

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,
Petitioner,

v.

STRATASYS, INC.,
Patent Owner.

IPR2025-00321
Patent 9,421,713 B2

Before MITCHELL G. WEATHERLY, CHRISTOPHER M. KAISER, and
LILAN REN, *Administrative Patent Judges*.

KAISER, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. *Background and Summary*

Shenzhen Tuozhu Technology Co., Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1, 2, 5–7, 9, 16, and 17 (“the challenged claims”) of U.S. Patent No. 9,421,713 B2 (Ex. 1001, “the ’713 patent”). Stratasys, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”). In addition, Petitioner filed a Preliminary Reply (Paper 8, “Prelim. Reply”), and Patent Owner filed a Preliminary Sur-Reply (Paper 9, “Prelim. Sur-Reply”).

We have authority, acting on the designation of the Director, to determine whether to institute an *inter partes* review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4(a). *Inter partes* review may not be instituted unless “the information presented in the petition filed under [35 U.S.C.] section 311 and any response filed under [35 U.S.C.] section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a). “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.” 37 C.F.R. § 42.108(a) (2023). In other words, a decision to institute under § 314 may not institute on fewer than all claims challenged in the petition. *SAS Inst., Inc. v. Iancu*, 138 S. Ct. 1348, 1359–60 (2018). In addition, if the Board institutes trial, it will “institute . . . on all grounds in the petition.” PTAB Consolidated Trial Practice Guide, 5–6 (Nov. 2019)¹ (“CTPG”); *see also PGS Geophysical AS v. Iancu*, 891 F.3d 1354, 1360 (Fed. Cir. 2018) (interpreting the statute to require “a simple yes-

¹ Available at <https://www.uspto.gov/TrialPracticeGuideConsolidated>.

or-no institution choice respecting a petition, embracing all challenges included in the petition”).

For the reasons set forth below, upon considering the briefing and the evidence of record, we determine that the information presented in the Petition establishes a reasonable likelihood that Petitioner will prevail with respect to at least one of the challenged claims. Accordingly, we institute *inter partes* review of all challenged claims on all grounds asserted in the Petition.

B. Real Parties-in-Interest

Petitioner identifies itself, Bambulab Limited, Shanghai Lunkuo Technology Co., Ltd., Tuo Zhu Technology Limited, and Bambulab USA Inc. as real parties-in-interest. Pet. 80. Patent Owner identifies itself and Stratasys Ltd. as real parties-in-interest. Paper 4, 2.

C. Related Matters

The parties identify the following related court proceedings: *Stratasys, Inc. v. Shenzhen Tuo Zhu Technology Co. Ltd. et al.*, Case No. 2:24-cv-00645 (E.D. Tex.) (consolidated with Case No. 2:24-cv-00644 (E.D. Tex.)), and *BambuLab USA, Inc. et al. v. Stratasys, Inc.*, Case No. 1:24-cv-01511 (W.D. Tex.). Pet. 80; Paper 4, 2. In addition, the parties note that related patents are being challenged in IPR2025-00257, IPR2025-00311, and IPR2025-00354. Pet. 80; Paper 4, 2.

D. The '713 Patent

The '713 patent, titled “Additive Manufacturing Method for Printing Three-Dimensional Parts with Purge Towers,” is directed to “[a] method for printing a three-dimensional part with an additive manufacturing system.”

Ex. 1001, codes (54), (57). The application giving rise to the '713 patent was filed on March 8, 2013. *Id.* at codes (21), (22).

The '713 patent describes an “additive manufacturing system” and “method” for printing a three-dimensional part and a support structure using a “layer-based, additive manufacturing technique.” *Id.* at 1:57–2:3. The system includes multiple print heads or deposition lines for depositing layers of a “part material” to print the three-dimensional part and for depositing layers of a “support material” to print the support structure. *Id.* at 2:4–33.

Each print head or deposition line can toggle between an “operating mode” in which it deposits material and a “stand-by mode” in which it does not deposit material. *Id.* at 1:57–2:33. When a print head or deposition line is switched from the stand-by mode to the operating mode, some material within the print head or deposition line is purged prior to depositing the next layer of material. *Id.* at 4:39–62. In the method of the '713 patent, this purging is accomplished by printing a layer of “a purge tower (or multiple purge towers)” rather than discharging material into “a separate purge station.” *Id.* at 4:63–5:17, 8:39–53, Figs. 3A, 3B, 6, 8, 9.

E. Illustrative Claim

Petitioner challenges claims 1, 2, 5–7, 9, 16, and 17 of the '713 patent. Claims 1 and 16 are independent. Claim 1 is illustrative; it is reproduced below.

1. A method for printing a three-dimensional part with an additive manufacturing system, the method comprising:
printing layers of the three-dimensional part and of a support structure for the three-dimensional part from multiple print heads or deposition lines using a layer-based, additive manufacturing technique;

switching the print heads or deposition line between stand-by modes and operating modes in-between the printing of the layers of the three-dimensional part and the support structure;

performing a purge operation for each print head or deposition line switched to the operating mode, the purge operation comprising printing at least one purge tower in a layer-by-layer manner, wherein the layers of the at least one purge tower are printed from the print head or deposition line switched to the operating mode.

Ex. 1001, 15:43–58.

F. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 1, 7–77):

Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
1, 2, 5–7, 9, 16, 17	103	Leavitt, ³ RepRap Article, ⁴ RepRap Video ⁵
1, 2, 6, 7, 9, 16, 17	103	Priedeman, ⁶ KISSlicer ⁷

² Amendments to 35 U.S.C. §§ 102 and 103 enacted by the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), took effect on March 16, 2013. The ’713 patent issued from an application filed on March 8, 2013. *See* Ex. 1001, code (22). Therefore, we apply the pre-AIA versions of §§ 102 and 103. Neither party, however, argues that the outcome of this case would differ based on applying the pre-AIA or post-AIA versions of these laws.

³ US 2009/0035405 A1, published Feb. 5, 2009 (Ex. 1004).

⁴ Dual extruder PLA printing (Oct. 29, 2012), available at <https://www.okob.net/wp/index.php/2012/10/29/dual-extruderpla-printing/> (Ex. 1005).

⁵ x2 dual color print (Oct. 29, 2012), available at <https://www.youtube.com/watch?v=ZAafPtKjZSc> (Ex. 1006).

⁶ US 2003/0004600 A1, published Jan. 2, 2003 (Ex. 1007).

⁷ KISSlicer Quick-Start Guide (2012), available at <https://web.archive.org/web/20121224171520/http://kisslicer.com/files/KISSlicerQuickStart.pdf#exp> and (Ex. 1010).

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
5	103	Priedeman, KISSlicer, RepRap Article, RepRap Video
1, 2, 6, 7, 9	102	Boyer ⁸

In support of its unpatentability arguments, Petitioner relies on the declaration of Dr. Michael A. Hickner (Ex. 1003).

II. ANALYSIS

A. Legal Standards

A claim may be unpatentable as anticipated if “each and every limitation is found either expressly or inherently in a single prior art reference.” *Sanofi-Synthelabo v. Apotex, Inc.*, 470 F.3d 1368, 1375 (Fed. Cir. 2006). Anticipation under § 102 may be established by showing, as a matter of fact, that all elements arranged as specified in a claim are disclosed within the four corners of a reference, either expressly or inherently, in a manner enabling one skilled in the art to practice an embodiment of the claimed invention without undue experimentation. *See ClearValue, Inc. v. Pearl River Polymers, Inc.*, 668 F.3d 1340, 1344 (Fed. Cir. 2012).

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

⁸ US 2014/0034214 A1, published Feb. 6, 2014 (Ex. 1008).

Inc., 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

At this preliminary stage, we determine whether the information presented shows a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have been unpatentable over the proposed prior art. We analyze the asserted grounds with the above-noted principles in mind.

B. Discretionary Denial Under 35 U.S.C. § 314(a)

The Board has held that the advanced state of a parallel district court action is a factor that may weigh in favor of denying a petition under § 314(a). *See NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 20 (PTAB Sept. 12, 2018) (precedential); Patent Trial and Appeal Board Consolidated Trial Practice Guide (Nov. 2019), 58 & n.2, *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated>. We consider the following factors to assess “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the 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

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

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 5–6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). 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.* at 6.

Upon consideration of these factors and the clarifications, which are discussed below, we decline to exercise our discretion to deny the Petition.

1. *Whether the Court Granted a Stay or Evidence Exists That One May Be Granted if a Proceeding is Instituted*

According to the parties, the district court has not issued a stay in the litigation. Pet. 78; Prelim. Resp. 6–8. Petitioner argues that this factor is neutral. Pet. 78. Patent Owner, on the other hand, argues that this factor “weighs in favor of discretionary denial” because “there has been no request for a stay pending *inter partes* review” and “the evidence indicates [the district court] will not grant a stay even if one were requested.” Prelim. Resp. 6. Patent Owner argues that there are a variety of reasons “that it is highly unlikely that [the district court] will grant a stay.” *Id.* For example, Patent Owner argues that the litigation “involves multiple patents besides the ’713 Patent, which are either challenged in separate IPRs with different filing dates or have not been challenged in IPR” and “Judge Gilstrap is highly unlikely to grant a stay in the particular Related Litigation due to facts specific to the case and parallel IPR proceedings.” *Id.* at 7 (citing Ex. 2012, 29). Patent Owner also argues that “Petitioner has offered a very limited estoppel by stipulation that only covers ‘the same grounds of invalidity raised in th[e] petition’” and a stay is highly unlikely given such limited estoppel. *Id.*

As noted below, Petitioner provided an updated second “*Sotera*-type” stipulation on April 8, 2025, which states if institution occurs here, Petitioner will not pursue in district court any other ground that was raised or reasonably could have been raised in an IPR.⁹ Ex. 1021. A district court judge determines whether to grant a stay based on the facts of each specific case as presented in the briefs by the parties. As such, it is speculative on our part to predict how a district judge will rule in view of the facts at issue and the updated stipulation. As a general matter, we decline to infer, based on actions taken in different cases with different facts, how a district court would rule should a stay be requested by the parties in a parallel case. *See Sand Revolution II LLC v. Cont’l Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative) (“*Sand*”). Thus, this factor is neutral or, at most, only slightly favors discretionary denial. *Id.*

2. *Proximity of the Court’s Trial Date to the Board’s Projected Statutory Deadline for a Final Written Decision*

Trial is currently set by the district court in the litigation for June 1, 2026. Pet. 79; Prelim. Resp. 8. Patent Owner does not disagree with Petitioner that “any final written decision in this proceeding will issue in mid-June 2026.” Pet. 79; *see* Prelim. Resp. 8–11. Both parties agree that the currently-scheduled trial date is two to three weeks earlier than the statutory deadline of the final written decision in this proceeding. Pet. 79; Prelim. Resp. 8–9. Petitioner argues that this factor is neutral, and Patent

⁹ *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A) (“*Sotera*”).

Owner argues that it should weigh in favor of discretionary denial. Pet. 79; Prelim. Resp. 8–11.

Patent Owner provides that the median time from filing to trial is 21.7 months for cases filed since January 2008 and “23.2 months for cases filed since January 2022.” Prelim. Resp. 9 (citing Ex. 2001, 3, 5, 7). Applying these median time-to-trial statistics, Patent Owner asserts that “trial would be expected between May 2026 and July 2026,” which is consistent with the currently-scheduled trial date of June 1, 2026. *Id.*

Patent Owner cites various PTAB decisions in which institution was denied in view of “even shorter periods between a trial and final written decision.” *Id.* at 10–11. For example, Patent Owner cites *EClinicalWorks, LLC v. Decapolis LLC*, 2022 WL 1150638, *4, IPR2022-00229, Paper 10 (PTAB Apr. 13, 2022), in which “the PTAB denied institution where trial would begin ‘roughly one to two months before any final decision.’” Prelim. Resp. 10.

The trial in the parallel proceeding is currently scheduled to begin approximately two weeks before the statutory deadline for a final written decision, but the most recent median time-to-trial statistics for Judge Gilstrap in the Eastern District of Texas indicate that the actual trial date will likely be in July 2026, which is later than the statutory deadline to issue a final written decision in this proceeding in mid-June 2026. *See* Ex. 2001, 7 (median time from filing to trial of 23.2 months); Prelim. Resp. 10. Thus, we find this factor is neutral or weighs slightly against discretionary denial.

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

Petitioner argues that this factor favors institution “because there has been little investment by the court and the Markman hearing is scheduled for December 3, 2025, well after institution.” Pet. 79 (citing Ex. 1020).

Patent Owner argues that this factor favors discretionary denial because “the Court has held a scheduling conference with the parties . . . and entered numerous orders in the case, including a docket control order, discovery order, e-discovery order, and protective order.” Prelim. Resp. 11–12 (citing Exs. 1020, 2003–2006). Moreover, Patent Owner argues the parties have invested significant resources because they have

(a) negotiated and proposed numerous orders, including the aforementioned orders, (b) exchanged initial disclosures (EX1020 at 6); (c) exchanged additional disclosures (EX1001 at 6); and (d) exchanged infringement, invalidity, and subject-matter eligibility contentions totaling well over 2,000 pages (*see* EX1020 at 5–6). Fact discovery is well underway with the parties having exchanged over 100 document requests, exchanged requests and responses to over 30 interrogatories, and produced documents exceeding 52,000 pages, and third-party discovery. In addition, the parties have briefed issues related to party joinder.

Id.

Patent Owner additionally argues that there will be “further substantial investments” before the statutory deadline of a final written decision, including source code reviews, amended infringement contentions, and conducting a jury trial. *Id.* at 12. Because the trial date is scheduled to start approximately two weeks before the statutory deadline for a final written decision, Patent Owner argues that “any final written decision would

simply revisit the jury’s earlier findings regarding validity” and thus be duplicative. *Id.*

We are not persuaded by Patent Owner’s arguments. The statutory deadline for determining whether to institute an *inter partes* review is June 24, 2025—three months from the filing of the Preliminary Response on March 24, 2024 (*see* 35 U.S.C. § 314(b)(1)), and none of the relevant deadlines for fact discovery or expert discovery, or the date of the scheduled *Markman* hearing, will have passed by that date. As the district court’s docket control order indicates, fact and expert discovery do not close until next year, and the *Markman* hearing is not scheduled until December 3, 2025, approximately six months after our deadline for this decision. *See* Ex. 1020. Nor has Patent Owner demonstrated that the district court has issued any orders specific to the ’713 patent, as opposed to general discovery and case management orders. *Fintiv*, Paper 11 at 10 (“If, at the time of the institution decision, the district court has not issued orders related to the patent at issue in the petition, this fact weights against exercising discretion to deny institution.”). Accordingly, in view of the parties’ respective arguments, we find that factor 3 weighs against discretionary denial.

4. *Overlapping Issues with the Parallel Proceeding*

Under this factor, Petitioner provides a first stipulation dated December 17, 2024 stating: “If IPR is instituted based on this Petition, Shenzhen Tuozhu and the other defendants named in the related District Court Case No. 2:24-cv-00644 (E.D. Tex.) stipulate that, while such IPR is pending, they will not pursue in the 2:24-cv-00644 case, against the ’713 Patent, the same grounds of invalidity raised in this petition.” Ex. 1019. Petitioner argues that this factor weighs against discretionary denial. *See*

Sand at 12 (such stipulation “mitigates to some degree the concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions”).

Petitioner also followed up with an updated second stipulation on April 8, 2025, stating:

If IPR is instituted in IPR2025-00321, unless institution is later vacated, reversed or otherwise withdrawn by rehearing or Director Review, Shenzhen Tuozhu and the other defendants named in the related District Court Cases No. 2:24-cv-00644 (E.D. Tex.) and 1:24-cv-01511 (W.D. Tex.) stipulate that they will not pursue in the 2:24-cv-00644 case or the 1:24-cv-01511 case, against the ’713 Patent, the specific grounds asserted in IPR2025-00321 or any other ground that was raised or could have been reasonably raised in an IPR (i.e., any ground that could [have been] raised under §§ 102 or 103 on the basis of prior art patent[s] or printed publications).

Ex. 1021.

Patent Owner’s argument that this factor weighs in favor of discretionary denial because the stipulation is limited in nature is solely based on Petitioner’s first stipulation filed on December 17, 2024.¹⁰ Prelim. Resp. 13–14. Patent Owner does not address Petitioner’s updated second stipulation filed on April 8, 2025. This updated second stipulation mitigates any concerns of duplicative efforts between the district court and the Board, as well as concerns of any potentially conflicting decisions. *See Sand* at 12.

¹⁰ Patent Owner correctly points out the December 17, 2024 stipulation here falls short of a *Sotera*-style stipulation. Prelim. Resp. 13. Unlike the updated second stipulation dated April 8, 2025, the first stipulation dated December 17, 2024, does not state “or any ground that could have been reasonably raised in an IPR,” and therefore does not qualify as a *Sotera*-style stipulation. *Sotera*, IPR2020-01019, Paper 12 at 18 (PTAB Dec. 1, 2020) (precedential as to § II.A).

We therefore find that this factor weighs against exercising discretion to deny institution. *See id.*, n.5.

5. *Whether Petitioner and the Defendant in the Parallel Proceeding are the Same Party*

Both parties agree that the parties to this proceeding are identical to those involved in the related district court litigation. Pet. 79; Prelim. Resp. 14–15. While it is common in IPR proceedings for the petitioner and patent owner to also be parties in a related district court proceeding, this factor weighs slightly in favor of discretionary denial. *Fintiv*, Paper 11 at 13–14.

6. *Other Circumstances that Impact the Board’s Exercise of Discretion, Including the Merits*

Regarding factor 6, Petitioner asserts that it filed a motion to dismiss the district court litigation, which “further favors institution under **Factor 6** because, if granted, there will be no potential overlap of issues between the IPR and parallel District Court action.” Pet. 79. Patent Owner counters that the district court “has not ruled on the Motion to Dismiss, which is premised on the failure to join another party.” Prelim. Resp. 15. Patent Owner argues that “speculation” with regard to such motion pending before the district court “should not receive any weight under factor 6.” *Id.* at 16. Patent Owner also “seeks to preserve any argument under” possible future directives from the Commerce Secretary regarding disputes between “inventors in the United States” and “foreign entities, such as the Petitioner” before “the PTAB, a tribunal of the United States Patent and Trademark Office.” *Id.* at 16–17. We agree that it would be speculative at best to determine whether arguments about a motion not yet decided in district court might impact our analysis in relation to *Fintiv* factor 6 here.

Beyond that, Patent Owner argues that the merits of the case are sufficiently flawed to weigh in favor of discretionary denial under factor 6. *Id.* at 16. As discussed in more detail in our analysis below, we are persuaded based on the current preliminary record before us that Petitioner raises at least one unpatentability challenge to claim 1 of the '713 patent that is sufficiently meritorious to warrant institution of trial, but that challenge is not so “particularly strong” on the present record as to rise to the level of weighing against discretionary denial. *Fintiv*, Paper 11 at 14–15 (“For example, if the merits of a ground raised in the petition seem particularly strong on the preliminary record, this fact has favored institution.”). We therefore find factor 6 is neutral.

7. *Summary of Fintiv Factors and Conclusion on § 314(a)*

In view of *Fintiv* factors 1–6, where factors 1 and 5 are slightly in favor of discretionary denial, factor 2 weighs slightly against discretionary denial, factor 6 is neutral, and factors 3 and 4 both weigh against discretionary denial, and taking “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review,” we conclude that the *Fintiv* factors weigh against discretionary denial. *Fintiv*, Paper 11 at 6. Accordingly, we do not discretionarily deny Petitioner’s request for *inter partes* review under *Fintiv*.

C. *Level of Ordinary Skill in the Art*

The level of ordinary skill in the pertinent art at the time of the invention is a factor in how we construe patent claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). It is also one of the factors we consider when determining whether a patent claim is obvious over the prior art. *See Graham*, 383 U.S. at 17–18.

Factors pertinent to a determination of the level of ordinary skill in the art include “(1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field.” *Envtl. Designs, Ltd. v. Union Oil Co. of Cal.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). “Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case.” *Id.*

Petitioner contends that one of ordinary skill in the art “would have had (1) at least a bachelor’s degree in Mechanical Engineering, Computer Engineering, Chemical Engineering, Materials Science, or a related field, and (2) at least two years of research or industry experience in 3D printing or materials used for 3D printing.” Pet. 5 (citing Ex. 1003 ¶¶ 14–16). Petitioner also argues that “[a]dditional experience could substitute for a formal degree or formal training (and vice versa).” *Id.* Patent Owner proposes a slightly different level of skill, arguing that a person of ordinary skill in the art “would have had a bachelor’s degree in Mechanical Engineering, Computer Engineering, Chemical Engineering, Materials Science, or a comparable field and at least two years of experience related to 3D printing, with additional experience potentially being a substitute for a formal degree or training (and vice versa).” Prelim. Resp. 24. Neither party explains why the outcome of this case would be affected by the adoption of any of the proffered definitions of a person of ordinary skill in the art.

For purposes of this Decision, we adopt Petitioner’s assessment of the level of ordinary skill in the art, as it appears to be consistent with the ’713 patent and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

D. Claim Construction

We apply the same claim-construction standard used in the federal courts—in other words, the 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*. *See* 37 C.F.R. § 42.100(b). Under the *Phillips* standard, the “words of a claim ‘are generally given their ordinary and customary meaning,’” which “is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1312–13.

Petitioner argues that we should construe one claim term, “from multiple print heads or deposition lines.” Pet. 5–7. Petitioner proposes two separate constructions for this term and asserts grounds of unpatentability under each construction, but Petitioner does not argue in favor of one proposed construction or the other. *Id.* at 6–7. Patent Owner also does not argue that either construction of “from multiple print heads . . . or deposition lines” is correct. Prelim. Resp. 24–26. Instead, Patent Owner argues merely that Petitioner’s failure to identify which construction it prefers requires denial of the Petition. *Id.*

We note that, as discussed below, we are able to determine whether to institute *inter partes* review of the ’713 patent without expressly construing the term “from multiple print heads or deposition lines.” *See Realtime Data*,

LLC v. Iancu, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

As for Patent Owner’s argument that Petitioner has failed to carry its burden to identify how the claims are to be construed, we disagree on the present record. Although Petitioner does not provide a preferred construction for the single term it proposes requires construction, Petitioner does identify which of its two alternative constructions applies to each of its asserted grounds of unpatentability. Pet. 6 (“Under the first construction, [the obviousness grounds] are applicable, and [the anticipation ground] would be excluded from the claim scope. Under the alternative construction, all of [the asserted grounds] are applicable.”). In our view, this approach does not fail to satisfy Petitioner’s burden under 37 U.S.C. § 42.104(b)(3).

E. Asserted Anticipation by Boyer

Petitioner argues that Boyer anticipates claims 1, 2, 6, 7, and 9. Pet. 63–77. Patent Owner disagrees. Prelim. Resp. 38–39, 65–69.

1. Overview of Boyer

Boyer, titled “Build Material Switching,” relates to the use, in a three-dimensional printer, of “transitional lengths of build material to facilitate changes from one color to another during a fabrication process.” Ex. 1008, codes (54), (57).

Figure 4, reproduced below, illustrates “a cross section of a multi-material build.” *Id.* ¶ 32.

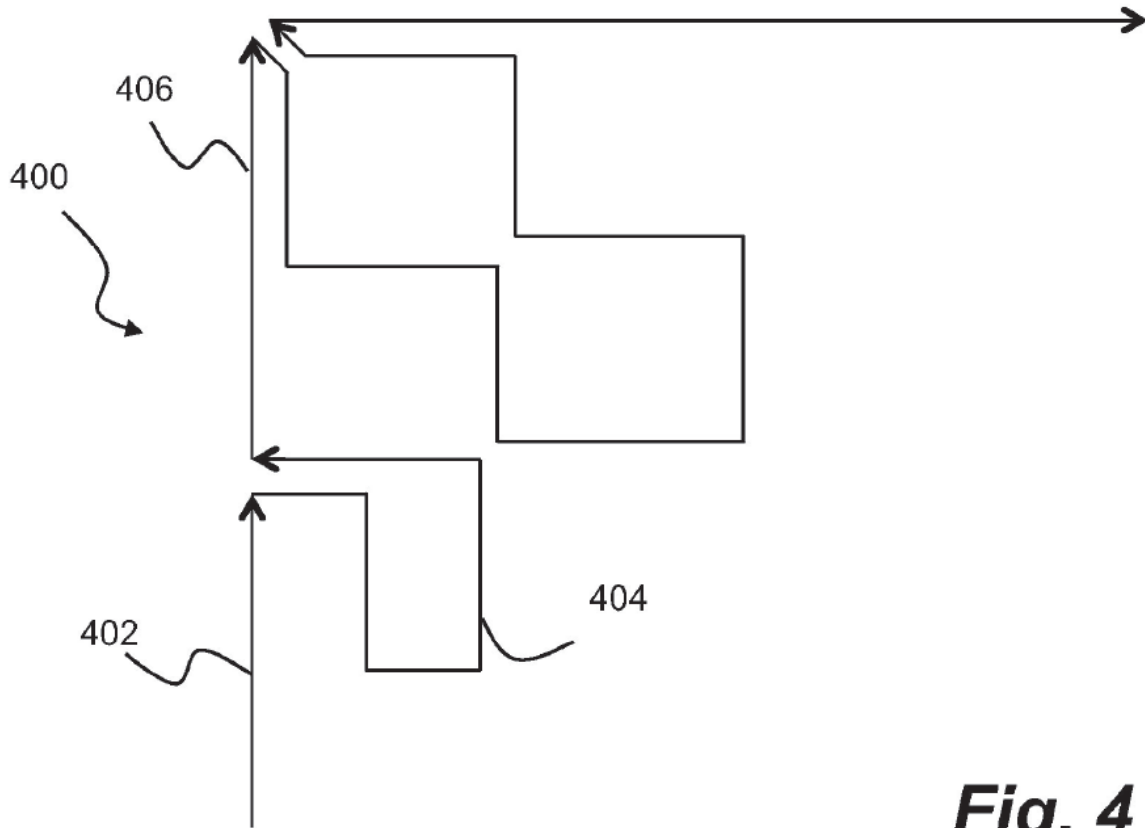


Fig. 4

As shown in Figure 4 of Boyer, a tool path 400 is made up of multiple segments 402, 404, 406. *Id.* “[F]irst segment 402 . . . may traverse a portion of an exterior surface of an object with a first color, such as red.” *Id.* “The tool path 400 may then turn in toward an interior of the object and infill with a transition segment 404 between the first color and a second color, such as blue.” *Id.* “After the transition is complete and the second color can be extruded without mixing from the first color, the tool path 400 may return to the exterior of the object.” *Id.* At this point, “the tool path may provide a third segment 406 traversing a different portion of the exterior with the second color.” *Id.*

Boyer’s teachings are not limited to switching between materials that differ in color.

Instead,

[w]hile color switching is one useful application of the systems and methods described herein, it will be further appreciated that the same techniques may be employed to switch between multiple build materials for a variety of other reasons. For example, different build materials may have different optical properties (opacity, color, finish, etc.), different mechanical properties (elasticity, strength, melting point, etc.), different chemical properties (curing conditions, solubility, etc.), thermal properties (insulation, etc.), electrical properties (conductance, etc.) and so forth, any of which might usefully be combined in an object fabricated from a model. The techniques described herein may be usefully employed to enable switching of build materials in any such multi-material models.

Id. ¶ 29.

2. *Prior-Art Status of Boyer*

The parties dispute whether Boyer is prior art to the '713 patent. Petitioner argues that Boyer is “prior art under pre-AIA § 102(e)” because it “has an effective filing date prior to March 8, 2013,” the “filing date of the '713 Patent.” Pet. 2. Patent Owner argues that evidence of record shows “conception of the claimed invention prior to the critical date and . . . actual reduction to practice prior to the reference’s critical date.” Prelim. Resp. 38–39 (quoting *Medtronic, Inc. v. Teleflex Life Scis. Ltd.*, 86 F.4th 902, 905–06 (Fed. Cir. 2023); citing Ex. 2010 ¶¶ 9–29; Ex. 2011 ¶¶ 9, 11–22, 24, 27, 28). In particular, Patent Owner argues that the inventors conceived of and reduced to practice the invention of the '713 patent “by November 2011, before September 21, 2012,” which is the effective filing date of the Boyer reference. *Id.* at 39; *see* Ex. 1008, code (22).

The evidence of the dates of conception and actual reduction to practice consists of declaration testimony from two people who have not yet

had their testimony tested by deposition. Ex. 2010; Ex. 2011. In addition, Petitioner and Patent Owner debate several factual issues with this testimony. Prelim. Reply 3–10; Prelim. Sur-Reply 4–10. Given the factual disputes raised and the present incompleteness of the record, we believe that a decision on the question of whether Boyer is prior art to the '713 patent is best left for trial after full development of the record. For the purpose of deciding whether to institute review, we assume without deciding that Boyer is properly considered prior art, and we invite the parties to develop the record on this issue more fully during trial.

3. *Analysis of Claim 1*

- a) *Disputed Limitation: “performing a purge operation for each print head or deposition line switched to the operating mode, the purge operation comprising printing at least one purge tower in a layer-by-layer manner”*

Claim 1 recites “performing a purge operation for each print head or deposition line switched to the operating mode, the purge operation comprising printing at least one purge tower in a layer-by-layer manner.” Ex. 1001, 15:53–56. According to Petitioner, Boyer discloses this limitation by describing printing a “first segment” with a “first build material” and a “third segment” with a “second material,” as well as “perform[ing] a purge operation by printing [a] transition segment” between the first and second segments using the “second build material.” Pet. 70 (citing Ex. 1003 ¶¶ 233–234; Ex. 1008 ¶¶ 25–29, 34, Figs. 2, 4). Because layers of these segments “are stacked on top of one another,” Petitioner argues that the stack of transition segments “correspond[s] to [a] purge tower[] printed in a layer-by-layer manner.” *Id.* at 73 (citing Ex. 1003 ¶¶ 237–238; Ex. 1008 ¶¶ 32–44, Figs. 4, 5).

Patent Owner argues that “*Boyer* does not describe both a 3-D part and purge tower.” Prelim. Resp. 67. Instead, according to Patent Owner, *Boyer*’s “first segment 402 and third segment 406 . . . traverse portions of the exterior surface of the object and transition segment 404 . . . ‘turn[s] in toward an interior of the object and infill.’” *Id.* (quoting Ex. 1008 ¶ 32). Because “there is no disclosure in *Boyer* that transition segment 404 of the tool path 400 forms a *different object* than the 3D object itself,” Patent Owner argues that *Boyer* does not disclose a purge tower. *Id.* at 67–68. We are not persuaded, on the present record, that a purge tower must be a structure that is separate from the object being printed, as opposed to encompassing either a separate structure or a structure printed within the interior of the part. Neither party asks for the term “purge tower” to be construed, nor does either party propose a construction for the term or offer any extrinsic evidence supporting any particular construction of the term. Pet. 5–7; Prelim. Resp. 24–26. The language of claim 1 does not expressly require that the purge tower and the object being printed must be separate structures. Ex. 1001, 15:43–58. In addition, on the present record, we are not persuaded that specification of the ’713 patent states that a purge tower must be a separate structure. *See, e.g., id.* at 4:63–5:17 (suggesting that one purpose of a purge tower is to consume less space within the build volume than a purge station, which is consistent with locating the purge tower inside the object being printed). The figures of the ’713 patent all depict the purge tower as a separate structure, but it is error to construe a term “as being limited to [a particular described] embodiment,” even when the “patent describes only [that] single embodiment.” *Phillips v. AWH Corp.*, 415 F.3d

1303, 1323 (Fed. Cir. 2005) (citing *Gemstar-TV Guide Int’l, Inc. v. Int’l Trade Comm’n*, 383 F.3d 1352, 1366 (Fed. Cir. 2004)).

Patent Owner also argues that “*Boyer* does not describe printing transition segment 404 for every layer of a purge [t]ower” because it only discloses “that it can ‘position different segments’ including transition segments ‘at suitable locations along a tool path in order to achieve specific colors (or more generally build materials) at specific locations.’” Prelim. Resp. 68–69 (quoting Ex. 1008 ¶ 33). Thus, according to Patent Owner, “[t]here is no disclosure in *Boyer* that the transition segments specifically are stacked on top of each other to create a purge tower.” *Id.* at 69. But Petitioner cites to evidence of record that a person of ordinary skill in the art would have interpreted Boyer’s disclosure to include stacked layers above and below those shown in Figure 4, including in the transition segments. Pet. 73 (citing Ex. 1003 ¶ 237). That evidence includes the testimony of Dr. Hickner that, “[b]y describing tool path 400 as a ‘cross section’ of a multi-material build, Boyer teaches that layers printed using a similar two-dimensional tool path can exist above and/or below FIG. 4’s cross section.” Ex. 1003 ¶ 237 (citing Ex. 1008 ¶¶ 18, 24, 32–34, Fig. 4). On the present record, this testimony is supported by citations to Boyer’s disclosure and is not contradicted by testimony to the contrary.

Thus, Petitioner has shown sufficiently for the purpose of the present decision that Boyer discloses the disputed limitation of claim 1. We encourage the parties to develop further the arguments and the record surrounding this issue during the trial.

b) *Disputed Limitation: “printing layers of the three-dimensional part and of a support structure for the three-dimensional part”*

Claim 1 recites “printing layers of the three-dimensional part and of a support structure for the three-dimensional part.” Ex. 1001, 15:45–46. According to Petitioner, Boyer discloses this limitation by describing depositing multiple layers, “each layer representing a ‘two-dimensional pattern’ derived from a cross-section of the three-dimensional part,” and each layer containing “**multiple** build materials.” Pet. 65 (citing Ex. 1008 ¶¶ 15–18, 24–29, 32–44, Figs. 2, 4, 5). Petitioner argues that one of the build materials that Boyer discloses using may be used to “print layers of a ‘sacrificial **support structure**’ for the three-dimensional part.” *Id.* (citing Ex. 1003 ¶ 221; Ex. 1008 ¶ 44). Patent Owner argues that, although Boyer describes its transition segments as switching from one color of print material to another color, it does not teach switching from part material to support structure material, as claim 1 recites. Prelim. Resp. 68 (citing Ex. 1008 ¶ 32).

As Patent Owner states, paragraph 32 of Boyer teaches using “multiple build materials to obtain different colors on an exterior of an object.” Ex. 1008 ¶ 32. But the disclosure of Boyer that Petitioner cites is not limited to different colors of material; instead, on the present record, we are persuaded that it also encompasses different materials, including those used to print support structures. Boyer teaches that, “[w]hile color switching is one useful application of the systems and methods described herein, it will be further appreciated that the same techniques may be employed to switch between multiple build materials for a variety of other reasons.” Ex. 1008 ¶ 29. Among these reasons are “different mechanical properties,” such as

“strength,” and “different chemical properties,” such as “solubility.” *Id.* At least on the present record, these materials appear to satisfy the need that Boyer describes for “sacrificial support structures [that] may be fabricated from materials that . . . dissolve or break away easily from the main structure of an object.” *Id.* ¶ 44.

c) Undisputed Limitations

Claim 1 also recites

1. A method for printing a three-dimensional part with an additive manufacturing system, the method comprising:
printing layers . . . from multiple print heads or deposition lines using a layer-based, additive manufacturing technique;
switching the print heads or deposition line between stand-by modes and operating modes in-between the printing of the layers of the three-dimensional part and the support structure;
. . . wherein the layers of the at least one purge tower are printed from the print head or deposition line switched to the operating mode.

Ex. 1001, 15:43–58. Petitioner argues that Boyer discloses these limitations, arranged as in claim 1. Pet. 63–77.

After reviewing Petitioner’s arguments and information regarding the limitations identified immediately above, including the Hickner Declaration, which are not addressed by Patent Owner at this stage (*see* Prelim. Resp. 65–69), we are persuaded that Petitioner sufficiently demonstrates, for purposes of deciding whether to institute trial, that Boyer discloses these limitations.

d) Conclusion Regarding Claim 1

Based on the current record, we determine that there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 1 is

unpatentable as anticipated by Boyer. Accordingly, we institute *inter partes* review with respect to all claims and all grounds asserted in the Petition.

4. *Claims 2, 6, 7, and 9*

Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '713 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See* 37 C.F.R.

§ 42.108(a). Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner, especially, as in this case, when Patent Owner does not separately argue those claims. *See* Prelim. Resp. 65–69. Those challenges, in our view, are best left for trial after full development of the record.

F. Asserted Obviousness Grounds

Petitioner argues that claims 1, 2, 5–7, 9, 16, and 17 of the '713 patent would have been obvious over the combination of Leavitt, RepRap Article, and RepRap Video. Pet. 7–42. Petitioner also argues that claims 1, 2, 6, 7, 9, 16, and 17 would have been obvious over the combination of Priedeman and KISSlicer and that claim 5 would have been obvious over the combination of Priedeman, KISSlicer, RepRap Article, and RepRap Video. *Id.* at 42–63.

Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '713 patent is unpatentable, we institute on all grounds and all claims raised in the Petition. *See* 37 C.F.R.

§ 42.108(a). Therefore, at this stage of the proceeding, it is not necessary for us to provide an assessment of every challenge raised by Petitioner. The obviousness challenges, in our view, are best left for trial after full development of the record.

III. CONCLUSION

For the reasons set forth above, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one challenged claim of the '713 patent. Accordingly, we institute *inter partes* review of all challenged claims on all grounds asserted in the Petition.

Our factual findings, conclusions of law, and determinations at this stage of the proceeding are preliminary, and based on the evidentiary record developed thus far. This is not a final decision as to the patentability of claims for which *inter partes* review is instituted. Our final decision will be based on the record as fully developed during trial.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review is instituted for claims 1, 2, 5–7, 9, 16, and 17 of the '713 patent on the grounds asserted 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, which shall commence on the entry date of this decision.

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FOR PETITIONER:

Michael T. Hawkins
Patrick J. Bisenius
Joshua A. Griswold
Cameron A. Ubel
FISH & RICHARDSON P.C.
IPR56224-0014IP1@fr.com
PTABInbound@fr.com

FOR PATENT OWNER:

Brian W. Oaks
Aashish G. Kapadia
Kevin J. Meek
Syed K. Fareed
MCDERMOTT WILL & EMERY LLP
boaks@mwe.com
akapadia@mwe.com
kmeek@mwe.com
sfareed@mwe.com