

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,
Petitioner,

v.

STRATASYS, INC.,
Patent Owner.

IPR2025-00311
Patent 8,562,324 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 Tuo Zhu Technology Co., Ltd. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) requesting *inter partes* review of claims 1, 3–11, and 17–22 (“the challenged claims”) of U.S. Patent No. 8,562,324 B2 (Ex. 1001, “the ’324 patent”). Stratasy, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).

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

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

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. 99. Patent Owner identifies itself and Stratasys Ltd. as real parties-in-interest. Paper 5, 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. 99–100; Paper 5, 2. In addition, the parties note that related patents are being challenged in IPR2025-00257, IPR2025-00321, and IPR2025-00354. Pet. 100; Paper 5, 2.

D. The '324 Patent

The '324 patent, titled “Networked Three-Dimensional Printing,” is directed to improving “[t]hree-dimensional fabrication resources . . . by adding networking capabilities to three-dimensional printers and providing a variety of tools for networked use of three-dimensional printers.” Ex. 1001, code (54), 1:32–35. The application giving rise to the '324 patent was filed on January 12, 2012, and asserts an earliest priority claim to U.S.

Application No. 12/858,622, filed on August 18, 2010. *Id.* at codes (21), (22), (63).

According to the '324 patent, “[w]eb-based servers or the like can provide a single point of access for remote users to manage access to distributed content on one hand, and to manage use of distributed fabrication resources on the other.” *Id.* at 1:35–38. Figure 5, reproduced below, illustrates “a user interface for networked three-dimensional printing.” *Id.* at 21:18–19.

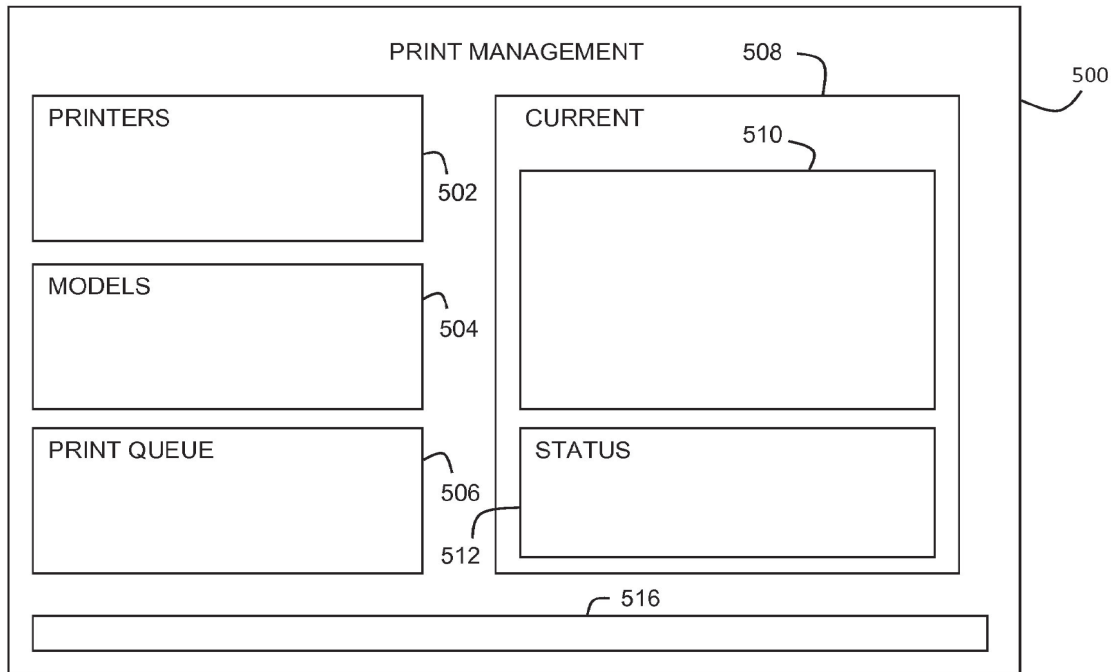


Fig. 5

As shown in Figure 5, “user interface 500” includes several display areas, including “first display area 502 that shows a list of available online three-dimensional printers,” “second display area 504 that shows a list of available models for fabrication,” “third display area 506 that shows a print queue,” and “fourth display area 508 that displays information for a currently active print job.” *Id.* at 21:40–22:31.

The fourth display area “may include a visualization area 510 that displays a visual representation of the print job.” *Id.* at 22:41–42. The visual representation may take any of several forms, including “a current tool path of the printer that is executing the print job,” “a simulated print object, such as a rendering of a three-dimensional model depicting a current state of the completion of an object being fabricated,” or “an image of a working volume of a three-dimensional printer or other fabrication resource captured during execution of the print job.” *Id.* at 22:41–53. This permits a user to “visually monitor progress or status of a remote print job through the user interface 500.” *Id.* at 22:56–57.

E. Illustrative Claim

Petitioner challenges claims 1, 3–11, and 17–22 of the ’324 patent. Claims 1 and 19 are independent. Claim 1 is illustrative; it is reproduced below.

1. A device comprising:
 - a three-dimensional printer including a build volume;
 - a network interface coupled to a data network;
 - a video camera positioned to capture video of the build volume from a point of view; and
 - a processor configured to receive a three-dimensional model through the network interface, and to control operation of the three-dimensional printer to fabricate the three-dimensional model as an object within the build volume of the three-dimensional printer, the processor further configured to provide a user interface to a remote user accessing the device through the network interface, and to present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.

Ex. 1001, 27:20–35.

F. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability (Pet. 1–2, 6–98):

Claim(s) Challenged	35 U.S.C. §²	Reference(s)/Basis
1, 3, 5–7, 9, 10, 19–22	103	Mazumder, ³ Mori ⁴
4	103	Mazumder, Mori, Tian ⁵
8	103	Mazumder, Mori, Hull ⁶
11	103	Mazumder, Mori, Seki ⁷
17	103	Mazumder, Mori, Waehner ⁸
18	103	Mazumder, Mori, Lan ⁹
20–22	103	Mazumder, Mori, Anderson ¹⁰
1, 3, 5–7, 9, 10, 19–22	103	Kritchman, ¹¹ Tay, ¹² Henke ¹³

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 in March 2013. The ’324 patent issued from an application claiming priority to an application filed in August 2010. *See* Ex. 1001, codes (22), (63). 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 6,580,959 B1, issued June 17, 2003 (Ex. 1004).

⁴ US 2010/0063615 A1, published Mar. 11, 2010 (Ex. 1005).

⁵ US 2009/0015668 A1, published Jan. 15, 2009 (Ex. 1006).

⁶ JP P2000-218708A, published Aug. 8, 2000 (Ex. 1007; English translation provided as Ex. 1008).

⁷ US 5,278,479, issued Jan. 11, 1994 (Ex. 1009).

⁸ US 2006/0171452 A1, published Aug. 3, 2006 (Ex. 1010).

⁹ Hongbo Lan, *Web-based Rapid Prototyping and Manufacturing Systems: A Review*, Computers in Industry (December 2009) (Ex. 1011).

¹⁰ US 2004/0207662 A1, published Oct. 21, 2004 (Ex. 1012).

¹¹ US 2006/0054039 A1, published Mar. 16, 2006 (Ex. 1015).

¹² Francis E.H. Tay et al., *Distributed Rapid Prototyping – A Framework for Internet Prototyping and Manufacturing*, Integrated Manufacturing Systems (November 2001) (Ex. 1013).

¹³ Karsten Henke et al., *Rapid Prototyping Modules for Remote Engineering Applications*, International Journal of Online Engineering, Vol. 4, Issue 1 (July 2008), available at <https://online-journals.org/index.php/i-joe/article/view/532/513> (Ex. 1014).

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
4	103	Kritchman, Tay, Henke, Tian
8	103	Kritchman, Tay, Henke, Hull
11	103	Kritchman, Tay, Henke, Seki
17	103	Kritchman, Tay, Henke, Waehner
18	103	Kritchman, Tay, Henke, Lan
3, 5, 9, 10, 20–22	103	Kritchman, Tay, Henke, Anderson

In support of its unpatentability arguments, Petitioner relies on the declaration of Andrew Wolfe, Ph.D. (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).

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

(3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). “While the sequence of these questions might be reordered in any particular case,” *KSR*, 550 U.S. at 407, the U.S. Court of Appeals for the Federal Circuit has repeatedly emphasized that “it is error to reach a conclusion of obviousness until all those factors are considered,” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1328 (Fed. Cir. 2016). Because Patent Owner does not address objective evidence of non-obviousness, we focus solely on the first three *Graham* factors.

“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, 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. 98; Prelim. Resp. 6–8. Petitioner argues that this factor is

neutral. Pet. 98. Patent Owner, on the other hand, argues that this factor “weighs in favor of discretionary denial because a stay in the related proceeding has not been requested and the evidence indicates that the Court in the [litigation] will not grant a stay even if Petitioner were to request one.” Prelim. Resp. 8. Patent Owner argues that there are a variety of reasons why the district court “is highly unlikely to grant a stay.” *Id.* at 6–8. For example, Patent Owner argues that the litigation “involves multiple patents besides the ’324 Patent, which are challenged in separate IPRs with different filing dates” 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. 1024, 30). 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.* at 8.

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.¹⁴ Ex. 1020. 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*

¹⁴ *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A) (“*Sotera*”).

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. 98; Prelim. Resp. 9. Patent Owner does not disagree with Petitioner that “any final written decision in this proceeding will issue in mid-June 2026.” Pet. 98; *see* Prelim. Resp. 9–11. 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. 98; Prelim. Resp. 9. Petitioner argues that this factor is neutral, and Patent Owner argues that it should weigh in favor of discretionary denial. Pet. 98; Prelim. Resp. 9–11.

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. 10 (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 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. 11.

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. 98 (citing Ex. 1019).

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. 12 (citing Exs. 1019, 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 (EX1019 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 EX1019 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 44,000 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 12–13. 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 20, 2025—three months from the filing of the Preliminary Response on March 20, 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. 1019. Nor has Patent Owner demonstrated that the district court has issued any orders specific to the ’324 patent, as opposed to general discovery and cases 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 18, 2024 stating: “If IPR is instituted based on this Petition, Shenzhen Tuo Zhu and the other defendants named in the related District Court Case No. 2:24-cv-00645 (E.D. Tex.) stipulate that, while such IPR is pending, they will not pursue in the 2:24-cv-00645 case, against the ’324 Patent, the same grounds of invalidity raised in this petition.” Ex. 1018. 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 for potentially conflicting decisions”).

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

If IPR is instituted in IPR2025-00311, unless institution is later vacated, reversed or otherwise withdrawn by rehearing or Director Review, Shenzhen Tuo Zhu and the other defendants named in the related District Court Cases No. 2:24-cv-00645 (E.D. Tex.) and 1:24-cv-01511 (W.D. Tex.) stipulate that they will not pursue in the 2:24-cv-00645 case or the 1:24-cv-01511 case, against the ’324 Patent, the specific grounds asserted in IPR2025-00311 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. 1020.

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 18, 2024.¹⁵ Prelim. Resp. 13–15. 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. 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*

Whereas Petitioner does not address factor 5, Patent Owner argues that the parties to this proceeding are both in the related district court litigation. Pet. 98–99; Prelim. Resp. 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. 99. Patent Owner counters that

¹⁵ Patent Owner correctly points out the December 18, 2024 stipulation here falls short of a *Sotera*-style stipulation. Prelim. Resp. 14. Unlike the updated second stipulation dated April 8, 2025, the first stipulation dated December 18, 2024 does not state “or any grounds that could have reasonably been raised before the PTAB,” and therefore does not qualify as a *Sotera*-style stipulation. *Sotera*, IPR2020-01019, Paper 12 (PTAB Dec. 1, 2020) (precedential as to § II.A).

the district court “has not ruled on the Motion to Dismiss, which is premised on the failure to join another party.” Prelim. Resp. 16. 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 15–16. 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 17–18. 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 16–17. 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 ’324 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 a bachelor’s degree in Mechanical Engineering, Computer Engineering, Electrical Engineering, Materials Science, or a comparable field and at least two years of experience related to 3D printers including remote control of rapid fabrication systems.” Pet. 6 (citing Ex. 1003 ¶¶ 40–42). Petitioner

also argues that “[a]dditional years of experience could substitute for an advanced-level degree (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, Electrical 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. 26. 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 consistent with the ’324 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.

Both parties argue that no claim terms require express construction at this stage of the proceeding. Pet. 6; Prelim. Resp. 26. On the present record,

we agree. *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))).

E. Asserted Obviousness Based on the Combination of Mazumder and Mori

Petitioner argues that claims 1, 3, 5–7, 9, 10, and 19–22 of the ’324 patent would have been obvious over the combination of Mazumder and Mori. Pet. 6–30. Petitioner also argues that claim 4 would have been obvious over the combination of Mazumder, Mori, and Tian; that claim 8 would have been obvious over the combination of Mazumder, Mori, and Hull; that claim 11 would have been obvious over the combination of Mazumder, Mori, and Seki; that claim 17 would have been obvious over the combination of Mazumder, Mori, and Waehner; that claim 18 would have been obvious over the combination of Mazumder, Mori, and Lan; and that claims 20–22 would have been obvious over the combination of Mazumder, Mori, and Anderson. *Id.* at 30–54.

1. Overview of Mazumder

Mazumder, titled “System and Method for Remote Direct Material Deposition,” relates to “[a] system and method for remotely controlling the fabrication of a product at a local manufacturing site” in which “[t]he product is fabricated by depositing successive material layers.” Ex. 1004, codes (54), (57). “The fabrication process” of Mazumder “is recorded by video or television camera and the[n] shown in real-time on a screen display connected to the remote computer.” *Id.* at code (57).

2. *Overview of Mori*

Mori, titled “Machining Status Monitoring Method and Machining Status Monitoring Apparatus,” relates to “[a] machining status monitoring apparatus [that] is provided on a machine tool.” Ex. 1005, codes (54), (57). The apparatus “has a plurality of actual CCD cameras for imaging the tool and workpiece from different view points and generating actual two-dimensional image data thereof [and] a virtual image generating section having a plurality of virtual CCD cameras corresponding to the actual CCD cameras.” *Id.* at code (57).

The “machining status monitoring apparatus” of Mori has “a plurality of actual CCD cameras” to “generate two-dimensional image data (actual image data)” of “the tool . . . and the workpiece.” *Id.* ¶¶ 43, 49. In addition, “virtual CCD cameras . . . are respectively arranged at the same positions and in the same orientations as the actual CCD cameras,” with “the view points of the virtual CCD cameras . . . match[ing] the view points of the actual CCD cameras.” *Id.* ¶ 62.

3. *Analogous-Art Status of Mori*

To properly include a reference in an obviousness analysis, the reference must be analogous art to the claimed invention. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). For a reference to be analogous art, it must be “either in the field of the applicant's endeavor or [be] reasonably pertinent to the problem with which the inventor was concerned.” *In re Kahn*, 441 F.3d 977, 986-87 (Fed. Cir. 2006) (citing *In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992)). “A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have

commended itself to an inventor's attention in considering his problem.” *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992).

Patent Owner argues that Mori is not analogous art to the claimed invention here. Prelim. Resp. 30–34. Petitioner does not address the question of whether Mori is analogous art, other than a statement that Mori is “directed to ‘three-dimensional fabrication’ systems, which is the same field identified in the ’324 patent.” Pet. 12 (citing Ex. 1001, 1:14–20). On the present record, we are persuaded sufficiently for the purpose of this decision that Mori is analogous art to the challenged patent. We address each of Patent Owner’s arguments to the contrary below.

Patent Owner argues that Petitioner “fail[s] to explain why *Mori* is in the same field of endeavor” as the ’324 patent, which “is fatal to its bare, unsupported assertion.” Prelim. Resp. 32. But “[a] petitioner is not required to anticipate and raise analogous art arguments in its petition; instead a petitioner can use its reply’ to respond to, for example, arguments raised in a patent owner response.” *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1009 (Fed. Cir. 2023) (quoting *Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc.*, 66 F.4th 1373, 1379 (Fed. Cir. 2023)).

Patent Owner also argues that “*Mori* is not in the same field of endeavor as the ’324 Patent” because the field of endeavor of the challenged patent “is specific to additive manufacturing,” and “*Mori* is directed to a *destructive machining tool*.” Prelim. Resp. 32–34. On the present record, we are not persuaded that the field of endeavor of the ’324 patent is limited to additive manufacturing. Although the ’324 patent discusses three-dimensional printing and other “additive fabrication processes including without limitation selective laser sintering [and] fused deposition modeling,”

it notes that these processes are merely examples of the wider category of “three-dimensional fabrication processes.” Ex. 1001, 2:1–6. Moreover, the ’324 patent states that “the principles of the invention may be adapted to” this wider category of processes and that “[t]he invention relates to three-dimensional fabrication using networked resources,” the same wider category that it distinguishes from the narrower category of “additive manufacturing processes.” *Id.* at 1:14–15, 2:1–4.

In addition, Patent Owner does not address whether Mori is a reference that, “because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.” *Clay*, 966 F.2d at 659. On the present record, we are persuaded that, even if Mori falls outside of the field of endeavor of the ’324 patent, it logically would have come to the attention of the inventor in considering the problem solved by that patent. Mori relates to “[a] machining status monitoring apparatus” for “a machine tool,” which is similar to the “manag[ing] use of distributed fabrication resources” and “user may visually monitor progress or status of a remote print job” of the ’324 patent. Ex. 1001, 1:37–38, 22:41–60; Ex. 1005, code (57). Moreover, Mori teaches using “a plurality of actual CCD cameras for imaging the tool and workpiece from different view points and generating actual two-dimensional image data thereof” and “a plurality of virtual CCD cameras corresponding to the actual CCD cameras, in which the tool and workpiece of the three-dimensional model are imaged by the virtual CCD cameras,” which is quite similar to the “visualization area . . . show[ing] a simulated print object, such as a rendering of a three-dimensional model depicting a current state of the completion of an object being fabricated according to a print job”

and the “visualization area . . . show[ing] an image of a working volume of a three-dimensional printer or other fabrication resource captured during execution of the print job,” such as by showing “a video image captured from a video camera at the three-dimensional printer” of the ’324 patent. Ex. 1001, 22:41–60; Ex. 1005, code (57).

We encourage the parties to develop the arguments and the record surrounding the analogous-art status of Mori further during the trial.

4. *Analysis of Claim 1*

- a) *Disputed Limitation: “the processor further configured to . . . present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera”*

Claim 1 recites “the processor further configured to . . . present in the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.” Ex. 1001, 27:29–35. According to Petitioner, Mori “displays virtual images of the model as if captured from ‘virtual CCD cameras’ that ‘are respectively arranged at the **same positions** and in the **same orientations** as the actual CCD cameras,” and Mori teaches a “user interface [that] displays the actual image data from the actual CCD cameras [and] the virtual image dat[a].” Pet. 22–23 (quoting Ex. 1005 ¶¶ 61–62, 70, 74–76, Figs. 4, 7, 10).

Patent Owner argues that this argument fails to the extent that it is intended to argue that displaying either the actual camera images or the virtual camera images, but not both at the same time, is sufficient to teach the subject matter of the recited limitation. Prelim. Resp. 37–42. According

to Patent Owner, Mori teaches displaying only one of “actual image data, virtual image data, *or* sectional image data” at a time, but claim 1 of the ’324 patent requires displaying both actual image data and virtual image data simultaneously. *Id.*

On the present record, we are not persuaded by Patent Owner’s argument that Petitioner has failed to show sufficiently that Mori teaches the recited limitation of claim 1. The plain language of the claim does not recite any requirement that the “image of the build volume from the video camera and [the] two-dimensional projection of the three-dimensional model from the point of view of the video camera” be presented simultaneously, only that they both be presented. Ex. 1001, 27:29–35. In addition, the specification of the ’324 patent states that “visualization area 510” within “user interface 500” “may display a current tool path of the printer that is executing the print job,” “may ***also or instead*** show a simulated print object, such as a rendering of a three-dimensional model depicting a current state of the completion of an object being fabricated,” or “may ***also or instead*** show a image of a working volume of a three-dimensional printer or other fabrication resource captured during execution of the print job.” Ex. 1001, 22:41–60 (emphases added). This language appears to envision non-simultaneous display of the virtual and actual image data.

Patent Owner directs us to the prosecution history of the ’324 patent, which includes an argument from the applicant that Taminger, a reference applied in a rejection, fails to teach or suggest “applicant’s claimed user interface, which provides both video and model views *from the same point of view* in order to permit side-by-side comparison of model and results by a remote user.” Ex. 1002, 161; *see* Prelim. Resp. 38. The examiner accepted

the argument that Taminger taught “all the limitation[s] except having a device comprising: *presenting the user interface an image of the build volume from the video camera and a two-dimensional projection of the three-dimensional model from the point of view of the video camera.*”

Ex. 1002, 174. According to Patent Owner, this “confirms that the user interface must present both an image and projection from the same perspective to permit comparison by, for example, a remote user.” Prelim. Resp. 38. We agree, at least on the present record, that, in Patent Owner’s words, “the user interface must present both an image and projection from the same perspective to permit comparison by, for example, a remote user,” but the examiner’s language does not contain any reference to the display of the two images needing to be simultaneous.

Thus, on the present record, the claim language, the language of the specification, and the prosecution history all permit non-simultaneous display of the actual image data and the virtual image data. For the reasons Petitioner lists, Mori teaches such non-simultaneous display. Ex. 1005 ¶ 62 (“[T]he virtual CCD cameras 19, 20, 21 and 22 are respectively arranged at the same positions and in the same orientations as the actual CCD cameras 11, 12, 13 and 14”; “the view points of the virtual CCD cameras 19, 20, 21 and 22 match the view points of the actual CCD cameras 11, 12, 13 and 14, respectively”), 70 (“The display-image switching section 25 . . . switches the image to be displayed between the actual image data, the virtual image data and the sectional image data.”); *see* Pet. 22–23.

In addition, Petitioner argues that, even if claim 1 requires simultaneous display of the virtual and actual image data, doing so would have been obvious in light of the combined teachings of Mori and

Mazumder because “the presentation of both image types would have beneficially aided the remote user to more easily visually compare the actual image and virtual image to quickly identify any defects or problems with the fabrication process.” Pet. 23–24 (citing Ex. 1003 ¶ 113). Patent Owner argues that “it is hindsight to use ‘the invention to define the problem the invention solves.’” Prelim. Resp. 43 (quoting *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1377 (Fed. Cir. 2012); citing *AT&T Services Inc. et. al. v. Innovative Sonic Ltd.*, IPR2024-001143 (PTAB Feb. 11, 2025)). According to Patent Owner, because neither Mazumder nor Mori teaches visual comparison of image types, the idea to improve the Mazumder-Mori combination by simultaneously displaying different image types and thus permitting visual comparison must be driven by hindsight. *Id.* at 44–45. But Petitioner cites evidence other than the ’324 patent to support the person of ordinary skill in the art having a desire to visually compare the different images presented in the Mazumder-Mori combination. Pet. 23–24 (citing Ex. 1003 ¶ 113). Specifically, Dr. Wolfe testifies that “the presentation of the actual images captured by the camera and the virtual images simultaneously within the user interface would have beneficially aided the remote user to more easily visually compare the actual image and virtual image to quickly identify any defects or problems with the fabrication process” and that a person of ordinary skill in the art would have recognized this. Ex. 1003 ¶ 113.

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

b) Undisputed Limitations

Claim 1 also recites

1. A device comprising:
 - a three-dimensional printer including a build volume;
 - a network interface coupled to a data network;
 - a video camera positioned to capture video of the build volume from a point of view; and
 - a processor configured to receive a three-dimensional model through the network interface, and to control operation of the three-dimensional printer to fabricate the three-dimensional model as an object within the build volume of the three-dimensional printer, the processor further configured to provide a user interface to a remote user accessing the device through the network interface

Ex. 1001, 27:20–32. Petitioner argues that the combination of Mazumder and Mori teaches these limitations and that a person of ordinary skill in the art would have had reason to combine the teachings of these references. Pet. 10–25.

After reviewing Petitioner’s arguments and information regarding the limitations identified immediately above, including the Wolfe Declaration, which are not addressed by Patent Owner at this stage (*see* Prelim. Resp. 28–46), we are persuaded that Petitioner sufficiently demonstrates, for purposes of deciding whether to institute trial, that these limitations would have been obvious over the combination of Mazumder and Mori.

c) 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 obvious over the combination of Mazumder and Mori.

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

5. *Claims 3, 5–7, 9, 10, and 19–22*

Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '324 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. 28–46. Those challenges, in our view, are best left for trial after full development of the record.

F. Asserted Obviousness Based on the Combination of Kritchman, Tay, and Henke

Petitioner argues that claims 1, 3, 5–7, 9, 10, and 19–22 of the '324 patent would have been obvious over the combination of Kritchman, Tay, and Henke. Pet. 54–84. Petitioner also argues that claim 4 would have been obvious over the combination of Kritchman, Tay, Henke, and Tian; that claim 8 would have been obvious over the combination of Kritchman, Tay, Henke, and Hull; that claim 11 would have been obvious over the combination of Kritchman, Tay, Henke, and Seki; that claim 17 would have been obvious over the combination of Kritchman, Tay, Henke, and Waehner; that claim 18 would have been obvious over the combination of Kritchman, Tay, Henke, and Lan; and that claims 3, 5, 9, 10, and 20–22 would have been obvious over the combination of Kritchman, Tay, Henke, and Anderson. *Id.* at 84–98.

Because Petitioner demonstrates a reasonable likelihood of success in proving that at least one claim of the '324 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 challenges based on the combination of Kritchman, Tay, and Henke, 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 '324 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, 3–11, and 17–22 of the '324 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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Patent 8,562,324 B2

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