

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MATTERPORT, INC.,
Petitioner,

v.

APPLIANCE COMPUTING III, INC.,
Patent Owner.

IPR2021-00937
Patent 10,510,111 B2

Before JAMESON LEE, MEREDITH C. PETRAVICK, and
BARBARA A. PARVIS, *Administrative Patent Judges*.

PARVIS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Matterport, Inc. (“Petitioner”) filed a Petition (Paper 1, “Pet.”) requesting an *inter partes* review of claims 1–23 of U.S. Patent No. 10,510,111 B2 (Ex. 1001, “the ’111 patent”) pursuant to 35 U.S.C. §§ 311–319, along with the supporting Declaration of Yasutaka Furukawa, Ph.D. (Ex. 1004). Appliance Computing III, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). With our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 13, “Reply”) and Patent Owner filed a Sur-Reply (Paper 14, “Sur-reply”).

We have authority to determine whether to institute review under 35 U.S.C. § 314 and 37 C.F.R. § 42.4. The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted “unless the Director determines . . . there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.”

Upon consideration of the parties’ contentions and the evidence of record, we conclude Petitioner has not established a reasonable likelihood of prevailing in demonstrating the unpatentability of any challenged claim of the ’111 patent. Accordingly, we do not institute an *inter partes* review.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies itself and Redfin Corporation as the real parties-in-interest. Pet. 2. Patent Owner names itself as the real party-in-interest. Paper 4, 2.

B. Related Matters

Each party identifies a judicial matter that would affect, or be affected by, a decision in this proceeding. In particular, the parties inform us that the '111 patent is asserted in the following district court case: *Appliance Computing III, Inc. d/b/a Surefield v. Redfin Corporation*, No. 6:20-cv-00376 (W.D. Tex.) (“parallel district court proceeding”). Pet. 3; Paper 4, 2.

Petitioner also has filed (1) a petition for *inter partes* review of U.S. Patent No. 9,836,885 B1 (IPR2021-00936); (2) a petition for *inter partes* review of U.S. Patent No. 10,592,973 B1 (IPR2021-00938); and (3) a petition for *inter partes* review of U.S. Patent No. 10,102,673 B2 (IPR2021-00939).

C. The '111 Patent

The '111 patent relates to three dimensional (3D) image-based rendering (IBR) for real estate. Ex. 1001, code (57). Figure 5, reproduced below, illustrates a flowchart for computer-implemented, image-based rendering. *Id.* at 8:38–39.

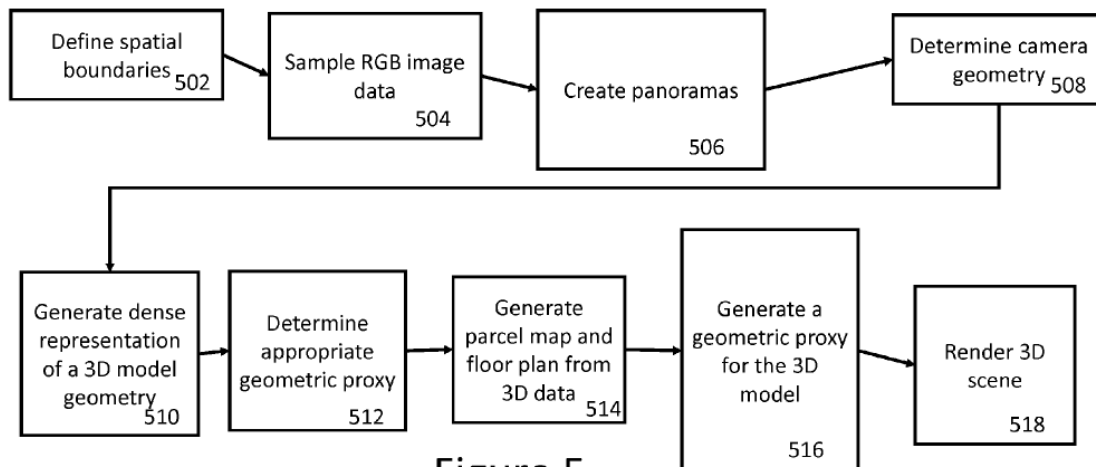


Figure 5

Figure 5, above, illustrates flowchart for computer-implemented, image-based rendering 100 for providing a 3D virtual model of real property. *Id.*

The flowchart shown in Figure 5 begins with step 502 in which the system generates the spatial boundaries in a model of the property that define any one or more of the following: (1) the land, such as a parcel outline; (2) structure, such as a house, apartment, or office; (3) structure internals, such as rooms within the structure; and (4) air-space above the land. *Id.* at 8:42–47. In step 504, red green blue (RGB) image data is captured from each of the spatial boundaries. *Id.* at 8:48–49. In step 506, panorama images are created from the RGB image data. *Id.* at 8:62–63.

Processing continues with step 508, in which the camera geometry is determined by use of first pass feature detection within the panoramas in order to spatially calibrate the panoramas. *Id.* at 9:1–3. In step 510, a second pass feature detection algorithm is applied. *Id.* at 9:12–13. Conversion is performed in step 512. *Id.* at 9:23.

Processing proceeds to step 514, in which the 3D data is used to generate a parcel map, such as the exterior and aerial views of the real estate, and a floor plan. *Id.* at 9:52–54. In step 516, the 3D data is used to generate a geometric proxy for the 3D model of the real property. *Id.* at 9:58–59. In step 518, the results are combined and a 3D scene that has photorealistic views from within a panorama capture location, as well as semi-photorealistic views from other locations using a geometric proxy and real image data are rendered to a viewer. *Id.* at 9:60–64. In addition to the 3D views, 2D floor plans are shown to the viewer user as well as descriptive spatial boundary labels. *Id.* at 9:65–67.

D. Illustrative Claim

Petitioner challenges claims 1–23 of the '111 patent. Pet. 1. Claims 1 and 18 are the independent claims. Claims 2–17 depend, directly or indirectly, from claim 1. Claims 19–23 depend, directly or indirectly, from

claim 18. Independent claim 1, reproduced below, is illustrative of the claimed subject matter.

1. [1.1¹] A method, comprising:
 - receiving image data of a plurality of spaces in a real estate property, the image data including a plurality of images captured from a plurality of viewpoints, wherein each of at least some of the images correspond to a respective one of a plurality of rooms of the real estate property;
 - [1.2] creating a plurality of panoramas of the plurality of spaces by processing and/or compositing the image data;
 - [1.3] defining a plurality of spatial boundaries of the plurality of spaces in the real estate property using the image data, some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property, and wherein a defined first spatial boundary is a further delineation within a second spatial boundary, the second spatial boundary corresponding to a parcel outline of the real estate property;
 - [1.4] in response to receiving a user indication of a location within the real estate property, rendering a virtual model of a selected space of the one or more spaces delineated by a spatial boundary of the plurality of spatial boundaries that corresponds to the indicated location, the virtual model rendered using one or more of the plurality of panoramas created from the captured images that correspond to the one or more spaces delineated by the spatial boundary that corresponds to the indicated location; and
 - [1.5] causing a device to display the virtual model with a first label indicating a location of the selected space in the spatial boundary that corresponds to the indicated location.

¹ Petitioner's designations to reference the elements of claim 1 are set forth in brackets. Pet. 22–32. Herein we refer to the elements of claim 1 using Petitioner's designations.

Ex. 1001, 16:8–41.

E. Evidence

Petitioner relies on the patent document references summarized in the table below.

Name	Patent Document	Exhibit
Cowtan	US 2009/0031246 A1	1008
Bell	US 2014/0043436 A1	1009

Petitioner relies on the non-patent literature reference summarized in the table below.

Name	Non-Patent Literature Title	Author(s)	Exhibit
Triggs	<i>“Bundle Adjustment – A Modern Synthesis,”</i> Springer-Verlag Berlin Heidelberg (2000).	Bill Triggs, et al.	1011

F. Asserted Grounds

Petitioner asserts that the challenged claims of the ’111 patent are unpatentable based on the following grounds summarized in the table below:

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1–23	103 ²	Cowtan, Bell
9	103	Cowtan, Bell, Triggs

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. Because the challenged claims of the ’111 patent have an apparent effective filing date on or after March 16, 2013, we apply the AIA versions of these statutes. Our application of the AIA law is not an affirmative ruling on the actual effective filing date of this patent.

III. DISCRETIONARY DENIAL OF THE PETITION

Patent Owner contends we should exercise our discretion under 35 U.S.C. § 314(a) to deny institution of *inter partes* review. Prelim. Resp. 11–20 (citing, e.g., *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). Patent Owner also asserts that we should exercise our discretion under 35 U.S.C. § 325(d) to deny institution of *inter partes* review because Cowtan and Bell were included in an information disclosure statement during prosecution. Prelim. Resp. 9–11. Because we determine that Petitioner fails to demonstrate that there is a reasonable likelihood that it would prevail with respect to at least one of the claims challenged in the Petition, we need not address Patent Owner’s contentions concerning discretionary denial.

IV. 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) as “requiring [*inter partes* review] petitions to identify ‘with particularity . . . the evidence that supports the grounds for the challenge to each claim’”). That burden never shifts to the patentee. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Furthermore, Petitioner cannot satisfy its burden of proving obviousness by employing “mere conclusory statements.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

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 of ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art the time of the invention would have had “a Bachelor of Science in Computer Science, or similar education, an understanding of the various techniques for image-based rendering, and at least 2 years of experience in their field of study, or equivalent practical experience in the relevant field.” Pet. 7 (citing Ex. 1004 ¶ 54). Dr. Furukawa’s testimony provides substantially the same level of skill as follows: “[t]he person of ordinary skill in the art at the relevant time, in October 2013 (‘POSITA’), would have a Bachelor of Science in Electrical Engineering, Computer Science, or similar education, an understanding of the various techniques for image-based rendering, and at least 2 years of experience in their field of study, or equivalent practical experience in the relevant field.” Ex. 1004 ¶ 54. Regarding the slight difference between the proposal in the Petition and the one in Dr. Furukawa’s testimony, Dr. Furukawa testifies that his opinions “do not turn on this precise definition, and the claims would be unpatentable from the perspective of any reasonable

³ Patent Owner does not present objective evidence of nonobviousness.

POSITA.” Ex. 1004 ¶ 55. Patent Owner does not dispute Petitioner’s proposal. Prelim. Resp. 7.

We find that the phrase “at least” in Petitioner’s proposed definition creates a vague, open-ended upper bound for the level of ordinary skill, and we therefore do not adopt that aspect of the proposal. With that exception, considering the subject matter of the ’111 patent, the background technical field, and the asserted prior art, we otherwise agree with Petitioner’s proposed qualifications for an ordinary level of skill. Petitioner’s proposed definition is consistent with the level of skill reflected in the specification of the ’111 patent and the asserted prior art references. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

Accordingly, for purposes of this decision, we adopt Petitioner’s undisputed assessment of the level of skill for one of ordinary skill in the art, except without the “at least” phrase.

C. Claim Construction

The parties provide contentions regarding construction of certain claim terms. *See, e.g.*, Pet. 7–8 (asserting that Petitioner applies the district court’s claim constructions set forth in Exhibit 1005); Prelim. Resp. 20–23 (providing contentions for the term “parcel outline”), 29–30 (providing contention for the term “space”). To resolve the disputes between the parties, we need to address only the parties’ claim construction contentions for the terms “parcel outline” and “space.” *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (explaining “we need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’”).

1. Legal Standards

We construe the challenged claims by applying the standard used in federal courts, in other words, “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b),” which is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2020). Under this standard, the words of a claim generally are given their “ordinary and customary meaning,” which is the meaning the term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *Phillips*, 415 F.3d at 1312–13.

2. “parcel outline”

In the parallel district court proceeding, the parties agreed that the term “parcel outline” means “a representation of the legal boundary of the land (i.e., the property lines).” Ex. 1005, 1. We consider whether we should use that agreed-to construction in the instant proceeding.

The intrinsic record supports that the agreed-to construction is the ordinary and customary meaning of “parcel outline.” The claim language recited in claim 1 differentiates between “one or more rooms within the real estate property” and “a parcel outline of the real estate property.” Ex. 1001, 16:20–22, 16:24–26. Claim 1 further recites a first spatial boundary, such as a spatial boundary delineating “one or more rooms” that is “within” a second spatial boundary, which corresponds to the parcel outline of the real property. *Id.* at 16:20–26. That further recitation in claim 1 supports the district court’s claim construction because rooms are within the legal boundary of the land. The recitation “a parcel outline of the real estate” in claim 1 (*id.* at 16:24–26) indicates a relationship between the parcel outline

and the real estate, which also supports the district court’s claim construction.

Similarly, the claim language recited in claim 18 differentiates between a floor of the real estate property and “a parcel outline of the real estate property.” *Id.* at 18:21–32 (reciting “a first floor of the real estate property,” “a second floor of the real estate property,” and “a parcel outline of the real estate property”). Claim 18 further recites that the “first spatial boundary” and the “second spatial boundary,” corresponding to the “first floor” and “second floor,” respectively, “are further delineations within a third spatial boundary,” which corresponds to the parcel outline of the real estate property. *Id.* 18:29–32. Like the similar recitation in claim 1, the further recitation in claim 18 supports the district court’s claim construction because floors are within a legal boundary of the land. The recitation “a parcel outline of the real estate” in claim 18 (*id.* at 18:32) indicates a relationship between the parcel outline and the real estate, which also supports the district court’s claim construction.

Consistently, the ’111 patent Specification describes that the spatial boundaries define the land, which perhaps is a parcel outline, as one of a few different alternatives. The relevant portion of the ’111 patent Specification is below.

In step 502, the system creates or generates the spatial boundaries in a model of the property that define *the land (perhaps a parcel outline)*, structure (e.g., house, apartment, office, etc.), structure internals (e.g., bedrooms, kitchens, hallways, etc.) and/or air-space above the land (e.g., via quadcopter or pole-based data capture of aerial views).
Id. at 8:42–47 (emphasis added).

As set forth above, spatial boundaries that define a parcel outline are distinguishable from spatial boundaries that define other aspects of real property, such as structure, structure internals, or air-space above the land. *Id.* The '111 patent Specification, thus, supports that the construction agreed to by the parties in the parallel district court proceeding is the ordinary and customary meaning of “parcel outline.”

Other evidence of record also supports adopting the parties’ agreed-to construction. In particular, Dr. Furukawa testifies that he understands “that ‘parcel outline’ means ‘a representation of the legal boundary of the land (i.e., the property lines).’” Ex. 1004 ¶ 143 (citing Ex. 1005, 1).⁴

Accordingly, for purposes of this decision, we adopt the construction that the parties agreed to in the parallel district court proceeding, i.e., that “parcel outline” means “a representation of the legal boundary of the land (i.e., the property lines).”

3. “space”

In the parallel district court proceeding, the district court determined that “space” means “a virtual or real 3D volume.” Ex. 1005, 3. We consider whether we should use the district court’s claim construction in the instant proceeding.

Although Petitioner argued for a different claim construction in the parallel district court proceeding (Ex. 1005, 3), Petitioner does not present

⁴ In its element-by-element analysis, Petitioner refers to the testimony of Patent Owner’s expert in the district court proceeding. *See, e.g.*, Pet. 24–25 (citing Ex. 1006 at 32–33; Ex. 1007, 14). Petitioner does not assert that this evidence should be considered with respect to the construction of “parcel outline.” *Id.* at 7–8, 24–25, 28. Also, at least certain of the evidence pertains to the ordinary and customary meaning of a different term, i.e., “spatial boundaries.”

those arguments here and, further, Petitioner states that it has applied the district court's claim constructions in the instant proceeding. Pet. 7–8. Like the construction adopted, Petitioner's proposed construction in the parallel district court proceeding is that “space” is a “3D volume.” Ex. 1005, 3. Petitioner's proposed construction in the district court proceeding includes additional limitations that we need not consider here. *Id.*

The intrinsic record supports that the district court's claim construction is the ordinary and customary meaning of “space.” The claim language supports that the “space” has a relationship to real property. Ex. 1001, 16:9 (reciting “a plurality of spaces in a real estate property” (claim 1)), 18:14–15 (“a plurality of spaces in a plurality of rooms in a real estate property” (claim 18)). The claim language also supports that “space” is a 3D volume. For instance, claim 1 recites “the spatial boundaries delineating a volume of one or more of the plurality of spaces.” *Id.* at 16:20–21. Additionally, claims 1 and 18 recite rendering “a virtual model of a selected space.” *Id.* at 16:28–29, 18:35–36.

Consistently, the '111 patent Specification describes that the capture process includes defining spatial boundaries and the processing pipeline that operates on the data output from the capture process involves 3D reconstruction. Ex. 1001, 7:41–49. Furthermore, the '111 patent provides a description of computer-implemented image-based rendering 100 that includes as step 502 creating or generating the spatial boundaries in a model of the property. *Id.* at 8:42–43. The '111 patent describes that computer-implemented image-based rendering 100 provides “a three-dimensional (3D) virtual model of a real property.” *Id.* at 8:38–40.

Patent Owner asserts that “the provisional application upon which the '111 Patent claims benefit states that the “[s]ystem enables the definition of

one or more, three dimensional spatial boundaries to be defined within a given real estate environment.” Prelim. Resp. 30 (citing Ex. 1003, 4). Patent Owner’s assertion is supported by the disclosure in the provisional application that the system “enables the definition of one or more, three dimensional spatial boundaries to be defined within a given real estate environment.” Ex. 1003, 4.

Accordingly, for purposes of this decision, we adopt the district court’s construction, i.e., that “space” means “a virtual or real 3D volume.”

D. Obviousness of Claims 1–23 over Cowtan and Bell

Petitioner asserts that claims 1–23 are unpatentable under 35 U.S.C. § 103 as obvious over Cowtan and Bell. Pet. 4. Patent Owner disputes Petitioner’s assertion. Prelim. Resp. 20–36.

We begin with an overview of Cowtan and Bell. We then turn to the parties’ contentions.

1. Cowtan

Cowtan describes providing “multi-media virtual tours in the real estate industry.” Ex. 1008 ¶ 2. Figure 1 of Cowtan, reproduced below, illustrates a graphical user interface (GUI) for an Internet-based multi-media virtual tour presentation system. *Id.* ¶ 16.

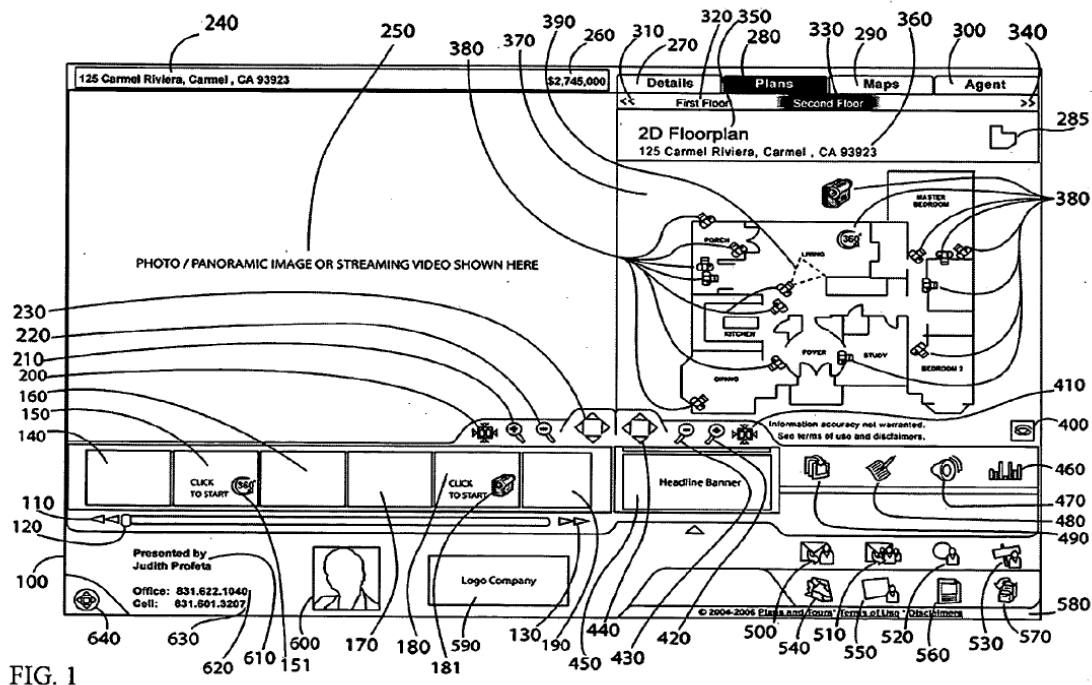


Figure 1, above, illustrates GUI 100 for an Internet-based multi-media virtual tour presentation system having (1) image navigation section 110–190, (2) image display section 200–260, and (3) hierarchical information organization and navigation section 270–440. *Id.* ¶¶ 110–113.

Image navigation section 110-190 comprises one or more of the following: left select button 110, slide bar 120, right select button 130, first thumbnail 140, second thumbnail 150, third thumbnail 160, fourth thumbnail 170, fifth thumbnail 180, and sixth thumbnail 190. *Id.* ¶ 111. Image display section 200–260 comprises, among other things, photographic or panoramic image or streaming video display section 250. *Id.* ¶ 112. In image navigation section 110–190, a user may select one of the thumbnails to display a corresponding full size image in photographic or panoramic image or streaming video display section 250. *Id.* ¶ 117.

Hierarchical information organization and navigation section 270–440 includes, among other things, plan-based navigation system 370 comprising a plurality of photograph, panorama, or video point of origin and orientation

icons 380. *Id.* ¶ 113. Plan-based navigation system 370 displays an image corresponding with a floor plan for the subject property. *Id.* ¶ 123. Each photograph, panorama, or video point of origin and orientation icons 380 corresponds with one of the photographs or videos from the thumbnails in image navigation section 110–190. *Id.*

2. Bell

Bell describes capturing and aligning multiple 3D scenes with one another. Ex. 1009 ¶ 3. Figure 2, reproduced below, illustrates a graphical user interface with windows with view of the capture process. *Id.* ¶ 56.

Figure 2

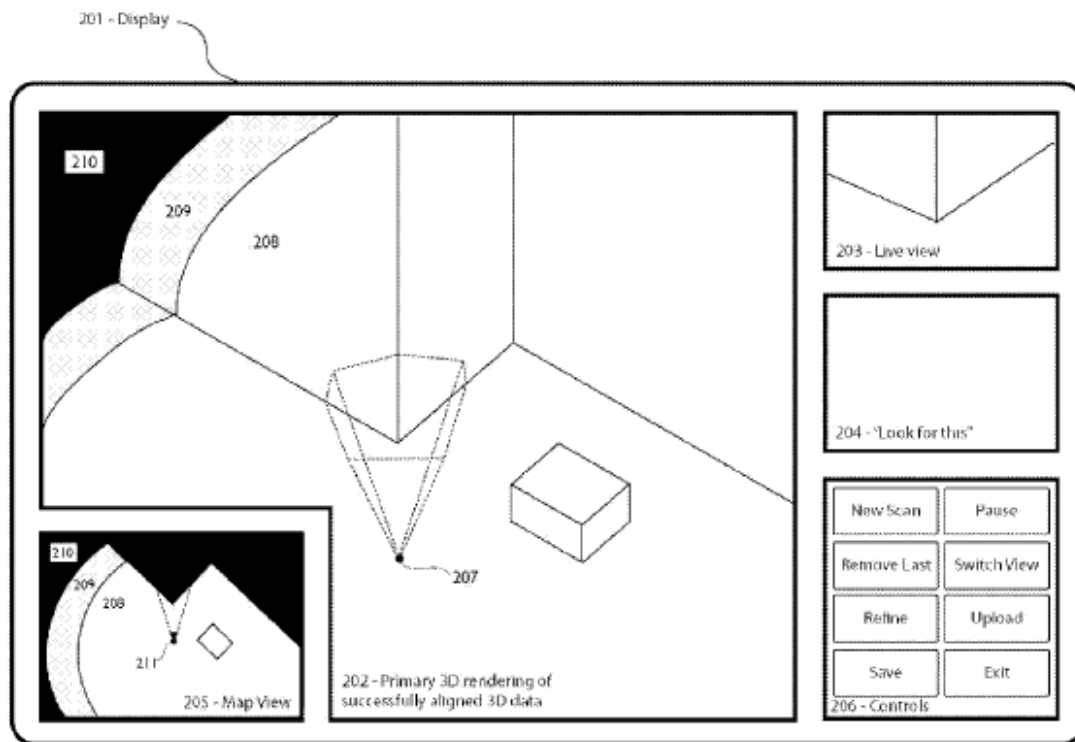


Figure 2, above, illustrates primary 3D rendering 202 of successfully aligned captured 3D data 208 shown on display 201. *Id.* ¶ 61.

As shown in Figure 2, primary 3D rendering 202 allows the user to see what areas have been captured. *Id.* Data 208 shown in primary 3D

rendering 202 includes sets of points captured at various times by a 3D capture device with the different sets aligned into a common coordinate system for display. *Id.* ¶ 63. A user selects a location, area, or previous capture position on primary 3D rendering 202 or map view 205. *Id.* ¶ 75. Map view 205 is displayed in two dimensions and gives users a larger context for their position. *Id.* ¶ 81. The graphical user interface illustrated in Figure 2 includes set of controls 206 for the scan process. *Id.* ¶ 82.

3. *Independent Claim 1*

a) *Element 1.3*

Petitioner relies on the combined teachings of Cowtan and Bell for element 1.3. We consider whether Petitioner has provided sufficient explanation showing how a person of ordinary skill in the art would have combined the teachings of Cowtan and Bell so as to meet the subject matter recited in element 1.3. Element 1.3 is reproduced below.

defining a plurality of spatial boundaries of the plurality of spaces in the real estate property using the image data, some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property, and wherein a defined first spatial boundary is a further delineation within a second spatial boundary, the second spatial boundary corresponding to a parcel outline of the real estate property.

Ex. 1001, 16:18–26.

For the reasons given above with respect to claim construction (*see* §§ IV.C.2, IV.C.3), for purposes of this decision, we adopt the constructions that are being used in the parallel district court proceeding. In particular, we use the parties’ agreed-to construction that “parcel outline” means “a representation of the legal boundary of the land (i.e., the property lines).”

Ex. 1005, 1. Also, we use the district court’s determination that “space” means “a virtual or real 3D volume.” *Id.* at 3.

We start with a portion of the Petition having the title “Motivation to combine Cowtan and Bell436.” Pet. 20. Petitioner asserts that a person of ordinary skill in the art would have looked to Bell’s 3D modeling technology and techniques for rendering 3D scenes to use with Cowtan’s virtual tours of real estate. *Id.* at 20–21 (citing Ex. 1004 ¶ 107) (“A person of ordinary skill in the art reading Cowtan naturally would look to existing techniques for generating 3D models and rendering 3D scenes, such as that described in Bell436.”), 21 (citing Ex. 1004 ¶¶ 107–108) (concluding “it would have been obvious to a POSITA^[5] to use the 3D modeling technology disclosed in Bell436 for the 3D walkthroughs, floorplans, visualizations or renderings disclosed in Cowtan for providing Internet-based virtual tours of real estate.”)

The aforementioned contention is too conclusory and vague with respect to how a person of ordinary skill in the art would have combined the teachings of the asserted art to meet element 1.3. For instance, Petitioner does not identify differences between either Cowtan and Bell and element 1.3 or how Petitioner proposes to combine or modify the asserted prior art to meet element 1.3. Also, Petitioner’s contention does not address the ordinary and customary meaning of the terms “parcel outline” and “space” with sufficient specificity.

Furthermore, Petitioner’s contention does not take into account that Cowtan also teaches 3D modeling technology and 3D rendering techniques. Indeed, Petitioner relies on both Bell’s teachings and Cowtan’s teachings of

⁵ POSITA is person of ordinary skill in the art.

3D modeling technology and 3D rendering techniques. *See, e.g., id.* at 20 (asserting that Cowtan discloses “3D rendering[s]”), 29 (asserting that Cowtan teaches “‘multi-media dual-paned virtual tour presentation system having orientational capabilities’ which provides ‘a digital representation of a 3D space’ (i.e., *virtual model*)”).

The portion of the Petition having the title “Motivation to combine Cowtan and Bell436” (Pet. 20) does not include sufficient explanation as to whether Petitioner contends that a person of ordinary skill in the art would have substituted Bell’s technology and techniques for those of Cowtan or whether Petitioner proposes combining the 3D modeling technologies and 3D rendering techniques of the two references in some manner. To the extent that Petitioner intends that Bell’s technology and techniques would have been substituted for those of Cowtan, Petitioner does not explain sufficiently Petitioner’s reliance on Cowtan’s techniques in its element-by-element analysis. For all these reasons, Petitioner’s contention in the portion of the Petition having the title “Motivation to combine Cowtan and Bell436” (Pet. 20) is deficient.

Petitioner does not remedy the deficiency in its analysis of element 1.3. Petitioner relies on Bell for the first portion of element 1.3, i.e., “defining a plurality of spatial boundaries of the plurality of spaces in the real estate property using the image data.” Pet. 26 (asserting that Bell’s techniques teach “spatial boundaries of the plurality of spaces”). Petitioner points to teachings in both Bell and Cowtan for the next portion of element 1.3., i.e., “some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property.” *Id.* at 26–27 (citing Ex. 1008 ¶¶ 113, 122–123, 189, Figs. 7–10, 13; Ex. 1009 ¶¶ 81, 162–168). To the extent that we can discern, the last

paragraph of the Petition is the only portion that pertains to “parcel outline” and the remainder of the recitation in element 1.3., i.e., “wherein a defined first spatial boundary is a further delineation within a second spatial boundary, the second spatial boundary corresponding to a parcel outline of the real estate property.” That discussion is deficient for the reasons given below. For completeness, we provide detailed discussion of each of Petitioner’s assertions made with respect to element 1.3 in turn.

Petitioner begins by pointing to Bell’s teachings regarding a technique for 3D modeling and rendering 3D scenes that involves using assumptions about planes and defining plane objects. *Id.* at 25–26 (citing Ex. 1009 ¶¶ 133, 134). In the portions of Bell relied on by Petitioner, Bell describes that “assumptions about planes being flat and potentially perpendicular may be used to reduce the potential for drift.” Ex. 1009 ¶ 133. Bell also teaches identifying planes and using their position and orientation “to define plane objects,” such as “boundaries, edges, corners, adjacent planes, location,” and visual appearance information. *Id.* ¶ 134. As indicated above, Petitioner appears to be relying on the aforementioned teachings in Bell for “defining a plurality of spatial boundaries of the plurality of spaces in the real estate property using the image data.” Pet. 26 (asserting that Bell’s techniques teach “spatial boundaries of the plurality of spaces”).

Petitioner next points to Bell’s disclosure that its 3D models may be used for “generation of floorplans, which may provide a top-down view of the aligned 3D data” and “generation of an exploded view, in which segments of a captured object or environment (e.g., floors of a building) may be separated.” Pet 26 (citing Ex. 1009 ¶¶ 162–168). Petitioner asserts that Bell’s data may be displayed in a variety of ways including the primary 3D rendering 202 and map view 205. *Id.* (citing 1009 ¶ 81). Petitioner appears

to be relying on those portions of Bell for the next portion of element 1.3., i.e., “some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property.”

Petitioner then asserts that Bell “can be combined with techniques, such as those disclosed in Cowtan, for defining rooms, floors, and floorplans in a real property.” Pet. 26 (citing Ex. 1008 ¶ 189, Figs. 7–10, 13). Figure 7 of Cowtan relied on by Petitioner is reproduced below.

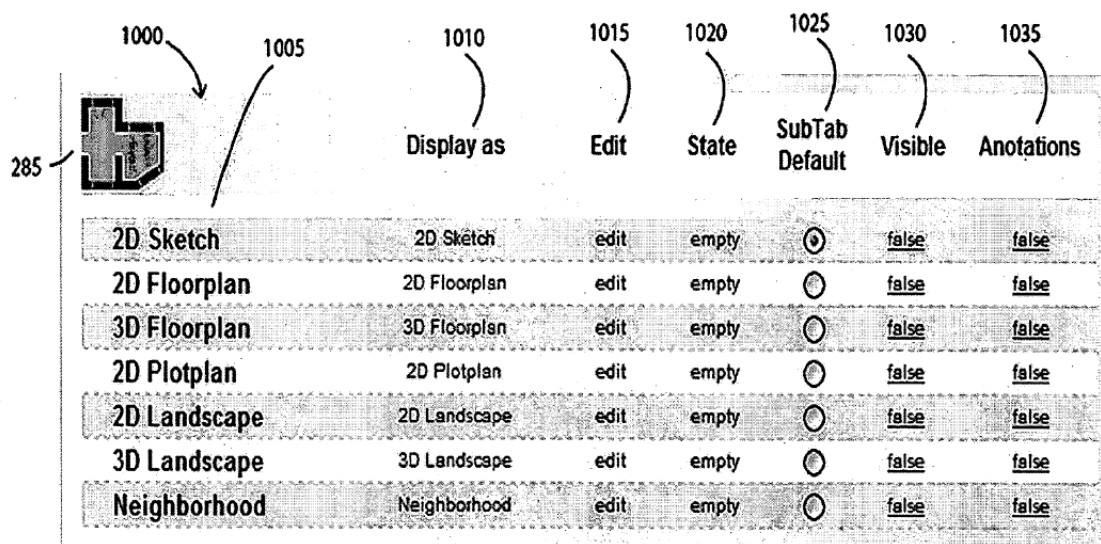


FIG. 7

Figure 7 of Cowtan, above, shows an example where seven sub tabs are provided for loading a floor plan before content is loaded into the system. Ex. 1008 ¶ 23.

Cowtan describes Figure 7 as “an example where seven sub tabs are provided for loading a floor plan” into the system. Ex. 1008 ¶¶ 23, 136. Cowtan describes that the screen may comprise certain tabs, icons, and indicators. *Id.* ¶ 136. The terms “Plotplan” and “Landscape” are found in a column identified by “1005,” which Cowtan describes as “floor plan sub tab names 1005.” *Id.* ¶ 136, Fig. 7. The column identified by “1005” also

includes “2D Floorplan” and “3D Floorplan.” *Id.* Petitioner’s reliance on Figure 7 of Cowtan appears at least in part to pertain to the same portion of element 1.3 discussed with respect to Bell, i.e., “some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property.” Pet 26 (citing Ex. 1009 ¶¶ 81, 162–168). Petitioner does not explain sufficiently why it relies on both Bell’s and Cowtan’s teachings for this recitation.

Petitioner’s relies on other teachings in Cowtan that also appear to pertain to the same portion of element 1.3 discussed with respect to Bell, i.e., “some of the spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property.” Pet. 26–27 (citing Ex. 1008 ¶¶ 113, 122–123, 189, Figs. 7–10, 13). For instance, Petitioner relies on Figures 8–10 of Cowtan. *Id.* Cowtan’s Figures 8–10 indicate that they pertain to 2D floorplans. Ex. 1008, Figs. 8–10. In contrast, the ordinary and customary meaning of the term “space” is “a virtual or real 3D volume.” Ex. 1005, 3. That teaching is at best duplicative of Figure 7.

We turn to Petitioner’s reliance on paragraphs 113 and 122–123 of Cowtan. Pet. 27 (citing, *e.g.*, Ex. 1008 ¶¶ 113, 122–123). Paragraph 113 of Cowtan describes navigation section 270–440 in graphical user interface 100 for providing a hierarchical organization of ways to navigate a virtual tour. Ex. 1008 ¶¶ 110, 113. Paragraphs 122 and 123 provide further details regarding navigation section 270–440 relating to sub-tabs in the second tier of the hierarchy and plan-based navigation system 370, which displays an image corresponding with a floor plan. Ex. 1008 ¶¶ 122–123. Petitioner’s reliance on paragraphs 113 and 122–123 also appears to pertain to the same portion of element 1.3 discussed with respect to Bell, i.e., “some of the

spatial boundaries delineating a volume of one or more of the plurality of spaces of one or more rooms within the real estate property.” Nothing in the Petition indicates that paragraphs 113 and 122–123 are relied on to meet element 1.3’s requirement that the second spatial boundary correspond to a parcel outline, i.e., “a representation of the *legal boundary of the land (i.e., the property lines)*.” See § IV.C.2 (emphasis added).

We now turn to Petitioner’s reliance on Figure 13 and paragraph 189 of Cowtan. Pet. 26 (citing, e.g., Ex. 1008 ¶ 189, Fig. 13). Cowtan’s Figure 13 is described as “similar to FIG. 7” (Ex. 1008 ¶ 29) and appears similar to Figure 7. Compare *id.* at Fig. 13, with *id.* at Fig. 7. Paragraph 189 of Cowtan is described as an “[e]xample XML file” and appears to be a computer software file. *Id.* ¶ 189. Paragraph 189 spans from page 12 to page 21 of Cowtan. See generally *id.* Petitioner does not specify sufficiently what portions of paragraph 189 it relies on or how this computer software file supports Petitioner’s position.

Petitioner then asserts that “the generation of boundaries for the spaces of a property, e.g., a floorplan, define the *parcel outline* for the property.” Pet. 28 (emphasis added). We agree with Patent Owner (Prelim. Resp. 24) that on this record Petitioner has not shown that simply providing a floorplan is enough to satisfy the entirety of element 1.3. Petitioner attempts to support its assertion by repeating one sentence of testimony of Patent Owner’s expert in the district court proceeding. Pet. 28 (citing Ex. 1006, 33). Petitioner has not explained sufficiently the evidence in the district court relating to claim construction. *Id.* at 24–25, 28 (citing Ex. 1005, 1, 3; Ex. 1006, 32–33; Ex. 1007, 14). Petitioner’s reliance on testimony of Patent Owner’s expert in the district court proceeding does not eliminate the need for the Petition to address the ordinary and customary meaning of the

terms “parcel outline” and “space” with sufficient specificity. Petitioner has not argued for a broader construction or explained sufficiently its reliance on the expert testimony in connection with the constructions adopted by the district court. *See, e.g.*, Pet. 7–8, 24–25, 28.

Petitioner also asserts “[f]or example, in Cowtan the boundaries of the rooms in a 2D floorplan (generated as described above) along with the ‘2D landscape’ and/or ‘2D plotplan’ define the parcel boundary for a given property.” Pet. 28 (citing Ex. 1008, Fig. 7). As explained throughout, the analysis in the Petition of element 1.3 includes reliance on both Bell’s and Cowtan’s teachings of modeling technology and rendering techniques without sufficient clarity as to why the Petition points to teachings in both references.

As also discussed above, Petitioner begins by pointing to Bell’s teachings regarding a technique for 3D modeling and rendering 3D scenes that involves using assumptions about planes and defining plane objects. *Id.* at 25–26 (citing Ex. 1009 ¶¶ 133, 134). Those portions of Bell pertain to “defining a plurality of spatial boundaries of the plurality of spaces in the real estate property using the image data.” Pet. 26 (asserting that Bell’s techniques teach “spatial boundaries of the plurality of spaces”). For completeness, we discuss those teachings in Bell (Ex. 1009 ¶¶ 133, 134) in connection with Cowtan’s description of the screen shown in Figure 7 comprising tabs, icons, and indicators, including the terms “Plotplan” and “Landscape,” which are found in a column identified by “1005.” Ex. 1008 ¶ 136, Fig. 7.

Upon consideration, we determine that the Petition does not take into account that Bell’s teachings pertain to spaces of man-made structures. *See, e.g.*, Ex. 1009 ¶ 133 (describing that Bell’s technique “can be useful in

situations for which the environment being scanned is a *man-made structure* that is supposed to have *flat floors, walls, or other surfaces*” (emphases added)). Petitioner does not explain sufficiently how Bell’s identification of planes and definition of plane objects of *man-made* structures would have been combined with Cowtan’s sub tab names “Plotplan” and “Landscape” to teach element 1.3. Also, the Petition does not address sufficiently the ordinary and customary meaning of “parcel outline,” which is “a representation of the *legal boundary of the land (i.e., the property lines)*.” See § IV.C.2 (emphasis added). Additionally, Petitioner’s argument relating to teachings of a two dimensional plotplan and a two dimensional landscape does not address the ordinary and customary meaning of “space” with sufficient specificity. See § IV.C.3. Furthermore, we note that Petitioner uses the term “parcel boundary,” not parcel outline, which is recited in the claim without sufficient explanation as to why two different terms are used. Pet. 28.

In its Reply to Patent Owner’s Preliminary Response, Petitioner provides arguments responding to Patent Owner’s Preliminary Response. Reply 5–7. Petitioner’s arguments should have been presented in the Petition. As an additional, independent reason for our denial, even upon consideration, Petitioner’s arguments in its Reply do not remedy the aforementioned deficiency. For instance, Petitioner asserts that Patent Owner’s infringement contentions in the parallel district court proceeding support Petitioner’s position. *Id.* Petitioner’s argument appears to imply that we should adopt a broader construction such that Bell’s floorplan would suffice as the parcel outline. *Id.* Petitioner, however, does not provide with sufficient specificity a broader construction or sufficient additional explanation regarding why we now should adopt any broader construction.

See 37 C.F.R. § 42.104(b)(3). Petitioner’s Reply is not consistent with the Petition’s assertion that Petitioner has applied the district court’s claim constructions. Pet. 7.

In summary, Petitioner does not explain with sufficient specificity in what manner a person of ordinary skill in the art would have combined Bell’s modeling technology or rendering techniques with Cowtan’s teachings to meet element 1.3 recited in claim 1.

b) Does the Petition provide sufficient articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Cowtan and Bell?

We turn to whether Petitioner provided sufficient articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Cowtan and Bell in the manner recited in claim 1. We again consider Petitioner’s contentions provided under the title “Motivation to combine Cowtan and Bell⁴³⁶,” as well as contentions provided in Petitioner’s element-by-element analysis. Pet. 20–21, 26, 28.

In its contentions, Petitioner points to similarities in Cowtan and Bell. *Id.* For instance, Petitioner asserts “Cowtan and Bell⁴³⁶ *both* disclose the use of images (e.g., panoramas) to generate 3D scenes for various types of spaces, including rooms and other spaces on properties.” *Id.* at 20 (citing Ex. 1004 ¶¶ 105–106) (emphasis added). As discussed above (*see* § IV.D.3.a), Petitioner relies on both Bell and Cowtan for teaching a portion of element 1.3. Also, Petitioner asserts that both Cowtan and Bell teach elements 1.1, 1.4 and 1.5. *Id.* at 22 (referring to element 1.1, “Cowtan and Bell⁴³⁶ both disclose this limitation”), 30 (referring to element 1.4, “[t]hus, this limitation is disclosed by Cowtan and Bell” and referring to element 1.5 “Cowtan and

Bell436 both disclose this limitation of claim 1, individually and in combination”).

Petitioner’s contentions pointing to similarities in Cowtan and Bell do not suffice as an articulated reason with rational underpinning to combine their respective teachings—more is required to support the legal conclusion of obviousness. *See KSR*, 550 U.S. at 418. The Federal Circuit has concluded that merely asserting that two references were drawn from the same field of art is “simply too conclusory” to show that the skilled artisan would have combined these references in the way of the claimed invention. *Securus Techs., Inc. v. Glob. Tel*Link Corp.*, 701 F. App’x 971, 976 (Fed. Cir. 2017); *see Microsoft Corp. v. Enfish, LLC*, 662 F. App’x 981, 990 (Fed. Cir. 2016) (determining that “the Board correctly concluded” that a petitioner “did not articulate a sufficient motivation to combine” where the only reason given was “that the references were directed to the same art or same techniques”). In the same way, Petitioner’s contentions here that the references are similar, even if true, are insufficient to show why the skilled artisan would have combined Cowtan and Bell in the manner recited in the claims.

Relying on the testimony of Dr. Furukawa, Petitioner also contends that a person of ordinary skill in the art reading Cowtan “naturally would look to” Bell’s techniques. Pet. 20–21 (citing Ex. 1004 ¶ 107). Dr. Furukawa’s testimony, however, pertains to similarities in the teachings of web-based technologies of Cowtan and Bell (Ex. 1004 ¶ 107), which is not enough as discussed above. Dr. Furukawa also testifies that Petitioner intended its system to be used by “property owners and real estate management companies.” Ex. 1004 ¶ 107 (citing Ex. 1025, 3). That, however, does not explain why a person of ordinary skill in the art would

have combined teachings in the manner recited in claim 1, which requires “the second spatial boundary corresponding to a parcel outline of the real estate property.” The Petition, also states that the named inventors asserted that Petitioner’s technology “could ‘generate significant artifacts.’” Pet. 21 (citing Ex. 1003, 9). That is a reason a person of ordinary skill in the art would not have looked to make the proposed combination. Under the circumstances here, Petitioner’s contention that a person of ordinary skill in the art reading Cowtan “naturally would look to” Bell’s techniques (Pet. 20–21) is conclusory and does not suffice as an articulated reason with a rational underpinning to combine the respective teachings of the references. *See KSR*, 550 U.S. at 418.⁶

Petitioner also asserts that a person of ordinary skill in the art could have combined the references. Pet. 21, (asserting that the named inventors acknowledged that Petitioner’s technology “could be used in real estate environments”), 26 (asserting Bell’s generation of floorplans and views “*can* be combined with techniques, such as those disclosed in Cowtan”) (emphasis added). Those contentions, however, do not explain sufficiently why one of ordinary skill in the art reading Cowtan would have applied specifically Bell’s particular teachings. Petitioner also does not identify a persuasive reason why a skilled artisan, viewing the teachings of Bell, would have been motivated to modify Cowtan. That a person of ordinary skill in the art could have done so is not enough. *Belden Inc. v. Berk-Tek LLC*, 805

⁶ Although Dr. Furukawa’s testimony does not remedy the deficiency in the Petition, we further determine that Petitioner’s reliance on that testimony is improper incorporation by reference. *See* 37 C.F.R. 42.6 (a) (3) (“Arguments must not be incorporated by reference from one document into another document.”)

F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”); *In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014) (“[T]he mere *capability* of pulling the handles is not the inquiry that the Board should have made; it should have determined whether it would have been obvious to modify the prior art apparatus to arrive at the claimed rowing machine.”).

Even if prior art references disclose all of the limitations in a claim when combined, which is not the case here, the Petition still must explain why a person of ordinary skill in the art would have combined the references to arrive at the claimed invention. *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1366–67 (Fed. Cir. 2012) (citing *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1374 (Fed. Cir. 2008) (holding that post-KSR “some kind of motivation must be shown from some source, so that the [trier of fact] can understand why a person of ordinary skill would have thought of either combining two or more references or modifying one to achieve the patented [invention]”)). Under the circumstances here, we determine that Petitioner has not provided sufficient articulated reasoning with a rational underpinning as to why one of ordinary skill in the art would have combined the teachings of Cowtan and Bell in the manner recited in claim 1.

c) Conclusion

After consideration of the contentions and the evidence, we determine that Petitioner has not provided sufficient explanation to show how a person of ordinary skill in the art would have combined the teachings of Cowtan and Bell so as to meet the claimed subject matter. Also, Petitioner has not provided sufficient articulated reasoning with a rational underpinning as to

why one of ordinary skill in the art would have combined the teachings of Cowtan and Bell in the manner recited in claim 1. Accordingly, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claim 1 is unpatentable under 35 U.S.C. § 103 as obvious over Cowtan and Bell.

4. *Independent Claim 18*

Independent claim 18 is similar to independent claim 1, except claim element 18.3⁷ recites “wherein the volume delineated by a first spatial boundary corresponds to *a first floor* of the real estate property and the volume delineated by a second spatial boundary corresponds to *a second floor* of the real estate property” (emphasis added). Element 18.3 also recites that those first and second spatial boundaries “are further delineations within a third spatial boundary corresponding to *a parcel outline* of the real estate property” (emphasis added). Petitioner references its assertions for claims 1, 4, and 7, and provides additional contentions. Pet. 52–56. Petitioner’s contentions for claim 18, however, do not remedy the deficiencies discussed with respect to claim 1. *See supra* §§ IV.D.3.a, IV.D.3.b.

Petitioner asserts that a person of ordinary skill in the art would understand that the floors of a building, and thus the spatial boundaries for those floors, would be within the parcel outline of the property. Pet. 54 (citing Ex. 1004 ¶ 359). Petitioner, however, relies on both Bell and Cowtan for teaching floors of a building without sufficient explanation as to why Petitioner points to the teachings of both references. *Id.* at 53–54 (citing Ex. 1009 ¶¶ 81, 162–168; Ex. 1009 ¶ 189, Figs. 7–10, 13).

⁷ Like we did for claim 1, we use Petitioner’s designation for element 18.3 recited in claim 18. Pet. 52.

The Petition does not provide sufficient explanation as to how the teachings of Bell and Cowtan would have been combined to meet the requirement in element 18.3 that the first and second spatial boundaries corresponding to floors “are further delineations within a third spatial boundary corresponding to *a parcel outline* of the real estate property” (emphasis added). Pet. 52–56. In its additional discussion for element 18.3, Petitioner relies on the same teachings discussed with respect to claim 1. *Compare* Pet. 53–56 (citing Ex. 1009 ¶¶ 133, 134, 162–168; Ex. 1008 ¶¶ 113, 122–123, 189, Figs. 7–10, 13) *with id.* at 25–26 (citing Ex. 1009 ¶¶ 133, 134, 162–168; Ex. 1008 ¶¶ 113, 122–123, 189, Figs. 7–10, 13). The reasons given for element 1.3 (*see supra* § IV.D.3) apply to the discussion in the Petition for element 18.3.

Also, a contention in the Petition for element 18.3 is inconsistent with a similar, but different contention for element 1.3. In particular, for element 18.3, Petitioner asserts “in Cowtan the boundaries of the rooms in a 2D floorplan (generated as described above) along with the ‘2D landscape’ and/or ‘2D plotplan’ are all *within* the parcel boundary for a given property.” Pet. 55–56 (citing Ex. 1008, Fig. 7) (emphasis added). For element 1.3, however, Petitioner asserts that “in Cowtan the boundaries of the rooms in a 2D floorplan (generated as described above) along with the ‘2D landscape’ and/or ‘2D plotplan’ *define* the parcel boundary for a given property.” *Id.* at 28 (emphasis added). Petitioner does not explain sufficiently how Cowtan’s boundaries are both within the parcel outline and define the parcel outline. Also, Petitioner’s different contention for 18.3 does not remedy the deficiency noted for element 1.3 that the Petition lacks sufficient explanation as to how Bell’s identification of planes and definition of plane objects of

man-made structures would have been combined with Cowtan’s sub tab names “Plotplan” and “Landscape” to teach element 18.3.

Like Petitioner’s reasoning to combine for claim 1, Petitioner again points to similarities in Cowtan and Bell and asserts that a person of ordinary skill in the art “would understand” that the teachings “can be combined.” Pet. 52–56 (citing, *e.g.*, Ex. 1004 ¶ 360). Those assertions are deficient for the same reasons provided for claim 1. *See supra* § IV.D.3.b. Petitioner does not provide additional contentions that remedy the earlier-noted deficiencies.

Accordingly, for the reasons discussed with respect to claim 1, as well as those discussed with respect to claim 18, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claim 18 is unpatentable under 35 U.S.C. § 103 as obvious over Cowtan and Bell.

5. *Dependent Claims 2–17 and 19–23*

We have considered Petitioner’s arguments and evidence for dependent claims 2–17 and 19–23. Petitioner does not provide contentions for claims 2–17 and 19–23 that remedy the deficiency discussed with respect to claim 1. Accordingly, for the reasons discussed with respect to claim 1, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 2–17 and 19–23 are unpatentable under 35 U.S.C. § 103 as obvious over Cowtan and Bell.

E. *Obviousness of Claim 9 over Cowtan, Bell, and Triggs*

Petitioner alternatively asserts that claim 9 is unpatentable under 35 U.S.C. § 103 as obvious over Cowtan, Bell, and Triggs. Pet. 4, 60–64. We considered Petitioner’s arguments and evidence for obviousness of dependent claim 9 over the combination of Cowtan, Bell, and Triggs. *Id.*

Petitioner does not provide contentions that remedy the deficiency discussed with respect to claim 1. Accordingly, for the reasons discussed with respect to claim 1, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claim 9 is unpatentable under 35 U.S.C. § 103 as obvious over Cowtan, Bell, and Triggs.

V. CONCLUSION

For the foregoing reasons, we conclude that the information presented in the Petition does not establish a reasonable likelihood that Petitioner would prevail in showing that any of claims 1–23 of the '111 patent is unpatentable.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is denied, and we do not institute *inter partes* review of any claim of the '111 patent based on the grounds asserted in this Petition.

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