

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
Petitioner,

v.

D3D TECHNOLOGIES, INC.,
Patent Owner.

IPR2021-00647
Patent 8,384,771 B1

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

RAEVSKY, *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 *inter partes* review of claims 1–21 of U.S. Patent No. 8,384,771 B1 (Ex. 1001, “the ’771 patent”). 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”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless it is determined that there is a reasonable likelihood that the petitioner would prevail with respect to at least one of the claims challenged in the petition. Based on the information presented in the Petition and the supporting evidence, we are persuaded there is a reasonable likelihood Petitioner would prevail with respect to the challenged claims. Accordingly, we institute an *inter partes* review of claims 1–21 on all of the grounds set forth in the Petition.

Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far. This is not a final decision as to patentability of the challenged claim.

II. BACKGROUND

A. Related Matters

The parties identify the following related district court litigation: D3D Technologies, Inc. v. Microsoft Corporation, No. 6:20-cv-01699 (M.D. Fla. Sept. 16, 2020). Pet. 95; Paper 4, 2. Patent Owner also identifies the following *inter partes* reviews of related patents: IPR2021-00648 and

IPR2021-00703. Paper 4, 2. Petitioner has also filed two petitions for *inter partes* review of U.S. Patent No. 9,980,691 B2 (IPR2021-00877 and IPR2021-00878).

B. The '771 patent

The '771 patent relates to the field of medical imaging. Ex. 1001, 13. The '771 patent describes “a process for combining slices generated by medical imaging devices to create a volume of interest and then presenting this volume in a three-dimensional representation to a Head Display Unit (HDU).” *Id.* at 4:59–65. “[I]mage processing techniques” can be used to “enable the user to rotate and view the volume of interest from alternative viewpoints; to enable tissue subtraction to facilitate unobstructed viewing of a region of interest; to identify differing tissues with color schematics; and to zoom in for optimal viewing.” *Id.* at 4:65–5:3.

Figure 1 depicts a system that can perform this process:

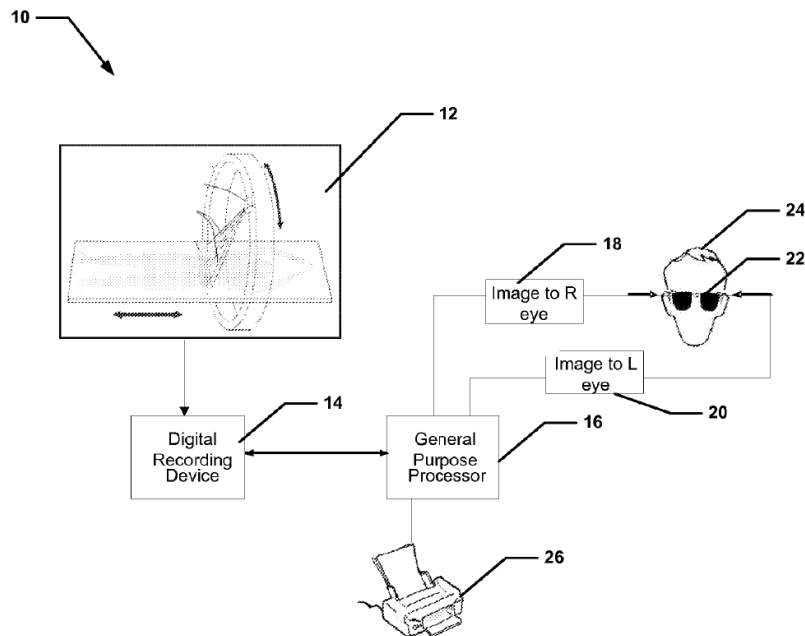


FIGURE 1

Id. at 4:29–31. In Figure 1, imaging device 12 is in communication with digital recording device 14, which records slices of imagery. *Id.* at 5:5–9. Processor 16 generates an image for the right eye 18 and an image for the left eye 20. *Id.* at 5:19–20. The images are sent to head display 22 as a volumetric mass so that the image seen by the right and left eyes is the volume of interest selected by the user. *Id.* at 5:27–34.

The '771 patent also describes a process for filtering an image. *Id.* at 9:60–10:17. In this process, a user selects tissues to be filtered from an image, and software eliminates the selected tissue from the displayed volume of interest. *Id.* at 9:60–10:11.

C. Challenged Claims

Petitioner challenges claims 1–21 of the '771 patent. Claim 1 is illustrative:¹

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

¹ For convenience, we use Petitioner's element labeling. *See* Pet. v–vi.

[g] displaying, in said HDU, a second image for said right eye based on said initial viewing angle, said second viewpoint for said right eye, and said volume of interest and wherein said first image for said left eye and said second image for said right eye produce a three-dimensional image to said user; and

[h] selecting items of said image to be filtered, wherein said selecting items of said image to be filtered comprises:

[i] selecting items of said image to be subtracted from said image to produce a filtered image;

[j] displaying, in said HDU, a filtered image for said left eye based on said initial viewing angle, said view point for said left eye and said volume of interest; and

[k] displaying, in said HDU, a filtered 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 filtered image for said left eye and said filtered image for said right eye produce a filtered three-dimensional image to said user.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 1–2), supported by the declaration of Dr. Michael Zyda (Ex. 1003):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–21	102(b) and/or 103(a) ²	Schoolman ³

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. Because the challenged patent was filed before March 16, 2013, we refer to the pre-AIA version of §§ 102, 103.

³ U.S. Patent No. 5,488,952 to Schoolman (“Schoolman”) (Ex. 1005).

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
2	103(a)	Schoolman and Bauch ⁴
1–21	102(e) and/or 103(a)	Murphy ⁵
2	103(a)	Murphy and Bauch

III. ANALYSIS

A. Discretion Under 35 U.S.C. § 314(a)

Patent Owner contends that we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review. Prelim. Resp. 30–38 (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 district court proceedings. Pet. 90–94; Pet. Reply 7. Upon review, we disagree with Patent Owner and decline to exercise our discretion to deny institution.

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:

⁴ U.S. Pub. No. 2002/0183607 A1 to Bauch et al. (“Bauch”) (Ex. 1007).

⁵ WIPO No. WO 2007/059477 A2 to Murphy et al. (“Murphy”) (Ex. 1010). Petitioner argues that Murphy is prior art under 35 U.S.C. § 102(e) as of its November 13, 2006 filing date as well as of the priority dates (February 2, 2006 and November 11, 2005) of two provisional applications. Pet. 2. Petitioner explains how Murphy is entitled to claim priority from these two applications. *Id.* at 2–5. Patent Owner does not contest these arguments. We need not address them at this stage.

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

Fintiv, 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.*

1. Factor 1—Likelihood of Stay

Petitioner asserts that Judge Byron has granted a stay pending an IPR in 67% of the cases (six of nine cases). Pet. 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 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. 31. Patent Owner asserts that “[i]ndeed, Microsoft’s earlier request for a stay pending a transfer motion was denied.” PO 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*, Patent Owner asserts that 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. *Factor 2—Proximity of Trial Date to Final Written Decision Due Date*

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.*, Pet. Reply 4; PO 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. Pet. Reply 4. Patent Owner responds that the current trial date of September 6, 2022 has been in place since November of last year. PO 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. *Factor 3—Investment in Proceedings*

Petitioner asserts that it was diligent in filing the Petition because it filed the Petition within six months of Petitioner being served and within three months of Patent Owner serving infringement contentions. Pet. 91–92 (citing Ex. 1020). Petitioner argues its diligence outweighs minimal investment in the parallel district court proceeding. Pet. 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. 34 (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.* at 35.

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. *Factor 4—Overlap of Issues*

Petitioner stipulates that “if the Board institutes an IPR based on Petitioner's '771 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 '771 Petition.” Pet. Reply 7 (emphasis omitted). Patent Owner argues that we should not consider Petitioner's broader stipulation because it was submitted in the Reply, after the Preliminary Response. PO 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. 93.

We are not persuaded by Patent Owner's argument that “[i]t would be unfair and improper” to consider Petitioner's broader stipulation. PO 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. PO 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. *Factor 5—Identity of Parties*

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. 93. 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. 37.

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

6. *Factor 6—Other Circumstances*

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. 94. Patent Owner argues that the merits are not strong. Prelim. Resp. 37; PO Sur-reply 6.

We agree with Petitioner that the merits of the Petition are particularly strong. Petitioner’s ground 2A, anticipation or obviousness of claims 1–21 over Murphy, presents strong arguments for the unpatentability of claims 1–21. For instance, Murphy describes “raw medical image data, such as volumetric data.” Ex. 1010 ¶ 35. Murphy discloses that “a user can select a part of a virtual patient to display by selecting a geometry of the virtual patient.” *Id.* ¶ 41. And Murphy discloses “the ability to [h]ide and show each anatomical feature,” such as by making features transparent or cutting them away. *Id.* ¶¶ 32, 44, 57. These and other teachings of Murphy, as explained by the testimony of Dr. Zyda, at this stage, strongly teach or suggest the limitations of the challenged claims.

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

7. 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).

B. Principles of Law

Petitioner bears the burden to demonstrate unpatentability. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). At this preliminary stage, we determine whether the information presented in the Petition shows a reasonable likelihood that Petitioner would

prevail in establishing that at least one of the challenged claims would have been obvious over the proposed combinations of prior art. *See* 35 U.S.C. § 314(a).

To show anticipation under 35 U.S.C. § 102, each and every claim element, arranged as in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359 (Fed. Cir. 2008). The prior art need not, however, use the same words as the claims. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009). The anticipation inquiry takes into account the literal teachings of the prior art reference, and inferences the ordinarily skilled person would draw from it. *Eli Lilly and Co. v. Los Angeles Biomedical Res. Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074–75 (Fed. Cir. 2017). Thus, “a reference can anticipate a claim even if it does not expressly spell out all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would at once envisage the claimed arrangement or combination.” *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015) (internal quotation marks omitted).

A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented 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) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the

level of skill in the art; and (4) when in evidence, objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the Petition’s challenges.

C. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Id.* at 13, 17. Petitioner asserts that

[a] person of ordinary skill in the art . . . (a “POSITA”) 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. . . . Superior education could compensate for a deficiency in work experience, and vice-versa.

Pet. 6 (citing Ex. 1003 ¶¶ 15–16).

Patent Owner accepts Petitioner’s level of skill for purposes of its preliminary response. Prelim. Resp. 13. We are persuaded, on the present record, that Petitioner’s proposal is consistent with the problems and solutions in the ’771 patent and prior art of record. We adopt Petitioner’s definition of the level of skill for the purposes of this Decision but delete the two qualifiers “at least” to keep the articulation from extending to the realm of an expert.

D. Claim Construction

In *inter partes* review, we construe claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as

understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. 37 C.F.R. § 42.100(b) (2020).

Petitioner asserts that no terms require express construction at this stage. Pet. 5. Patent Owner disagrees, proposing constructions for two terms: “volume” and “volume of interest.” Prelim. Resp. 14–15. We preliminarily construe “volume” and one additional term in dispute: “subtracted.”

1. “*volume*”

Patent Owner contends that in the related litigation, Petitioner construed “volume” to mean “three-dimensional pixels.” *Id.* at 14 (citing Ex. 2002 at 5–6). Patent Owner states that it agreed to this construction. *Id.* (citing Ex. 2005). Because the parties agreed to this construction, Patent Owner urges us to adopt it. *Id.*

We are not bound by the parties’ agreement. Although we consider any prior claim construction determination in related court proceedings, the parties do not advise us of any such determinations. 37 C.F.R. § 100(b). As we noted above, we construe claims in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *Id.* It is possible for parties to agree to a legally incorrect claim construction. We therefore must make our own determination as to the correct meaning of disputed terms.

Here, Patent Owner provides no substantive argument explaining why we should adopt the parties’ agreed-upon construction. We thus have no briefing or testimony on the meaning of “volume.” At most, the record includes Exhibit 2002, Defendant’s (Microsoft Corporation’s) Responsive

Claim Construction Brief from the related district court litigation, which construes “volume.” Petitioner apparently filed this brief in the district court after it filed the Petition here. Ex. 2002, 1; Paper 3. Petitioner has not briefed this construction in the current proceeding.

As we explain in more detail below, the term “volume” pervades the claims. Thus, we view the meaning of this term as particularly important to at least one ground (anticipation and/or obviousness of claims 1–21 over Schoolman). To help focus the issues during trial, we make a preliminary construction of “volume” on the current, sparse record. *See* 37 C.F.R. § 42.1(b) (setting forth a policy of “secur[ing] the just, speedy, and inexpensive resolution of every proceeding”).

In the related litigation, Petitioner argued that “volume” refers to “voxels,” which are “three-dimensional pixel[s].” Ex. 2002, 5. Looking to the Specification, at least one passage appears to support Petitioner’s litigation position: “A volume with every point in the data representing a small volume (i.e. a voxel) with an associated H. unit has been produced.” Ex. 1001, 12:26–28. This passage refers to “a small volume (i.e. a voxel).” We view the use of “i.e.” in this phrase as presumptively definitional, as Petitioner has argued before the district court. *See* Ex. 2005 (citing *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1334 (Fed. Cir. 2009) (“[U]se of ‘i.e.’ signals an intent to define the word to which it refers[.]”)). Petitioner’s brief also relies on extrinsic evidence to define “voxel” as “three-dimensional pixel.” Ex. 2002, 5 (citing, e.g., 2004 Bloomsbury English Dictionary at 2078, “voxel” (“[T]he smallest unit of three-dimensional space in a computer image, equivalent to a three-dimensional pixel [Blend of VOLUME + PIXEL.]”). Although this extrinsic evidence is

not before us at this stage, we rely on Petitioner's statements solely for purposes of this Decision.

We thus preliminarily construe "volume" as "three-dimensional pixels." We encourage the parties to fully brief this construction at trial. If Petitioner argues for a different construction than it proffered in the district court, Petitioner should explain why it does so even though the same claim construction standard applies in both forums.

2. "*volume of interest*"

Patent Owner asserts that the parties have agreed that the claim term, "volume of interest," means "one or more three-dimensional pixels selected by any individual or automated process." Prelim. Resp. 15 (citing Ex. 2005). In light of our construction of "volume," we do not find it necessary to construe "volume of interest" at this stage.

3. "*subtracted*"

Each of the independent claims recites "selecting items of said image to be subtracted from said image to produce a filtered image." Ex. 1001, 16:37–38, 17:56–57, 19:24–25. Neither party proposes a construction for the term "subtracted," but in light of Patent Owner's arguments on this term (discussed below with the Murphy ground on claims 1–21), we find it necessary to construe it. *See* Prelim. Resp. 25–30. Again, as we have no briefing from the parties on this term, our construction is preliminary and may benefit from briefing at trial.

The Specification does not appear to define "subtracted." Perhaps the most detailed explanation of this term occurs in the following passage, which describes selecting items to be subtracted from an image to produce a filtered image:

Method 500 begins with processing block 502 which recites selecting items of the image to be *subtracted* from the image to produce a filtered image. The user selects the tissues to be filtered. Several filtering processes are possible, including by composition (e.g. Hounsfield unit or signal intensity) or position (x, y, z) of the tissue.

Ex. 1001, 9:60–67 (emphasis added). This passage appears to equate subtracting from an image with filtering an image. And “[s]everal filtering processes are possible” to effect subtraction. *Id.* These filtering processes include “by composition (e.g. Hounsfield unit or signal intensity)” and by “position (x, y, z) of the tissue.” *Id.* Elsewhere, the Specification refers to filtering as “*eliminat[ing]* the selected tissue from the volume of interest.” *Id.* at 10:9–11 (emphasis added). The Specification also gives a specific example of displaying “only the bones,” which may relate to subtraction: “one method would be to *ignore* all voxels with H. units [Hounsfield units] less than 500 and display all voxels with H. unit of greater than 500.” *Id.* at 13:15–18 (emphasis added); *see also id.* at 11:57 (defining “Hounsfield units (H. units)”).

From these passages, we glean that the Specification may not refer to subtraction as mathematical deduction. Rather, it appears to use “subtracted” more expansively, including “filtering” an image, “eliminating” selected tissue, and “ignoring” certain voxels. As the patent does not appear to limit subtraction to a specific mathematical operation, we likewise decline to do so at this stage. Looking to extrinsic evidence for clarification, we adopt the following definition of the root word “subtract” that encompasses the disclosed Specification embodiments: “subtract” means “to withdraw or take away, as a part from a whole.” Ex. 3001, 1 (Dictionary.com entry for “subtract,” available from The Wayback Machine at <https://web.archive.org>

/web/20061209015559/http://dictionary.reference.com/browse/subtract (showing a December 9, 2006 date)). Hence, “subtracted” means “withdrawn or taken away, as a part from a whole.” We encourage the parties to address this construction further at trial.

No other terms require construction at this stage. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms that are in controversy, and only to the extent necessary to resolve the controversy.”) (internal quotation omitted).

E. Asserted Obviousness over Schoolman

Petitioner contends that claims 1–21 are anticipated by and/or obvious over Schoolman. Pet. 8–49. We address the parties’ arguments in some detail below. At this stage, however, we decline to make a determination of whether Petitioner met its burden on this ground for two reasons. First, our construction of “volume,” which may be determinative of this ground, is based on a sparse record, without briefing of the parties on the issue. Second, we do not have expert testimony from Patent Owner supporting its arguments related to the term “volume.”

Yet we agree that Petitioner has met its burden on its other ground on claims 1–21, based on Murphy, for reasons explained below. Thus, we institute trial on all grounds. *See SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018) (determining that institution is a “binary choice” to institute on all or no challenged claims). We invite the parties to address this Schoolman ground further at trial.

1. Overview of Schoolman

Schoolman describes “[a] stereoscopically displayed three dimensional ultrasound imaging system . . . [that] reconstructs the image data into a three dimensional model, and displays right and left stereoscopic three dimensional image components of the model on corresponding right and left video display devices of a stereoscopic viewing unit.” Ex. 1005, code (57). This system can, for example, include “a medical display device which produces a three dimensional representation of internal anatomical structures produced from a full series of stacked two dimensional slices of that structure,” which allows a user to “manipulate the object and its image interactively in real time.” *Id.* at 3:10–18.

2. Independent Claim 1

Petitioner contends that Schoolman teaches or suggests all the limitations of claim 1. Pet. 9–26. Patent Owner contends that Schoolman fails to teach or suggest limitation 1[f] and similar limitations in claims 8 and 15. Prelim. Resp. 22–24. Limitation 1[f] recites in part a “volume of interest.” Although Patent Owner confines its argument to limitation 1[f], we begin by noting that the term “volume” (in “volume of interest”) pervades claim 1 (and claims 8 and 15):

1. A method . . . comprising:

[a] selecting a *volume* of interest from a collection of image slices;

[b] arranging said slices corresponding to said *volume* of interest;

. . . .

[f] displaying, in a head display unit (HDU), a first image for said left eye based on . . . said *volume* of interest;

[g] displaying, in said HDU, a second image for said right eye based on . . . said *volume* of interest . . .; and

[h] selecting items of said image to be filtered, wherein said selecting items of said image to be filtered comprises:

. . . .

[j] displaying, in said HDU, a filtered image for said left eye based on . . . said *volume* of interest; and

[k] displaying, in said HDU, a filtered image for said right eye based on . . . said *volume* of interest

(Emphasis added.) As “volume” appears so frequently in the claims, we start by analyzing the parties’ arguments regarding this term.

Petitioner contends, with respect to limitation 1[a], that Schoolman discloses a volume of interest by teaching a 3D “anatomical structure[] of interest.” Pet. 13 (citing Ex. 1003 ¶ 51). This anatomical structure can be any of the body parts in the image slices a user is viewing in Schoolman, according to Petitioner. *Id.* (citing Ex. 1005, 5:29–35). Said another way, Petitioner argues that the volume of interest in Schoolman is “the anatomical structure that the user wants to see.” *Id.* (citing Ex. 1005, 10:19–22; Ex. 1003 ¶ 51). Petitioner appears to rely on these same teachings for the remaining limitations of claim 1 that reference “volume of interest.” *See id.* at 14–26.

Patent Owner argues that Petitioner has taken the position that “the volume of interest . . . must refer to three-dimensional pixels,” as we noted above in our claim construction section. Prelim. Resp. 22. Patent Owner contrasts Schoolman, which “does not display images based on selected three-dimensional pixels, but rather according to a list of polygons.” *Id.* (citing Ex. 1005, 5:27–48, 56–60). Using polygons is “significantly different from the use of three-dimensional pixels,” according to Patent

Owner. *Id.* Unlike three-dimensional pixels, Patent Owner contends, Schoolman’s “polygons represent surface approximations of the imaged region.” *Id.* (citing Ex. 10:35–54).

At this stage, it appears to us that Patent Owner’s argument might have merit. It may be true that the polygon surface approximations described in Schoolman do not disclose three-dimensional pixels—assuming that our preliminary construction of “volume” is correct. However, Patent Owner has not yet supported its arguments with expert testimony. We only have attorney argument from Patent Owner, contrasted against expert testimony from Petitioner. Yet the Petition is bereft of claim construction guidance on a term that pervades the entire claim. Thus, we do not reach a determination on this ground at this stage. We encourage the parties to fully address whether Schoolman discloses the claimed “volume” at trial.

As for the remaining limitations of claim 1, Petitioner argues, and we agree at this stage, that Schoolman teaches them.⁶ *See* Pet. 9–26 (citing, e.g., Ex. 1003 ¶¶ 47–69; Ex. 1005, *passim*). Petitioner identifies where Schoolman teaches these limitations, supporting this showing with testimony from Dr. Zyda, which Patent Owner does not dispute at this stage. *See id.*

3. *Independent Claims 8 and 15*

Petitioner makes similar arguments for independent claims 8 and 15 as it makes for claim 1. *Id.* at 37–39, 41–47. Patent Owner relies on the same arguments for these claims as it does for claim 1. *See* Prelim. Resp. 20–24. The same issues are therefore present for these claims as in claim 1.

⁶ Including the preamble, although we need not determine whether it is limiting because we agree with Petitioner that Schoolman discloses it.

For similar reasons discussed above, based on the current record, we decline to determine whether Petitioner has demonstrated a reasonable likelihood of prevailing with respect to its challenges on claims 8 and 15.

4. Dependent Claims 2–7, 9–14, and 16–21

Petitioner contends that dependent claims 2–7, 9–14, and 16–21 are anticipated by or would have been obvious over Schoolman. Pet. 27–37, 39–41, 47–49. As we decline to determine whether Petitioner has shown a reasonable likelihood that independent claims 1, 8, and 15 are unpatentable over Schoolman, we also decline to determine whether Petitioner has shown a reasonable likelihood that claims 2–7, 9–14, and 16–21 are unpatentable as anticipated or obvious over Schoolman.

F. Asserted Obviousness over Schoolman and Bauch

Petitioner contends that claim 2 is unpatentable as obvious over Schoolman and Bauch. Pet. 49–52. As we decline to determine at this stage whether Petitioner has shown a reasonable likelihood that independent claim 1 is unpatentable over Schoolman, we also decline to determine whether Petitioner has shown a reasonable likelihood that claim 2 is unpatentable as obvious over Schoolman and Bauch. We address Bauch below in our discussion of Petitioner’s Murphy and Bauch ground.

G. Asserted Obviousness over Murphy

Petitioner contends that claims 1–21 are anticipated by or would have been obvious over Murphy. *Id.* at 53–87. Patent Owner argues that Murphy fails to teach or suggest limitation 1[i] of claim 1 and similar limitations in claims 8 and 15. Prelim. Resp. 25–30. For the reasons that follow, Petitioner has established a reasonable likelihood of prevailing on this ground.

1. Overview of Murphy

Murphy describes “a stereoscopic display system” that can display “data representing human anatomy” in a virtual environment. Ex. 1010 ¶¶ 15–16. 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. Independent Claim 1

Petitioner contends that Murphy teaches or suggests all the limitations of claim 1. Pet. 53–87. Patent Owner contends that Murphy fails to teach or suggest limitation 1[i], which recites “selecting items of said image to be subtracted from said image to produce a filtered image.” Prelim. Resp. 25–30. For the reasons set forth below, we determine that Petitioner has shown a reasonable likelihood that the Murphy anticipates and renders claim 1 obvious.

a. Preamble and limitations 1[a]–1[h], 1[j], 1[k]

Petitioner contends that Murphy discloses the preamble and limitations 1[a]–1[h], 1[j], and 1[k]. Pet. 53–87. Patent Owner does not dispute these contentions at this stage. *See generally* Prelim. Resp.

Petitioner supports its arguments with specific citations to Murphy and Dr. Zyda’s declaration. Pet. 53–87 (citing Ex. 1010, *passim*; Ex. 1003 ¶¶ 166–183, 185, 186). On this record, we agree with Petitioner that there is a reasonable likelihood that Murphy discloses the preamble and limitations

1[a]–1[h], 1[j], and 1[k]. We need not determine whether the preamble is limiting because even if it were, we determine that Petitioner has shown that Murphy likely discloses it.

b. 1[i] selecting items of said image to be subtracted from said image to produce a filtered image

Petitioner contends that Murphy discloses this limitation by teaching filtering out selected items by completely removing them from an image. *Id.* at 66. According to Petitioner, Murphy does this by either hiding, cutting away, or making the items completely transparent. *Id.* (citing Ex. 1010 ¶¶ 32, 44, 57; Ex. 1003 ¶ 184). One of ordinary skill in the art, Petitioner argues, “would have recognized and/or found it obvious that selecting items of the image to be hidden, cut away, or otherwise made transparent corresponds to subtracting the selected items from the image to produce a filtered image in which the subtracted regions are no longer visible.” *Id.* (citing Ex. 1003 ¶ 184).

Patent Owner faults the Petition and Petitioner’s declarant for conclusory explanations as to how Murphy discloses this claim limitation. Prelim. Resp. 26–29. For example, Patent Owner contends that “there is no explanation of what ‘cutting away’ from an image actually entails” or “why making something hidden in an image require[s] subtraction of an item from the image.” *Id.* at 28. Pointing to Murphy’s description of “opacity,” Patent Owner argues that in Murphy, “cutting-away, making something hidden, or making something transparent could simply be accomplished by forcing the opacity component to zero.” *Id.* at 29 (citing Ex. 1010 ¶ 45). That manipulation involves no subtraction, according to Patent Owner. *Id.* And

“because transparency implies seeing through an item,” Patent Owner argues that transparency also fails to teach that an item is subtracted. *Id.*

At this stage, we agree with Petitioner. As we explained above, we preliminarily construe “subtracted” to mean “withdrawn or taken away, as a part from the whole.” Petitioner relies on Murphy’s “ability to [h]ide and show each anatomical feature” (Murphy ¶ 32); “arbitrarily-chosen regions of the Virtual Patient can be made transparent” (*id.* ¶ 44); and “they can cut away sections arbitrarily with cutting planes, spheres, etc.” (*id.* ¶ 57). On this record, Murphy’s hiding, cutting away, and making items completely transparent both teaches and suggests withdrawing or taking away items from an image.

Because “subtracted” is a broad term, we do not agree with Patent Owner at this stage that manipulating opacity or transparency does not teach or suggest subtraction. *See* Prelim. Resp. 29. Also, we disagree with Patent Owner that the Petition inadequately explains what cutting away entails or why making something hidden constitutes subtraction. *Id.* at 28. At this stage, Patent Owner’s attorney argument does not outweigh Dr. Zyda’s testimony that “[one of ordinary skill in the art] would have understood that selecting items of the image to be hidden, cut away, or otherwise made transparent corresponds to subtracting the selected items from the image to produce a filtered image.” Ex. 1003 ¶ 184, *cited in* Pet. 66. And we do not view Dr. Zyda’s testimony as defective, as on this record, Murphy’s teachings corroborate Dr. Zyda’s testimony under our preliminary construction of “subtracted.”

Accordingly, we determine that Murphy likely both teaches and suggests limitation 1[i].

c. Summary as to Claim 1

Based on the preliminary record before us, we find that Petitioner has shown a reasonable likelihood that claim 1 is anticipated by and would have been obvious over Murphy.

3. Independent Claims 8 and 15

Petitioner asserts that independent claims 8 and 15 are similar to claim 1 and identifies any pertinent differences. Pet. 75–78, 80–86. Petitioner’s detailed analysis explaining where Murphy teaches or suggests the limitations in these claims is similar to the analysis discussed above with respect to claim 1. *Id.* Patent Owner relies on the same arguments for claims 8 and 15 as it does for claim 1. *See* Prelim. Resp. 25–30. For the reasons discussed above, based on the current record, we determine that Petitioner has demonstrated a reasonable likelihood that claims 8 and 15 are unpatentable as anticipated and obvious over Murphy.

4. Dependent Claims 2–7, 9–14, and 16–21

Petitioner contends that dependent claims 2–7, 9–14, and 16–21 are unpatentable as anticipated or obvious over Murphy. Pet. 67–75, 78–80, 86–87. Petitioner provides a detailed analysis explaining where Murphy discloses the limitations in dependent claims 2–7, 9–14, and 16–21. *Id.* Patent Owner does not offer separate arguments for these claims or contest Petitioner’s analysis at this preliminary stage. *See generally* Prelim. Resp. For the reasons discussed above, based on the current record, we determine that Petitioner has demonstrated a reasonable likelihood that claims 2–7, 9–14, and 16–21 are unpatentable as anticipated and obvious over Murphy.

H. Asserted Obviousness over Murphy and Bauch

Petitioner contends that claim 2 also would have been obvious over the combination of Murphy and Bauch. Pet. 88–90. Patent Owner disputes that assertion. Prelim. Resp. 30; *see also id.* at 24–25. For the reasons that follow, Petitioner has established a reasonable likelihood of prevailing on this ground.

5. Overview of Bauch

Bauch describes a system for visualizing a human or animal body in two or three dimensions. Ex. 1007 ¶ 3. The system obtains image data from computer tomography (CT) or magnetic resonance imaging (MRI) scans. *Id.* ¶ 4. The system then processes the data and displays it on a screen, where a user may rotate the image in three-dimensional space. *Id.*

6. Claim 2

Claim 2 recites, “The method of claim 1 further comprising selecting images for future reference.” Petitioner contends that the combination of Murphy and Bauch teaches or suggests this limitation. Pet. 88–90. According to Petitioner, Bauch provides a user interface control panel for manipulating 3D stacks of slice images, including “recording” what is on-screen. *Id.* at 90 (citing Ex. 1008 ¶ 61; Ex. 1003 ¶ 278). Petitioner argues that one of ordinary skill in the art “would have been motivated and able to incorporate such recording functions into Murphy to thereby enable a user to select particular images being viewed for future reference.” *Id.* (citing Ex. 1003 ¶ 278). Petitioner asserts that one of ordinary skill in the art would have combined the references in part because Bauch’s “recording and playback capabilities would be especially useful for training/simulation

purposes,” and Murphy “expressly recognizes the importance of using its . . . technology for medical training.” *Id.* at 88–89 (citing, e.g., Ex. 1003 ¶ 276).

Patent Owner appears to contend that Murphy and Bauch do not teach or suggest claim 2 because of Murphy’s alleged deficiencies:

the petition cites Bauch only in connection with its describing “the use of a control panel that provides a user interface for, among other things, controlling, manipulating, and recording the visualized image.” Pet. at 88-90. Accordingly, even if a person of ordinary skill in the art were to make the combination of Murphy and [Bauch] as proposed, the above-noted deficiencies remain and so claim 2 is not unpatentable over the combined teachings of Murphy and Bauch.

Prelim. Resp. 30. This argument appears to rest on Patent Owner’s arguments against Murphy for claim 1, which we have not adopted at this stage. We view Petitioner’s explanation and evidence persuasive at this stage to show a reasonable likelihood that Murphy and Bauch would have rendered claim 2 obvious.

IV. SUMMARY

At this stage of the proceeding, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing on its challenge to claims 1–21 as anticipated and obvious over Murphy. We determine that Petitioner has not demonstrated a reasonable likelihood of prevailing on its challenge to claims 1–21 as anticipated or obvious over Schoolman. Nevertheless, in view of *SAS*, 138 S. Ct. at 1355, we institute on all claims and all grounds presented in the Petition. *See also* 37 C.F.R. § 42.108(a) (“When instituting inter partes review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”). At this preliminary stage, we have not made a final determination

as to the patentability of claims 1–21 or any underlying factual and legal issues.

V. ORDER

It is, therefore,

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of the '771 patent is hereby instituted on:

the challenge to claims 1–21 under 35 U.S.C. §§ 102(b) and 103(a) as unpatentable over Schoolman;

the challenge to claim 2 under 35 U.S.C. § 103(a) as unpatentable over Schoolman and Bauch;

the challenge to claims 1–21 under 35 U.S.C. §§ 102(e) and 103(a) as unpatentable over Murphy; and

the challenge to claim 2 under 35 U.S.C. § 103(a) as unpatentable over Murphy and Bauch; 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 commencing on the entry date of this Decision.

IPR2021-00647
Patent 8,384,771 B1

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