).

Petitioner asserts that Ogasawara and Bolle both suggest using well known video input devices such as a CCD digital camera, and that Bolle teaches that a “**camera flash** will suffice if a lighting source is preferred.” *Id.* at 22. Petitioner also asserts that Patent Owner’s expert, Dr. Bajaj, “acknowledged that flash functionality in CCD cameras integrated in mobile phones was well-known at the time of the invention.” *Id.* (citing Ex. 1063, 108:4–23, Ex. 1050 ¶¶ 90–91, Ex. 1062, 4:33–38 (“Parulski”)). In that regard, Petitioner’s expert, Dr. Rodriguez, testifies:

I also understand that mobile phones with camera flash functionality were known by 2000. For example, U.S. Patent 6,122,526 (“Parulski”), titled “Cellular telephone and electronic camera system with programmable transmission capability” issued on September 9, 2000. Ex. 1062, cover. It describes a cellular phone that “includes a lens 50, a flip-up flash unit 52, and an antenna 54.” *Id.*, 4:33–38.

Ex. 1050 ¶ 91.

Petitioner asserts:

For illumination-based segmentation, Bolle further teaches synchronizing the timing of the camera flash or “strobe” to illuminate an object. Ex. 1006, 9:59–60 (CCD digital video camera includes “a **camera flash**”), 10:9–16 (“The **control** may be a part of the light 110 as a **timing device** such as in a strobe. The control may be **synchronized with the camera** . . . [and was] **well known**.”). A POSITA would therefore understand, when a user presses a key on Ogasawara’s videophone to inform the program that image frames of a video stream are ready for processing, a synchronized camera flash would illuminate the scene (e.g., the second, “illuminated” scene) for Bolle’s segmentation. Ex. 1050, ¶¶ 94–96.

Reply 23.

Regarding Patent Owner’s argument focusing on the superior bar code recognition abilities of Ogasawara, Petitioner asserts that it is “a red herring,” because Petitioner proposes combining Bolle’s image recognition

techniques with Ogasawara's wireless videophone with "advanced pattern recognition software" which is for "items that are not identified by either a bar code or alpha-numeric label." Reply 23–24 (citing Pet. 24).

d) Patent Owner's Assertions in the Sur-Reply

Patent Owner asserts that Petitioner's reliance on the Figure 3b embodiment of Bolle and on disclosures relating to Figure 14 of Bolle as a segmentation method are newly and belatedly presented in the Reply and should be given no weight. Sur-Reply 4–6.

Patent Owner asserts that Petitioner's argument on integrating a flash into Ogasawara's videophone, and supporting evidence therefor including Parulski, are newly and belatedly presented in the Reply and should be given no weight. *Id.* at 8–9.

Patent Owner asserts that "Petitioner argues for the first time on Reply that 'Bolle's and Ogasawara's Systems Use the Same Hardware'" and should be given no weight. *Id.* at 9 (citing Reply 19–22). Patent Owner states:

Petitioner cites to 24 paragraphs of Dr. Rodriguez's declaration and a dozen new references that are purportedly prior art, specifically, EX1051-1061, and 1065. Reply 21–22. This new argument and evidence incorporating a specific DSP into Ogasawara and comparing it other hardware was never presented in the Petition, and should likewise be given no weight.

Id. Patent Owner also asserts that Petition's argument that Ogasawara and Bolle both use the same hardware is flawed. Sur-Reply 24–25.

Responding to Petitioner's assertion that Patent Owner provides no support for its claim that a user cannot hold Ogasawara's videophone sufficiently stationary while capturing multiple images, Patent Owner notes that it cited to the testimony of Dr. Bajaj to that effect. Sur-Reply 11 (citing Ex. 2007 ¶¶ 24–25). Patent Owner further states that "[t]he difficulty of an

average customer to take two pixel-perfect images using a mobile phone is also self-apparent, and that Petitioner has not met its burden of proving the feasibility of this physically difficult task.” *Id.* Patent Owner asserts that “[w]ithout camera stability, the combination [of Ogasawara and Bolle] simply would not work, as the pixel-by-pixel comparison would be unable to delineate between the background and the object to be identified.” *Id.* at 10.

In paragraph 24 of his testimony, Dr. Bajaj states: “Performing this pixel-perfect special registration from two independently-acquired images taken by a shopping customer on their phone is non-trivial and is prone to be erroneous.” Ex. 2007 ¶ 24. In paragraph 25 of his testimony, Dr. Bajaj explains:

The resulting segmentation errors [from lack of pixel-to-pixel alignment] in the separation of the pixels belonging to the object from the pixels belonging to the background image causes greater and cascading error in the object recognition phase of Bolle’s method of extracting and normalizing separated object histogram characteristics and comparing to one or more stored normalized reference characterizations. . . . Since errors in pixel-wise special registration cascade to larger errors in pixel-wise object image segmentation, this pixel-wise area or length causes even larger errors in the normalized characteristics leading to erroneous comparisons with reference normalized characterizations and incorrect object recognition.

Id. ¶ 25.

For Bolle’s Figure 3a embodiment, which takes an image with object and the background and an image with background only, Patent Owner asserts that Petitioner “provides no evidence that the pixel-perfect images with and without the object could be captured in ‘quick succession’ using a mobile phone,” and that Bolle’s teaching of “quick succession” is only with respect to Bolle’s Figure 3b embodiment. Sur-Reply 11–12.

Patent Owner reiterates that “Bolle’s dual-photograph, stationary system disclosure fundamentally teaches away from Ogasawara’s single-photograph, mobile videophone.” Sur-Reply 12 (citing PO Resp. 45–46). Patent Owner clarifies that it did not argue that Ogasawara’s bar code embodiments teach away from Bolle’s image recognition techniques. *Id.* at 12–13. Patent Owner reiterates that Bolle’s system is fundamentally different from Ogasawara’s system. *Id.* at 22–23. Notwithstanding that Bolle’s system may be used in a retail store, Patent Owner asserts that Bolle’s system requires precise pixel-to-pixel correspondence between the two spatially-aligned images in a non-mobile environment. *Id.* at 23.

Responding to Petitioner’s assertion that Bolle’s system is not designed to be used by highly trained and skilled professionals, Patent Owner asserts:

But Bolle’s system requires specific images and lighting to perform segmenting. Thus, the user of Bolle’s system must be trained to capture images with and without an object, or capture images with and without illumination. It would not be reasonable to require untrained customers to capture these required images. Finally, Petitioner argues that “Bolle’s segmentation techniques may be performed by an automated system,” but while the segmentation algorithms can be automated, capturing the strict, specific images required for segmentation cannot be automated. Reply 19.

Id.

For Bolle’s Figure 3b embodiment, which takes an image without lighting and an image with lighting, Patent Owner asserts that Petitioner has failed to provide any explanation as to why a POSITA would have combined Ogasawara with the Figure 3b embodiment of Bolle or with the flip-up flash unit” of the new Parulski flash reference (Ex. 1062). *Id.* at 13–14. Patent Owner asserts that the use of Bolle’s Figure 3b embodiment is inconsistent

with Petitioner's expert, who initially proposed using Bolle's Figure 3a embodiment because it does not require "carefully controlled lighting conditions." *Id.* at 14 (citing Ex. 1003 ¶ 114).

Patent Owner asserts that with respect to Parulski, Petitioner only argues that "flash functionality in CCD cameras integrated in mobile phones was well-known at the time of the invention," but that "this is not an adequate rationale to combine." *Id.* at 15.

Patent Owner explains that the "quick succession" disclosure of Bolle applies still to a stationary camera. *Id.* at 16. Patent Owner states:

As part of the Figure 3b embodiment, Bolle explains that pictures may be taken in "quick succession" when the **object** or **background** are not stationary, and otherwise expressly states that he camera "should be at the same position." EX1006 10:31–44. As Dr. Rodriguez admitted, Bolle teaches that these pictures are taken using a stationary camera. EX1006 9:21; EX2008 44:24–45:16 ("The camera seems to be stationary."); *see also* EX2010 55:18–56:5 ("the camera is in a fixed position," such as "putting a camera on a tripod."). Thus, Bolle's teaching of capturing images in "quick succession" is a solution for a stationary or fixed-position camera.

Id. at 16.

Patent Owner asserts that Petitioner provides no evidence that it would have been possible to take two images in quick succession while maintaining the required special registration. *Id.* at 17. Patent Owner notes:

Bolle expressly discloses in both its Figure 3a and 3b embodiments use of an enclosure where the desired object is placed on "a support 405" to "ensure[] the object is of fixed and repeatable distance 407 from camera 120." EX1006 9:32–34. This is because the segmentation process uses a precise pixel-by-pixel comparison of two images. EX1006 10:59–11:4. There is no reasoned analysis in the record to establish that a mobile device could maintain the required special alignment across both pictures. Petitioner has therefore failed to establish a reasonable

expectation of success in its new combination [Ogasawara and Bolle's Figure 3b embodiment].

Id.

Patent Owner asserts further that Petitioner has not established that Ogasawara's videophone was capable of capturing images in sufficient quick succession. *Id.* Patent Owner explains:

[M]obile phones in 2000 (7 years before the iPhone) were very unlike those of today. Very few mobile phones had cameras, and Petitioner has not shown phones had the processing power or shutter speeds to quickly take multiple photos. Such processing included "translat[ing] the visual image acquired by the camera's lens into digital signals [and] into a form which can be broadcast transmitted." EX1005 16:7–12. Dr. Rodriguez also identified many factors that affect how quickly the images needed to be taken, including "shutter speed," "lighting," "focal length," and the size and diversity of the recognition database. EX2010 76:21–77:3. Petitioner does not consider any of these factors, nor whether a POSITA would reasonably expect success in view of these factors.

Id. at 18.

Patent Owner asserts that Petitioner provides no evidence that a flip-up flash, such as the one disclosed in Parulski, would have integrated with Ogasawara's videophone and still meet Bolle's segmentation requirements.

Id. at 18–19. Patent Owner explains:

Petitioner points to Parulski, which discloses a mobile phone that includes an integrated flash. Reply 22. Petitioner, however, says nothing more—it does not, for example, establish that Parulski's flash meets Bolle's requirement that lighting be "non-monochromatic and of a constant frequency distribution" or that it is "infrared" or "ultraviolet." EX1007 7:7–14. Nor does Petitioner provide any evidence that Parulski's flash is similar to the exemplary flashes described by Bolle. *Id.* 7:14–17. Thus, Petitioner's revised combination [Ogasawara and Figure 3b embodiment of Bolle] fails to establish that Bolle's system could

be successfully combined with Ogasawara, and is thus inadequate. 844 F.3d at 1361 (Fed. Cir. 2017).

Id. at 19.

e) *Discussion*

We agree with Patent Owner that Bolle's system is not mobile, and that Bolle's camera and light source are stationary. The camera is stationary for a critical reason, that Bolle's segmentation method requires spatial registration between two images taken by the camera. Ex. 1006, 10:31–34. Bolle explains:

[T]he object 131, the background 312, and the image input device 120 should be at the same position in both step 510 and 520 to assure that the first and second images are in *spatial registration*. Suppose each pixel is numbered starting in the upper left corner of the image then proceeding across the first line then down to the second line in the manner of reading a book. *Registration means that each numbered pixel in the first image corresponds to the same area of the scene (object(s) 131 and background 312) as the identically numbered pixel in the second image.*

Id. at 10:31–40 (emphases added). We credit Dr. Bajaj's testimony that "[a] person of ordinary skill in the art would have recognized that Bolle contemplates that the image processing would be performed at the point of sale by a cashier, using a stationary device with a stationary camera, light source, and object platform." Ex. 2007 ¶ 33. The testimony is supported by Figures 1 and 4 of Bolle. We credit that testimony over Dr. Rodriguez's suggestion that Bolle discloses an embodiment which makes use of a mobile device for taking the images.

Dr. Rodriguez refers to this statement in Bolle: "Proper registration can be ensured by either acquiring the first and second image in quick succession, or by imaging a stationary object 131 against a stationary

background 312.” Ex. 1006, 10:41–43 (cited in Ex. 2007 ¶ 31). Based on that description, Dr. Rodriguez testifies:

When the object and background are not stationary with respect to the camera (as may be the case when a user holds Ogasawara’s videophone), Bolle explains that proper registration can be ensured by capturing the first and second scenes in quick succession. *Id.*, 10:41–44 (“Proper registration can be ensured by either acquiring the first and second image in quick succession, or by imaging a **stationary** object 131 against a **stationary** background 312.”) (emphases added).

Ex. 2007 ¶ 31. We agree with Patent Owner (Sur-Reply 16) that the “quick succession” solution description is not for a moving camera, but for an object or a background that is not staying sufficiently still. We take official notice that apples, such as those shown in Bolle’s Figures 1 and 4, take some time to settle still after being placed on a flat support. Even if the “quick succession” description applies to Bolle’s camera, that does not turn Bolle’s stationary camera to a mobile device. For various reasons, a stationary camera may still have unintended small movements in certain circumstances, such as when its structural support is not firm.

We find no disclosure in Bolle of a mobile camera or a camera embodied in a mobile device, and Petitioner has identified none. On cross-examination, Dr. Rodriguez testified that the camera in Bolle’s Figure 4 “seems to be stationary.” Ex. 2008, 44:24–45:16.

Because the camera disclosed in Bolle is stationary, and is stationary for a critical reason associated with Bolle’s segmentation method, i.e., spatial registration with pixel-to-pixel alignment between first and second images, we determine that one with ordinary skill in the art would see Bolle’s system as fundamentally different from and not usable in Ogasawara’s videophone which is a mobile device hand-held by a retail

shopper. We arrive at that conclusion even assuming that Bolle's segmentation method achieves better results in recognizing an object based on a visual characteristic of the object. "It is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one skilled in the art." *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 448 (Fed. Cir. 1986). Here, the manner in which Bolle performs segmentation and what are required for performing that segmentation, pixel-to-pixel alignment between two images, must be considered.

The application environment and context of Ogasawara and of Bolle are fundamentally opposite to each other, stationary for an important reason versus high mobility.¹¹ Petitioner has not provided a reasonable motivation for one with ordinary skill in the art to implement Bolle's segmentation method, either the Figure 3a embodiment or the Figure 3b embodiment, on Ogasawara's videophone.¹²

Aside from the issue of adequate motivation to combine teachings, Petitioner also has a burden to show a reasonable expectation of success. *Proctor & Ganble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009). We conclude that even if an adequate motivation for one with ordinary skill in the art to combine teachings is assumed, Petitioner has not

¹¹ We make this conclusion even assuming, without determination, that Bolle's system can be operated by a retail shopper at an automatic check-out station without formal training of any kind.

¹² We need not resolve whether Petitioner's reliance in its Reply on Bolle's Figure 3b embodiment is belated and thus constitutes an improper new argument first presented in the Reply.

shown a reasonable expectation of success in implementing Bolle's segmentation methods on Ogasawara's videophone.

Bolle's Figure 3a embodiment would have required a retail shopper to take two pictures in succession, one with the object in the background and one with just the background. Petitioner has not shown how one with ordinary skill in the art would have had a reasonable expectation of success in having the two pictures, with pixel-to-pixel alignment, taken by a retail shopper with Ogasawara's videophone.

Petitioner asserts that Patent Owner "provides no support for its claim that a user cannot hold Ogasawara's videophone sufficiently stationary while capturing multiple scenes." Reply 14. But significant intervening activity performed by the shopper is unavoidable either to add an object to the scene or to remove an object from the scene, while holding Ogasawara's videophone in place. Also, Dr. Bajaj does explain as follows:

Performing this pixel-accurate spatial registration from two independently-acquired images taken by a shopping customer on their phone is non-trivial and is prone to be erroneous. All spatial registration errors between the two images are carried over and causatively yield much greater error using the pixel-wise segmentation algorithm 220 of Bolle.

The resulting segmentation errors in the separation of the pixels belonging to the object from the pixels belonging to background image causes greater and cascading error in the object recognition phase of Bolle's method of extracting and normalizing separated object histogram characteristics and comparing to one or more stored normalized reference characterizations.

Ex. 2007 ¶¶ 24–25 (cited at Sur-Reply 11). We credit the above-quoted testimony of Dr. Bajaj.

Petitioner does not adequately explain how the user's intervening activity could have been performed without causing substantial misalignment that undermines the registration requirement of Bolle. Petitioner does refer to Bolle's description of taking the two pictures in "quick succession," *id.*, but (1) the "quick succession" description of Bolle relates to Bolle's Figure 3b embodiment which does not involve moving an object into or out of a background (Ex. 1006, 10:24–43), and (2) Petitioner does not explain how holding Ogasawara's videophone still gets easier for the shopper if the shopper has to move an object either into or out of a scene quicker.

Bolle's Figure 3b embodiment would have required a retail shopper to take two pictures in succession, one with the camera flash on and one with the camera flash off, both with the object in the background. Petitioner has not shown how one with ordinary skill in the art would have had a reasonable expectation of success in having the two pictures, with sufficient pixel-to-pixel alignment, taken by a retail shopper with Ogasawara's videophone.

Petitioner's expert, Dr. Rodriguez, testifies that "mobile phones with camera flash functionality were known by 2000," and Dr. Rodriguez identifies Parulski (Ex. 1062) as describing such a mobile phone with an integrated flip-up flash unit. Ex. 1050 ¶ 91. There are two infirmities with respect to this testimony as applied to the issue of implementing the segmentation method of Bolle's Figure 3b embodiment in Ogasawara's videophone.

First, Petitioner's proposed combination makes use of Ogasawara's videophone. A flash usable for taking a video is not the same as a flash usable for a still image, given that substantially more pictures or frames have

to be taken within a short period of time to form a video. Dr. Rodriguez does not testify that videophones with camera flash functionality were known by 2000. Second, Dr. Rodriguez simply states that mobile phones with camera functionality “were known by 2000,” not “well known by 2000.” The difference is not insignificant, because if such a camera flash was just known, a reference showing that may be formally required as a portion of the alleged ground of unpatentability, e.g., Ogasawara, Bolle, and Parulski. But Parulski is not in the specific ground of unpatentability asserted by Petitioner. If a feature was “well known” to one with ordinary skill in the art, Parulski need not be named in the alleged ground of unpatentability and can still be relied on by Petitioner to show basic knowledge or fundamental skill that would have been possessed by one with ordinary skill in the art. Dr. Rodriguez’s testimony does not persuade us that a flash functionality was so well known for videophones in 2000 that that was basic knowledge or fundamental skill to one with ordinary skill in the art without need to include a pertinent reference in the alleged ground of unpatentability. We note further that even Parulski itself does not show a videophone. On this record, Petitioner has shown no videophone with an early enough date that operates with an integrated flash for taking a video.

Further, Petitioner asserts:

For illumination-based segmentation, Bolle further teaches synchronizing the timing of the camera flash or “strobe” to illuminate an object. Ex. 1006, 9:59–60 (CCD digital video camera includes “a **camera flash**”), 10:9–16 (“The **control** may be a part of the light 110 as a **timing device** such as in a strobe. The control may be **synchronized with the camera** . . . [and was] **well known**.”). A POSITA would therefore understand, when a user presses a key on Ogasawara’s videophone to inform the program that image frames of a video stream are ready for processing, a synchronized camera flash would illuminate the

scene (e.g., the second, “illuminated” scene) for Bolle’s segmentation. Ex. 1050, ¶¶ 94–96.

Id. at 23. Thus, assuming that Ogasawara’s videophone is modified to include a flash functionality for taking a video, Petitioner urges that a retail shopper could have held Ogasawara’s videophone sufficiently still to take two frames while the flash is automatically synchronized to turn on and off at the appropriate time.

Petitioner, however, has not shown the existence, prior to the critical date, of an integrated flash that can be programmed in this manner, even assuming that the processing circuitry of Ogasawara is sufficiently sophisticated to be so programmed. Specifically, Petitioner has not shown that Parulski’s flip-up flash can be turned on and off so quickly that it can be controlled on a frame by frame basis with respect to the video taken. For the use required by Bolle’s segmentation method, the light from the flash cannot take time to emit and to cease but essentially must be instantly on and off to be programmable on a per frame basis. Petitioner has not made a showing that Parulski’s flip-up flash is of that type. It is possible that Parulski’s flash is turned on when it is flipped up, and is turned off when it is flipped down. It is also possible that when charging is needed, Parulski’s flash starts charging after it has been flipped up and the user has to wait some time before the flash can function. Such characteristics would be incompatible with the segmentation method of Bolle’s Figure 3b embodiment performed with flash programmable on a per frame basis.

In summary, Petitioner has not provided a reasonable motivation for one with ordinary skill in the art to implement Bolle’s segmentation method, either the Figure 3a embodiment or the Figure 3b embodiment, on Ogasawara’s videophone. And we also determine that even if an adequate

motivation for one with ordinary skill in the art to combine teachings is assumed, Petitioner has not shown a reasonable expectation of success in implementing Bolle's segmentation methods on Ogasawara's videophone.¹³

f) Conclusion

Petitioner has not proved by a preponderance of the evidence that claim 1 would have been obvious over Ogasawara and Bolle.

6. Dependent Claims 2, 3, 6, 18

Claims 2, 6, and 18 each depend from claim 1, and claim 3 depends from claim 2. Ex. 1001, 24:34–39, 24:46–48, 25:18–20. All of the deficiencies of Petitioner's assertions discussed above in the context of claim 1 equally apply to claims 2, 3, 6, and 18. Accordingly, Petitioner has not proved by a preponderance of the evidence that any of claims 2, 3, 6, and 18 would have been obvious over Ogasawara and Bolle.

E. Alleged Obviousness of Claims 1–3, 6, and 18 Over Ogasawara, Bolle, and Rhoads

Petitioner does not apply Rhoads in a manner that eliminates the need to combine the teachings of Ogasawara and Bolle to use Bolle's segmentation method on Ogasawara's wireless videophone. Pet. 48–56. For example, Petitioner relies on Rhoads for teaching presenting a network address (e.g., a URL) to the display of a user's phone, in case that is, hypothetically, determined to be required by the claims. *Id.* at 54. Petitioner also relies on Rhoads for teaching that a user should align an object to be imaged within a camera's view and hold the object to be imaged steady," in case, hypothetically, the claims are construed to require recognizing an object based at least in part on an indication of how steady is the depicted

¹³ We need not resolve Patent Owner's assertion that Petitioner's reliance on the Figure 3b embodiment of Bolle is belated and should not be considered.

image of the object and/or alignment of the object within the video stream.
Id. at 55–56.

Accordingly, the deficiencies discussed above in Section II.D for the ground of unpatentability based on Ogasawara and Bolle apply equally to the ground of unpatentability based on Ogasawara, Bolle, and Rhoads. For the same reasons discussed above in Section II.D, Petitioner has not proved by a preponderance of the evidence that any of claims 1, 2, 3, 6, and 18 would have been obvious over Ogasawara, Bolle, and Rhoads.

F. Petitioner’s Motion to Exclude Evidence

Petitioner seeks to exclude multiple paragraphs within the Supplemental Declaration of Patent Owner’s expert, Dr. Chandrajit Bajaj (Ex. 2007), as well as certain images contained in the Supplemental Declaration. Paper 34. Specifically, Petitioner seeks to exclude paragraphs 23–28, 30–43, 45, 47–55, 57, and 59, and the images contained in paragraphs 37–40. *Id.* at 5, 8, 10–12.

1. Assertion of Testimony being Conclusory

On the basis of statements being conclusory or opinions lacking supporting fact or data, Petitioner seeks to exclude all of paragraphs 26–28, 30, 34–43, 51–54, and parts of paragraphs 23, 24, 25, 31, 32, 33, 45, 47, 48, 49, 50, 55, 57, and 59 of Dr. Bajaj’s Supplemental Declaration. Paper 34, 5. Petitioner does not specifically address the content of each paragraph, but discusses only what it asserts to be exemplary. *Id.* at 6–7. Specifically, Petitioner provides three examples. *Id.*

As a first example, Petitioner asserts: “Dr. Bajaj testifies in Paragraph 33 of Exhibit 2007 that ‘a person of ordinary skill in the art would have known that a wireless videophone available in the late-1990s would have significantly less processing power than any of the hardware discussed in

Bolle.’ Ex. 2007, ¶ 33. Dr. Bajaj, however, provides no facts or data to support this bald assertion, which calls into question his credibility.” *Id.* at 5. We disagree that Dr. Bajaj has to show more. As an expert in the field, Dr. Bajaj can testify as to his opinion regarding the state of the art at a certain time period, without need of specific underlying material. The subject is not one for which Dr. Bajaj needs to run an experiment to observe the results. In the absence of supporting material, the testimony may be challenged as lacking sufficient credibility, but the testimony is not inadmissible. In any event, as discussed above, our decision assumes that Ogasawara’s videophone has processing circuitry just as powerful as Bolle’s computer. The testimony did not result in any detriment to Petitioner.

As a second example, Petitioner asserts: “Dr. Bajaj testifies in Paragraphs 24, 26, 30–32, 34–35, 52–54, 57 and 59 of Exhibit 2007 that two images are *required* by Bolle for segmentation. Again, this opinion is conclusory without any supporting facts or data.” *Id.* at 6. We disagree that there is no support for Dr. Bajaj’s testimony. Bolle’s disclosure describing the Figure 3a and Figure 3b embodiments provide such support.

Petitioner further asserts:

Dr. Bajaj contradicts this opinion in his deposition. He acknowledges in his deposition that Bolle’s segmentation methods (that require comparing two images) are “preferred” methods (Ex. 1063, 66:15–67:20) and admits that segmentation without comparing two-images was known at the time of the invention (*id.*, 68:15–25). He also acknowledged that motivation to combine considers a prior art reference as a whole (*id.*, 33:11–22), yet he admits that he did not consider parts of Bolle that indicate Bolle’s segmentation methods are not limited to comparing two images, such as claim 32 (*id.*, 98:6–99:14, 100:2–11).

Id. The arguments are misplaced. That single image segmentation methods were known at that time is an entirely separate question from what segmentation methods are disclosed by Bolle. Here, we are not persuaded that claim 32 discloses a single image segmentation method. *Supra* 29–31. Further, that claim 32 of Bolle may be read to cover segmentation methods not requiring two images does not necessarily mean Bolle discloses a segmentation method not requiring two images. Similarly, Bolle characterizing his disclosed embodiments as preferred does not mean Bolle discloses other segmentation methods. We see no contradiction. Even if there is any contradiction, that merely affects credibility of Dr. Bajaj’s testimony and is not a basis for excluding that testimony.

Petitioner further asserts:

Similarly, Dr. Bajaj’s deposition testimony contradicts his unsupported assertions that Ogasawara is a “bar-code based system.” Ex. 2007, ¶¶ 45–49. He testifies in his deposition that Ogasawara discloses character and pattern recognition software. Ex. 1063, 40:10–23, 42:4–13, 43:14–44:18, 46:3–47:16. He also testifies that a POSITA would have been aware of the character and pattern recognition software routines disclosed in Ogasawara. *Id.*, 51:1–23, 61:16–62:4.

Paper 34, 6–7. We disagree that there is no support for Dr. Bajaj’s testimony such that the testimony should be excluded. That there is conflicting evidence, even overwhelming conflicting evidence, does not mean the testimony is inadmissible. Further, our determination of Petitioner not having provided insufficient motivation to combine does not rely, in any part, on Dr. Bajaj’s testimony that Ogasawara is a “bar-code based system.”

As the third example, Petitioner asserts:

Dr. Bajaj provides no basis for his opinion that Bolle’s system is limited to a stationary system (Ex. 2007, ¶¶ 33–35, 59), which is based on the unsupported conclusion that two images are

required for Bolle's segmentation (*id.*, ¶¶ 33–35) and the unsupported conclusion that a user could not stabilize Ogasawara's mobile videophone to take two images for Bolle's two-image segmentation methods (*id.*, ¶¶ 24–25, 35, 59). Beyond failing to consider Bolle's other segmentation methods, as discussed above, Dr. Bajaj ignores Bolle's disclosure that, as an alternative to a stationary system, special registration "can be ensured by [] acquiring the first and second image in quick succession." Ex. 1006, 10:41–43.

Id. at 7.

We disagree that there is no basis for Dr. Bajaj's opinion that Bolle's system is limited to a stationary system. There is support in Figures 1 and 4 of Bolle, and also in Bolle's description of spatial registration for taking a first and a second image (Ex. 1006, 10:31–44). We also disagree that Dr. Bajaj's conclusion that a user could not stabilize Ogasawara's mobile videophone to take two images for Bolle's two-image segmentation methods" is without evidentiary support. Bolle's description of spatial registration constitutes such support. That Bolle also describes taking pictures in quick succession to address the effects of some movement goes to the weight of the evidence and is not a basis to exclude Dr. Bajaj's testimony.

2. *Assertion of Irrelevance*

Petitioner asserts that paragraphs 36–43 of Dr. Bajaj's Supplemental Declaration (Ex. 2007) should be excluded because they focus on symbols, e.g., barcodes, which "(i) did not form the bases of the instituted grounds, and (ii) is contrary to district court's claim constructions adopted by the Board." *Id.* at 8–9. Petitioner explains that opinions regarding Ogasawara's symbols and barcodes "have no bearing on the prior art combinations in this IPR (which are specifically for items without symbols) or the Challenged Claims (which have not been construed to include symbols)." *Id.* at 10.

According to Petitioner, an expert's testimony that has no bearing on the issues in the case and ignores the tribunal's claim construction is irrelevant. *Id.*

The testimony regarding Ogasawara's barcodes may be misplaced but is not irrelevant to Patent Owner's theory of lack of motivation to combine. Patent Owner, in its presentation, is free to emphasize the symbol or bar code aspect of Ogasawara more than it does the non-symbol aspect of Ogasawara. In any event, our determination that Petitioner has not shown an adequate motivation to combine teachings does not in any way rely on Patent Owner's emphasizing Ogasawara's symbol or barcode disclosures over Ogasawara's disclosure on recognizing visual characteristics of an object. The same is true for our determination that Petitioner has not shown that one with ordinary skill in the art would have had a reasonable expectation of success in implementing a system according to the combined teachings. Petitioner is concerned that we would be confused by the discussion pertaining to Ogasawara's bar codes. We are not.

3. *The Images*

Petitioner makes numerous contentions regarding the images reflected in paragraphs 37–40 of Exhibit 2007. Paper 34, 10–12. Petitioner asserts that the images supposedly are representations of bar codes and data matrices printed on various surfaces. *Id.* at 10. Petitioner asserts that the images are evidence without foundation because “[n]either Patent Owner nor Dr. Bajaj have identified any details regarding the origin of the images or the method and circumstances under which they were produced.” *Id.*

Petitioner also asserts that the images appear to be “manipulated or annotated, including markings/etchings on the objects and manipulating light,” and that “Dr. Bajaj provides no basis or explanation for the

manipulations or annotations.” *Id.* at 11. For that reason, Petitioner asserts the images are unreliable and should be excluded. *Id.* Petitioner further asserts that the images lack authentication and thus Patent Owner has not demonstrated that they are what they are purported to be. *Id.*

Petitioner further asserts that the images should be excluded because they (“including the original, copy, and any other evidence”) “have not been produced to prove the content.” *Id.* at 12 (citing Fed. R. Evid. 1001–1007). Petitioner asserts that “Patent Owner has provided no explanation as to why it did not submit supporting evidence for these images along with its Patent Owner’s Response.” *Id.*

All of the above-noted contentions are misplaced. The images themselves constitute the opinion of Dr. Bajaj on what some printed bar codes and data matrices on surfaces may look like under certain conditions. They are not items of evidence, separate from the opinion, submitted to prove anything, and they are not purported by Dr. Bajaj to have a specific source or origin. Even if they are assumed as evidence relied on by Dr. Bajaj, the facts or data relied on by an expert to form an opinion need not be admissible for the opinion to be admitted. Fed. R. Evid. 703.

In any event, our determination that Petitioner has not shown an adequate motivation to combine teachings and a reasonable expectation of success in implementing a system according to the combined teachings does not in any way rely on these images in paragraph 37–40 of Dr. Bajaj’s Supplemental Declaration.

4. *Alleged Hearsay*

Petitioner further asserts that paragraphs 36–43 “should be excluded as containing, referencing, and relying upon out of court statements purporting to describe the sources of these images, which are hearsay under

Fed. R. Evid. 801 and 802 for which Patent Owner has shown no exception.” Paper 34, 12. The assertion is too vague. Petitioner does not specifically identify any such statement and we see none.¹⁴ Further, as discussed above in Section II.F.3, the facts or data relied on by an expert to form an opinion need not be admissible for the opinion to be admitted. Fed. R. Evid. 703.

In any event, we have not relied on these images in determining that Petitioner failed to show adequate motivation to combine teachings. We also have not relied on these images in determining that Petitioner has not shown that one with ordinary skill in the art would have had a reasonable expectation of success in implementing a system according to the combined teachings.

5. *Alleged Demonstratives*

Petitioner asserts that the images “should be excluded to the extent they are intended as demonstratives.” *Id.* at 12. The assertion is without merit, because Dr. Bajaj’s Supplemental Declaration (Ex. 2007), including all contents thereof, is not a demonstrative exhibit and has not been submitted by Patent Owner as a demonstrative exhibit. Patent Owner’s demonstrative exhibit was submitted as Exhibit 2012. As discussed above in Section II.F.3, the images are the opinion of Dr. Bajaj on what some bar codes and data matrices may look like under certain conditions.

6. *Conclusion*

Petitioner’s Motion to Exclude Evidence is *denied*.

¹⁴ The assertion also conflicts with the contention of Petitioner, that “[n]either Patent Owner nor Dr. Bajaj have identified any details regarding the origin of the images.” *Id.* at 10.

III. CONCLUSION

Petitioner has not proved by a preponderance of the evidence that claims 1–3, 6, and 18 of the '004 patent are unpatentable. The outcome for the challenged claims of the '004 patent is set forth in the table below.¹⁵ In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1–3, 6, 18	103	Ogasawara, Bolle		1–3, 6, 18
1–3, 6, 18	103	Ogasawara, Bolle, Rhoads		1–3, 6, 18
Overall Outcome				1–3, 6, 18

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1–3, 6, and 18 of the '004 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence is *denied*; and

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

IPR2021-01332
Patent 9,324,004 B2

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