

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

3SHAPE A/S and 3SHAPE INC.,
Petitioner,

v.

ALIGN TECHNOLOGY, INC.,
Patent Owner.

IPR2021-01241
Patent 10,791,936 B2

Before NEIL T. POWELL, JAMES J. MAYBERRY, and
ELIZABETH M. ROESEL, *Administrative Patent Judges*.

ROESEL, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

3Shape A/S and 3Shape Inc. (“Petitioner”) filed a Petition (Paper 3, “Pet.”) seeking an *inter partes* review of claims 1–20 of U.S. Patent No. 10,791,936 B2 (Ex. 1001, “the ’936 Patent”). Align Technology Inc. (“Patent Owner”) filed a Preliminary Response. Paper 10 (“Prelim. Resp.”).

We have authority to determine whether to institute an *inter partes* review. 35 U.S.C. § 314 (2018); 37 C.F.R. § 42.4(a) (2021). An *inter partes* review may not be instituted “unless . . . 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). After considering the information presented in the Petition and the Preliminary Response, we determine that the reasonable likelihood standard is not met. Accordingly, we deny institution of an *inter partes* review.

B. *Related Matters*

The parties identify the following as related matters: *Align Technology, Inc. v. 3Shape A/S*, No. 6:20-cv-00979 (W.D. Tex.); *3Shape A/S v. Align Technology, Inc.*, No. 1:20-cv-01492 (D. Del.); *Align Technology, Inc. v. 3Shape A/S*, No. 1:17-cv-01646 (D. Del.); and *3Shape A/S v. Align Technology, Inc.*, IPR2019-00134 (PTAB). Pet. 2; Paper 6, 2 (Patent Owner’s mandatory notices).

C. *The ’936 Patent (Ex. 1001)*

The ’936 Patent discloses methods and systems for creating and interacting with three dimensional (“3D”) virtual models that are useful in dentistry, orthodontics, and prosthodontics. Ex. 1001, codes (54), (57),

1:20–22. The disclosed method includes scanning a patient’s teeth to obtain a virtual model; removing a portion of the virtual model where a tooth surface is obscured by saliva, blood, or debris; removing the saliva, blood, or debris from the patient’s intraoral cavity; re-scanning the previously obscured portion of the tooth surface; and replacing the removed portion of the virtual model with the re-scanned portion. *Id.* at code (57), 14:43–15:32, 17:4–11, 20:64–21:11, 22:30–40, 23:41–55. The ’936 Patent discloses that a feature of this method is that “the user only needs to ‘correct’ parts of the original virtual model of the dental surface, and does not need to rescan everything, should part of the virtual model not be acceptable.” *Id.* at 15:33–36.

D. Illustrative Claim

Petitioner challenges claims 1–20 of the ’936 Patent. Pet. 1. Claims 1, 9, and 17 are independent claims. Claim 1 is illustrative of the claimed subject matter and is reproduced below.

1. [Preamble] A system for scanning a patient’s teeth for a dental procedure, the system comprising:

[1.1] a hand-held intraoral scanner; and

[1.2] a computer readable medium including instructions that when executed by a computer system, cause the computer system to:

[1.3] receive first scan data of the patient’s teeth from the hand-held intraoral scanner;

[1.4] display, to a display, a model of the patient’s teeth, wherein the model of the patient’s teeth is based on the received first scan data of the patient’s teeth;

[1.5] receive user input defining a portion of the model to be removed;

[1.6] remove, from the displayed model, a removed surface portion of the model to be removed according to the user input;

[1.7] receive second scan data of the patient's teeth from the hand-held intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity;

[1.8] replace at least a portion of the removed surface portion of the model using the received second scan data of the patient's teeth including surface data of a physically changed portion of the patient's intraoral cavity; and

[1.9] output, to the display, the model of the patient's teeth with the portion of the removed surface portion replaced using the received second scan data.

Ex. 1001, 30:24–50 (with bracketed additions to identify claim elements).

E. Asserted Grounds and Evidence

Petitioner asserts the following grounds of unpatentability:

Claims	35 U.S.C. § ¹	Reference(s)
1, 4–7, 9, 11–13	102(b)	Rubbert ²
1, 4–13, 17, 20	103(a)	Rubbert
2, 3, 18, 19	103(a)	Rubbert, Babayoff ³

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, effective March 16, 2013. Because the '936 Patent has an effective filing date before this date, the pre-AIA version of §§ 102, 103 applies. Ex. 1001, code (63).

² Ex. 1005, Rubbert et al., WO 03/094102 A1, published November 13, 2003.

³ Ex. 1006, Babayoff et al., WO 00/08415, published February 17, 2000.

Claims	35 U.S.C. § ¹	Reference(s)
14–16	103(a)	Rubbert, Rosenstiel ⁴

Pet. 5. Petitioner relies on the Declaration of Dr. J.P. Mellor to support its challenges. Ex. 1002 (the “Mellor Declaration”).

II. ANALYSIS

A. Legal Standards

“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”)); *see also* 37 C.F.R. § 42.104(b) (requiring a petition for *inter partes* review to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied upon).

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. Inc., v. Union Oil Co. of Calif.*, 814 F.2d 628, 631 (Fed. Cir. 1987).

A patent claim is unpatentable under 35 U.S.C. § 103 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

⁴ Ex. 1017, Rosenstiel et al., *Contemporary Fixed Prosthodontics* (2nd ed. 1995).

subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). 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 nonobviousness, i.e., secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

Additionally, 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*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements,” but “must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

Relying on the Mellor Declaration, Petitioner contends that a person of ordinary skill in the art (“POSA”) would have had “at least a bachelor’s degree in electrical engineering, computer engineering, or computer science (or equivalent course work) and two to three years of work experience in 3D imaging and modeling of physical structures.” Pet. 9 (citing Ex. 1002 ¶¶ 34–37). Petitioner asserts that, alternatively, a POSA would have had “a master’s degree in electrical engineering, computer engineering, or computer

science (or equivalent course work) with a focus in 3D imaging and modeling of physical structures.” Pet. 9–10.

For purposes of the Preliminary Response, Patent Owner does not dispute Petitioner’s definition of a POSA. *See, generally* Prelim. Resp.

We find that Petitioner’s definition of a POSA is consistent with the scope and content of the ’936 Patent and the asserted prior art, and we apply this definition for purposes of this Decision.

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).

Below we discuss the meaning of “first scan data” and “second scan data.” We determine that we do not need to resolve any other claim construction disputes for purposes of this Decision. *See Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”); *see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (applying *Vivid Techs.* in the context of *inter partes* review).

first scan data; second scan data

These phrases are recited in independent claims 1, 9, and 17, which recite “first scan data of the patient’s teeth from [a/the] intraoral scanner” and “second scan data of the patient’s teeth from the hand-held intraoral scanner.” Ex. 1001, 30:31–32, 30:40–41, 31:25–26, 31:33–34, 32:25–26, 32:35–37. Claims 1 and 9 additionally recite: “the second scan data including surface data of a physically changed portion of the patient’s intraoral cavity.” *Id.* at 30:41–43, 31:34–36.

Petitioner asserts that no express claim constructions are necessary. Pet. 12. Nevertheless, when applying the claim language to the prior art, Petitioner contends that “no particular order is required based on the claim wording choice” and no “temporal aspect” is required. Pet. 28 (addressing anticipation ground).

Patent Owner disagrees. According to Patent Owner, “the language of the claims provides a temporal relationship between the first and second scans: specifically, it indicates that the ‘second scan’ is a ‘post-change’ scan while the ‘first scan’ is an ‘initial’ scan.” Prelim. Resp. 6 (addressing Examiner’s understanding of the claim); *see also id.* at 15 (addressing claim construction and asserting that “the second scan data is from a post-change scan and the first scan data is from an earlier scan”).

We agree with Patent Owner that the claim language provides a temporal relationship between “first scan data” and “second scan data.” We determine that, in claims 1 and 9, “first scan data” pertains to an earlier scan than “second scan data,” and “second scan data” includes surface data of a physically changed portion of the intra-oral cavity, where the physical change occurs after the first scan and before the second scan.

Our interpretation is based on the plain language of claims 1 and 9, which recite that “second scan data” includes “surface data of a physically changed portion of the patient’s intraoral cavity.” The claim language as a whole makes clear that a physical change occurs between the first scan and the second scan. Petitioner implicitly agrees with this interpretation by characterizing its arguments as showing that “a dentist or orthodontist makes a physical change to the tooth *between scans*.” Pet. 12 (emphasis added). In other words, claims 1 and 9 require the following order of steps: first scan, physical change, second scan.

Our interpretation of claims 1 and 9 is supported by the Specification, which discloses examples in which a physical change occurs between an initial scan and a second, later scan. In Embodiment A, for example, a “first virtual model (computer 3D model)” is created, where “during the initial scan” a part of the dental surface “was covered with saliva, blood, debris, or otherwise obscured.” Ex. 1001, 14:43–52, 45:58–67. This part of the model is deleted by the user “resulting in a modified first virtual model.” *Id.* at 14:55–57. A “second virtual model” is created from second scan data after the obscured part of the dental surface “is cleaned up and/or unobstructed, and then rescanned.” *Id.* at 15:4–11. The second virtual model “is then manipulated in the computer system to register it onto the modified first virtual model.” *Id.* at 15:12–14. In this example, first scan data is generated in an initial scan, and second scan data is generated by rescanning a portion of the intra-oral cavity after cleaning it up or removing an obstruction.⁵

⁵ Petitioner does not dispute that removing saliva from a patient’s teeth creates “a physically changed portion of the patient’s intraoral cavity.” Pet. 43.

The '936 Patent describes additional embodiments in which a physical change occurs between an initial scan and a second, later scan. For example, when describing the Figure 1 embodiment, the '936 Patent discloses that, “during the initial 3D data collection step, for example via scanning, . . . part . . . of the physical dental surface was covered with foreign material, such as for example saliva, blood, debris, or was otherwise obscured.” Ex. 1001, 21:4–11. Further describing the Figure 1 embodiment, the '936 Patent discloses that part “of the physical dental surface is cleaned up and/or unobstructed, and for example rescanned to obtain second virtual model.” *Id.* at 22:38–40. The '936 Patent includes the same disclosure for the Figure 9 embodiment. *Id.* at 23:53–55. In these examples, first scan data is generated in an initial scan, and second scan data is generated by rescanning a portion of the intra-oral cavity after cleaning it up or removing an obstruction.

The Specification does not support Petitioner’s contention that “no particular order is required.” Pet. 28 (citing Ex. 1001, 30:10–21). The cited passage states: “In the method claims that follow, alphanumeric characters and Roman numerals used to designate claim steps are provided for convenience only and do not imply any particular order of performing the steps.” Ex. 1001, 30:10–21. Our claim construction is based on the claim language, not any alphanumeric characters and Roman numerals used to designate claim steps. More particularly, for claims 1 and 9, we rely on the part of the claim that recites “the second scan data including surface data of a physically changed portion of the patient’s intraoral cavity.” When read in the context of the claims as a whole, this phrase requires that a first scan, a physical change, and a second scan occur in that order.

Our claim interpretation is consistent with the Examiner's Reasons for Allowance. The Examiner stated that the claims distinguish over the cited art by reciting "updating scans to be directed to scenarios where the intra-oral cavity (e.g. dentition) is modified in between the scans (e.g. subjected to surface preparation)." Ex. 1004, 4. According to the Examiner, the cited art "does not provide for (or suggest) generating a composite scan after intra-oral modifications are made." *Id.* at 5. When distinguishing the cited art, the Examiner stated that "the instant applications' claims . . . provide a composite scan based on both a first (initial) and second (post-change) scan." *Id.* The Examiner characterized the claimed process as follows: "generating a composite scan by using a second scan to update the changed region from the first" and "data is newly captured and composited to update for the intra-oral modification." *Id.*

Claim 17 likewise provides a temporal relationship between "first scan data" and "second scan data." In claim 17, "first scan data" is received by the computer before "second scan data." Our interpretation is based on express recitations of the claim, which uses the word "after" and other claim language to describe a particular order of steps. In particular, claim 17 recites instructions for causing a computer system to, among other things:

receive first scan data of the patient's teeth from the hand-held intraoral scanner;

display, to a display, a model of the patient's teeth, wherein the model of the patient's teeth is based on the received first scan data of the patient's teeth;

receive user input defining a portion of the model to be removed;

after receiving the user input, remove, from the displayed model, a removed surface portion of the model to be removed according to the user input;

after removing the portion of the model, *receive second scan data* of the patient's teeth from the hand-held intraoral scanner.

Ex. 1001, 32:25–40 (emphasis added). Based on the foregoing recitations in claim 17, it is clear that the computer receives “first scan data” before it receives “second scan data.” More particularly, the claim recites that “first scan data” is received by the computer and then, after a series of other steps, “second scan data” is received by the computer. *Id.*

D. Petitioner's Anticipation Ground

Petitioner contends that claims 1, 4–7, 9, and 11–13 are unpatentable as anticipated by Rubbert. Pet. 16–40. Patent Owner opposes. Prelim. Resp. 17–25. We provide an overview of Rubbert before addressing the parties' arguments.

1. Rubbert (Ex. 1005)

Rubbert discloses monitoring the movement and position of the teeth during orthodontic treatment by performing monitoring scans to provide a 3D virtual image of the dentition, including the teeth and orthodontic appliances, such as brackets bonded to the teeth. Ex. 1005, 2:16–21. Rubbert discloses that, after a monitoring scan is performed, a bracket registration step may be carried out, whereby scan data for a bracket is replaced by a stored 3D model of the bracket, so as to provide a more complete and accurate representation of the bracket. *Id.* at 20:26–21:9, Fig. 6 (steps 90, 92).

Of particular relevance to the parties' dispute is Figure 16 of Rubbert, which is reproduced below.

FIG. 16

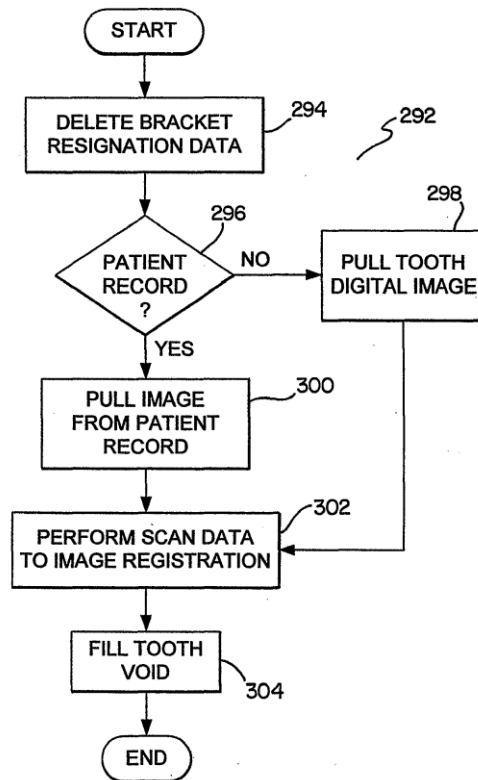


Figure 16 is a flow chart of “a process for finding a best fit between a virtual tooth model and the tooth scan data.” Ex. 1005, 9:10–11. Rubbert discloses that, after bracket registration, there may be a need to obtain a new or revised virtual model of the tooth underlying the registered bracket, for example, to enable the orthodontist to see if the tooth has undergone movement since the previous scan. *Id.* at 29:28–31. As shown in Figure 16 at step 294, scan data in the vicinity of the registered bracket model is deleted, leaving a data void in the virtual tooth model. *Id.* at 30:8–11. At steps 296, 298, and 300, a preexisting digital tooth model is pulled either from a patient data record or from a digital library, and at step 302, the tooth scan data is registered to the digital tooth model. *Id.* at 30:16–27. At step 304, the void in the scan data is filled with the 3D surface resulting from the registration process. *Id.* at 30:27–29.

2. Independent Claim 1

Our analysis focuses on claim element 1.7, which recites: “receive second scan data of the patient’s teeth from the hand-held intraoral scanner, the second scan data including surface data of a physically changed portion of the patient’s intraoral cavity.” Ex. 1001, 30:40–43.

Petitioner contends that Rubbert discloses claim element 1.7. Pet. 26–28. Petitioner contends that “second scan data,” as recited in the claim, is scan data of the patient’s tooth without a bracket, as disclosed by Rubbert in step 300 of Figure 16. Pet. 26–27. Petitioner contends that this data is “surface data of a physically changed portion of the patient’s intraoral cavity” as recited in claim 1 “because the second scan data (without a bracket) is a physically changed portion in the oral cavity relative to the first scan data (with a bracket).” Pet. 28.

Patent Owner argues that, under a correct claim construction, Rubbert does not disclose claim element 1.7. Prelim. Resp. 18–25. On this record, we agree with Patent Owner.

For the reasons discussed above, we determine that claim 1 requires a temporal relationship between “first scan data” and “second scan data.” More specifically, we determine that “first scan data” pertains to an earlier scan than “second scan data,” and “second scan data” includes surface data of a physically changed portion of the intra-oral cavity, where the physical change occurs after the first scan and before the second scan.

Petitioner contends that “Rubbert’s original scan of the patient’s teeth (without brackets) satisfies the ‘second’ scan data limitation, and the monitoring scan of the patient’s teeth (with brackets) satisfies the ‘first’ scan data limitation, with the teeth without brackets being a ‘physically changed portion’ relative to the teeth with brackets.” Pet. 28. Petitioner’s contention

does not satisfy our claim construction for “first scan data” and “second scan data.” Although Petitioner contends that “first scan data” is disclosed by Rubbert’s “monitoring scan of the patient’s teeth (with brackets)” (*id.*), Petitioner does not show that Rubbert’s monitoring scan is an earlier scan than the one that produces “second scan data.” Instead, Petitioner contends that “second scan data” is disclosed by Rubbert’s earlier scan—an original scan of the patient’s teeth without brackets retrieved from a stored patient record. Pet. 26–28. The temporal relationship between “first scan data” and “second scan data,” as identified by Petitioner in Rubbert, is the reverse of the temporal relationship required by claim 1. According to Petitioner’s contentions, Rubbert’s “second scan data” pertains to an earlier scan than “first scan data.” As properly construed, claim 1 requires the opposite.

Furthermore, Petitioner does not show that Rubbert discloses “surface data of a physically changed portion of the patient’s intra-oral cavity,” as recited in claim 1. Petitioner contends that Rubbert discloses this limitation “because the second scan data (without a bracket) is a physically changed portion in the oral cavity relative to the first scan data (with a bracket).” Pet. 28. Petitioner’s contention does not satisfy our claim construction. Petitioner does not identify any disclosure in Rubbert of a physical change that takes place after the alleged first scan (with a bracket) and before the alleged second scan (without a bracket). Rubbert does not disclose physically removing a bracket from the patient’s tooth and then rescanning the tooth after removal of the bracket. Petitioner does not assert otherwise.

Although Petitioner asserts that “installing a bracket” is a “physical change to the tooth between scans” (Pet. 12), Rubbert discloses that bracket installation occurs **before**, not after, the monitoring scans that Petitioner relies upon to teach “first scan data.” Pet. 22, 28; Ex. 1005, 19:12–14

(“Once the actual brackets have been bonded to the teeth, an orthodontist will proceed with the treatment process by initiating monitoring scans of the dentition to obtain bracket position and tooth movement information.”).

Accordingly, we find that Petitioner does not show that Rubbert discloses “second scan data” that includes surface data of a physically changed portion of the intra-oral cavity, where the physical change occurs after the first scan and before the second scan, as required by our claim construction.

Accordingly, we find that Petitioner does not show that Rubbert discloses claim element 1.7.

3. Independent Claim 9

Claim element 9.4 recites the same limitations as claim element 1.7, except that claim element 9.4 recites “receiving” instead of “receive.” Both claim elements recite “second scan data of the patient’s teeth from the hand-held intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity.” Ex. 1001, 30:40–43, 31:33–36.

Petitioner relies on the same contentions for claim element 9.4 as it presents for claim element 1.7. Pet. 39. We find that Petitioner does not show that Rubbert discloses claim element 9.4 for the same reasons as set forth above for claim element 1.7

4. Dependent claims 4–7 and 11–13

Claims 4–7 each depend directly or indirectly from claim 1, and claims 11–13 each depend directly or indirectly from claim 9. Petitioner contends that claims 4–7 and 11–13 are anticipated by Rubbert. Pet. 31–36, 40. We find that Petitioner’s arguments and evidence for dependent claims 4–7 and 11–13 do not remedy the shortcomings in Petitioner’s arguments

and evidence for independent claims 1 and 9 and that Petitioner does not show anticipation of the dependent claims for the same reasons as set forth above for the independent claims.

E. Petitioner's Obviousness Ground based on Rubbert Alone

Petitioner contends that claims 1, 4–13, 17, and 20 are unpatentable as obvious in view of Rubbert. Pet. 40–53. Patent Owner opposes. Prelim. Resp. 25–37. We address the parties' contentions below.

1. Independent Claim 1

Petitioner contends that claim 1 would have been obvious, even if claim element 1.7 is construed to require a temporal aspect. Pet. 28, 42. According to Petitioner, a POSA “would have recognized that physically changing the patient's oral cavity and then re-scanning that area would have been an obvious variation of Rubbert.” Pet. 42. Petitioner asserts that “it would have been obvious to re-scan the patient's teeth and use that scan data to replace Rubbert's tooth void in the same manner as disclosed in Rubbert of using the tooth data from the patient's record.” Pet. 43–44.

Patent Owner argues that Petitioner's proposal to use “a new scan instead of Rubbert's pre-treatment patient scans . . . makes no sense” and “would fail to provide the information Rubbert requires.” Prelim. Resp. 25–26. In addition, Patent Owner argues that Petitioner engages in “hindsight reasoning” and relies on “generic objectives from Rubbert” that “do not supply any direction toward the particular modifications” Petitioner proposes. *Id.* at 31.

After considering the parties' arguments and evidence, we are not persuaded that Petitioner's obviousness rationale is sufficient to support

institution. At the heart of Petitioner's obviousness case for claim element 1.7 is the following contention:

[A POSA] would have recognized that after cleaning or performing a simple, conventional dental operation to adjust the position of the bracket on the tooth (which would result in a "physically changed portion of the patient's intraoral cavity" as a bracket on a tooth is within the patient's oral cavity), it would have been obvious to re-scan the patient's teeth and use that scan data to replace Rubbert's tooth void in the same manner as disclosed in Rubbert of using the tooth data from the patient's record. For example, a [POSA] would have understood that re-scanning the patient's teeth after correcting a physical impediment, such as saliva, would have provided an accurate representation of the patient's intraoral cavity.

Pet. 43–44. Petitioner's contention suffers from the flaws identified by Patent Owner. Prelim. Resp. 25–32.

First, we agree with Patent Owner that Petitioner's proposed substitution makes no sense in the context of Rubbert's disclosure. Prelim. Resp. 26, 28–29. Petitioner proposes "to re-scan the patient's teeth and use that scan data to replace Rubbert's tooth void in the same manner as disclosed in Rubbert of using the tooth data from the patient's record."

Pet. 43–44. As discussed above, Rubbert discloses performing monitoring scans during orthodontic treatment, where the scans include teeth and orthodontic appliances, such as brackets. Ex. 1005, 2:16–21. To enable the orthodontist to see if a bracketed tooth has undergone movement, Rubbert discloses deleting scan data that includes the bracket and filling the void with pre-treatment scan data of the underlying tooth without a bracket. *Id.* at 29:28–30:29, Fig. 16. The objective of Rubbert's void-filling disclosure is to provide a virtual model of the teeth during orthodontic treatment and to

show the tooth surface as it appeared before an orthodontic bracket was attached to the tooth. *Id.*

Petitioner’s proposed modification—using a new scan instead of a pre-treatment patient scan—would not accomplish Rubbert’s objective for void-filling. Rescanning the bracketed tooth after cleaning it or adjusting the bracket as Petitioner proposes (Pet. 43–44) would not provide scan data for the tooth surface under the bracket to fill the void created by deleting the bracket from the virtual model. Thus, contrary to Rubbert’s objective, Petitioner’s modification would not show the tooth surface as it appeared before an orthodontic bracket was attached to the tooth.

Moreover, we agree with Patent Owner that Petitioner does not provide a sufficient non-hindsight biased rationale for its proposed modification of Rubbert’s disclosure. Prelim. Resp. 29–32. As support for its obviousness rationale, Petitioner relies on four categories of evidence: (1) the ’936 Patent, Ex. 1001; (2) Patent Owner’s district court claim construction arguments, Ex. 1022; (3) Rubbert, Ex. 1005; and (4) the Mellor Declaration (Ex. 1002). Pet. 42–44. We discuss each category below.

First, Petitioner’s reliance on the ’936 Patent shows hindsight bias, and Petitioner does not accurately characterize the cited disclosures. Petitioner asserts that the ’936 Patent “admits” that “soft tissues such as the gums or other agents such as saliva *were known* to obscure intraoral structures such as the finish line during intraoral scanning.” Pet. 42–43 (citing Ex. 1001, 1:62–67; emphasis added). The ’936 Patent states that such obscuring of the finish line “is often the case,” but does not admit that such problems were known. Ex. 1001, 1:60–2:5. Next Petitioner asserts that the ’936 Patent “admits . . . that a dental practitioner would have used their dental training to remove obscuring agents (such as gums or saliva)

such that the finish line is no longer obscured.” Pet. 42–43 (citing Ex. 1001, 14:12–38). The cited passage discusses user and automated analysis of a 3D virtual model “to determine the suitability of the first physical part for the purpose of allowing a prosthesis to be seated thereon.” Ex. 1001, 14:12–17. The cited passage discloses that “the user can rework the physical part” to allow for good prosthesis seating (*id.* at 14:23–35) but says nothing about “remov[ing] obscuring agents (such as gums or saliva),” as asserted by Petitioner. Pet. 43.

Second, Petitioner relies on Patent Owner’s district court claim construction argument that “removing saliva or even a piece of spinach from a patient’s teeth creates ‘a physically changed portion of the patient’s intraoral cavity.’” Pet. 43 (citing Ex. 1022, 29–31). The cited excerpt from Patent Owner’s district court claim construction brief addresses the “physically changed” limitation of claims 1 and 9 and argues that it does not require action by a dental practitioner, as opposed to a patient. After reviewing Patent Owner’s claim construction argument, we find that it provides little or no support for Petitioner’s obviousness rationale. More particularly, Patent Owner’s district court claim construction argument has little bearing on whether it would have been obvious to modify Rubbert to replace a portion of the 3D virtual model with second scan data that includes surface data of physically changed portion of the patient’s intraoral cavity.

Third, Petitioner relies on general statements from Rubbert, but these statements are taken out of context and are insufficient to support the particular modification proposed by Petitioner. Petitioner argues that the same type of changes discussed in Patent Owner’s district court claim construction brief “would have been obvious to implement as part Rubbert’s scanning process to facilitate Rubbert’s aim to ‘acquire accurate and

complete scan results of dental devices having small or minute geometrical structures.” Pet. 43 (quoting Ex. 1005, 3:16). In the quoted text, Rubbert is discussing the difficulty of acquiring accurate and complete scan results of small or minute geometrical structures, such as orthodontic brackets that are bonded to a patient’s tooth. Ex. 1005, 3:16–4:10. Rubbert’s discussion provides virtually no support for Petitioner’s contention that it would have been obvious to modify Rubbert to re-scan the patient’s teeth and use that scan data to replace a void in the 3D model in the same way that Rubbert teaches to use data from the patient’s record. Pet. 43–44. Next, Petitioner relies on Rubbert’s disclosure that “there is a general need for a process that can generate an accurate virtual model of the teeth and the appliance and thereby locate manually bonded brackets.” Pet. 43 (quoting Ex. 1005, 5:11–13). Here, Rubbert is discussing a need for the disclosed solution, which involves replacing scan data of a bracket bonded to a tooth with a stored 3D model of the bracket so as so as to provide a more complete and accurate representation of the bonded bracket. Ex. 1005, 20:26–21:9, Fig. 6 (steps 90, 92). Petitioner does not show sufficiently that Rubbert’s disclosure would have led a POSA to modify Rubbert such that it satisfies claim element 1.7.

Fourth, Petitioner relies on the Mellor Declaration. Pet. 42–45 (citing Ex. 1002 ¶¶ 129–135). The cited paragraphs of the Mellor Declaration are substantively identical to the Petition and suffer from the same deficiencies.

Accordingly, we find that Petitioner does not show sufficiently that it would have been obvious to modify Rubbert in a way that satisfies claim element 1.7.

2. Independent Claim 9

Petitioner relies on the same obviousness rationale for claim element 9.4 as it presents for claim element 1.7. Pet. 47. We find that Petitioner's obviousness rationale for claim element 9.4 is insufficient for the same reasons as set forth above for claim element 1.7.

3. Independent Claim 17

Claim element 17.7 recites: "after removing the portion of the model, receive second scan data of the patient's teeth from the hand-held intraoral scanner." Ex. 1001, 32:35–37.

Petitioner relies on the same obviousness rationale for claim element 17.7 as it presents for claim element 1.7. Pet. 50. We find that Petitioner's obviousness rationale for claim element 17.7 is insufficient for the same reasons as set forth above for claim element 1.7.

4. Dependent claims 4–8, 10–13, and 20

Claims 4–8, 10–13, and 20 each depend directly or indirectly from one of claims 1, 9, and 17. Petitioner contends that claims 4–8, 10–13, and 20 are unpatentable as obvious in view of Rubbert. Pet. 45–48, 51–53. We find that Petitioner's arguments and evidence for dependent claims 4–8, 10–13, and 20 do not remedy the shortcomings in Petitioner's arguments and evidence for independent claims 1, 9, and 17 and that Petitioner does not show obviousness of the dependent claims for the same reasons as set forth above for the independent claims.

F. Petitioner's Obviousness Grounds based on Rubbert in Combination with Babayoff or Rosenstiel

Petitioner contends that claims 2, 3, 18, and 19 are unpatentable as obvious in view of Rubbert and Babayoff and that claims 14–16 are

unpatentable as obvious in view of Rubbert and Rosenstiel. Pet. 53–74. Claims 2 and 3 each depend directly or indirectly from claim 1, claims 14–16 each depend directly or indirectly from claim 9, and claims 18 and 19 each depend directly or indirectly from claim 17. We find that Petitioner’s arguments and evidence for dependent claims 2, 3, 14–16, 18, and 19 do not remedy the shortcomings in Petitioner’s arguments and evidence for independent claims 1, 9, and 17 and that Petitioner does not show obviousness of the dependent claims for the same reasons as set forth above for the independent claims.

G. Discretion under 35 U.S.C. § 325(d)

Patent Owner argues that the Board should exercise its discretion to deny the Petition under 35 U.S.C. § 325(d). Prelim. Resp. 3–12. In view of our determination that Petitioner does not meet the threshold for instituting review on the merits, we need not consider Patent Owner’s arguments for a discretionary denial of institution.

III. CONCLUSION

For the above reasons, we determine that Petitioner does not establish a reasonable likelihood that it would prevail in showing that claims 1–20 of the ’936 Patent are unpatentable on the grounds asserted in the Petition.

IV. ORDER

It is

ORDERED that, the Petition is *denied*, and no trial is instituted.

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