

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,
Petitioner,

v.

STRATASYS, INC.,
Patent Owner.

IPR2025-00438
Patent 10,569,466 B2

Before MITCHELL G. WEATHERLY, CHRISTOPHER L. OGDEN, and
LILAN REN, *Administrative Patent Judges*.

REN, *Administrative Patent Judge*.

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

I. INTRODUCTION

Shenzhen Tuozhu Technology Co., Ltd. (“Petitioner”) filed a Petition requesting *inter partes* review of claims 1–5, 7–13, and 16–20 (“the challenged claims”) of U.S. Patent No. 10,569,466 (Ex. 1001, “the ’466 patent”). Paper 2 (“Pet.”). Petitioner filed a declaration of Dr. Michael Hickner (Ex. 1003) in support of the Petition. Stratasy, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. See 35 U.S.C. § 314 (2024); 37 C.F.R. § 42.4(a) (2024). Institution of an *inter partes* review requires that “the information presented in the petition . . . and any response . . . 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). For the reasons set forth below, we determine that there is a reasonable likelihood that Petitioner will prevail with respect to at least one challenged claim, and we institute an *inter partes* review.¹

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies itself as a real party in interest, and notes that Bambulab Limited, Shanghai Lunkuo Technology Co. Ltd., Tuozhu Technology Limited, and Bambulab USA Inc. are potential real parties in interest. Pet. 85. Patent Owner identifies itself and Stratasy Ltd. as real parties in interest. Paper 4, 2 (Patent Owner Mandatory Notices).

¹ The case was referred to the Board panel to consider the merits and non-discretionary considerations. Paper 10, 2.

B. Related Matters

Petitioner indicates that the '466 patent is involved in *Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.*, No. 2:24-cv-00645 (E.D. Tex.) which has been consolidated with No. 2:24-cv-00644 (E.D. Tex.) involving the same parties. Pet. 85–86; *see also* Paper 4, 2. Both parties indicate that the '466 patent is also involved in Civil Action No. 1:24-cv-01511, which is pending in the U.S. District Court for the Western District of Texas, Austin Division. Pet. 86; *see also* Paper 4, 2. Petitioner also states that the parties are involved in IPR2025-00257, IPR2025-00311, IPR2025-00321, IPR2025-00354, IPR2025-00531, and IPR2025-00532 whereas Patent Owner states that the parties are additionally involved in IPR2025-00585 and IPR2025-00611. Pet. 86; Paper 4, 2.

C. The '466 Patent

The '466 patent, titled “Tagged Build Material For Three-Dimensional Printing,” relates to “three-dimensional printers [which] use build material of various type and configuration to print three-dimensional objects.” Ex. 1001, 1:16–18. “In order to properly process the build material through the three-dimensional printer extruder for the fabrication of an object, the three-dimensional printer controller may need at least a basic set of characteristics of the build material to determine operation.” *Id.* at 1:18–22. To obtain these characteristics, the '466 patent provides that “[a] supply of build material such as a spool or cartridge is instrumented with a data tag that includes information about the build material. A three-dimensional printer can read the information from the tag and determine how to use the build material during fabrication of a three-dimensional object.” *Id.* at 1:29–33.

In particular, the '466 patent provides a process which “can dramatically simplify use of a three-dimensional printer by automating those aspects of printer configuration that depend on the type of build material being used.” *Id.* at 22:24–27. As a result, “a user may simply load a build material [sic.] from a suitably instrumented container and select an object to print without specifying various configuration details that might otherwise be required.” *Id.* at 22:27–31. Figure 6 reproduced below is a flowchart of such a process:

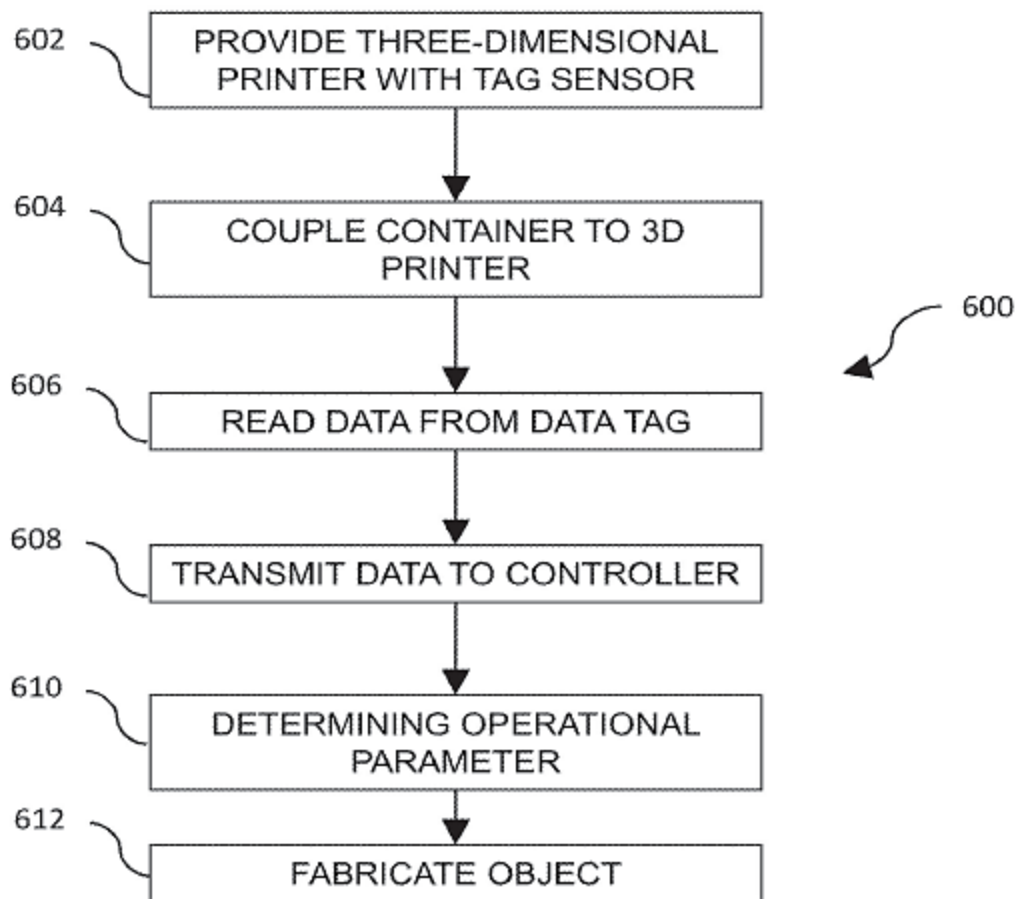


Fig. 6

As Figure 6 illustrates, step 602 includes “providing a three-dimensional printer with a controller and a tag sensor.” Ex. 1001, 20:64–66. Step 604 includes “coupling a container with a data tag to the three-dimensional printer.” *Id.* at 21:5–7. Such a “data tag may be a radio frequency identification (RFID) tag” and the like which “may store information about the build material such as a property of the build material in the container.” *Id.* at 21:7–13. The stored information may include “mechanical or structural properties of the build material, thermal properties of the build material (including phase change data), aesthetic properties of the build material, or any other properties useful for determining operational parameters.” *Id.* at 21:15–20.

Upon reading the data from the data tag at step 606 and transmitting the data from the tag sensor to the controller at step 608, “determining an operational parameter for the fabrication of an object by the three-dimensional printer based on data from the data tag” takes place at step 610. *Id.* at 21:39–45, 21:50–53. Such parameters may include “an extruder temperature, a feed rate, a build platform temperature, a build volume temperature, a build platform temperature, an infill requirement, a rafting requirement, a support structure requirement, an extruder movement speed, and a cooling requirement.” *Id.* at 21:58–61. “In one embodiment, the controller may make the determination of operational parameters using only the data from the data tag” *Id.* at 15:25–27. “For example, the data tag 304 may explicitly specify an extruder temperature and the controller may use the extruder temperature as an operational parameter” *Id.* at 15:27–30. Alternatively, the data tag “may identify a type of build material and the controller may calculate a suitable extruder temperature based on the type. Similarly, the controller may calculate other operational parameters such as

build platform temperature, feed rate, cooling parameters, build chamber heating parameters, and so forth.” *Id.* at 15:30–35. Lastly, “[a]s shown in step 612, the method 600 may include fabricating an object while using the operational parameter(s) to control operation of a three-dimensional printer.” *Id.* at 22:21–24.

D. Illustrative Claim

Of the challenged claims, claims 1 and 19 are independent. Claim 1 and claim 19, each reproduced below with bracketed reference letters corresponding to those used by Petitioner, are illustrative of the claimed subject matter.

1. [p] A method comprising:
 - [a] providing a three-dimensional printer that includes a tag sensor;
 - [b] receiving a request from a client over a network to fabricate an object on the three-dimensional printer;
 - [c] the three-dimensional printer coupled to a supply of a build material including a tag that stores at least one property of the build material;
 - [d] reading data from the tag with the tag sensor;
 - [e] providing the data from the tag to the client over the network, the data including at least one property of the build material;
 - [f] receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag; and
 - [g] fabricating the object with the build material according to the one or more operational parameters.

19. [p] A method comprising:
 - [a] providing a three-dimensional printer that includes a controller and a tag sensor;

[b] coupling a container of a build material to the three-dimensional printer, the container including a tag that stores at least one property of the build material;
[c] reading data from the tag with the tag sensor;
[d] transmitting the data to the controller;
[e] determining an operational parameter for configuring the three-dimensional printer for a fabrication process using the build material based upon at least one property of the build material in the data, the operational parameter including at least one of a build platform temperature, a build volume temperature, an infill requirement, a rafting requirement, a support structure requirement, and a cooling requirement;
[f] controlling operation of the three-dimensional printer with the controller according to the operational parameter;
and fabricating an object with the three-dimensional printer based upon the operational parameter.

Ex. 1001, 23:31–50; 24:54–25:7; *see* Pet. v, vii (providing Petitioner’s claim labeling).

E. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1A	1–5, 7–13, 16, 18, 20	103(a) ²	Loughran, ³ Dubois ⁴
1B	1–5, 7–13, 16, 18, 20	103(a)	Loughran, Dubois, Jazayeri ⁵
1C	5	103(a)	Loughran, Dubois, KISSlicer ⁶
1D	5	103(a)	Loughran, Dubois, Jazayeri, KISSlicer
1E	17	103(a)	Loughran, Dubois, Menchik, Dahlin ⁷

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), amended 35 U.S.C. §102 and § 103, effective March 16, 2013. The ’466 patent claims priority to an earlier provisional application (filed on October 29, 2012). Petitioner argues that the ’466 patent is not entitled to the earlier priority date without explanation, yet Petitioner still applies the pre-AIA version of § 102. Pet. 2. Thus, we apply the pre-AIA versions of §§ 102 and 103.

³ Loughran, US 2006/0091199 A1, published May 4, 2006, filed Oct. 29, 2004 (Ex. 1004). Petitioner contends that Loughran is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

⁴ Dubois, US 2008/0192074 A1, published August 14, 2008, filed August 17, 2004 (Ex. 1005). Petitioner contends that Loughran is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

⁵ Jazayeri, US 2011/0299110 A1, published December 8, 2011, filed March 16, 2010 (Ex. 1010). Petitioner contends that Loughran is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(a). Pet. 2.

⁶ KISSlicer, KISSlicer Quick Start Guide, published February 15, 2012 (Ex. 1018). Petitioner contends that Loughran is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(a). Pet. 2.

⁷ Dahlin, US 6,022,207, issued Feb. 8, 2000, filed Jan. 26, 1998 (Ex. 1011). Petitioner contends that Dahlin is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1F	17	103(a)	Loughran, Dubois, Menchik, Jazayeri, Dahlin
2	19	103(a)	Devos ⁸
3A	1, 3–5, 7, 9–11, 19, 20	102/103(a)	Menchik ⁹
3B	1, 3–5, 7, 9–11, 20	103(a)	Menchik, Jazayeri
3C	2, 8, 12, 16	103(a)	Menchik, Loughran
3D	2, 8, 12, 16	103(a)	Menchik, Jazayeri, Loughran
3E	17	103(a)	Menchik, Dahlin
3F	17	103(a)	Menchik, Jazayeri, Dahlin
3G	5	103(a)	Menchik, KISSlicer
3H	5	103(a)	Menchik, Jazayeri, KISSlicer

Pet. 1–2.

III. ANALYSIS

A. *Legal Standards*

A claim is 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) (citation omitted). 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*

⁸ Devos, US 2007/0026102 A1, published February 1, 2007, filed July 28, 2005 (Ex. 1008). Petitioner contends that Loughran is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

⁹ Menchik, US 2006/0127153 A1, published June 15, 2006, filed Nov. 12, 2003 (Ex. 1009). Petitioner contends that Menchik is prior art to the ’466 patent under pre-AIA 35 U.S.C. § 102(b). Pet. 2.

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 subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” The question of obviousness is resolved based on 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 presented, objective evidence of obviousness or nonobviousness, i.e., secondary considerations.¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

The obviousness inquiry typically requires an analysis of “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring the adjudicator to provide “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). A patent claim “is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *Id.* In particular, “[a]lthough the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references . . . without any explanation as to *how* or *why* the references would be combined to produce the claimed

¹⁰ Neither party presents evidence or arguments regarding objective evidence of non-obviousness. *See* Pet.; Prelim. Resp.

invention.” *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (alteration in original) (quoting *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012) (emphases added)).

“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 Technology, Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)); *see also Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016). Therefore, to prevail in an *inter partes* review, Petitioner must explain how the proposed combinations of prior art would have rendered the challenged claims unpatentable. At this preliminary stage, we determine whether the information presented in the Petition shows there is a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have been anticipated by the prior art or rendered obvious over the proposed combinations of prior art. *See* 35 U.S.C. § 314(a).

B. Level of Ordinary Skill in the Art

Determining whether an invention would have been obvious under 35 U.S.C. § 103 requires resolving the level of ordinary skill in the pertinent art at the relevant time. *Graham*, 383 U.S. at 17. The person of ordinary skill in the art is a hypothetical person who knows the relevant art. *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995). Factors in determining the level of ordinary skill in the art include the types of problems encountered in the art, the sophistication of the technology, and educational level of active workers in the field. *Id.* One or more factors may predominate. *Id.*

Petitioner contends that a person of ordinary skill in the art in the field in the relevant time frame 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. 6 (citing Ex. 1003 ¶ 20). Petitioner also contends that “[a]dditional experience could substitute for a formal degree or formal training (and vice versa).” *Id.* (citing the same).

Patent Owner contends that an ordinarily skilled artisan “would have had a bachelor’s degree in Mechanical Engineering, Computer Engineering, Electrical 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. 11–12.

For purposes of this decision, we adopt Petitioner’s definition of the level of ordinary skill in the art as it appears unopposed and consistent with the disclosures of the ’466 patent and the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

C. Claim Construction

In an *inter partes* review, we apply the same claim construction standard as would be used by a district court to construe a claim in a civil action involving the validity or infringement of a patent. 37 C.F.R. § 42.100(b). Under that standard, claim terms are given their ordinary and customary meaning, as would have been understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history of record. *Id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–19 (Fed. Cir. 2005) (en banc); *Thorner v. Sony Comput. Entm’t Am. LLC*, 669 F.3d 1362, 1365–66 (Fed. Cir. 2012). “The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the

controversy.” *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (quoting *Vivid Techs., Inc. v. Am. Sci. Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

At this stage of the proceeding, neither party contends that any formal claim construction is necessary. *See* Pet. 6 (“Petitioner submits that no claim terms require a formal construction for purposes of evaluating the prior art and resolving issues this proceeding.”); Prelim. Resp. 12 (“For the purposes of this Preliminary Response, Patent Owner submits that the Board does not need to construe any claim terms in any particular way to conclude that the Petition is deficient and thus institution of review is not warranted.”). After reviewing the parties’ respective arguments and the evidence currently before us, however, we determine that we do not need to expressly construe any claim term to resolve any controversy at this stage of the proceeding.

D. Alleged Obviousness Over Loughran and Dubois (Ground 1A)

Petitioner alleges claims 1–5, 7–13, 16, 18, and 20 of the ’466 patent would have been obvious over Loughran and Dubois. Pet. 7–28. Patent Owner contends in response that there is no motivation to combine the references and that the proposed combination does not teach various claim elements. Prelim. Resp. 15–28.¹¹

As explained in more detail below, having considered the arguments and evidence before us at this preliminary stage, we find that the current record establishes a reasonable likelihood that Petitioner would prevail on claim 1, in this asserted ground of unpatentability.

¹¹ The Preliminary Response generally italicizes the names of the references. Unless otherwise noted, our quotations of the Preliminary Response do not reproduce such italicization of reference names.

1. *Loughran*

Loughran, titled “Retrieving Information on Material Used in Solid Freeform Fabrication,” describes certain solid freeform fabrication or SFF systems and “material 112 from which physical objects can be fabricated” at the SFF system. Ex. 1004 ¶ 20. The SFF system includes “first SFF system 102 and the material information server 108” and “second SFF system 104” to which “the first SFF system 102 may be considered a client” because “the first SFF system 102 provides SFF jobs to the second SFF system 104, and the second SFF system 104 fabricates these jobs.” *Id.* ¶ 12. “[T]he SFF systems are able to retrieve information regarding materials from the material information server” *Id.* ¶ 5.

The SFF system also includes “tag 114 [which] may be a bar code tag having a bar code encoding the unique material identifier of the material 112.” *Id.* ¶ 21. The SFF system “is able to recognize the material 112 being introduced thereinto” “[b]ased on the material identifier of the tag 114.” *Id.* ¶ 20. The SFF system may request and retrieve information regarding material 112 from the material information server “based on the unique material identifier with which the material 112 is associated.” *Id.* ¶ 22. Such retrieved information “may include material data sheet (MDS) information regarding the material 112, including safety, storage, and other information that is more pertinent to the users of” the SFF system. *Id.* ¶ 25. “Thus, the information retrieved from the material information server 108 regarding the material 112 may be both information on which basis the second SFF system 104 dynamically adjusts its own parameters for fabricating physical objects from the material 112, as well as information intended for user education.” *Id.*

These parameters may include the operating temperature that the second SFF system 104 needs to achieve to melt the material, the temperature that the second SFF system 104 needs to maintain to store the material, the length of time to wait after one layer of the material has been fabricated before processing the next layer, and so on.

Id.

2. *Dubois*

Dubois, titled “Method and Device for The Production of a Three-Dimensional Multi-Material Component by Means of Ink-Jet-Type Printing,” provides means for the “production of three-dimensional structures consisting of a plurality of different materials.” Ex. 1005 ¶ 21. According to Dubois, “[c]onventionally, the production of a component is preceded by a stage of computer-aided design which involves producing a three-dimensional (hereinafter ‘3D’) representation of this object on the basis of a specification assembling all the requirements and properties to be fulfilled thereby.” *Id.* ¶ 57. The invention in Dubois “determines a set of printing characteristic” based on such “3D representation and the specification.” *Id.* ¶ 58. For example, Dubois describes “an algorithm for seeking an optimum printing order for the layers [of a 3D product] which takes into account all of the printing characteristics of the print layers.” *Id.* ¶ 120.

The device in Dubois includes a printer and data processing unit 105 which controls various components of the printer. *See, e.g., id.* ¶¶ 130, 132 (data processing unit 105 controlling unidimensional displacement plates of the printer), 136 (data processing unit 105 controlling nozzles). Data processing unit 105 includes “database 199 [which] contains . . . the choice of optimum values of printing parameters as a function of the nature of the

materials, the characteristics of the printer and the deposition conditions.” *Id.* ¶ 148.

3. *Reasons to Combine and Reasonable Expectation of Success*

Petitioner argues that a skilled artisan would have combined Loughran with Dubois “so that the SFF printer 104 uses—for each individual fabrication job—the ‘optimum values of printing parameters as a function of the nature of the materials, the characteristics of the printer and deposition conditions.’” Pet. 11 (citing Ex. 1005 ¶ 149; Ex. 1003 ¶ 46). Petitioner argues that Dubois’s teaching regarding the “importan[ce] to control the nature of the materials in the printer to provide materials having the properties required for printing and to use the various functions of the printer optimally” provides motivation to combine “so that various functions of the SFF printer 104 are optimally utilized for each individual fabrication job.” Pet. 12 (citing Ex. 1005 ¶ 11; Ex. 1003 ¶ 47). Petitioner also argues that “the systems of Loughran and Dubois are each related to systems for fabricating three-dimensional objects in a layer-by-layer manner, which is the same as the ’466 patent,” and combining the prior art teachings “would have been merely the application of known techniques to a known system ready for improvement to yield predictable results.” Pet. 12 (citing Ex. 1003 ¶ 48; *KSR*, 550 U.S. at 417).

Patent Owner argues that Petitioner’s proposed combination “would alter the principles of operation of Loughran and render Loughran inoperable for its intended purpose.” Prelim. Resp. 22. Quoting various passages of Loughran related to its teaching of automatically and dynamically adjusting the printing operation, Patent Owner argues that “Petitioner’s proposed combination eviscerates these teachings of automatic and dynamic adjustments” “replacing the SFF system’s ability to

automatically and dynamically adjust its own parameters . . . with waiting for the CAD client to adjust parameters based on material information and simply setting parameters as instructed by the client.” *Id.* at 21–22. Patent Owner argues that because Dubois “teaches an isolated solution with only one printer that includes its own data processing unit to determine the layers to be printed successively and all of the printing parameters,” Dubois does not provide any motivation to be combined with Loughran’s “networked SFF system/printer that can access a server and another SFF system/printer.” *Id.* at 22. Patent Owner also argues that “[t]here is no teaching or suggestion in Dubois of how its solution for a non-subtractive solution would apply to or benefit Loughran’s subtractive solution, nor does Petitioner provide any explanation.” *Id.* at 23. Based on these differences between Loughran and Dubois, Patent Owner argues that “there is no motivation to use ‘optimum values’ or achieve ‘optimal use’ of various printer functions by looking to Dubois as Petitioner asserts.” *Id.*

The record before us supports Petitioner’s contention that the combining Loughran and Dubois is no more than a “combination of familiar elements according to known methods . . . [which] does no more than yield predictable results.” *Compare* Pet. 12, *with* Prelim. Resp. 19–23 (disputing some of Petitioner’s reasons to combine without addressing Petitioner’s reasoning based on *KSR*); *see KSR*, 550 U.S. at 416. By contrast, Patent Owner’s contentions relating to the alleged motivation to combine teachings of Loughran and Dubois lack evidentiary support.

Based on our review and consideration of the current record, we are persuaded that Petitioner has adequately shown for purposes of institution that there is sufficient rationale to combine as well as a reasonable

expectation of success in combining the teachings of Loughran and Dubois in the manner suggested.

4. *Analysis of Independent Claim 1*

a) elements 1p, 1a, 1c–1e, 1g

Petitioner argues that claim elements 1p, 1a, 1c–1e, and 1g are taught or suggested by the combination of Loughran and Dubois. Pet. 13–16, 18–23, 26–28. Patent Owner does not contest these arguments. Prelim. Resp. 24–28.

Based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that the combination of Loughran and Dubois teaches these claim elements, for purposes of institution.

b) element 1b: “receiving a request from a client over a network to fabricate an object on the three-dimensional printer”

Petitioner contends that Loughran teaches client system 102 and SFF system 104 which “are communicatively coupled to one another via a network 106.” Pet. 17 (citing Ex. 1004, Fig. 1, ¶¶ 12, 48, 49). Petitioner contends that SFF system 104 receives “SFF fabrication jobs over the network” from system 102. *Id.* at 18. Petitioner argues that Loughran teaches claim element 1b because “Loughran’s SFF fabrication job corresponds to a request to fabricate an object on the three-dimensional printer.” *Id.* (citing Ex. 1003 ¶ 53).

Patent Owner argues that Petitioner does not explain why the combination of Loughran and Dubois teaches this claim element. Prelim. Resp. 24. Patent Owner argues that Petitioner only relies on “declaration of Petitioner’s expert” and does not cite to additional evidence to establish that

Loughran alone teaches this claim element. *Id.* Patent Owner also argues that “Petitioner tacitly admits that Loughran’s SFF fabrication job is not a request to fabricate an object on the three-dimensional printer by introducing another ground (Ground 1B) to address the deficiencies.” *Id.* at 25. Patent Owner argues that Loughran does not describe the fabrication job as a “request” because “Loughran repeatedly describes requests in other contexts, such as requesting information about the material.” *Id.* (citing Ex. 1004 ¶¶ 22, 28, 31).

The record before us shows that Petitioner cites various portions of Loughran to reach the assertion that “Loughran’s SFF fabrication job corresponds to a request to fabricate an object on the three-dimensional printer.” Pet. 17–18 (citing Ex. 1004 ¶¶ 5, 12, 44, 48–50). Patent Owner’s contention that Petitioner’s obviousness analysis for element 1b lacks citation to the record is therefore unsupported. The fact that Petitioner asserts an alternative ground to challenge the patentability of claim 1 does not, in and of itself, show that Loughran alone fails to teach this claim element. We also note that Patent Owner’s contention regarding Loughran’s use of the word “request” in contexts other than a fabrication job does not establish that Loughran does not teach or suggest “receiving a request from a client over a network to fabricate an object on the three-dimensional printer” as claim element 1b requires.

Based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that the Loughran teaches claim element 1b, for purposes of institution.

- c) element 1f: “receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when

fabricating the object with the build material having the at least one property stored in the tag”

Petitioner contends that

Loughran’s client system 102 “receive[s] the information regarding the material 112. For instance, the [client] system 102 may have CAD software running thereon to generate SFF fabrication jobs outlining the fabrication of physical objects by the second SFF system 104 from materials, like the material 112. The [client] system 102, such as its CAD software, may have to have the information regarding the material 112 so that ***the SFF fabrication jobs can be accurately generate[d] for ultimate fabrication of physical objects from the material 112.***

Pet. 23 (alterations in original). Petitioner contends that Dubois describes a “design process [that] includes ‘establishing a set of printing parameters as a function of the nature of the materials deposited and the deposition conditions thereof for each print layer and for each discrete spatial trajectory.’” *Id.* at 25. Petitioner argues that a skilled artisan would have combined Loughran with Dubois to “enable[] Loughran’s system to complete each fabrication job based on CAD information with the optimal set of material parameters.” *Id.* at 26.

Patent Owner first argues that Loughran alone does not teach claim element 1b. Prelim. Resp. 27. Because Petitioner’s asserted unpatentability is based on the combined teachings of Loughran and Dubois, Patent Owner’s argument based on Loughran alone is unpersuasive. Patent Owner’s argument regarding the combined teachings of Loughran and Dubois is essentially based on the same arguments regarding motivation to combine. *See id.* at 27 (referring to the section of the Preliminary Response titled “There is No Motivation to Combine *Loughran* and *Dubois*”). As our analysis regarding motivation to combine shows above, we are persuaded

that Petitioner has adequately shown for purposes of institution that there is sufficient rationale to combine with a reasonable expectation of success in combining the teachings of Loughran and Dubois in the manner suggested.

5. Conclusion of Independent Claim 1 (Ground 1A)

We determine that Petitioner establishes, at this time, that the combination of Loughran and Dubois teaches or suggests all elements of claim 1. Petitioner also sufficiently establishes, at this time, that one of skill in the art would have been motivated with a reasonable expectation of success to combined these references.

For these reasons and others set forth above, we find that Petitioner has sufficiently demonstrated, based on the current record, that the combination of Loughran and Dubois teaches each of the limitations of claim 1 and that the information presented in the Petition demonstrates a reasonable likelihood that claim 1 is unpatentable under 35 U.S.C. § 103 over that combination.

E. Alleged Obviousness Over Loughran, Dubois, Jazayeri (Ground 1B)

Petitioner alleges claims 1–5, 7–13, 16, 18, and 20 of the '466 patent would have been obvious over Loughran, Dubois, and Jazayeri. Pet. 33–36. Patent Owner contends in response that Jazayeri is non-analogous art, that there is no motivation to combine the references, and that the proposed combination does not teach various claim elements. Prelim. Resp. 29–34.

As explained in more detail below, having considered the arguments and evidence before us at this preliminary stage, we find that the current record establishes a reasonable likelihood that Petitioner would prevail on claim 1, in this asserted ground of unpatentability.

1. Jazayeri

Jazayeri, titled “Cloud-Based Print Service,” describes

A print server may include an application manager configured to receive a print request over a network from an application executing on a device, and configured to provide, over the network, a print dialog to a user of the application, the print dialog configured to provide for a selection of at least one printer associated with a user account of the user and thereafter receive a selected printer from the selection.

Ex. 1010, Abs. Jazayeri seeks to address certain issues involved with “conventional printers and printing paradigms [which] often provide a fragmented, expensive, resource-intensive, potentially unpredictable user experience which is suboptimal at best and unworkable at worst for many users.” *Id.* ¶ 7.

2. *Analogous Art*

Patent Owner argues that Jazayeri is non-analogous art because it “relates to two-dimensional printers” which is not in the same field of endeavor of the three-dimensional printers in the ’466 patent. Prelim. Resp. 29. The record before us, however, does not clearly show that Jazayeri is limited to two-dimensional printers and excludes three-dimensional printers. Patent Owner cites various passages of Jazayeri in support of the contention that Jazayeri discloses “two-dimensional printers . . . that can print on paper.” *Id.* at 28 (citing Ex. 1010 ¶¶ 2, 5, 24, 27, 70). Although some of these cited passages describe certain conventional printers with “print characteristics” such as “a designation of one-sided versus two-sided printing, paper size, paper tray, color versus black-and-white, and various other such well-known print characteristics” (Ex. 1010 ¶¶ 2, 70), these cited passages do not exclude three-dimensional printers. Moreover, Patent Owner’s argument that Jazayeri is not pertinent to the problem faced by the inventor because Petitioner’s definition of the ordinary skill includes

“experience in 3D printing” (Prelim. Resp. 30) is unpersuasive. We decline to conflate the level of ordinary skill with the inquiry of whether a reference is analogous art.

Based on the record before us, we conclude that Petitioner has sufficiently established that Jazayeri is analogous art at this stage of the proceeding.

3. Reasons to Combine and Reasonable Expectation of Success

Petitioner argues that combining Jazayeri with Loughran may allow users to “benefit from increased printing options and abilities” based on Jazayeri’s teaching of “an ability for virtually any application running on any device within the network 106 . . . to communicate with the cloud print service 102 to thereby print to any printer which is also in (direct or indirect) communication with the cloud print service 102.” Pet. 35 (citing Ex. 1010 ¶ 28). Petitioner argues that the combination would allow a user to “use software that is not printer specific for generating the SFF fabrication job” based on Jazayeri’s teaching of a “cloud-aware printer.” Pet. 35 (citing Ex. 1010 ¶ 24, Ex. 1003 ¶ 98); *see also* Pet. 36 (citing Ex. 1003 ¶ 99). Petitioner also argues because both Loughran and Jazayeri are related to a “networked printing environment,” combining these prior art teachings “would have been merely the application of known techniques to a known system ready for improvement to yield predictable results.” Pet. 36 (citing Ex. 1003 ¶ 100; *KSR*, 550 U.S. at 417).

Patent Owner argues that Petitioner “fails to explain how Jazayeri’s suggestion would have worked in the combined system.” Prelim. Resp. 32. Patent Owner argues that instead of modifying Loughran with a printer server, Petitioner “asserts that Loughran’s SFF system would have been implemented with the functionality of a print server” without explanation.

Id. Patent Owner argues that Petitioner relies on Jazayeri’s components that are not part of the combination to support the motivation to combine. *Id.* Patent Owner also argues that a skilled artisan would not have combined Dubois’s “printer-specific implementations” with Jazayeri’s “printer-agnostic implementations.” *Id.* at 32–33.

The record before us supports Petitioner’s contention that the proposed combination of Loughran, Dubois, and Jazayeri is no more than a “combination of familiar elements according to known methods . . . [which] does no more than yield predictable results.” *Compare* Pet. 36, *with* Prelim. Resp. 31–33 (disputing some of Petitioner’s reasons to combine without addressing Petitioner’s reasoning based on *KSR*); *see KSR*, 550 U.S. at 416. All of the components of Jazayeri need not be bodily incorporated into Loughran or Dubois. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 889 (Fed. Cir. 1984). The record before us sufficiently supports Petitioner’s contention that implementing Loughran’s system with a network server to receive a certain request is within the ordinary skill with a reasonable expectation of success.

Based on our review and consideration of the current record, we are persuaded that Petitioner has adequately shown for purposes of institution that there is sufficient rationale to combine with a reasonable expectation of success in combining the teachings of Loughran, Dubois, and Jazayeri in the manner suggested.

4. Analysis & Conclusion of Independent Claim 1 (Ground 1B)

Patent Owner’s arguments regarding the asserted unpatentability of claim 1 based on Loughran, Dubois, and Jazayeri substantially follow the arguments regarding the asserted unpatentability based on Loughran and Dubois set forth *supra*. Prelim. Resp. 33–34. As our analysis shows *supra*,

we determine that Petitioner establishes, at this time, that the combination of Loughran, Dubois, and Jazayeri teaches or suggests all elements of claim 1 and that the information presented in the Petition demonstrates a reasonable likelihood that claim 1 is unpatentable under 35 U.S.C. § 103 over that combination.

F. Alleged Obviousness Over Devos (Ground 2)

Petitioner alleges that claim 19 would have been obvious over Devos. Pet. 42–52. Patent Owner contends that Devos does not teach every element of claim 19. Prelim. Resp. 34–39.

As explained in more detail below, having considered the arguments and evidence before us at this preliminary stage, we find that the current record establishes a reasonable likelihood that Petitioner would prevail on claim 19, in this asserted ground of unpatentability.

1. Devos

Devos, titled “Systems and Methods of Solid Freeform Fabrication with Improved Powder Supply Bins,” seeks to provide “a convenient supply powder packaging” “[b]y using a removable supply bin” so that “unused powder that is contained in the supply bin can be easily removed from the solid freeform fabrication system for disposal or reuse by removing the packaging without the need for powder scooping or vacuuming.” Ex. 1008 ¶¶ 11, 31.

Devos describes a powder supply bin that “include[s] a memory mechanism 146” and the fabrication system may “use the data encoded in or on the memory mechanism 146 to determine certain operating parameters, . . .” *Id.* ¶ 32. These operating parameters include, *inter alia*, “powder settling coefficient (e.g., to determine whether powder supports need to be included, and if so, how much support).” *Id.*

2. Reasons to Modify and Reasonable Expectation of Success

Petitioner contends that a skilled artisan would have found it obvious to implement Devos's system to arrive at claim 19 for multiple reasons with a reasonable expectation of success. Pet. 51–52. Patent Owner does not contest Petitioner's arguments with respect to these reasons. Prelim. Resp. 37–39. Instead, as discussed in more detail below, Patent Owner argues that Devos does not teach one particular claim element, i.e., “support structure requirement.” *Id.* at 37–39.

Based on our review and consideration of the current record, we are persuaded that Petitioner has sufficiently shown for purposes of institution that a person of ordinary skill in the art would have found it obvious to arrive at claim 19 based on Devos's teachings with a reasonable expectation of success.

3. Analysis of Independent Claim 19

a) elements 19p–19d, and 19f

Petitioner argues that Devos teaches or suggests claim elements 19p–19d, and 19f. Pet. 42–52. Patent Owner does not contest these arguments. Prelim. Resp. 37–39.

Based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that the Devos teaches these claim elements, for purposes of institution.

b) element 19e: “determining an operational parameter for configuring the three-dimensional printer for a fabrication process using the build material based upon at least one property of the build material in the data, the operational parameter including at least one of a build platform temperature, a build volume temperature, an

infill requirement, a rafting requirement, a support structure requirement, and a cooling requirement”

Petitioner argues that element 19e is taught by Devos’s fabrication system which “use[s] the data encoded in or on the memory mechanism 146 to determine certain operating parameters” such as “powder settling coefficient (e.g., to determine whether powder supports need to be included, and if so, how much support).” Pet. 49 (citing Ex. 1008 ¶ 32). More specifically, Petitioner argues that a skilled artisan “would have been motivated to implement Devos’s system to determine an operating parameter specifying whether and how much powder supports are needed (a support structure requirement) to fabricate an object with the proper support to prevent portions of the object from collapsing during fabrication.” Pet. 49 (citing Ex. 1003 ¶ 113).

Patent Owner argues that Petitioner “fails to explain why Devos’s disclosure of ‘powder supports’ teaches ‘determining an operational parameter for configuring the three-dimensional printer’ in which the parameter includes a ‘support structure requirement.’” Prelim. Resp. 37. Patent Owner argues that Devos “discloses that only one powder is used to build objects” and because “each layer directly supports each successive layer of the object” in Devos’s process, there is no need for any “support material.” *Id.* at 38 (citing various portions of Ex. 1008). Patent Owner argues that “[w]hen the entire object is formed” in Devos, “the extra material (in powder form) that is not bonded with a binder/adhesive is ‘brushed away.’” *Id.*

The evidence in the record before us supports Petitioner’s argument that Devos teaches or suggests element 1e. The plain language of element 1e merely requires “determining an operational parameter . . . including . . . a

support structure requirement” without necessarily requiring the physical presence of a support structure. Patent Owner does not clearly explain why the recited “requirement” excludes a support made from the same material as that of the build object or a layer that performs a supporting functionality. We are therefore persuaded by Petitioner that Devos teaches or suggests element 1e based on the record before us.

4. Conclusion of Claim 19 (Ground 2)

We determine that the information presented in the Petition demonstrates a reasonable likelihood that claim 19 is unpatentable under 35 U.S.C. § 103 based on Devos.

G. Alleged Anticipation or Obviousness Over Menchik (Ground 3A)

Petitioner alleges claims 1, 3–5, 7, 9–11, 19, and 20 of the ’466 patent are anticipated or would have been obvious over Menchik. Pet. 52–64. Patent Owner contends in response that Menchik does not teach various claim elements of both independent claim 1 and independent claim 19. Prelim. Resp. 41–49.

As explained in more detail below, having considered the arguments and evidence before us at this preliminary stage, we find that the current record establishes a reasonable likelihood that Petitioner would prevail on claim 1, in this asserted ground of unpatentability.

1. Menchik

Menchik, titled “Three-Dimensional Object Printing,” describes “apparatus and method for management and control of the supply of building materials in three-dimensional object printing apparatuses” Ex. 1009 ¶ 6. Figure 1, reproduced below, illustrates “3D printer system 100.” *Id.* ¶ 20.

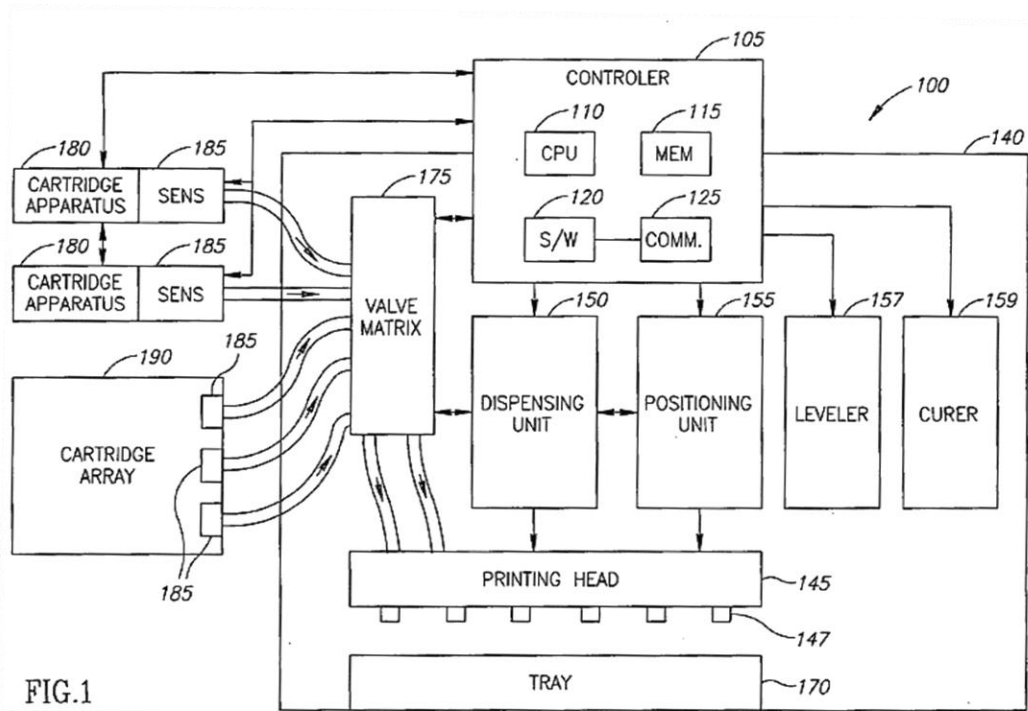


FIG.1

Figure 1 of Menchik

As illustrated, included in the printing system of Menchik is “controller 105” which “may be located outside of printing system 100 and may communicate with printing system 100 . . . over a wire and/or using wireless communications.” *Id.* ¶¶ 20, 24. “Controller 105 may be suitably coupled and/or connected to various components of printing apparatus 104” to “control valves, pumps, switches, compression or inflation devices, positioning units, dispensing units, leveling devices, curing devices, or any other system components.” *Id.* ¶ 27. “[C]ontroller 105 may use software code 120 to process data related to the status of building material in one or more supply sources to compute material parameters for building material(s), material required to construct one or more objects, and supply parameters for materials in one or more cartridges.” *Id.*

Upon measuring “the status of the building material in the one or more cartridges . . . by respective sensors,” the controller may compute

“various parameters of the materials within the various cartridges” by “utilizing the data provided by . . . respective memory chips attached to the respective cartridges.” *Id.* ¶ 47. Menchik describes a memory chip “or other suitable data storage device” which may “store and/or record information relating to the material stored within cartridge” such as “the type of building material in the cartridge bag,” “the materials color, manufacturing date, optimal operation parameters (e.g., recommended jetting temperature), optimum building parameters (e.g., for building or support), and material parameters (e.g., viscosity and surface tension at the recommended temperature etc.) etc.” *Id.* ¶ 35.

“The controller may utilize data relating to the object to be printed, such as print data, CAD data, control data, etc.” *Id.* ¶ 47. The controller “may compute . . . the amount of modeling material, support liquid, or combination of modeling and supporting materials required for printing a given three-dimensional object” as well as “supply parameters for the material in each cartridge” “based on the materials required for printing a given object.” *Id.* ¶¶ 48, 49. The controller “may determine whether the amount of modeling and/or support material in the available cartridges is sufficient to complete a three-dimensional object to be built or printed.” *Id.* ¶ 49.

2. *Analysis of Independent Claim 1*

a) elements 1p, 1a, 1c, 1d, 1g

Petitioner argues that claim elements 1p, 1a, 1c, 1d, and 1g are disclosed or taught/suggested by Menchik. Pet. 52–57, 59–60, 63–64. Patent Owner does not contest these arguments. Prelim. Resp. 41–47.

Based on our review and consideration of the current record, we determine that Petitioner has sufficiently shown that Menchik discloses or teaches/suggests these claim elements, for purposes of institution.

- b) element 1b: “receiving a request from a client over a network to fabricate an object on the three-dimensional printer”

Petitioner contends that controller 105 in Menchik discloses or teaches/suggest a client that element 1b requires because Menchik teaches “a separate unit, such as a personal computer or workstation” to “provide some control or storage capability” via wired or wireless communication with the printing system. Pet. 57 (citing Ex. 1009 ¶¶ 21, 24, 26). Petitioner argues that “to the extent this element is interpreted such that the disclosed communication over a wired or wireless connection does not satisfy the claimed communication ‘over a network,’” Menchik at least suggests the recited communication “over a network.” Pet. 57 (citing Ex. 1003 ¶ 128). Based on Menchik’s teachings that “[c]ontroller 105 may convert [CAD] data *to instructions* for the various units within 3D printer system 100 to print a 3D object” and that “a printing file . . . may be . . . provided . . . by a computing platform connected to 3D printer system 100,” Petitioner contends that “the printing file provided by the controller of the computing device (client) to the printing apparatus (three-dimensional printer) is a request to fabricate an object on the printing apparatus (three-dimensional printer).” Pet. 58–59 (citing Ex. 1009 ¶¶ 24–26; Ex. 1003 ¶¶ 129, 130).

Patent Owner argues that Menchik “never uses the term client to describe anything” and therefore does not teach controller 105 to be a client. Prelim. Resp. 41. Patent Owner argues that whereas “controller 105 controls various parts of the printer 140,” it is a separate component from the

“computing platform” that provides the printing. *Id.* at 42–43 (citing Ex. 1009 ¶ 25).

The record before us supports Petitioner’s contention that controller 105 discloses or teaches/suggests a client. The ’466 patent provides that “[c]lient device 206 may be any devices within the environment 200 operated by users to initiate, manage, monitor, or otherwise interact with print jobs at the three-dimensional printers 204” and that such client device “may include desktop computers, laptop computers, network computers, tablets, or any other computing device that can participate in the environment 200.” Ex. 1001, 5:40–46. Because Menchik’s controller 105 “may be included within, or may include, a computing device such as a personal computer, a desktop computer, a mobile computer, a laptop computer, a server computer, or work station (and thus part or all of the functionality of controller 105 may be external to 3D printer system 100),” (Ex. 1009 ¶ 26), Petitioner’s contention is supported by the record before us.

The record also supports Petitioner’s contention that the “computing platform connected to 3D printer system” (Ex. 1009 ¶ 25) is an embodiment of controller 105. Menchik teaches that “controller 105 may be partially external to 3D printer system 100” exemplified by “an external control or processing unit (e.g., a . . . computing platform . . .)” which “may provide some or all of the printing system control capability.” Ex. 1009 ¶ 24. Patent Owner’s argument that the computing platform and controller 105 are separate components is not supported by Menchik. We are therefore persuaded by Petitioner that Menchik discloses or teaches/suggests element 1b based on the record before us, for purposes of institution.

- c) element 1e: “providing the data from the tag to the client over the network, the data including at least one property of the build material”

Petitioner contends that element 1e is disclosed based on Menchik’s teaching of “transmitting data to printer controller” from a memory chip that stores at least one property of the build material. Pet. 60–61. Patent Owner’s argument regarding this claim element is solely based on claim element 1b. *See* Prelim. Resp. 42 (repeating the argument that controller 105 is not a client).

For reasons provided *supra* regarding claim element 1b, we are not persuaded by Patent Owner. The record before us supports Petitioner’s contention that Menchik discloses element 1e, for purposes of institution.

- d) element 1f: “receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag”

Petitioner contends that element 1f is disclosed by Menchik’s teachings that “the printing apparatus 140 (three-dimensional printer) receives the printing file and the printing parameters, operation parameters, building parameters, material parameters, and supply parameters (collectively operational parameters) from the controller 105 in the computing device (client) over a network.” Pet. 63 (citing Ex. 1003 ¶ 137); *see also* Pet. 61–62 (citing various portions of Ex. 1009 as support).

Patent Owner first repeats the argument that controller 105 is not a client. Prelim. Resp. 44–45. As our analysis *supra* shows, the record before us sufficiently supports Petitioner’s contention that controller 105 in Menchik teaches the recited client.

Patent Owner next argues that Petitioner “fails to explain which printing file, printing parameters, operation parameters, building parameters, material parameters, and supply parameters are allegedly received” and “fails to explain why such information . . . are operational parameters.” Prelim. Resp. 45. Although Patent Owner acknowledges that Menchik uses the terms “operational parameters” and “building parameters,” Patent Owner argues that these parameters are stored on a memory chip and transmitted to the controller – as opposed to being received by the controller. *Id.* at 46. Patent Owner also acknowledges that Menchik teaches or suggests “material parameters” and “supply parameters” but argues that these parameters are not received from the controller as element 1f requires. *Id.* at 46–47.

The record before us supports Petitioner’s contention regarding claim element 1f. The ’466 patent provides that the “operational parameters” may include any “operational parameter that might usefully be determined by the controller from the data stored by the data tag 304.” Ex. 1001, 15:17–24. The broad scope of the term “operational parameter” therefore does not explicitly exclude parameters such as Menchik’s “printing file” which “may be used to determine . . . the order and configuration of disposition of building material via, for example, movement of and activation and/or non-activation of one or more nozzles 147 of printing head 145, according to the 3D object to be built.” Ex. 1009 ¶ 25. Menchik’s teaching that controller 105 communicates with printing apparatus 104 to provide “printing system control capability” teaches or suggests that printing apparatus 104 receives information such as the printing file to control the printing operation. *See id.* ¶ 24. The record before us supports Petitioner’s contention that Menchik teaches or suggests element 1f, for purposes of institution.

3. Conclusion of Claim 1 (Ground 3A)

We determine that Petitioner establishes, at this time, that Menchik discloses or teaches/suggests all elements of claim 1 and that the information presented in the Petition demonstrates a reasonable likelihood that claim 1 is anticipated under 35 U.S.C. § 102 by Menchik and/or rendered unpatentable under 35 U.S.C. § 103 based on Menchik.

4. Analysis of Independent Claim 19

In Petitioner’s analysis of claim 19 based on Menchik, Petitioner contends that claim element 19e is taught based on the analysis of “element 1[f] and claim 10.” Pet. 71. A comparison of claim element 19e, claim element 1f, and dependent claim 10 is shown below.

claim element 19e	claim element 1f	dependent claim 10
determining an operational parameter for configuring the three-dimensional printer for a fabrication process using the build material	receiving one or more operational parameters from the client selected for use in controlling operation of the three-dimensional printer when fabricating the object with the build material having the at least one property stored in the tag	
based upon at least one property of the build material in the data,		
the operational parameter including at least one of a build platform temperature, a build volume temperature, an infill requirement, a rafting requirement, a support		the one or more operational parameters includes at least one of an extruder temperature, a feed rate, a build platform

structure requirement, and a cooling requirement		temperature, a build volume temperature, an infill requirement, a rafting requirement, a support structure requirement, and a cooling requirement
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As Patent Owner points out, Petitioner’s analysis of element 19e is solely based on element 1f and dependent claim 10, which collectively differ in scope and requirement from element 19e. Prelim. Resp. 48. The requirement in element 19e that the “operational parameter” is determined “based upon at least on property of the build material” is not required in element 1f or dependent claim 10.

5. Conclusion Regarding Independent Claim 19 (Ground 3A)

Notwithstanding the foregoing, we nevertheless institute review of the challenge against claim 19 based on Menchik in Ground 3A. *See* 37 C.F.R. § 42.108(a) (“When instituting . . . 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.”).

H. Alleged Obviousness Over Menchik and Jazayeri (Ground 3B)

Petitioner alleges claims 1, 3–5, 7, 9–11, and 20 of the ’466 patent would have been obvious over Menchik and Jazayeri. Pet. 71–74. Patent Owner contends in response that there is no motivation to combine the references and that the proposed combination does not teach various claim elements. Prelim. Resp. 49–50.

1. Analysis of Independent Claim 1

Petitioner contends that “[w]here Ground 3A relies on Menchik’s disclosure to satisfy 1[b], Ground 3B relies on the additional disclosure of Jazayeri.” Pet. 71. Petitioner contends that the remaining claim elements, namely, 1p, 1a, 1c–1g, are taught or suggested by Menchik as provided in ground 3A. *Id.*

With regard to claim element 1b, Petitioner argues that “[t]o the extent that Menchik’s printing file (*supra*, Ground 3A, element 1[b]) is not considered a request,” a skilled artisan would have combined Menchik with Jazayeri’s teachings regarding a “print server [which] may include an application manager configured to receive a print request over a network from an application executing on a device” (Ex. 1010, Abs.) to arrive at element 1b. Pet. 71. Petitioner provides various reasons that a skilled artisan would have been motivated to combine the references with a reasonable expectation of success. *Id.* at 72–74.

Patent Owner argues that because “neither Menchik nor Jazayeri describe a ‘client device,’” “[i]t appears that Petitioner has erroneously incorporated the ‘client devices’ from Loughran . . . into a combination that does not include the reference.” Prelim. Resp. 49–50. Patent Owner repeats the argument that the controller in Menchik is not a client and argues that there is no motivation to combine Menchik with Jazayeri. *Id.* at 50.

As our analysis *supra* shows, the record before us sufficiently supports Petitioner’s contention that controller 105 in Menchik teaches the recited client. The record before us also does not support Patent Owner’s contention that Petitioner’s analysis based on the combined teachings of Menchik and Jazayeri improperly includes the teachings of Loughran. The record before us supports Petitioner’s contention that combining Menchik

and Jazayeri is no more than a “combination of familiar elements according to known methods . . . [which] does no more than yield predictable results.” *Compare* Pet. 73, with Prelim. Resp. 49–50 (arguing that there is no reason to combine without addressing Petitioner’s reasoning based on *KSR*); *see KSR*, 550 U.S. at 416. The record before us sufficiently supports Petitioner’s contention that implementing Menchick’s system with a network server to receive certain request is within the ordinary skill with a reasonable expectation of success.

Based on our review and consideration of the current record, we are persuaded that Petitioner has adequately shown for purposes of institution that there is sufficient rationale to combine with a reasonable expectation of success in combining the teachings of Menchik and Jazayeri in the manner suggested and that the combination teaches or suggests every element of claim 1.

I. Remaining Challenges

As set forth in Section II.E. above, Petitioner additionally challenges claim 5 as unpatentable over Loughran, Dubois, and KISSlicer (Ground 1C), over Loughran, Dubois, Jazayeri, and KISSlicer (Ground 1D), over Menchik and KISSlicer (Ground 3G), and over Menchik, Jazayeri, and KISSlicer (Ground 3H), claim 17 over Loughran, Dubois, Menchik, and Dahlin (Ground 1E), over Loughran, Dubois, Jazayeri, Menchik, and Dahlin (Ground 1F), over Menchik and Dahlin (Ground 3E), and over Menchik Jazayeri, and Dahlin (Ground 3F), and claims 2, 8, 12, and 16 over Menchik and Loughran (Ground 3C) and over Menchik, Jazayeri, and Loughran (Ground 3D). *See* Pet. 28–33, 36–42, 64–68, 74–82. Patent Owner does not present separate arguments for these challenges. *See* Prelim. Resp. 15–50. Because we determine above that Petitioner demonstrated a reasonable

likelihood of prevailing in its challenge to at least one claim of the '466 patent, we institute *inter partes* review on all claims and grounds. *See* 37 C.F.R. § 42.108(a) (“When instituting . . . 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.”).

IV. CONCLUSION

After considering the evidence and arguments presented in the Petition, we determine Petitioner has established a reasonable likelihood of prevailing on its assertion that at least one claim of the '466 patent is unpatentable, and we institute an *inter partes* review on the challenged claims and on the grounds presented in the Petition. *See* 37 C.F.R. § 42.108(a).

V. ORDER

For the reasons given, it is hereby:

ORDERED that the Petition is granted and trial is institute on all the challenged claims and on all the grounds presented in the Petition.

FURTHER ORDERED that *inter partes* review is commenced on the entry date of this Order, and 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.

IPR2025-00438
Patent 10,569,466 B2

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