

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

D3D TECHNOLOGIES, INC.,
Patent Owner.

IPR2021-00648
Patent 9,349,183 B1

Before JAMESON LEE, BARBARA A. PARVIS, and SCOTT RAEVSKY,
Administrative Patent Judges.

PARVIS, *Administrative Patent Judge.*

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

I. INTRODUCTION

Microsoft Corporation (“Petitioner”) filed a Petition (Paper 2 (“Pet.”)) requesting an *inter partes* review of claims 1–18 of U.S. Patent No. 9,349,183 B1 (Ex. 1001, “the ’183 patent”) pursuant to 35 U.S.C. §§ 311–319, along with the supporting Declaration of Michael Zyda, Ph.D. (Ex. 1003). D3D Technologies, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”). With our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 8, “Reply”) and Patent Owner filed a Sur-Reply (Paper 9, “Sur-reply”).

We have authority to determine whether to institute review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4.

Upon consideration of the contentions and the evidence of record at this juncture, we conclude Petitioner establishes a reasonable likelihood of prevailing in demonstrating the unpatentability of claims 1–18 of the ’183 patent. Accordingly, we grant Petitioner’s request and institute an *inter partes* review of all challenged claims of the ’183 patent and with respect to all grounds set forth in the Petition.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies itself as the real party-in-interest. Pet. 97. Patent Owner names itself as the real party-in-interest. Paper 4, 2.

B. *Related Matters*

Each party identifies a judicial matter that would affect, or be affected by, a decision in this proceeding. In particular, the parties inform us that the ’183 patent is asserted in the following district court case: *D3D Technologies, Inc. v. Microsoft Corporation.*, No. 6:20-cv-01699 (M.D. Fla.) (“parallel district court proceeding”). Pet. 97; Paper 4, 2.

Petitioner also has filed (1) a petition for *inter partes* review of U.S. Patent No. 8,384,771 B1 (IPR2021-00647); (2) a petition for *inter partes* review of U.S. Patent No. 9,473,766 B2 (IPR2021-00703); and (3) two petitions for *inter partes* review of U.S. Patent No. 9,980,691 B2 (IPR2021-00877 and IPR2021-00878).

C. The '183 Patent

The '183 patent relates to the field of medical imaging. Ex. 1001, 1:15. The '183 patent describes providing three-dimensional viewing of images by a user. *Id.* at 2:53–54. Figure 1 is a block diagram of a computer system that produces a three-dimensional image to the user and is reproduced below. *Id.* at 4:31–32, 5:48–49.

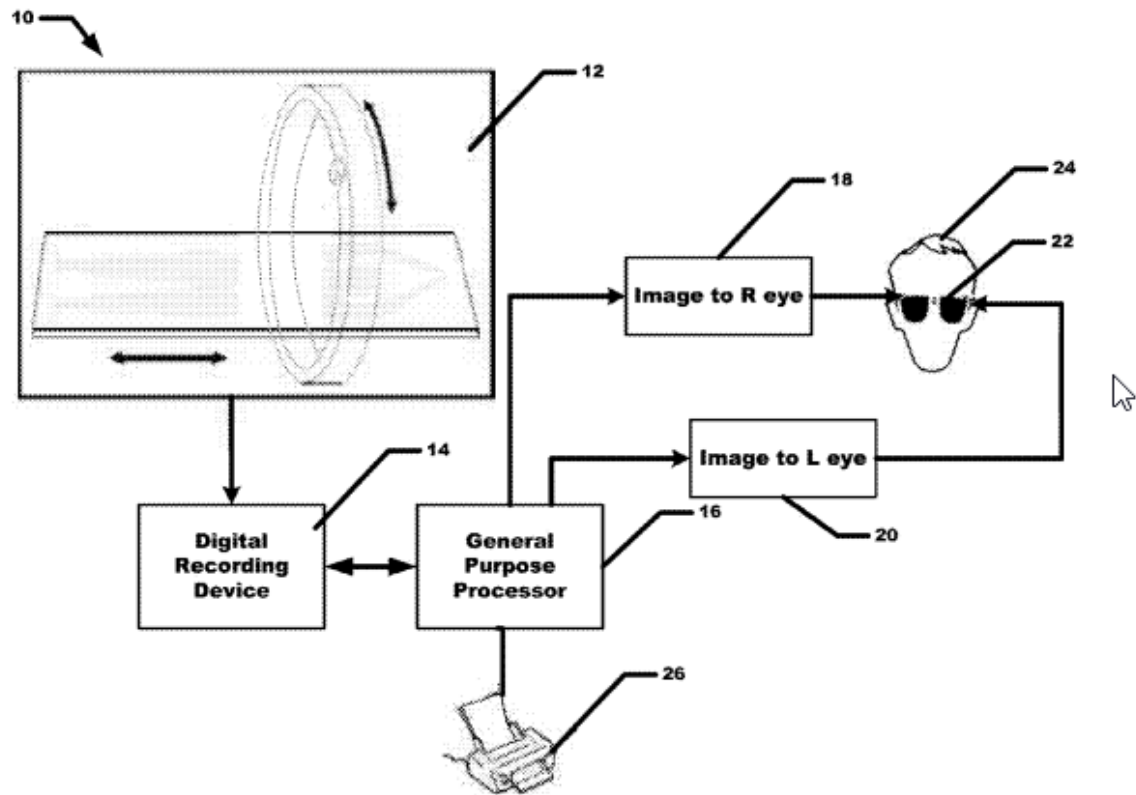


FIGURE 1

Figure 1, above, is a diagram of system 10, which includes imaging device 12, digital recording device 14, general purpose processor (“processor”) 16, and head display unit (HDU) 22, among other components. *Id.* at 5:11–34.

Imaging device 12 communicates with digital recording device 14 to record slices of imagery with metadata. *Id.* at 5:14–19. Processor 16 receives input from user 24 and interacts with digital recording device 14 to generate image for right eye 18 and image for left eye 20. *Id.* at 5:20–26. The images are sent to HDU 22 worn by user 24. *Id.* at 5:33–34.

Figure 8, reproduced below, is a flow diagram of a method for providing three-dimensional images. *Id.* at 4:48–50.

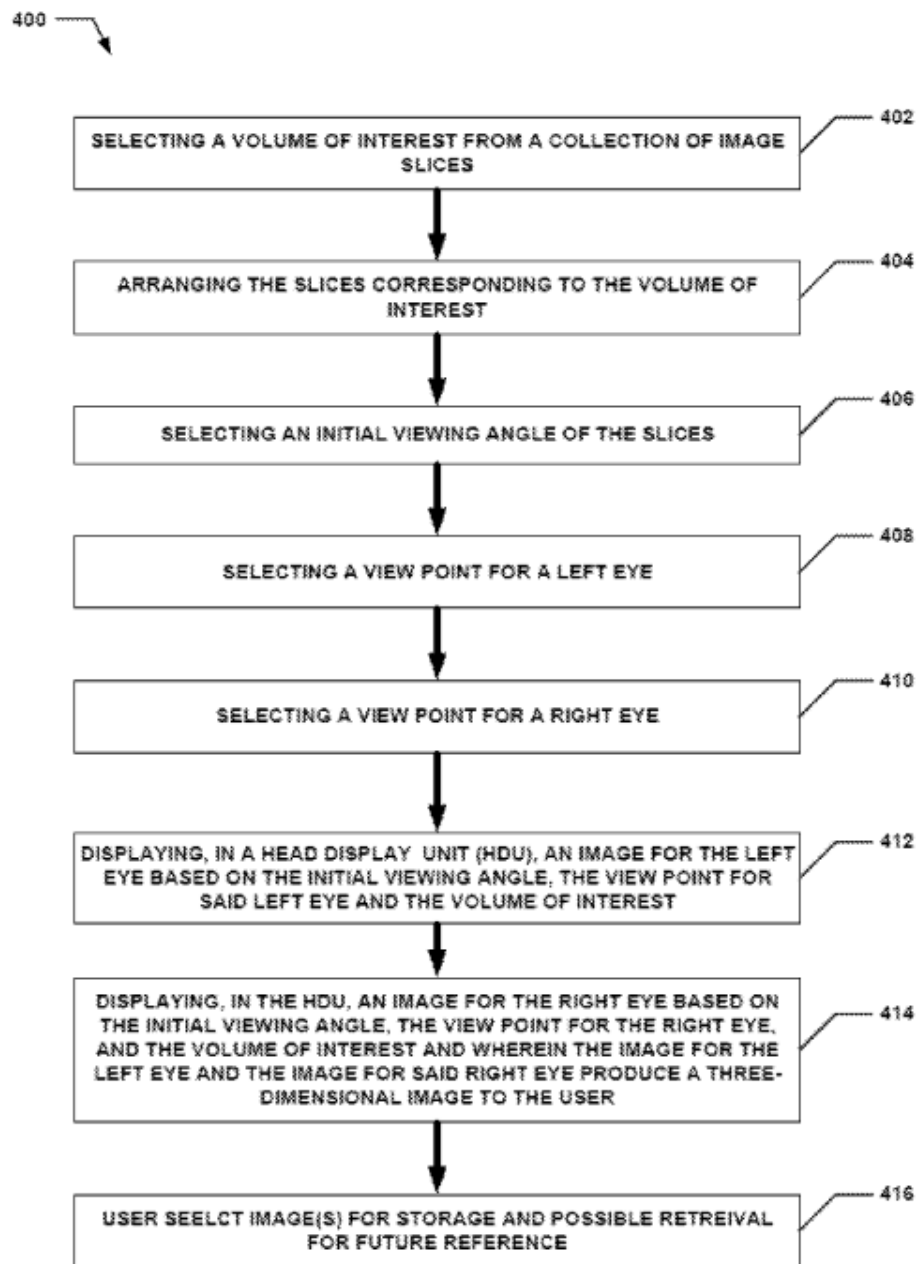


FIGURE 8

Figure 8, above, is a flow diagram of method 400 for providing three-dimensional viewing of images to a user. *Id.*

Method 400 begins with processing block 402, which discloses selecting a volume of interest from a collection of image slices. *Id.* at 8:32–34. The '183 patent states “[t]hrough interaction with the GUI [graphical user interface], the user selects viewing parameter(s) from, for example, a pull down menu.” *Id.* at 8:34–36.

Processing continues with processing blocks 404 through 416. Processing block 404 discloses arranging the slices corresponding to the volume of interest. *Id.* at 8:42–43. The '183 patent describes that in block 404 the software stacks slices corresponding to the area of interest. *Id.* at 8:44–45.

Processing block 406 discloses selecting an initial viewing angle of the slices. *Id.* at 8:56–57. The '183 patent describes that in block 406 the software rotates the volume of interest so that the viewing angle is aligned with that directed by the user. *Id.* at 8:57–59. The user interacts with the GUI to indicate the initial desired viewing angle. *Id.* 8:59–60.

Processing block 408 discloses selecting a view point for a left eye, and processing block 410 discloses selecting a view point for a right eye. *Id.* at 8:64–66. The '183 patent describes that the software selects initial view points for the left and right eyes, respectively. *Id.* at 8:66–67.

Processing block 412 discloses displaying in a HDU, an image for the left eye based on the initial viewing angle, the view point for the left eye, and the volume of interest. *Id.* at 9:28–31. Processing block 414 discloses displaying, in the HDU, an image for the right eye based on the initial viewing angle, the view point for the right eye, and the volume of interest. *Id.* at 9:31–34. According to the '183 patent, the image for the left eye and the image for the right eye produce a three-dimensional image to the user. *Id.* at 9:34–36.

Processing block 416 discloses selecting images for future reference. *Id.* at 10:4–5. The '183 patent describes that the image slices generated through the imaging process are stored in a sequential file in the digital recording unit together with associated meta data. *Id.* at 10:5–7.

D. Illustrative Claim

Petitioner challenges claims 1–18 of the '183 patent. Pet. 1. Claims 1, 7, and 13 are the independent claims. Claims 2–6 depend directly from claim 1. Claims 8–12 depend directly from claim 7. Claims 14–18 depend directly from claim 13. Independent claim 1, reproduced below, is illustrative of the claimed subject matter.

1. [1 pre]¹ A method of three-dimensional viewing of images by a user comprising:
 - [1a] selecting a volume of interest from a collection of image slices;
 - [1b] arranging said slices corresponding to said volume of interest;
 - [1c] selecting an initial viewing angle of said slices;
 - [1d] selecting a viewpoint for a left eye;
 - [1e] selecting a viewpoint for a right eye;
 - [1f] displaying, in a display unit (DU), an image for said left eye based on said initial viewing angle, said view point for said left eye and said volume of interest;
 - [1g] displaying, in said DU, an image for said right eye based on said initial viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce a three-dimensional image to said user;

¹ Petitioner's designations to reference the elements of claim 1 are set forth in brackets. Pet. v–vi. Herein we refer to the elements of claim 1 using Petitioner's designations.

- [1h] wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user; and
- [1i] selecting an alternate viewing angle, said selecting an alternate viewing angle comprising:
 - [1j] reorienting said volume of interest in accordance with said alternate viewing angle;
 - [1k] displaying, in said DU, an image for said left eye based on said alternate viewing angle, said view point for said left eye and said volume of interest; and
 - [1l] displaying, in said DU, an image for said right eye based on said alternate viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce an alternate three-dimensional image to said user.

Ex. 1001, 17:23–56.

E. Evidence

Petitioner relies on the patent document references summarized in Table 1 below.

Name	Patent Document	Exhibit
Schoolman	US 5,488,952	1005
Murphy	WO 2007/059477 A2	1010
Jones	EP 1 056 049 A2	1013
Guang	US 2005/0148848 A1	1014

F. Asserted Grounds

Petitioner asserts that the challenged claims of the '183 patent are unpatentable based on the following grounds summarized in Table 3 below:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1, 5–7, 11–13, 17, 18	102 ²	Jones
1, 5–7, 11–13, 17, 18	103(a)	Jones
2–5, 8–10, 14–16	103(a)	Jones, Schoolman
1–18	103(a)	Murphy, Guang

III. DISCRETIONARY DENIAL OF THE PETITION

A. Overview

Patent Owner contends we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review. Prelim. Resp. 35–42 (citing, e.g., *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”)). In contrast, Petitioner asserts that we should institute and provides stipulations to avoid overlap in the instant and parallel district court proceedings. Reply 7.

In *Fintiv*, the Board articulated a list of factors that we consider in determining whether to exercise discretion to deny institution based on an advanced stage of a parallel proceeding:

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

² The Leahy-Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §§ 102 and 103. Because the ’183 Patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA version of 35 U.S.C. §§ 102 and 103.

6. other circumstances that impact the Board's exercise of discretion, including the merits.

Fintiv, Paper 11 at 5–6. Here, we consider these factors to determine whether we should exercise discretion to deny institution. In evaluating these factors, we take “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.*

B. Analysis of Fintiv Factors

1. Fintiv Factor 1: Stay in the Parallel Proceeding

Petitioner asserts that Judge Byron has granted a stay pending an IPR in 67% of the cases (six of nine cases). Reply 2 (citing Ex. 1025). Petitioner asserts that in *NOCO Company, Inc. v. Deltona Transformer Corporation*, “Judge Byron granted a motion to stay pending an IPR almost a year after the complaint was filed, approximately three months after the Claim Construction Order was issued, and a month after a decision to institute an IPR (the Institution Decision was issued 11 months after the complaint filing).” *Id.* at 2–3 (citing Ex. 1026; Ex. 1027). Also, according to Petitioner, “Judge Byron characterized Patent Owner’s assertions as being ‘excessive and overly complicate[d],’ thereby revealing a desire for simplification, which is best achieved through institution and stay, thereby making stay more likely.” *Id.* at 3–4(citing Ex. 2004, 2).

Patent Owner counters that the “district court has not granted a stay in the parallel district court proceeding and is unlikely to do so should Microsoft decide to request one.” Prelim. Resp. 36. Patent Owner asserts that “[i]ndeed, Microsoft’s earlier request for a stay pending a transfer motion was denied.” Sur-reply 1 (citing Ex. 2008). Patent Owner also asserts that the cases relied on by Petitioner are distinguishable. *Id.* at 1–3. For instance, in *NOCO Company, Inc. v. Deltona Transformer Corporation*, the

stay was unopposed and another district court stayed a case involving the same patent. *Id.* at 1–2 (citing Ex. 2007, 1–2).

We decline to speculate as to whether a stay will be granted if Petitioner requests one. *See Fintiv*, Paper 15 at 12 (PTAB May 13, 2020) (informative); *Sand Revolution II, LLC v. Cont'l Intermodal Group – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative). Under these circumstances, factor 1 is neutral.

2. *Fintiv Factor 2: Trial Date in the Parallel Proceeding*

Under factor 2, we consider the “proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision.” *Fintiv*, Paper 11 at 5–6. The parties agree that the current trial date is September 6, 2022. *See, e.g.*, Reply 4; Sur-reply 3 (citing Ex. 2003, 2). The projected statutory deadline for the instant final written decision is close to the trial date as it also is in September 2022.

Petitioner asserts that the current trial date is uncertain and may be further delayed due to backlog. Reply 4. Patent Owner responds that the current trial date of September 6, 2022 has been in place since November of last year. Sur-reply 3 (citing Ex. 2003, 2). Also, Patent Owner asserts that although other deadlines were modified when the case was transferred to Judge Byron, the trial date was not modified. *Id.*

Given that the current trial date has been set for almost one year, we make our determination based on that date. We note, however, that the current trial date is close to the projected statutory deadline for a final written decision in the instant proceeding. *See Fintiv*, Paper 11 at 9 (“If the court’s trial date is at or around the same time as the projected statutory deadline or even significantly after the projected statutory deadline, the decision whether to institute will likely implicate other factors.”).

Under these circumstances, this *Fintiv* factor is neutral.

3. *Fintiv Factor 3: Investment by the Court and the Parties in the Parallel Proceeding*

Petitioner asserts that it was diligent in filing the Petition because the Petition was filed within six months of Petitioner being served and within three months of Patent Owner serving infringement contentions. Pet. 94 (citing Ex. 1020). Petitioner argues its diligence outweighs minimal investment in the parallel district court proceeding. Reply 6.

Patent Owner argues that the investment in the parallel district court proceeding is substantial. Patent Owner asserts that claim construction briefing has been completed and the hearing was held June 16, 2021. Prelim. Resp. 39 (citing Ex. 2004, 5). Patent Owner further asserts that fact discovery is in progress and must be completed by Nov. 15, 2021, preliminary infringement and invalidity contentions have been prepared and served, and updated contentions will be due thirty days after the court issues its claim construction order. *Id.* Patent Owner also asserts that a mediation was held. *Id.*

We find that the evidence of record supports that some progress has been made in the parallel district court proceeding. We also recognize that *Fintiv* provides that a petitioner's diligence in filing a petition may be relevant under the third *Fintiv* factor. *Fintiv*, Paper 11 at 11–12. The Petition here was filed within six months of Petitioner being served and within three months of Patent Owner serving infringement contentions. Nevertheless, under the circumstances present here, we find that the timing of the filing of the Petition does not outweigh that some investment has been made by the parties in the parallel district court proceeding. Accordingly, this factor is neutral.

4. *Fintiv Factor 4: Overlap Between Issues Raised in the Petition and Parallel Proceeding*

Petitioner stipulates that “if the Board institutes an IPR based on Petitioner’s ’183 Petition, Petitioner will not assert any 35 U.S.C. § 102 or § 103 invalidity ground in co-pending litigation (6:20-cv-1699) based on any of the primary or secondary references asserted in the ’183 Petition.” Reply 7. Patent Owner argues that we should not consider Petitioner’s broader stipulation because it was submitted in the Reply, after the Preliminary Response. Sur-reply 4–5. Patent Owner argues that Petitioner should be bound to its narrower stipulation in the Petition (*id.*), which is “Petitioner will not pursue district court invalidity challenges based on the pending Petition’s asserted grounds.” Pet. 95.

We are not persuaded by Patent Owner’s argument that “[i]t would be unfair and improper” to consider Petitioner’s broader stipulation. Sur-reply 5–6. Patent Owner was given the opportunity to respond in its Sur-reply, which was filed after Petitioner’s Reply. Paper 7.

We also are not persuaded by Patent Owner’s argument that the broader stipulation is improper because it is conditioned on institution of an *inter partes* review in the instant proceeding. Sur-reply 5. The Board has previously determined that a stipulation that “if IPR is instituted, [Petitioner] will not pursue in the District Court Litigation any ground raised or that could have been reasonably raised in an IPR” weighs strongly in favor of not exercising discretion. *Sotera Wireless, Inc. v. Masimo Corporation*, IPR2020-01019, Paper 12, 18–19 (PTAB Dec. 1, 2020) (precedential) (“*Sotera*”). Although the stipulation in the instant proceeding is worded differently than the stipulation in *Sotera*, both stipulations include a

condition that relates to institution. We are not persuaded that conditioning the stipulation on institution in the instant proceeding is improper.

Based on the stipulation in Petitioner's Reply that would mitigate concerns of inefficiency, factor 4 weighs against exercising discretion to deny institution of *inter partes* review.

5. *Fintiv Factor 5: Whether Petitioner is the Defendant in the Parallel Proceeding*

Petitioner asserts "Petitioner and Patent Owner are parties to the co-pending litigation, a fact that favors institution in this case because the Board's FWD would bind Petitioner via the §315(e)(2) estoppel before a jury trial, and thereby promote judicial efficiency." Pet. 95. Patent Owner argues the parties are exactly the same and "this is the canonical scenario where *Fintiv* Factor 5 favors denial of the Petition." Prelim. Resp. 42.

Under these circumstances, this factor weighs in favor of exercising discretion to deny institution.

6. *Fintiv Factor 6: Other Considerations*

Under the sixth *Fintiv* factor, which takes into account any other relevant circumstances, Petitioner argues that the merits of the present Petition are particularly strong. Pet. 95. Patent Owner argues that the merits are not strong. Prelim. Resp. 42; Sur-reply 6.

We agree with Petitioner that the merits of the Petition are particularly strong with respect to Petitioner's ground of obviousness of claims 1–18 over Murphy and Guang. For instance, Murphy describes "raw medical image data, such as volumetric data." Ex. 1010 ¶ 35. Murphy further discloses that "a user can select a part of the virtual patient to display by selecting a geometry of the virtual patient." *Id.* ¶ 41. Guang describes that "it is desirable to dynamically adjust the convergence point of the stereo images

to be at or near the object a user is currently inspecting.” Ex. 1014 ¶ 108. These and other teachings of Murphy and Guang, as explained by the testimony of Dr. Zyda, at this stage, strongly teach the limitations of the challenged claims.

With respect to the remaining grounds, we do not make a further determination that the merits are particularly strong. Instead, our analysis for factor 6 is based on our determination that the merits of the Petition are particularly strong with respect to Petitioner’s ground of obviousness of claims 1–18 over Murphy and Guang.

Under these circumstances, factor 6 weighs against exercising discretion to deny institution of *inter partes* review.

C. Conclusion

On balance, after a holistic consideration of the relevant facts and the particular circumstances of this case, we conclude that the facts against exercising discretion collectively outweigh those favoring discretion. Accordingly, we do not exercise our discretion to deny institution under 35 U.S.C. § 314(a).

IV. ANALYSIS

A. Legal Standards

To prevail in its challenge to Patent Owner’s claims, Petitioner must demonstrate that the claims are unpatentable and that burden never shifts to the patentee. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Therasense, Inc. v. Becton, Dickinson & Co.*, 593 F.3d 1325, 1332 (Fed. Cir. 2010); *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545

F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). The applied reference “need not satisfy an *ipsissimis verbis* test.” *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832–33 (Fed. Cir. 1990).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art the time of the invention would have had “at least a Bachelor’s degree in an academic area emphasizing electrical engineering, computer science, or a similar discipline, and at least two years of experience in the field working with, teaching, or researching stereoscopic and/or virtual/augmented reality (VR/AR) display technologies.” Pet. 4 (citing Ex. 1003, ¶¶ 15–16). Petitioner further contends that “[s]uperior education could compensate for a deficiency in work experience, and vice-versa.” *Id.* At this stage in the

³ Patent Owner does not present objective evidence of nonobviousness at this stage of the proceeding.

proceeding, Patent Owner does not dispute Petitioner's proposal. Prelim. Resp.

We find that the phrase “at least” in Petitioner's proposed definition creates a vague, open-ended upper bound for the level of ordinary skill, and we therefore do not adopt that aspect of the proposal. With that exception, considering the subject matter of the '183 patent, the background technical field, and the asserted prior art, we otherwise agree with Petitioner's proposed qualifications for an ordinary level of skill. Petitioner's proposed definition is consistent with the level of skill reflected in the specification of the '183 patent and the asserted prior art references. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Accordingly, for purposes of this decision, and based on the current record, we adopt Petitioner's assessment of the level of skill for one of ordinary skill in the art, except without the “at least” phrase.

C. Claim Construction

We construe the challenged claims by applying the standard used in federal courts, in other words, “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b),” which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2020). Under this standard, the words of a claim generally are given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips*, 415 F.3d at 1312–13.

Petitioner states that “no formal claim constructions are necessary in this proceeding.” Pet. 3. Patent Owner provides constructions for “volume” and “volume of interest,” which we address below. Prelim. Resp. 15. Also

below, we provide our analysis regarding the phrase “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user” recited in independent claims 1, 7 and 13 to address a dispute as to whether the asserted prior art teaches that recitation. Pet. 21–25, 70–71; Prelim. Resp. 23–26, 30–35. We further provide a brief discussion of “selecting an initial viewing angle” and “selecting an alternate viewing angle” recited in claims 1, 7, and 13 to simplify our analysis of the prior art with respect to those recitations, although constructions of those recitations are not discussed by the parties at this juncture.

1. “volume” and “volume of interest”

Patent Owner asserts that that parties agreed in the parallel district court proceeding that the ’183 patent “defines a ‘volume’ to be made up of three-dimensional pixels.” Prelim. Resp. 15 (citing Ex. 2002, 1, 6; Ex. 2005). Patent Owner also asserts that that parties agreed that “volume of interest” “means one or more three-dimensional pixels selected by an individual or automated process.” *Id.* (citing Ex. 2005).

For purposes of this decision, we adopt the agreed-to constructions in the parallel district court proceeding because at this early juncture Petitioner has made a sufficient showing under those constructions. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017)), *cert. denied*, 138 S. Ct. 1695 (April 30, 2018) (noting that “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’”) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

2. *“wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user”*

Neither party provides an express construction for this phrase, but each party provides contentions regarding disclosure in the '183 patent Specification relating to this phrase. We provide our analysis regarding claim construction here to address below a dispute as to whether the prior art teaches the phrase.

Petitioner asserts that “the '183 patent describes that “[t]he convergence point is where the center theta-alpha ray from each LEVP and REVP intersect.” Pet. 21 (citing Ex. 1001, 6:61–59, Fig. 3B; Ex. 1003 ¶ 67).⁴ Petitioner provides annotations to Figure 3B of the '183 patent, reproduced below, illustrating Petitioner’s position.

⁴ Petitioner’s citation to the '183 patent in this sentence includes the wrong exhibit number. *Id.* at 21. We treat this as harmless error.

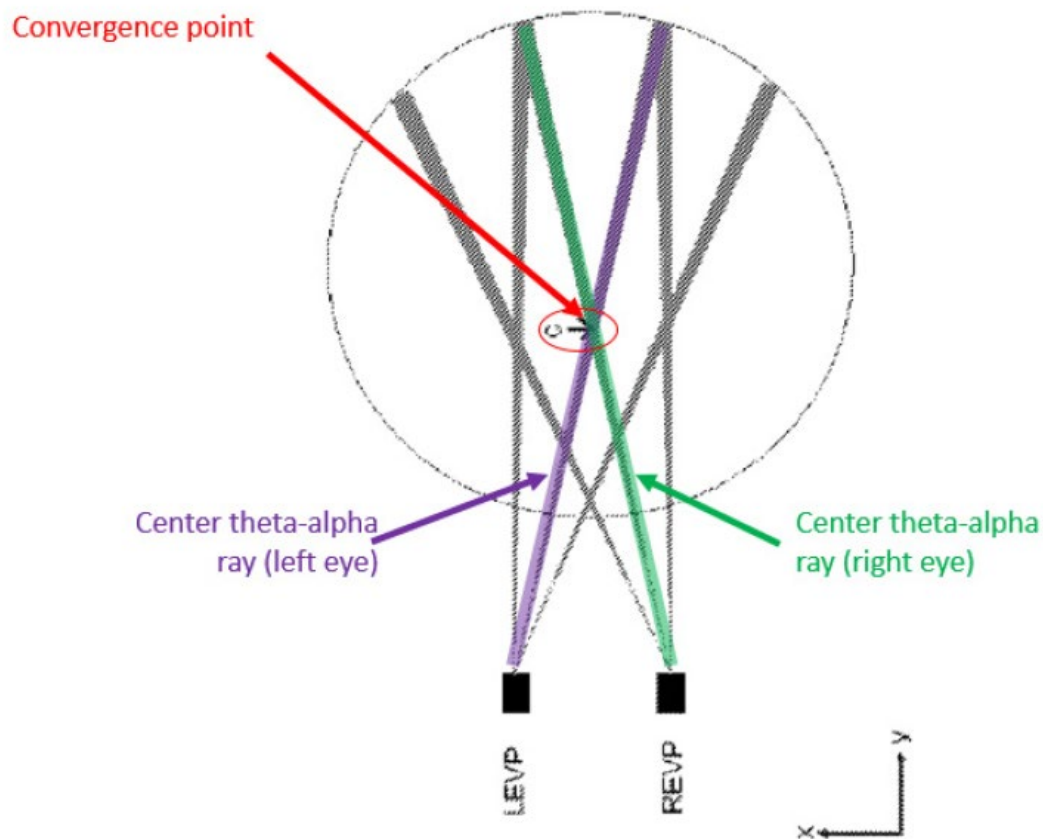


Figure 3B of the '183 patent, above, illustrates a user-selectable convergence point (Ex. 1001, 4:38–39) and includes Petitioner's purple highlighting of the center theta-alpha ray for the left eye, green highlighting of the center theta-alpha ray for the right eye, and a red circle indicating the convergence point. Pet. 21.

Patent Owner does not respond directly to Petitioner's contentions. Patent Owner, instead, provides its own assertions relating to the '183 patent Specification's description of a convergence point. Importantly, Patent Owner points to the same disclosures identified by Petitioner, as well as additional disclosures. Prelim. Resp. 11–12 (citing Ex. 1001, 6:51–7:3, Fig. 3B). Patent Owner asserts that “[a] convergence point is ‘where the center theta-alpha ray from each LEVP [(left eye viewing perspective)] and REVP [(right eye viewing perspective)] intersect.’” *Id.* at 11 (citing Ex. 1001, 6:52–

53). Patent Owner also asserts that Figure 3B of the '183 patent illustrates the convergence point. *Id.*

Patent Owner further asserts the following:

The theta-alpha rays represent a point on a display unit where a view[er] is looking. Allowing for a shift in the convergence point means that the theta-alpha rays no longer are directly straight ahead (i.e., in the y-direction) from each eye's viewing perspective, but rather they are directed to an intersection point "C". [Ex. 1001,] 6:51-66. According to the '183 patent, one can simulate this effect by focusing one's view on a pencil in front of oneself and then moving the pencil to a different point in space. The muscles of the eyes alter the convergence angle to remain focused on the pencil as it moves. *Id.* at 6:66 – 7:3.

Prelim. Resp. 11–12.

We begin our analysis with the language of the claim. Each of the independent claims recites "a convergence point of said image for said left eye and said image for said right eye." Ex. 1001, 17:40–41, 18:64–65, 20:34–35. The claim language recites that the "convergence point" is related to "said image for said left eye and said image for said right eye." *Id.*

Consistently, the portion of the '183 patent Specification identified by both parties describes that the convergence point is "where the center theta-alpha ray from each LEVP [Left Eye Viewing Perspective] and REVP [Right Eye Viewing Perspective] *intersect*." Ex. 1001, 6:25–32, 6:52–53. Also, Figure 3B illustrates the "convergence point" as an intersection. *Id.* at Fig. 3B. In the portions identified by Patent Owner, the '183 patent describes the "convergence point" with respect to the viewer by stating that the viewer converges his or her eyes "to focus on an object," and then the object is moved, resulting in the "eye muscles alter[ing] the convergence angle." *Id.* at 6:66–7:2.

At this early juncture, we preliminarily determine that the term “convergence point” is where the center theta-alpha ray from the left and right eye viewing perspectives intersect. Our understanding is that that convergence point, without simulation, is determined by a point on an object a viewer focuses his or her eyes on to look, and that if the object moves and the viewer continues to focus on the same point on the object after the object moved, then the convergence point has changed. Ex. 1001, 6:52–53, 6:66–7:2.

We turn to the full phrase i.e., “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user.” The claim language does not indicate whether the shifting is performed by the system or a user. The ’183 patent Specification describes “an embodiment wherein a user is able to adjust the convergence.” Ex. 1001, 6:51–52.

Neither party indicates that the independent claims should be limited so as to require adjustment or shifting performed by a user. In its discussion of a different term, Patent Owner asserts that the parties agreed that the claims encompass not only a user’s selection, but also an “automated process.” Prelim. Resp. 15. Namely, Patent Owner argues that “volume of interest” “means one or more three-dimensional pixels *selected by an individual or automated process.*” *Id.* (citing Ex. 2005) (emphasis added). On the record before us at this early juncture, we decline to limit the independent claims so as to require convergence adjustment by a user.

We determine that we need not provide an express construction for the full phrase at this juncture for purposes of this decision.

3. *“selecting an initial viewing angle” and “selecting an alternate viewing angle”*

The '183 patent Specification describes that “selecting an initial viewing angle” and “selecting an alternate viewing angle” are performed by a user. Ex. 1001, 8:59–60 (describing with respect to processing block 406 in Figure 8 that the “user interacts with the GUI to indicate the initial desired viewing angle”), 10:24–25 (describing that processing block 452 in Figure 9 “discloses the user selecting an alternative viewing angle”). The claim recitations, however, are not limited to a user performing the selecting. Also, at this preliminary stage, neither party proposes that “selecting an initial viewing angle” and “selecting an alternate viewing angle” should be limited to selection by a user. At this early juncture and based on the record before us at this stage, we decline to construe “selecting an initial viewing angle” and “selecting an alternate viewing angle” so as to require that a user perform the selecting.

No further analysis of claim construction is needed for our determinations herein.

D. *Unpatentability of Claims 1, 5–7, 11–13, 17, and 18 under 35 U.S.C. § 102 as Anticipated by Jones*

Petitioner asserts that claims 1, 5–7, 11–13, 17, and 18 are unpatentable as anticipated by or obvious over Jones. Pet. 1. Patent Owner counters that the asserted prior art does not disclose element 1h, i.e., “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user” recited in each of independent claims 1, 7, and 13. Prelim. Resp. 23–26.

We begin with an overview of Jones. We then turn to the parties' contentions.

1. Jones

Jones describes a method and apparatus for displaying volumetric data. Ex. 1013 ¶ 1. Figure 5 illustrates an apparatus for performing observer eye tracking. *Id.* ¶ 41.

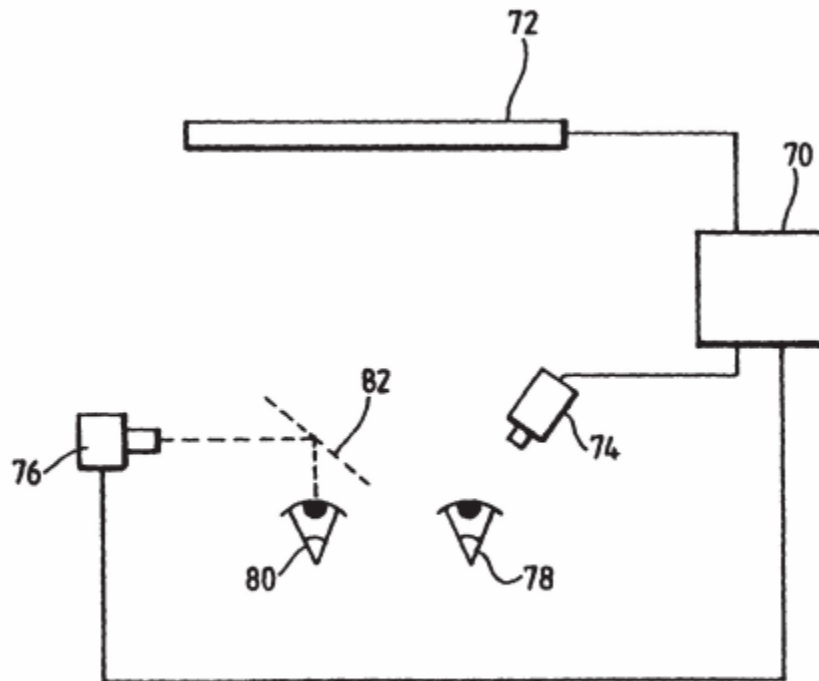


Fig.5.

Figure 5, above, schematically illustrates an apparatus for observer eye tracking, which includes data processor 70 connected to display 72, among other things. *Id.* ¶ 41.

Data processor 70 generates a plurality of views, which are displayed on display 72. *Id.* Cameras 74 and 76 are arranged to view eyes 78 and 80 of an observer. *Id.* Data processor 70 receives information from cameras 74 and 76 to perform visual tracking to determine the observer's fixation point in three-dimensions. *Id.*

Figure 7b, reproduced below, illustrates applying fixation point tracking techniques when a dataset rotates with respect to the observer. *Id.* ¶ 43.

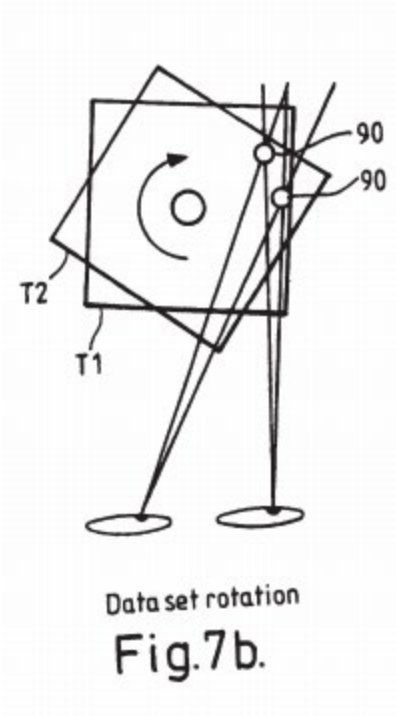


Figure 7b, above, illustrates applying fixation point tracking techniques when a dataset rotates with respect to the observer. *Id.* ¶ 43.

As shown in Figure 7b, region of interest 90 moves from first position at time T1 to a second position at time T2 with respect to the observer. *Id.* Jones describes that at each of positions T1 and T2, eye direction data may be used to calculate a region of intersection. *Id.*

2. *Independent Claim 1*

a) *The Preamble*

The preamble of claim 1 is a “method of three-dimensional viewing of images by a user.” Ex. 1001, 17:23–24.⁵ Petitioner contends that Jones

⁵ We treat the preamble as limiting without deciding, because at this juncture Petitioner makes a sufficient showing.

discloses the preamble, based on Jones's disclosure that it relates to "a method of and apparatus for displaying volumetric data." Pet. 10 (quoting Ex. 1013 ¶ 1); *see also id.* (quoting Claim 1 ("A method of displaying data, wherein the data represents structure within at least a three dimensional space..."))).

At this preliminary stage, Patent Owner does not dispute Petitioner's arguments or evidence regarding the preamble. Petitioner's assertions are supported by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses the preamble of claim 1 for purposes of institution.

b) Element 1a: "selecting a volume of interest from a collection of image slices"

Petitioner contends that Jones discloses "selecting a volume of interest" based on Jones's disclosure of a user "select[ing] a volume of space encompassing the right eye," where the right eye corresponds to the "volume of interest" recited in claim 1. Pet. 11 (quoting Ex. 1013 ¶ 32). Petitioner also points to Jones's disclosure of displaying "data representing a head 12." *Id.* at 12 (quoting Ex. 1013 ¶ 31; citing Ex. 1003 ¶ 54). Petitioner contends that Jones discloses that the volume of interest is from "a collection of image slices" based on Jones's disclosure of cubic data volume 2 defined by orthogonal X,Y and Z axes, where a plurality of slices are stacked along the Z direction. *Id.* at 11 (citing Ex. 1013 ¶¶ 2, 9, 30, Fig. 1 Ex. 1003 ¶¶ 53–54); Ex. 1013 ¶ 30. Jones discloses that "[t]ypically such a dataset may comprise 256 x 256 pixels in the X and Y directions and 128 planes 4 in the Z direction." Ex. 1013 ¶ 30.

As discussed above with respect to claim construction (*see* § IV.C.1), for purposes of this decision, we adopt the agreed-to construction in the parallel district court proceeding because at this early juncture Petitioner has made a sufficient showing using that construction. In particular, we adopt that “‘volume’ [is] made up of three-dimensional pixels” and that “volume of interest” “means one or more three-dimensional pixels selected by an individual or automated process.” *See id.* (quoting Prelim. Resp. 15; citing Ex. 2002, 1, 6; Ex. 2005). Jones discloses that “[a] typical volumetric data set is made up of a plurality of voxels,” and a “typical image dataset may contain 256 x 256 x 128 voxels.” Ex. 1013 ¶ 3; *see also id.* ¶ 30 (“Typically such a dataset may comprise 256 x 256 pixels in the X and Y directions and 128 planes in the Z direction”).

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1a. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions are supported sufficiently by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1a of claim 1 for purposes of institution.

c) Element 1b: “arranging said slices corresponding to said volume of interest”

Petitioner contends that Jones discloses element 1b based on Jones’s disclosure that “‘a plurality of slices are stacked along the Z direction’ to show ‘features within the dataset [that] represent an object, such as a part or whole of a persons body[.]’” Pet. 12 (quoting Ex. 1013 ¶ 30); *see also id.* citing Ex. 1013 ¶ 31 (describing that “the display of data representing a head

12” includes steps in which “various layers . . . of the data set are stacked and displayed”).

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1b. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1b of claim 1 for purposes of institution.

d) Element 1c: “selecting an initial viewing angle of said slices”

Petitioner contends that Jones discloses element 1c based on Jones’s disclosure that “the dataset is displayed” and “the dataset may also be rotated in space in order to present the observer with a plurality of views of the data.” Pet. 13–14 (quoting Ex. 1013 ¶ 9; citing *id.* ¶ 22). Petitioner contends that “[a]n initial angle at which the 3D volume is presented to the user (initial viewing angle), which may be set by the system or chosen by the user, corresponds to selection of an initial viewing angle from which further rotation is performed.” *Id.* at 14 (citing Ex. 1003 ¶ 57).

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1c. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. As we explained above with respect to claim construction (*see* § IV.C.3), at this early juncture, we decline to construe “selecting an initial viewing angle” and “selecting an alternate viewing angle” so as to require that a user perform the selecting. Setting by the system an initial

angle at the start of the rotation, therefore, meets the “selecting” requirement recited in element 1c based on the record at this preliminary stage.

For the reasons given, we determine that Petitioner’s assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1c of claim 1 for purposes of institution.

*e) Element 1d: “selecting a viewpoint for a left eye” and
Element 1e: “selecting a viewpoint for a right eye”*

Petitioner contends that Jones discloses elements 1d and 1e based on Jones’s disclosure of displaying the three dimensional volume “in a stereoscopic form, with different view points being presented to the observer’s left and right eyes, respectively.” Pet. 16–17 (quoting Ex. 1013 ¶ 9). Petitioner also points to Jones’s disclosure that “[f]or a stereoscopic display, different projection images must be calculated for each of the left and right eye view points.” *Id.* at 17 (quoting Ex. 1013 ¶ 33).

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding elements 1d and 1e. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions are supported sufficiently by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses elements 1d and 1e of claim 1 for purposes of institution.

f) Elements 1f and 1g

Elements 1f and 1g are reproduced below.

[1f] displaying, in a display unit (DU), an image for said left eye based on said initial viewing angle, said view point for said left eye and said volume of interest;

[1g] displaying, in said DU, an image for said right eye based on said initial viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce a three-dimensional image to said user;

Ex. 1001, 17:32–39.

Petitioner contends that Jones discloses elements 1f and 1g based on Jones’s disclosure that “a plurality of views . . . are displayed on a display 72.” Pet. 18–19 (quoting Ex. 1013 ¶ 41) (alteration in original). Petitioner also provides an annotation to Figure 5 of Jones pointing to display 72 for meeting the recitation of “display unit (DU)” in claim 1. *Id.* at 19 (citing Fig. 5).

Petitioner further points to Jones’s disclosure regarding computing views of data in a first contextual form and a second enhanced contextual form, which includes processing so that the three dimensional data volume can be displayed on a two dimensional display. *Id.* (citing Ex. 1013 ¶ 33). Petitioner contends that Jones’s disclosure in this regard states that “different projection images must be calculated for each of the left and right eye view points.” *Id.* (quoting Ex. 1013 ¶ 33). Petitioner also points to Jones’s disclosure that “[e]xisting display technologies can be used to separate the left eye and right eye images,” which Petitioner contends results in a different image being provided to each of the left and right eyes. *Id.* (citing Ex. 1013 ¶ 9) (alteration in original).

With respect to the claim recitation “based on said initial viewing angle, said view point for said [left/right] eye and said volume of interest”

recited in elements 1f and 1g of claim 1, Petitioner refers to its contentions for elements 1a, 1c, and 1d. *Id.* at 18–19.

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding elements 1f and 1g. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses elements 1f and 1g of claim 1 for purposes of institution.

g) *Element 1h: “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user”*

Petitioner contends that Jones discloses element 1h based on Jones’s disclosure of fixation point tracking. Pet. 21 (citing, *e.g.*, Ex. 1013 ¶¶ 42–43, Figs. 7a–7c). Petitioner contends that “point of intersection 90” described with respect to Figure 7A and “region of interest 90” described with respect to Figure 7b correspond to the claimed convergence point. *Id.* at 21–24 (citing, *e.g.*, Ex. 1013 ¶¶ 42–43, Figs. 7a, 7b; Ex. 1013 ¶ 42).

Petitioner provides an annotated version of Figure 7b to illustrate Petitioner’s contentions regarding shifting of the convergence point.

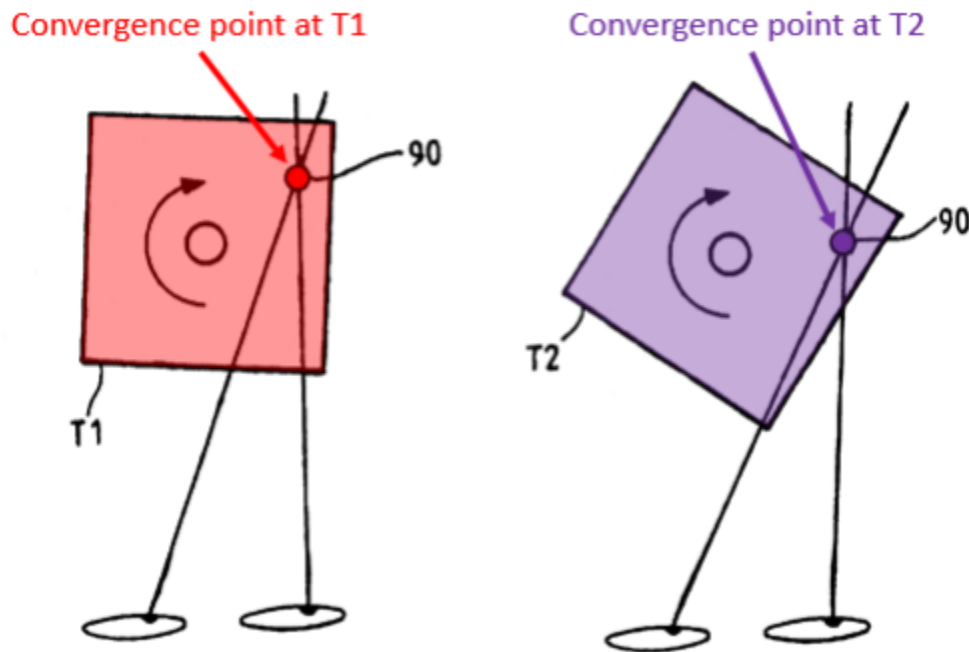


Figure 7b of Jones, above, illustrates observer eye tracking with a rotating dataset and has been modified by Petitioner (1) to separate the representation of the dataset at T1 from the representation at T2, (2) to include red annotations of the dataset and point 90 at T1, and (3) to include purple annotations of the dataset and point 90 at T2.

Patent Owner contends, “[i]n Jones, eye movement is tracked,” but the image “remains unaltered—there is no provision of a different perspective of the image to the view, as required by claims 1, 7, and 13.” Prelim. Resp. 23–24 (citing, e.g., Ex. 1013 ¶ 41). At this early juncture, we disagree.

Although Jones describes tracking eye movement, importantly, at this preliminary stage we find that Jones also discloses rotating or altering the image to provide a different perspective of the image to the user. *See, e.g.*, Ex. 1013 ¶ 9 (“[T]he dataset may also be *rotated* in space in order to present the observer with a plurality of views of the data.”) (emphasis added), ¶ 22 (describing imaging systems “in which the dataset is *moved* (*such movement*

is often rotational”) (emphasis added), ¶ 36 (“The view point may be fixed or may be changed depending on whether the pre-processing of the base image was performed only for a single view point or for *a smoothly changing set of view points thereby giving the impression that the data space is rotating on the screen.*”) (emphasis added), ¶ 43 (“In Figure 7b, motion tracking is performed with both eyes as the region of interest 90, *moves from the first position at time T1 to a second position at time T2* with respect to the observer.”) (emphasis added).

Patent Owner also contends that “Jones uses Figures 7a–7c to illustrate why it is not necessary to be concerned with convergence points at all and instead one need only track the movement of a single eye (it is axiomatic that the view of a single eye has no convergence point).” Prelim. Resp. 24; *see also id.* at 25 (“[R]ather than teaching shifting of a convergence point as recited in the claims, Jones is demonstrating why it is not necessary to shift convergence points . . . as it is sufficient to track only the motion of one eye”). Patent Owner improperly suggests that Jones describes the observer viewing the image with a single eye because Jones describes tracking the movement of a single eye, but viewing and tracking are not synonymous, and Jones describes viewing with both eyes. *See, e.g.*, Ex. 1013, Fig. 5, ¶ 41 (“One or more cameras 74 and 76 are arranged to view the *eyes 78 and 80 of an observer.*”) (emphasis added). Indeed, although the claims require view points for the left and right eyes, the claims do not require tracking, measuring, or calculating with respect to those view points. Tracking, measuring, and calculating are additional features discussed in Jones that are not required by the claims. Nonetheless, with respect to Figure 7b, Jones describes that “motion tracking is performed with *both eyes.*” *Id.* ¶ 43 (emphasis added). Further, Patent Owner does not

contend that by tracking the motion of a single eye, Jones cannot determine the point at which the viewer looks to provide an appropriate image for the other eye.

At this preliminary stage, we find that Jones discloses a “convergence point,” as well as “a convergence point . . . is shifted,” recited in claims 1, 7, and 13. As we discussed above with respect to claim construction (*see* § IV.C.2), we preliminarily determine that the term “convergence point” is where the center theta-alpha ray from the left and right eye viewing perspectives intersect. As we explained with respect to claim construction (*id.*), our understanding is that that convergence point, without simulation, is determined by a point on an object a viewer focuses his or her eyes on to look, and that if the object moves and the viewer continues to focus on the same point on the object after the object moved, then the convergence point has changed. Also, we decline to limit the independent claims so as to require adjustment or shifting by a user.

Jones describes that “both eyes are tracked” and that “the point of intersection 90” is calculated with respect a stationary three-dimensional object illustrated in Figure 7a. Ex. 1013 ¶ 42. In the context of Jones, “point of intersection 90” meets the recitation of “convergence point,” but Figure 7a pertains to a stationary object and each of the claims requires that “a convergence point . . . is shifted.”

Jones also describes that Figures 7b and 7c illustrate applying “fixation point” tracking techniques “when the dataset *rotates*.” *Id.* ¶ 43. Jones further describes the following:

In Figure 7b, motion tracking is performed with both eyes as the region of interest 90 moves from the first position at time T1 to a second position at time T2 with respect to the observer. At each

of these positions, and at intermediate ones, eye direction data may[]be used to calculate a region of intersection.

Id.

Jones appears to use different terms to refer to the same thing. In particular, in its discussion of performing eye tracking, we preliminarily find that Jones uses the terms “fixation point,” “point of intersection,” “point of interest,” and “region of intersection” in a manner such that Jones’s disclosure as understood by a person having ordinary skill in the art meets the “convergence point” requirement recited in claim 1. For instance, with respect to “fixation point,” Jones describes “the observer’s fixation point,” which is determined using camera information in one embodiment obtained from both eyes of the observer. Ex. 1013 ¶ 41. Jones’s “point of intersection” is described as being calculated using measurements of “the direction of the view of each eye.” *Id.* ¶ 42. Also, Jones’s “region of interest 90” and “region of intersection” are described with respect to performance of motion tracking “with both eyes.” *Id.* ¶ 43. At this early juncture, we find that a person having ordinary skill in the art would have understood Figure 7b’s “region of interest 90” to be much like “point of intersection 90” shown in Figure 7a, except in Figure 7b the dataset rotates and the viewer continues to focus on the same point on the object. *Id.* at Figs. 7a, 7b, ¶¶ 9, 42–43; Ex. 1003 ¶¶ 67–72.

With respect to “a convergence point . . . is shifted,” Jones describes calculating the “region of intersection” “when the dataset rotates,” i.e., when that region “moves from the first position at time T1 to a second position at time T2.” *Id.* ¶ 43. Jones also describes that the calculation may be performed “[a]t each of these positions, and at intermediate ones.” *Id.* As we discussed above with respect to claim construction (*see* § IV.C.2), we

decline to limit the independent claims so as to require adjustment or shifting by a user at this early stage. At this juncture, therefore, we preliminarily find that the recitation of “a convergence point . . . is shifted” is met by Jones’s disclosure of “region of interest 90” used interchangeably with “region of intersection” moving “from the first position at time T1 to a second position at time T2” and having “intermediate” positions. *Id.* ¶ 43.

Patent Owner also contends that “Jones uses Figures 7b and 7c to explain that any uncertainty in determining where a viewer is looking can be reduced by taking more measurements or by effectively extending the baseline between the viewers eyes” and, therefore, Jones is different than the ’183 patent. Prelim. Resp. 24–25. Even assuming Jones describes additional features, such as determining where a viewer is looking using measurements obtained from tracking one eye, that additional disclosure does not negate Jones’s disclosure that “a convergence point . . . is shifted.” Indeed, Jones discloses “the dataset may also be *rotated in space in order to present the observer with a plurality of views of the data.*” Ex. 1013 ¶ 9 (emphasis added).

After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1h of claim 1 for purposes of institution.

h) Element 1i: “selecting an alternate viewing angle, said selecting an alternate viewing angle comprising”

Petitioner contends that Jones discloses element 1i based on Jones’s disclosure of that “the dataset may also be rotated in space in order to present the observer with a plurality of views of the data.” Pet. 25 (citing Ex. 1013 ¶ 9). Petitioner contends that “rotating the dataset to a particular viewing angle, which may be set by the system or chosen by the user,

corresponds to *selection of an alternate viewing angle*.” *Id.* (citing Ex. 1003 ¶ 73). Petitioner also refers to its contentions for element 1h and contends “an alternate viewing angle is presented to the user by rotating the 3D model from an initial viewing angle at T1 to an alternate viewing angle at T2.” *Id.*

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1i. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. As we explained above with respect to claim construction (*see* § IV.C.3), at this early juncture, we decline to construe “selecting an initial viewing angle” and “selecting an alternate viewing angle” so as to require that a user perform the selecting. The system setting an alternate viewing angle after the start of the rotation, therefore, meets the “selecting” requirement recited in element 1i based on the record at this preliminary stage.

For the reasons given, we determine that Petitioner’s assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1i of claim 1 for purposes of institution.

i) *Element 1j: “reorienting said volume of interest in accordance with said alternate viewing angle”*

Petitioner contends that Jones discloses element 1j, based on Jones’s disclosure of “changing the viewpoint of the 3D volume such that an alternate viewing angle is presented to the user.” Pet. 26 (citing Ex. 1003 ¶75; Ex. 1013 ¶¶ 9, 36, 43). Petitioner contends “[t]hat is, once an alternate viewing angle is selected, either by the system or by the user, as described in

[1i], the selected data space (volume of interest) is reoriented by being rotated.” *Id.* (citing Ex. 1003 ¶ 75; Ex. 1013 ¶¶ 9, 36, 43).

At this preliminary stage, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1j. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1j of claim 1 for purposes of institution.

j) Elements 1k and 1l

Elements 1k and 1l are reproduced below.

displaying, in said DU, an image for said left eye based on said alternate viewing angle, said view point for said left eye and said volume of interest ; and
displaying, in said DU, an image for said right eye based on said alternate viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce an alternate three-dimensional image to said user.

Ex. 1001, 17:48–56.

Petitioner contends that Jones discloses elements 1k and 1l based on Jones’s disclosure that “the dataset is displayed in a stereoscopic form, with different view points being presented to the observer's left and right eyes, respectively.” Pet. 27 (quoting Ex. 1013 ¶ 9; citing Ex. 1003 ¶ 77). Petitioner contends Jones’s different view points are based on the alternate viewing angle and, therefore, an alternate three-dimensional image is presented to the user. *Id.*

At this preliminary stage, Patent Owner does not dispute Petitioner's arguments or evidence regarding element 1k and 1l. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner's assertions are supported sufficiently at this juncture by the cited portions of Jones. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses element 1k and 1l of claim 1 for purposes of institution.

k) Conclusion

After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Jones discloses each recitation of claim 1 for purposes of institution. Accordingly, we conclude that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that claim 1 is unpatentable under 35 U.S.C. § 102 as anticipated by Jones.

3. Independent Claims 7 and 13

Independent claims 7 and 13 are similar to independent claim 1. Petitioner's analysis of these claims for this challenge largely relies on Petitioner's analysis of claim 1. Pet. 30–36. Petitioner accounts for all differences between the claims. For instance, in contrast to claim 1, which recites a method, the preamble of claim 7 recites a “non-transitory computer readable medium having computer readable code thereon” and claim 13 recites a “computer system” comprising “a memory,” “a processor,” “a communications interface,” and “an interconnection mechanism coupling the memory, the processor and the communications interface.” Ex. 1001, 18:43–44, 20:8–15.

Petitioner contends “[t]o the extent the preamble is limiting,” Jones discloses the preamble of claim 7. Pet. 30. Petitioner contends that Jones discloses “non-transitory computer readable medium having computer readable code thereon” recited in the preamble of claim 7 based on Jones’s disclosure of “a computer program product stored on a computer readable medium.” *Id.* (quoting Ex. 1013 ¶ 28). Petitioner also points to Jones’s disclosure that the “computer program product” causes “a computer to perform a method” of an aspect of the Jones invention. *Id.* (quoting Ex. 1013 ¶ 27).

Petitioner contends that “[t]o the extent the preamble is limiting,” Jones discloses the preamble of claim 13. Pet. 32. Petitioner contends that Jones discloses “computer system” recited in claim 13 based on Jones’s disclosure that a “computer” is used to perform methods described in Jones. *Id.* (quoting Ex. 1013 ¶¶ 27, 28).

Petitioner contends Jones discloses that the “computer system” comprises “a memory” based on the same disclosures relied on for claim 7 relating to “a computer program product stored on computer readable medium.” *See, e.g., id.* at 33 (quoting Ex. 1013 ¶ 28). Petitioner asserts that “[t]he ‘computer readable medium’ is one implementation of a memory.” *Id.* (citing Ex. 1003 ¶ 97).

Petitioner contends Jones discloses that the “computer system” comprises “a processor” based on Jones’s disclosure of “data processor (70).” *Id.* (citing, *e.g.*, Fig. 5). Petitioner contends Jones discloses that the “computer system” comprises “a communications interface” based on Jones’s disclosure of “a pointer, such as a mouse.” *Id.* at 34 (quoting Ex. 1013 ¶ 38). Petitioner contends Jones discloses that the “computer system” comprises “an interconnection mechanism coupling the memory, the

processor and the communications interface.” based on Jones’s disclosure that the recited elements operate together. *Id.* Petitioner asserts a person having ordinary skill in the art would have recognized that Jones’s disclosure is of interconnected elements that operated together. *Id.*

At this preliminary stage, Patent Owner does not argue claims 7 and 13 separately. *See generally* Prelim. Resp. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. Petitioner’s assertions regarding claims 7 and 13 are supported sufficiently at this juncture by the cited portions of Jones. For the reasons given in our discussion of claim 1, as well as immediately above with respect to claims 7 and 13, we conclude that Petitioner has demonstrated a reasonable likelihood of prevailing on in showing that claims 7 and 13 are unpatentable under 35 U.S.C. § 102 as anticipated by Jones.

4. *Dependent Claims 5, 6, 11, 12, 17, and 18*

We have considered Petitioner’s arguments and evidence for dependent claims 5, 6, 11, 12, 17, and 18 and are persuaded that Petitioner has shown sufficiently that Jones discloses the further recitations in each of those dependent claims. Patent Owner does not present arguments separately contesting Petitioner’s assertions for claims 5, 6, 11, 12, 17, and 18.

Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this juncture, we conclude that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that claims 5, 6, 11, 12, 17, and 18 are unpatentable under 35 U.S.C. § 102 as anticipated by Jones.

E. Unpatentability of Claims 1, 5–7, 11–13, 17, and 18 under 35 U.S.C. § 103(a) over Jones

Petitioner asserts an additional position that claims 1, 5–7, 11–13, 17, and 18 are unpatentable as obvious over Jones. Pet. 1. For the reasons that follow, we are persuaded by Petitioner’s contentions for its additional position of obviousness of claims 1, 5–7, 11–13, 17, and 18.

For its additional position of obviousness, Petitioner contends that “selecting an alternate viewing angle, said selecting an alternate viewing angle comprising” recited in claims 1, 7, and 13 would have been obvious over Jones’s disclosure of rotating a dataset. *Id.* at 25 (citing Ex. 1003 ¶ 73). Petitioner also contends that the “computer system” comprises “an interconnection mechanism coupling the memory, the processor and the communications interface” recited in claim 13 would have been obvious over Jones’s disclosure that the recited elements operate together. *Id.* at 34 (citing Ex. 1003 ¶ 100). Regarding the additional position, Dr. Zyda testifies that claims 1, 7, and 13 are obvious over the explicit disclosure of Jones combined with the common sense of a person having ordinary skill in the art. Ex. 1003 ¶ 51.

For the reasons given, we are persuaded that Petitioner establishes sufficiently, for the purpose of institution, that Jones teaches all of the limitations recited in claims 1, 5–7, 11–13, 17, and 18. Also, at this juncture, we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have modified the teachings of Jones in the manner recited in the claims.

Accordingly, for the reasons presented by Petitioner regarding its additional position, in addition to those explained above addressing claims anticipation by Jones of claims 1, 5–7, 11–13, 17, and 18, we conclude for

the purpose of institution and based on the record before us that there is a reasonable likelihood Petitioner would prevail in showing claims 1, 5–7, 11–13, 17, and 18 are unpatentable under 35 U.S.C. § 103(a) over Jones.

F. Unpatentability of Claims 2–5, 8–10, and 14–16 under 35 U.S.C. § 103(a) over Jones and Schoolman

Petitioner asserts that dependent claims 2–5, 8–10, and 14–16 are unpatentable as obvious over the combination of Jones and Schoolman. Pet.

1. Patent Owner disputes this. Prelim. Resp. 27–30.

We begin with an overview of Schoolman. We then turn to Petitioner’s contentions.

1. Schoolman

Schoolman relates to methods and apparatus for three dimensional imaging of anatomical structures and stereoscopically displaying image data derived thereby. Ex. 1005, 1:32–36. Figure 4, reproduced below, illustrates stereoscopic three dimensional imaging system 6. *Id.* at 9:33–34.

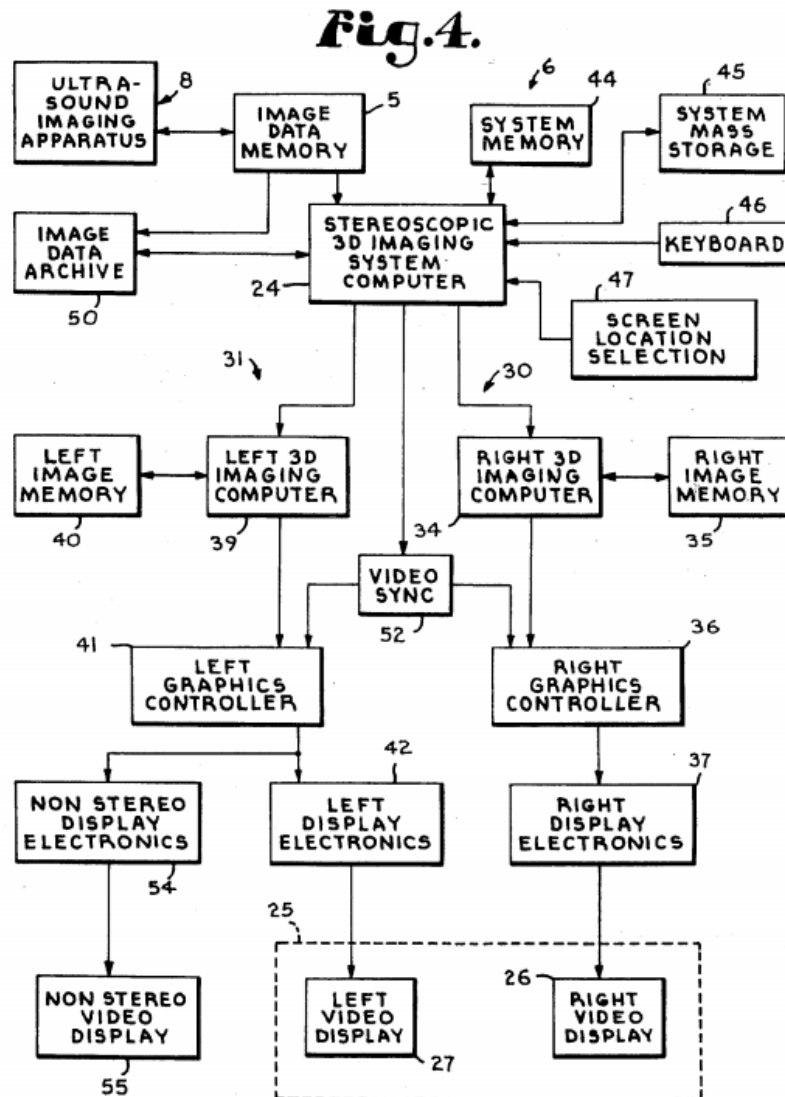


Figure 4, above, illustrates functional blocks of stereoscopic three dimensional imaging system 6 including computer 24 interfaced between ultrasound imaging apparatus 8 and stereoscopic viewing unit 25. *Id.* at 9:33–41.

Stereoscopic three dimensional imaging system 6 receives image data from ultrasound imaging apparatus 8, reconstructs the image data into a three dimensional model, generates right and left stereoscopic three dimensional components of the model, and displays the stereoscopic components on right and left video display devices 30 and 31 of viewing

unit 25 for viewing. *Id.* at 9:41–48. Computer 24 includes CPU 43, system memory 44, and system mass storage devices 45, among other things. Mass storage devices 45 store operating system and application programs for computer 24, routines for manipulating the images displayed on viewing unit 25 and for communicating with imaging apparatus 8, and software for operating three dimension display processors 34 and 39. *Id.* at 9:56–65.

Figure 9 of Schoolman, reproduced below, illustrates stereoscopic viewing unit 116. *Id.* at 12:39–40.

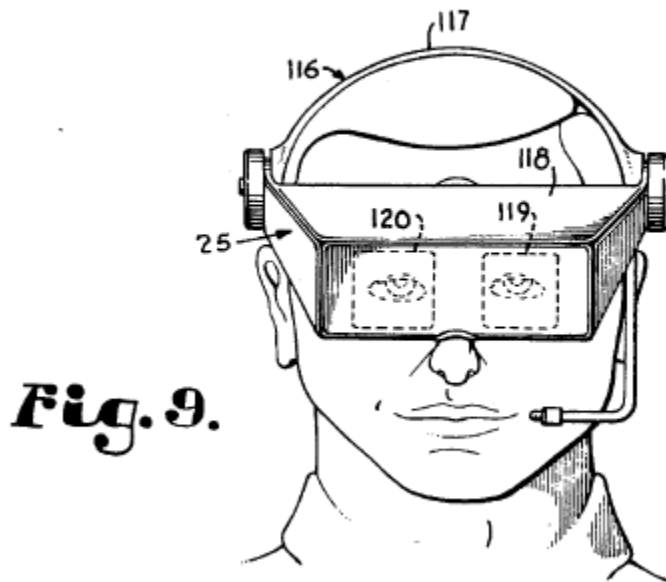


Figure 9, above, illustrates stereoscopic viewing unit 116 including harness 117 connected to visor 118 having left and right video display devices 119 and 120 positioned therein. *Id.* at 12:39–43.

Harness 117 is adjustable and worn on the head of a medical practitioner for viewing the generated images. *Id.* at 12:43–46. Visor 118 has left and right video liquid crystal displays (LCDs) 119 and 120. *Id.* at 12:39–43, 12:51–53. LCDs 119 and 120 are mounted directly in line of sight of the eyes of the viewer. *Id.* at 12:57–59.

2. *Dependent Claims 2–5, 8–10, and 14–16*

Dependent claims 2–4, 8–10, and 14–16 are directed to techniques for manipulating the image display including a feature of selecting items of an image to be subtracted and displaying the filtered image recited in claims 2, 8, and 14; applying colors to groups of voxels recited in claims 3, 9, and 15; and zooming in on a portion of the image recited in claims 4, 10, and 16. Petitioner relies on Schoolman for teaching the techniques for manipulating the image display claimed. *See, e.g.*, Pet. 39–50, 52–54 (citing, *e.g.*, Ex. 1005, 1:60–2:4, 4:53–59, 6:27–57, 11:15–19, 11:22–27).

Petitioner provides contentions regarding reasoning to combine the teachings of Jones and Schoolman in the manner claimed. *Id.* at 40–42. For instance, Petitioner contends the following:

A POSITA in possession of both Jones and Schoolman would have recognized that Schoolman’s filtering techniques (including complete removal of certain parts from user’s view) for improved clarity are common 3D image manipulation techniques that would provide similar benefits for Jones in terms of “making [the desired parts] clearly visible to the user.” *Id.* at 41 (citing Ex. 1013 ¶ 11; Ex. 1003 ¶ 119) (alteration in original).

Patent Owner disputes Petitioner’s reasoning to combine. Prelim. Resp. 27–30. In particular, Patent Owner asserts that in Schoolman each image channel includes a display processor to reconstruct ultrasound image data by deriving polygon lists from ultrasound image data (either such data stored in a data storage medium or archive or directly from an ultrasound machine itself) and forwarding the polygon lists to the right and left image channels. *Id.* at 28. Patent Owner asserts that Jones’s volume rendering is different from “rendering of surface characteristics as is found in Schoolman’s use of polygons.” *Id.* at 29. Patent Owner further asserts that Petitioner’s reasoning to combine does not account for “the fact that

[Schoolman’s] image manipulation techniques are prescribed in a regime in which polygons are used to construct the very views being manipulated.” *Id.* at 30.

Even assuming that Patent Owner is correct that Schoolman operates differently than Jones, Petitioner contends that the skilled artisan would have recognized that the improved clarity from using Schoolman’s common techniques would have provided similar benefits when used in Jones’s system. Pet. 41 (citing Ex. 1013 ¶ 11; Ex. 1003 ¶ 119). The improvement is in the observer’s perceived clarity of the display, which at this preliminary juncture appears to apply to both systems. Petitioner also contends the techniques are common (*id.*), which Patent Owner does not dispute.

Patent Owner also contends that Jones already teaches use of increase resolution to provide detail regarding certain parts of an image. Prelim. Resp. 30 (citing Ex. 1013 ¶ 34). Petitioner, however, relies on Schoolman for providing further teachings regarding techniques for manipulating the image display. *See, e.g.*, Pet. 39–50, 52–54 (citing, *e.g.*, Ex. 1005, 1:60–2:4, 4:53–59, 6:27–57, 11:15–19, 11:22–27).

At this preliminary stage, therefore, we determine that Petitioner’s reasoning to combine the teachings of Jones and Schoolman is sufficient for purposes of institution.

Claim 5 recites that the display unit is selected from a group including “other types of three-dimensional (3D) displays.” As discussed above (*see* §§ IV.D.4, IV.E), at this preliminary stage, we determine Petitioner’s showing that claim 5 is anticipated by or obvious over Jones alone is sufficient for purposes of institution. Schoolman provides further descriptions of display units supporting Petitioner’s contentions.

We have considered arguments and evidence for dependent claims 2–5, 8–10, and 14–16 and we determine that Petitioner has shown sufficiently that the combination of Jones and Schoolman teaches the further recitations in each of those dependent claims. Also, at this juncture, we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Jones and Schoolman in the manner recited in claims 2–5, 8–10, and 14–16.

After consideration of the contentions and the evidence of record at this juncture, we conclude that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that claims 2–5, 8–10, and 14–16 are unpatentable under 35 U.S.C. § 103(a) over Jones and Schoolman.

G. Unpatentability of Claims 1–18 under 35 U.S.C. § 103(a) over Murphy and Guang

Petitioner asserts that claims 1–18 are unpatentable as obvious over the combination of Murphy and Guang. Patent Owner counters that the asserted prior art does not disclose element 1h, i.e., “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user” recited in each of independent claims 1, 7, and 13. Prelim. Resp. 30–35.

We begin with an overview of Murphy and Guang. We then turn to the parties’ contentions.

1. Murphy

Murphy describes “a stereoscopic display system” that displays “data representing human anatomy.” Ex. 1010 ¶ 15. Murphy’s system can “create complete, anatomically detailed, three-dimensional representations of the

normal male and female human bodies” based on data obtained from medical imaging. *Id.* ¶ 33. A displayed user interface can allow rotation, translation, and alterations to the displayed virtual patient. *Id.* ¶ 41. For example, a user can select a part of a virtual patient to display by selecting any part or sub-part of the virtual patient. *Id.*

2. *Guang*

Guang describes a system and methods for improved visualization and stereographic display of three-dimensional data sets of tube-like anatomical structures. Ex. 1014 ¶ 2. Guang describes that the convergence point is “where the two eyes’ viewing direction cross, thus setting the directions of the two eyes.” *Id.* ¶ 100. Guang describes that “the convergence point can be varied as necessary” and can be “dynamically set.” *Id.* ¶ 105.

3. *Independent Claim 1*

a) *Reasoning to Combine*

Petitioner contends that a person having ordinary skill in the art “would have been motivated to modify 3D stereoscopic viewing system of Murphy to include ‘dynamic adjustment of an eye convergence point for stereo display’ to allow the user to, for instance, view stereoscopic images ‘clearly and most comfortably’ as described in Guang.” Pet. 57 (citing Ex. 1014, code (57), ¶ 87; Ex. 1003 ¶ 172). Petitioner contends that Murphy leaves implementation details relating to eye tracking to the knowledge of a person having ordinary skill in the art. *Id.* (citing Ex. 1003 ¶ 172).

Petitioner further contends the following:

In view of Murphy’s disclosure that eye-tracking can be used to detect where the user is looking in order to enhance that area of focus, a POSITA would have found it obvious to incorporate Guang’s teachings into Murphy such that the system updates the rendering appropriately to shift the convergence

point provided to the user for a clearer and more comfortable viewing experience. MS-1003, ¶175. By ensuring that a convergence point of the rendered 3D image coincides with the area of interest among the 3D volume that the user is looking at, the resulting Murphy-Guang system would allow the user (e.g., surgeon) to get a clearer view of the particular anatomy of interest. MS-1003, ¶175.

Pet. 59.

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding Petitioner’s reasoning to combine the teachings of Murphy and Guang. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Murphy and Guang in the manner recited in claim 1 sufficient for purposes of institution.

b) The Preamble

The preamble of claim 1 is a “method of three-dimensional viewing of images by a user.” Ex. 1001, 17:23–24.⁶ Petitioner contends that Murphy teaches the preamble based on Murphy’s description of software that is designed for “generation of 3D stereo display of the data.” Pet. 61 (quoting Ex. 1010 ¶ 32).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding the preamble. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at

⁶ We treat the preamble as limiting without deciding, because at this juncture Petitioner makes a sufficient showing.

1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches the preamble of claim 1 for purposes of institution.

c) Element 1a: “selecting a volume of interest from a collection of image slices”

Petitioner contends that Murphy teaches element 1a based on Murphy’s description that user can “select a part of a virtual patient to display by selecting a geometry of the virtual patient,” including “any part or sub-part of the virtual patient available in the medical image data.” Pet. 61 (quoting Ex. 1010 ¶ 41). Petitioner also points to step 401 in Figure 4 (*id.* at 61–62), which states “Receive Geometry Selection.” Ex. 1010, Fig. 4.

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1a. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches element 1a of claim 1 for purposes of institution.

d) Element 1b: “arranging said slices corresponding to said volume of interest”

Petitioner contends that Murphy teaches element 1b based on Murphy’s description of receiving medical image data (step 402 in Figure 4) and performing volume rendering (step 409 in Figure 4). Pet. 63–64 (citing, *e.g.*, Ex. 1010 ¶¶ 41, 44, Fig. 4). Petitioner also points to Murphy’s description that volume rendering involves production of “three-dimensional stacks of parallel plane images.” *Id.* at 64 (citing Ex. 1010 ¶ 46). Petitioner also submits the testimony of Dr. Zyda that a person having ordinary skill in the art “would have understood that that presenting 2D slices in 3D

volumetric form requires taking the 2D slices and subsequently stacking/arranging them in an order similar to that in which they were generated when originally created by the imaging device.” Ex. 1003 ¶ 184 (citing Ex. 1010 ¶ 46).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1b. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches element 1b of claim 1 for purposes of institution.

e) *Element 1c: “selecting an initial viewing angle of said slices”*

Petitioner contends that Murphy teaches element 1c based on Murphy’s description that a user “can select pre-defined views” and “can move and rotate the Virtual Patient in any direction or angle.” Pet. 66, 87 (quoting Ex. 1010 ¶ 57); *see also id.* (citing ¶ 55 (describing that “the user can control the system,” including for example that “the user can manipulate the scenario such as by selecting a pre-defined view of the image, moving the image, [and] rotating the image.”)).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1c. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches element 1c of claim 1 for purposes of institution.

- f) Element 1d: “selecting a viewpoint for a left eye” and
Element 1e: “selecting a viewpoint for a right eye”*

Petitioner contends that Murphy teaches elements 1d and 1e based on Murphy’s description of a “stereoscopic display” in which the image to be viewed is rendered with “two slightly different view transformations, reflecting the different locations of the ideal viewer’s two eyes.” *See, e.g.*, Pet. 67 (quoting Ex. 1010 ¶ 50). Petitioner contends that one image representing the left eye’s viewpoint is “rendered for the left eye’s position” and another image representing the right eye’s viewpoint is “rendered for the right eye’s position.” *Id.* (quoting Ex. 1010 ¶ 50).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding elements 1d and 1e. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches elements 1d and 1e of claim 1 for purposes of institution.

- g) Elements 1f and 1g*

Elements 1f and 1g are reproduced below.

displaying, in a display unit (DU), an image for said left eye based on said initial viewing angle, said view point for said left eye and said volume of interest;
displaying, in said DU, an image for said right eye based on said initial viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce a three-dimensional image to said user;

Ex. 1001, 17:32–39.

Petitioner contends that Murphy teaches elements 1f and 1g based on Murphy’s description that its system “display[s] the resulting image” using

“a stereoscopic display, or any other virtual reality display system.” Pet. 68 (quoting Ex. 1010 ¶ 50) (alteration in original). Petitioner also contends that Murphy describes that output devices for its system include “head mounted displays (HMD) in the form of glasses or goggles, which allow a user to wear a display system on their head.” *Id.* at 68, 70 (quoting Ex. 1010 ¶ 20). Petitioner further contends that Murphy describes that different images are presented to the left and right eyes. *Id.* at 70 (citing Ex. 1010 ¶¶ 20, 50; Pet. 67–68).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding elements 1f and 1g. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches elements 1f and 1g of claim 1 for purposes of institution.

h) Element 1h: “wherein a convergence point of said image for said left eye and said image for said right eye is shifted to provide a different perspective of the volume of interest to said user”

Petitioner contends that the combination of Murphy and Guang teaches element 1h based on Guang’s description of dynamically setting the convergence point. Pet. 57–60, 70–71 (citing, *e.g.*, Ex. 1014, code (57), ¶¶ 87, 102, 104, 105, Fig. 19). Petitioner asserts that Guang describes that “it is desirable to dynamically adjust the convergence point of the stereo images to be at or near the object a user is currently inspecting.” Pet. 58 (quoting Ex. 1014 ¶ 108).⁷

⁷ Petitioner cites to paragraphs 102 and 105 of Guang, but the quote appears instead in paragraph 108 of Guang. Ex. 1014 ¶¶ 102, 105, 108. We treat this as harmless error at this early juncture of the proceeding.

Patent Owner contends that “Guang informs a reader that for a given image, the convergence point needs to be chosen so as to focus the viewer’s gaze at a desired location (the presumed location where the viewer will be looking).” Prelim. Resp. 32. Patent Owner contends that Guang differs from the claims because “the challenged claims require providing a different perspective of an initially selected volume of interest by shifting a convergence point of currently displayed left eye and right eye images.” *Id.* at 33–34.

Claim 1 recites “wherein a convergence point of said image for said left eye and said image for said right eye is shifted *to provide a different perspective of the volume of interest to said user*” (emphasis added). The recitation “*to provide a different perspective of the volume of interest to said user*” (emphasis added) indicates the purpose for which the shift is to be used. We preliminarily find that “to provide a different perspective of the volume of interest to said user” at least is met by Guang’s shift that is performed to provide a different, clearer perspective as the user moves through the tube-like structure. Ex. 1014, code (57), ¶ 108.

After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that the combination of Murphy and Guang teaches element 1h of claim 1 for purposes of institution. Also, as we discussed above, at this early stage, we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Murphy and Guang in the manner proposed by Petitioner. *See* § IV.G.3.a.

- i) *Element 1i: “selecting an alternate viewing angle, said selecting an alternate viewing angle comprising”*

Petitioner contends that the combination of Murphy and Guang teaches element 1i based on Murphy’s description of rotating the three dimensional model including, for example, Murphy’s description of “mov[ing] and rotat[ing] the Virtual Patient in any direction or angle.” Pet. 71 (quoting Ex. 1010 ¶ 57); *see also id.* (citing Ex. 1010 ¶¶ 32, 55; Ex. 1003 ¶ 194).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1i. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches element 1i of claim 1 for purposes of institution.

- j) *Element 1j: “reorienting said volume of interest in accordance with said alternate viewing angle”*

Petitioner contends that the combination of Murphy and Guang teaches element 1j based on Murphy’s description that an alternate viewing angle is presented to the user and Dr. Zyda’s testimony that “once an alternate viewing angle is selected either by the system or by the user, the selected data space (volume of interest) is reoriented by being rotated.” Pet. 72 (citing Ex. 1010 ¶¶ 32, 55, 57; Ex. 1003 ¶ 195).

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding element 1j. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at

this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches element 1j of claim 1 for purposes of institution.

k) Elements 1k and 1l

Elements 1k and 1l are reproduced below.

displaying, in said DU, an image for said left eye based on said alternate viewing angle, said view point for said left eye and said volume of interest ; and

displaying, in said DU, an image for said right eye based on said alternate viewing angle, said view point for said right eye, and said volume of interest and wherein said image for said left eye and said image for said right eye produce an alternate three-dimensional image to said user.

Ex. 1001, 17:48–56.

Petitioner contends that the combination of Murphy and Guang teaches elements 1k and 1l based on Murphy’s description of display units, such as head mounted displays, discussed with respect to elements 1f and 1g. Pet. 72. Petitioner also refers to its contentions for elements 1a, 1d, 1e, and 1i.

At this juncture, Patent Owner does not dispute Petitioner’s arguments or evidence regarding elements 1k and 1l. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this early stage, we determine that Petitioner has shown sufficiently that Murphy teaches elements 1k and 1l of claim 1 for purposes of institution.

l) Conclusion

For the reasons given, we determine that Petitioner establishes sufficiently, for the purpose of institution, that the combination of Murphy and Guang teaches all of the limitations recited in claim 1. Also, at this

juncture, we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Murphy and Guang in the manner recited in claim 1.

Accordingly, after consideration of the contentions and the evidence of record at this juncture, we conclude that Petitioner has demonstrated a reasonable likelihood of prevailing on in showing that claim 1 is unpatentable under 35 U.S.C. § 103(a) over the combination of Murphy and Guang.

4. *Independent Claims 7 and 13*

Independent claims 7 and 13 are similar to independent claim 1. Petitioner's analysis of these claims for this challenge largely relies on Petitioner's analysis of claim 1. Pet. 81–83, 85–90. Petitioner accounts for all differences between the claims. *Id.*

Patent Owner does not argue claims 7 and 13 separately. *See generally* Prelim. Resp. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. For the reasons given in our discussion of claim 1, we conclude that Petitioner has demonstrated a reasonable likelihood of prevailing in showing that claims 7 and 13 are unpatentable under 35 U.S.C. § 103(a) over the combination of Murphy and Guang.

5. *Dependent Claims 2–6, 8–12, and 14–18*

We have considered Petitioner's arguments and evidence for dependent claims 2–6, 8–12, and 14–18 and are persuaded that Petitioner has shown sufficiently that the combination of Murphy and Guang teaches the further recitations in each of those dependent claims. Also, at this juncture,

we are persuaded that Petitioner has offered articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Murphy and Guang in the manner recited in claims 2–6, 8–12, and 14–18.

Patent Owner does not present arguments separately contesting Petitioner’s assertions for claims 2–6, 8–12, and 14–18. Nonetheless, the burden remains on Petitioner to demonstrate unpatentability. *Dynamic Drinkware*, 800 F.3d at 1378. After consideration of the contentions and the evidence of record at this juncture, we conclude that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that claims 2–6, 8–12, and 14–18 are unpatentable under 35 U.S.C. § 103(a) over the combination of Murphy and Guang.

V. CONCLUSION

For the foregoing reasons, we conclude that the information presented in the Petition establishes a reasonable likelihood that Petitioner would prevail in showing that claims 1–18 of the ’183 patent are unpatentable.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that *inter partes* review of claims 1–18 of the ’183 patent is hereby instituted on all grounds stated in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this decision.

IPR2021-00648
Patent 9,349,183 B1

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