

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GOOGLE INC.,
Petitioner,

v.

VISUAL REAL ESTATE, INC.,
Patent Owner.

Case IPR2014-01341
Patent 8,078,396 B2

Before MICHAEL R. ZECHER, BEVERLY M. BUNTING, and
KEVIN W. CHERRY, *Administrative Patent Judges*.

ZECHER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. BACKGROUND

A. Introduction

Petitioner, Google Incorporated (“Google”), filed a corrected Petition requesting an *inter partes* review of claims 1, 2, 5, 8–13, and 16 of U.S. Patent No. 8,078,396 B2 (“the ’396 patent,” Ex. 1002). Paper 4 (“Pet.”). Patent Owner, Visual Real Estate, Incorporated (“VRE”), timely filed a Preliminary Response. Paper 9 (“Prelim. Resp.”). Taking into account the arguments presented in VRE’s Preliminary Response, we determined that the information presented in the Petition establishes that there is a reasonable likelihood that Google would prevail in challenging claims 1, 2, 5, 8–13, and 16 of the ’396 patent under 35 U.S.C. §§ 102(b) and 103(a). Pursuant to 35 U.S.C. § 314, we instituted this proceeding on February 27, 2015, as to these claims of the ’396 patent. Paper 11 (“Dec. on Inst.”).

During the course of trial, VRE timely filed a Patent Owner Response (Paper 21, “PO Resp.”), and Google timely filed a Reply to the Patent Owner Response (Paper 22, “Pet. Reply”). VRE then filed two motions. First, VRE filed a Motion for Observation regarding certain cross-examination testimony of Google’s rebuttal witness, Dr. John. R. Grindon. Paper 28 (“Obs.”). Google filed a Response to VRE’s Motion for Observation. Paper 34 (“Obs. Resp.”). Second, VRE filed a Motion to Exclude. Paper 29 (“Mot. to Exclude”). Google filed an Opposition to VRE’s Motion to Exclude. Paper 33 (“Exclude Opp.”). An oral hearing was held on October 28, 2015, and a transcript of the hearing is included in the record. Paper 37 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c). This decision is a Final Written Decision under 35 U.S.C. § 318(a) as to the patentability of claims 1, 2, 5, 8–13, and 16 of the '396 patent. For the reasons discussed below, Google has demonstrated by a preponderance of the evidence that these claims are unpatentable under §§ 102(b) and 103(a). We also deny VRE's Motion to Exclude.

B. Related Matters

The parties indicate that the '396 patent was asserted in *Visual Real Estate, Inc. v. Google Inc.*, No. 3:14-cv-00274-TJC-JRK (M.D. Fla.). Pet. 2; Paper 7, 2. In addition to this Petition, Google filed three other Petitions challenging the patentability of a certain subset of claims in the following patents owned by VRE: (1) U.S. Patent No. 7,389,181 B2 ("the '181 patent") (Cases IPR2014-01338 and IPR2014-01339); and (2) U.S. Patent No. 7,929,800 B2 (Case IPR2014-01340). See Pet. 2; Paper 7, 2–3. We instituted an *inter partes* review in each of these three cases. Case IPR2014-01338, Paper 11 (PTAB Feb. 23, 2015); Case IPR2014-01339, Paper 10 (PTAB Jan. 26, 2015); Case IPR2014-01340, Paper 11 (PTAB Feb. 27, 2015). To date, we have entered a Final Written Decision only in Case IPR2014-01339. In that Final Written Decision, we determined that Google demonstrated by a preponderance of the evidence that claims 1 and 3–11 of the '181 patent were unpatentable under §§ 102(b) and 103(a). Case IPR2014-01339, Paper 39 (PTAB Jan. 25, 2016).

C. The '396 Patent

The '396 patent, titled "Methods for and Apparatus for Generating a Continuum of Three Dimensional Image Data," issued December 13, 2011,

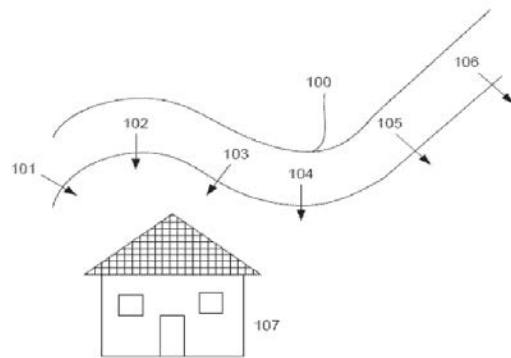
from U.S. Patent Application No. 12/035,423 (“the ’423 application”), filed on February 21, 2008. Ex. 1002, at [54], [45], [21], and [22]. The ’396 patent claims priority to the following non-provisional patent applications: (1) U.S. Patent Application No. 11/216,465 (“the ’465 application”), filed on August 31, 2005; (2) U.S. Patent Application No. 11/702,708 (“the ’708 application”), filed on February 6, 2007; and (3) U.S. Patent Application No. 11/702,707 (Ex. 1008, “the ’707 application”), also filed on February 6, 2007. *Id.* at 1:8–17.

The ’396 patent generally relates to generating data descriptive of a continuum of three-dimensional (“3-D”) images, such as a geographic location. Ex. 1002, 1:22–25. In its Background of the Invention section, the ’396 patent discloses that it is old and well known to capture images of a geographic location using cameras, movie cameras, video camera recorders, and digital recorders. *Id.* at 1:29–32. Each of these formats, however, has its disadvantages. *See id.* 1:33–53. In addition, the ’396 patent discloses that it is old and well known to generate point clouds, as well as to generate representations of particular objects by processing point clouds. *Id.* at 1:54–56. According to the ’396 patent, prior to the invention embodied in the challenged claims, there has never been a mechanism for generating a continuum of object representations based upon point cloud data. *Id.* at 1:57–59.

In one embodiment, the ’396 patent discloses creating a continuum of 3-D images, such as a street level representation of a geographic location. Ex. 1002, 1:63–67. This process begins by capturing two or more sets of image data from disparate points on a continuum. *Id.* at 1:67–2:2. Using the

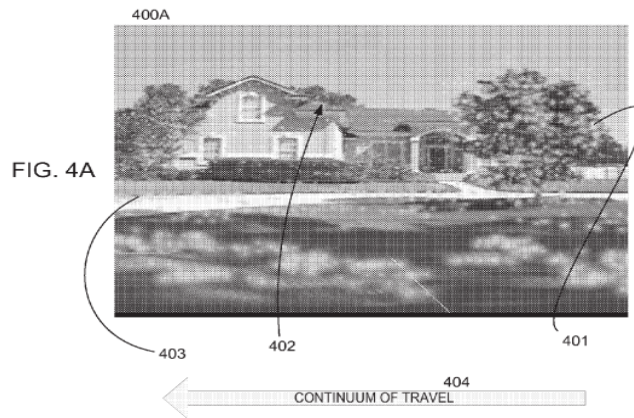
image data captured from disparate points on the continuum, the process then generates a 3-D representation of the subject matter. *Id.* at 2:32–35. In another embodiment, the '396 patent discloses generating a composite image by assembling the 3-D representation with other image data. *Id.* at 2:35–37. The composite image may include its own continuum of two-dimensional (“2-D”) image data sprayed over 3-D polygon based models. *Id.* at 2:37–40.

Figure 1 of the '396 patent, reproduced below, illustrates a continuum along which image data sets capture a particular subject. Ex. 1002, 2:11–12.



As shown in Figure 1, continuum 100 includes the path of a vehicle carrying a digital camera, or other image data-capturing device. *Id.* at 3:15–18. The image data sets of subject matter 107 are captured by, e.g., the digital camera, at separate points 101–106 along continuum 100. *Id.* at 3:18–19. In addition to capturing image data sets, positional data and the orientation of the device used to capture the image data sets is recorded at each disparate point 101–106 along continuum 100. *Id.* at 3:22–25. Positional data may include recording a global position of subject matter 107 using a Global Positioning System (“GPS”) device. *See id.* at 3:30–36.

Figure 4A, reproduced below, illustrates an initial image data set with features indicated as voxels. Ex. 1002, 2:17–18.



As shown in Figure 4A, 2-D image data set 400A includes highlighted pixels 401–403 indicating feature points of various objects contained within the image data set. *Id.* at 5:30–33. For example, highlighted pixels 401 indicate feature points of a tree in the front yard, highlighted pixels 402 indicate feature points of a roof line of a house, and highlighted pixels 403 indicate feature points along an edge of a driveway. *Id.* at 5:33–37. The locations of these feature points are registered and their relative positions, e.g., global position, are tracked. *Id.* at 5:43–45.

Using the information collected, point cloud arrays may be generated that represent various aspects of the image data sets, e.g., tree 401, house 402, and driveway 403. *See* Ex. 1002, 5:50–55. The point cloud arrays also may be converted to 3-D polygon based models of artifacts present in the image data sets. *Id.* at 6:50–52. The 3-D polygon based models are based on the physical attributes determined by processing the image data sets. *Id.* at 6:52–54. The positional data previously recorded or tracked may be

associated with each polygon model and used to position the polygon model in relation to other image data. *Id.* at 6:63–65.

D. Illustrative Claim

Of the challenged claims, claim 1 is the only independent claim. Claims 2, 5, 8–13, and 16 directly or indirectly depend from independent claim 1. Independent claim 1 is illustrative of the challenged claims and is reproduced below:

1. A method for creating a continuum of image data, the method comprising:
 - a) receiving multiple two-dimensional image data sets of a subject, wherein each image data set is captured from a disparate point on a continuum and each image data set comprises a plurality of features;
 - b) generating a composite image of the subject from portions of two or more of the multiple two-dimensional image data sets, wherein the portions are aligned in a dimension consistent with the continuum;
 - c) receiving data descriptive of a location of the plurality of features;
 - d) tracking the position of at least one of the plurality of features in two or more of the two-dimensional images;
 - e) generating a point cloud array for the at least one of the plurality of features;
 - f) converting the point cloud array to a polygon based model; and
 - g) associating a location for the polygon based model relative to the portions of the image data sets and based upon the location of the plurality of features.

Ex. 1002, 10:43–63.

E. Prior Art Relied Upon

Google relies upon the following prior art references:

Di Bernardo, et al., U.S. Patent No. 6,895,126 B2, issued May 17, 2005 (Ex. 1005, “Di Bernardo”).

Christian Früh & Avidenh Zakhor, *An Automated Method for Large-Scale, Ground-Based City Model Acquisition*, 5–24 (International Journal of Computer Vision, Kluwer Academic Publishers 2004) (Ex. 1004, “Fruh”).

F. Instituted Grounds of Unpatentability

We instituted this proceeding based on the asserted grounds of unpatentability (“grounds”) set forth in the table below. Dec. on Inst. 28.

Reference(s)	Basis	Claims Challenged
Fruh	§ 102(b)	1, 2, 5, and 8–13
Fruh and Di Bernardo	§ 103(a)	1, 2, 5, 8, 9, 11–13, and 16

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms are given their broadest reasonable interpretation in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1278–79 (Fed. Cir. 2015), *cert. granted sub nom. Cuozzo Speed Techs., LLC v. Lee*, 84 U.S.LW. 3218 (U.S. Jan. 15, 2016) (No. 15-446). Under the broadest reasonable interpretation standard, and absent any special definitions, claims terms are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the

context of the entire disclosure. *In re Translogic Tech. Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

1. Claim Phrases Construed in the Decision to Institute

In its Petition, Google proposed a claim construction for each of the following claim phrases: (1) “a continuum of image data ” (all challenged claims); (2) “point cloud array” (all challenged claims); (3) “polygon based model” (all challenged claims); (4) “spraying image data onto the each polygon based model” (claim 5); and (5) “associating the composite image with a particular portion of the subject” (claims 12, 13, and 16). Pet. 9–11. In its Preliminary Response, VRE proposed an alternative claim construction for the claim phrase “point cloud array” and presented arguments directed to why Google’s construction for this claim phrase does not constitute the broadest reasonable interpretation. Prelim. Resp. 11–12. In addition, VRE proposed a claim construction for the following claim phrases: (1) “image data set” (all challenged claims); and (2) “composite image” (all challenged claims). *Id.* at 9–11. For purposes of the Decision to Institute, we only assessed the constructions offered by the parties for the claim phrase “point cloud array,” as well as the constructions offered by VRE for the claim phrases “image data set” and “composite image.” Dec. on Inst. 9–13.

In its Patent Owner Response, VRE does not propose alternative constructions for the claim phrases “point cloud array,” “image data set,” and “composite image” that we construed in the Decision to Institute. *See* PO Resp. 8–24. Nor does Google propose an alternative claim construction for these claim phrases in its Reply. *See generally* Pet. Reply 2–23. Given the parties’ acceptance of our constructions of each claim phrase in the

Decision to Institute, we discern no reason to address or alter those constructions for the purposes of this Final Written Decision. For convenience, those constructions are reproduced in the table below.

Claims	Claim Phrase	Claim Construction
1, 2, 5, 8–13, and 16	“point cloud array”	“a set of points corresponding to locations of features”
1, 2, 5, 8–13, and 16	“image data set”	“a data set associated with an image”
1, 2, 5, 8–13, and 16	“composite image”	“an image formed by aligning portions of at least two or more image data sets”

2. “*aligned*” (*all challenged claims*)

Independent claim 1 recites, in relevant part, “generating a composite image of the subject from portions of two or more of the multiple two-dimensional image data sets, wherein the portions are *aligned* in a dimension consistent with the continuum.” Ex. 1002, 10:49–52 (emphasis added). In its Patent Owner Response, VRE contends that Fruh does not disclose this first “generating” step because, in order to align portions of multiple 2-D image data sets, features in the image data sets need to be in common and overlap; otherwise there is nothing to align. PO Resp. 17. In other words, VRE’s argument is predicated on the notion that the claim term “aligned” in the context of independent claim 1 necessarily requires determining common and overlapping features in order to align portions of two or more of the multiple 2-D image data sets in a dimension consistent with the continuum. *See id.* To support its construction, VRE directs us to two portions of the specification of the ’396 patent. *Id.* at 16–17 (citing Ex. 1002, 7:1–13, 7:48–52).

In its Reply, Google contends that the specification of the '396 patent does not define explicitly the claim term “aligned.” Pet. Reply 9. Instead, Google argues that that specification of the '396 uses the terms “overlap” and “features” in connection with only “some embodiments.” *Id.* (citing Ex. 1002, 5:23–29). Google asserts that, under the broadest reasonable interpretation standard, the challenged claims should not be construed narrowly to apply to only “some embodiments” contemplated in the '396 patent. *Id.* at 10.

Upon reviewing the specification of the '396 patent, we agree with Google that it does not define explicitly or implicitly the claim term “aligned.” Absent an explicit or implicit definition, we must accord this claim term its ordinary and customary meaning, as would be understood by one of ordinary skill in the art, in the context of the entire disclosure of the '396 patent. *See Translogic*, 504 F.3d at 1257. We begin by addressing the two portions of the specification relied upon by VRE to support its proposed construction. PO Resp. 16–17. These portions of the specification merely disclose how some embodiments align multiple 2-D data image sets to form a composite image. *See, e.g.*, Ex. 1002, 7:1–13 (disclosing that “images 701–703 are aligned to form . . . composite image 700”), 7:48–52 (disclosing that “select portions 704–707 of two or more sets of captured image data are aligned to generate . . . composite image 708”). Notably absent from each cited portion is an explanation as to how the 2-D data image sets require features that are in common and overlap in order to be “aligned.” Absent such an explanation, we decline VRE’s invitation to

construe the claim term “aligned” as necessarily requiring common and overlapping features.

Next, we turn to the portion of the specification of the ’396 patent cited by Google. Pet. Reply 9. This portion of the specification discloses that, in some embodiments, image data sets overlap the subject matter captured, and the overlap allows for features present in one image data set to be present in a second image data set. Ex. 1002, 5:23–29. Notably absent from this cited portion is an explanation as to how “aligned” 2-D data image sets necessarily require features within each data image set to be in common and overlap. Absent such an explanation, we agree with Google that VRE’s proposed construction of the claim term “aligned” does not constitute the broadest reasonable interpretation.

Given that the claim term “aligned” is a commonly understood word, we consult a general purpose dictionary to ascertain its meaning. *See Agfa Corp. v. Creo Prods., Inc.*, 451 F.3d 1366, 1376 (Fed. Cir. 2006). Neither Google nor VRE provides a dictionary definition that would help us ascertain the meaning of this claim term. THE MERRIAM-WEBSTER DICTIONARY (New ed. 2005) defines “align” as “to bring into line.” Ex. 3001.

Applying the broadest reasonable interpretation standard, we construe the claim term “aligned” to mean “brought into line.” We note, however, that “aligned” in the context of independent claim 1 does not require necessarily common and overlapping features in order to bring into line portions of two or more of the multiple 2-D image data sets in a dimension consistent with the continuum. This claim construction is consistent with

the ordinary and customary meaning of “aligned,” as would be understood by one with ordinary skill in the art in light of the ’396 patent. *See, e.g.*, Ex. 1002, 7:1–8:2 (disclosing how some embodiments process image data by aligning or bringing into line some or all of the images to form a composite image).

B. Priority Date for the Challenged Claims of the ’396 Patent

As we explained previously, the ’396 patent issued from the ’423 application, filed on February 21, 2008. Ex. 1002, at [21], [22]. The ’423 application claims the benefit of the following non-provisional applications: (1) the ’465 application, filed on August 31, 2005; (2) the ’708 application, filed on February 6, 2007; and (3) the ’707 application, also filed on February 6, 2007. *Id.* at 1:8–17.

In the Decision to Institute, we explained that, based on the record prior to instituting trial, we were persuaded by Google’s argument that the ’465 application, the ’708 application, and the ’707 application do not provide sufficient written description support for the method steps of “generating a point cloud array for the at least one of the plurality of features,” and “converting the point cloud array to a polygon based model,” as recited in independent claim 1. Dec. on Inst. 13–14 (citing Pet. 8–9). For purposes of the Decision to Institute, we determined that Google presented sufficient evidence indicating that the challenged claims of the ’396 patent only are entitled to claim the benefit of the filing date of the ’423 application—namely, February 21, 2008. *Id.* at 14.

Although the burden of persuasion with respect to the unpatentability of the challenged claims remains with Google, the burden of production of

demonstrating that the challenged claims of the '396 patent are entitled to the earlier priority dates of the '465 application, the '708 application, and the '707 application lies with VRE. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1379–80 (Fed. Cir. 2015). In its Patent Owner Response, VRE does not dispute that the earliest effective filing date of the challenged claims of the '396 patent is February 21, 2008. We, therefore, discern no reason to address or alter our determination in this regard for the purposes of this Final Written Decision.

C. Anticipation by Fruh

In its Petition, Google contends that claims 1, 2, 5, and 8–13 are anticipated under § 102(b) by Fruh. Pet. 12–18, 28–37. In support of this asserted ground, Google explains how Fruh describes the subject matter of each challenged claim, and relies upon the Declaration of Dr. Henry Fuchs (Ex. 1001 ¶¶ 24–39). In its Patent Owner Response, VRE presents arguments that solely focus on independent claim 1. PO Resp. 10–19.

We begin our analysis with the principles of law that generally apply to a ground based on anticipation, followed by a brief overview of Fruh, and then we address the parties' arguments directed to independent claim 1.

1. Principles of Law

To establish anticipation, “all of the elements and limitations of the claim must be shown in a single prior reference, arranged as in the claim.” *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). “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 California*, 814

F.2d 628, 631 (Fed. Cir. 1987). We analyze this asserted ground based on anticipation with the principles stated above in mind.

2. *Fruh*

Fruh is a paper that describes an automated method of acquiring large-scale 3-D city models at the ground level. Ex. 1004, Abstract, 6.¹

According to Fruh, a truck equipped with one camera and two 2-D laser scanners is driven on city streets during normal traffic conditions. *Id.* at Abstract. One laser scanner is mounted vertically to capture building facades, and the other laser scanner is mounted horizontally. *Id.* The truck collects continuous data, e.g., horizontal and vertical scans, which are processed offline. *Id.* at 6. Successive horizontal scans may be matched with each other to estimate the vehicle's motion, which, in turn, is concatenated to form an initial path. *Id.* at Abstract. The initial path then is corrected globally by Monte-Carlo Localization techniques. *Id.* A final global pose is obtained by matching the horizontal scans to a global map, such as an aerial photograph or a Digital Surface Model ("DSM"). *Id.*

3. *Claim 1*

In its Petition, Google relies upon Fruh to describe each of the seven method steps recited in independent claim 1. Pet. 12–15, 28–32. In its Patent Owner Response, VRE presents patentability arguments directed to three of the seven method steps recited in independent claim 1. PO Resp.

¹ All references to the page numbers in Fruh are to the original page numbers located in the top, left-hand or top, right-hand portion of each page.

14–18. We address the parties’ positions regarding the three disputed method steps in turn.

a. Fruh describes the first “receiving” method step

Independent claim 1 recites, among other things, “receiving multiple two-dimensional image data sets of a subject, wherein each image data set is captured from a disparate point on a continuum and each image data set comprises a plurality of features.” Ex. 1002, 10:45–48 (“the first ‘receiving’ step”).

In its Petition, Google contends that Fruh discloses a truck equipped with one camera and two 2-D laser scanners that capture drive-by scanning data while driving on city streets. Pet. 12, 28–29 (Ex. 1004, Abstract, 6, 7; Ex. 1001 ¶ 26). Google also contends that Fruh discloses using this drive-by scanning data to generate 3-D geometry and texture data of an entire city at the ground level. *Id.* Based on these cited disclosures, Google asserts that Fruh describes the first “receiving” method step recited in independent claim 1. *See id.*

In its Patent Owner Response, VRE contends that, because Fruh’s vertical scans do not overlap, Fruh does not disclose multiple data sets at a single point on a continuum, as required by this first “receiving” step. PO Resp. 14–15 (citing Ex. 2005, 247:20–21). VRE also argues that, if Google were to argue that Fruh’s horizontal 2-D scans constitute the image data sets, these scans do not include a plurality features. *Id.* at 15 (Ex. 1004, 7).

In its Reply, Google counters that the first “receiving” step does not require that multiple image data sets overlap the captured subject matter, much less that the multiple image data sets be captured from a single point

on a singular continuum of a vehicle traveling down a street. Pet. Reply 3. Google argues that we should maintain our determination in the Decision to Institute that VRE's argument is not commensurate in scope with this disputed step. *Id.* at 3 (citing Dec. on Inst. 17–18). Google also argues that the first “receiving” step does not require that a continuum be a single continuum of a vehicle traveling down the street. *Id.* at 4. Google asserts that VRE's argument to the contrary improperly imports limitations from the specification into the claims. *Id.* at 4–5 (citing Ex. 1002, 2:15–19, 5:23–25, 5:38–40, 5:59–6:10). Google urges us not to accept VRE's overly narrow interpretation of the first “receiving” step. *Id.* at 6.

VRE's argument that Fruh does not disclose multiple data sets at a single point on a continuum is predicated on the following two notions: (1) the multiple 2-D image data sets must overlap the captured subject matter, such that a first image data set shares common subject matter with a second image data set; and (2) each image data set must be captured from a single point on a continuum. First, we are not persuaded by VRE's argument that the multiple 2-D image data sets must overlap the captured subject matter, such that a first image data set shares common subject matter with a second image data set, because this argument is not commensurate in scope with the first “receiving” step at issue. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (stating that limitations not appearing in the claims cannot be relied upon for patentability). The disputed first “receiving” step simply recites, in relevant part, “receiving multiple two-dimensional image data sets of a subject.” Ex. 1002, 10:45–46. VRE does not direct us to, nor can we find, language in this step that requires receiving multiple 2-D image data sets

that overlap the captured subject, such that a first image data set shares common subject matter with a second image data set. We, therefore, decline VRE's invitation to narrow the scope of this disputed step by incorporating an extraneous overlapping requirement.

Second, we are not persuaded by VRE's argument that the multiple image data sets must be captured from a single point on a continuum because this argument is not commensurate in scope with the first "receiving" step at issue. *See Self*, 671 F.2d at 1348. The disputed first "receiving" step simply recites, in relevant part, "wherein each image data set is captured from a disparate point on a continuum." Ex. 1002, 10:46–47. VRE does not direct us to, nor can we find, language in this step that requires capturing each image data set from a single point on a continuum. Instead, this step clearly requires capturing each image data set from a different point on a continuum.

Lastly, we are not persuaded by VRE's argument that, if Google were to argue that Fruh's horizontal 2-D scans constitute the image data sets, these scans do not include a plurality features. VRE's argument is misplaced because Google does not rely solely on Fruh's horizontal 2-D scans to account for the "two-dimensional image data sets," as claimed. Instead, Google takes the position that Fruh's drive-by camera images and associated laser scan data collectively disclose this claimed feature. *See Pet. 12, 28–29; Pet. Reply 6.*

In considering the record in its entirety, Google has presented sufficient evidence to support a finding that Fruh describes the first "receiving" step recited in independent claim 1.

b. Fruh describes the first “generating” method step

Independent claim 1 recites, among other things, “generating a composite image of the subject from portions of two or more of the multiple two-dimensional image data sets, wherein the portions are aligned in a dimension consistent with the continuum.” Ex. 1002, 10:49–52 (“the first ‘generating’ step”).

In its Petition, Google contends that Fruh discloses acquiring 3-D geometry and texture data of an entire city at the ground level by using two 2-D laser scanners and a digital camera attached to a truck. Pet. 12, 29 (citing Ex. 1004, 6). Google also contends that Fruh discloses creating façade models using, at least in part, processed point clouds that have been transformed into a triangular mesh. *Id.* at 12–13, 29 (citing Ex. 1004, 16). Google argues that texturing a 3-D model in this manner includes extracting a single vertical strip of a camera image corresponding to a structure of the point cloud, and aligning vertical strips in adjacent images corresponding to adjacent vertices. *Id.* at 13 (Ex. 1001 ¶ 27). Based on the cited disclosures in Fruh, as well as Dr. Fuchs’s supporting testimony, Google asserts that Fruh’s disclosure of texturing a 3-D model describes the first “generating” method step recited in independent claim 1. *See id.*

In its Patent Owner Response, VRE contends that Fruh’s vertical 2-D scans cannot be aligned in a dimension consistent with a continuum because they do not overlap. PO Resp. 15–16 (citing Ex. 1004, 6). VRE argues that absent a disclosure in Fruh that the vertical 2-D scans overlap, it is impossible to align these scans. *Id.* at 16; *see also id.* at 17 (arguing that Fruh’s vertical 2-D scans cannot align in a dimension consistent with the

path of a truck because they do not overlap, which purportedly means that there are no points or features to align).

In its Reply, Google counters that VRE relies upon an overly narrow construction of the claim term “aligned” when asserting that aligning portions of multiple 2-D image sets necessarily requires features in the image set to be in common and overlap. Pet. Reply. 8. Google asserts that we should not accept this narrow construction of the claim term “aligned,” especially given that such a construction applies to only “some embodiments” contemplated in the specification of the ’396 patent. *Id.* at 8–10.

In our claim construction section above, we construed the claim term “aligned” to mean “brought into line.” We also explained that “aligned” in the context of independent claim 1 does not require necessarily common and overlapping features in order to bring into line portions of two or more of the multiple 2-D image data sets in a dimension consistent with the continuum. *See supra* Section II.A.2. Google’s position that Fruh’s disclosure of texturing a 3-D model, particularly by aligning vertical strips in adjacent images corresponding to adjacent vertices, is consistent with this claim construction. We, therefore, agree with Google that Fruh describes generating a 3-D model by aligning portions of at least two or more adjacent 2-D image data sets, as required by this first “generating” step.

To the extent VRE argues that Fruh teaches away from the invention embodied in independent claim 1 because Fruh discloses that its vertical 2-D scans do not overlap, we are not persuaded. PO Resp. 17. Google’s asserted ground is based on anticipation by Fruh. It is well settled that “[t]eaching

away is irrelevant to anticipation.” *Seachange Int’l, Inc., v. C-Cor, Inc.*, 413 F.3d 1361, 1380 (Fed. Cir. 2005).

In considering the record in its entirety, Google has presented sufficient evidence to support a finding that Fruh describes the first “generating” step recited in independent claim 1.

c. Fruh describes the “tracking” method step

Independent claim 1 recites, among other things, “tracking the position of at least one of the plurality of features in two or more of the two-dimensional images.” Ex. 1002, 10:55–56 (“the ‘tracking’ step”).

In its Petition, Google contends that Fruh discloses synchronizing and calibrating the camera and laser scanners in the 3-D coordinate system such that an image coordinate is computed for every 3-D point. Pet. 13, 30–31 (citing Ex. 1004, 16). Google also contends that Fruh discloses matching successive horizontal 2-D scans with each other to determine an estimate of the vehicle’s motion, and to determine a pose of successive scans and camera images. *Id.* at 13–14, 30 (citing Ex. 1004, Abstract, 6). In addition, Google directs us to Dr. Fuchs’s testimony that matching successive horizontal 2-D scans would include tracking the position of objects in these scans. *Id.* at 14 (citing Ex. 1001 ¶ 29). Based on the cited disclosures in Fruh, as well as Dr. Fuchs’s supporting testimony, Google asserts that Fruh describes the “tracking” method step recited in independent claim 1. *See id.*

In its Patent Owner Response, VRE contends that Fruh discloses its drive-by scans are “vertical [2-D] scans [that] are parallel and do not overlap.” PO Resp. 18 (emphasis omitted) (quoting Ex. 1004, 6). VRE argues that, with no overlap, none of the data present in Fruh’s first scan can

be present in Fruh's second scan, which purportedly means that a feature in Fruh's first scan cannot be present in Fruh's second scan. *Id.* VRE, therefore, asserts that tracking the position of at least one of a plurality of features in two or more 2-D images would be impossible in Fruh. *Id.*

In its Reply, Google counters that VRE merely relies upon attorney argument and, yet again, attempts to import language from the specification of the '396 patent into the claims to justify its position. Pet. Reply 12–13 (citing Ex. 1002, 5:23–29, 5:43–45). Google further contends that the '396 patent lacks a detailed description as to how the “tracking” step is accomplished. *Id.* at 13. Google argues that Fruh discloses at least as much, if not more, than the '396 patent about tracking the position of a feature in a 2-D image. *Id.* (citing Ex. 1004, Abstract, 7–8, 16, 19). Google asserts that the cited disclosures in Fruh, as well as Dr. Fuchs's supporting testimony, support a finding that Fruh describes the “tracking” step recited in independent claim 1. *See id.*

We are not persuaded by VRE's argument that tracking the position of at least one of a plurality of features in two or more 2-D images would be impossible in Fruh because it discloses that vertical 2-D scans do not overlap. VRE's argument narrowly focuses on Fruh's vertical 2-D scans. VRE either ignores or does not appreciate that Google does not rely on just Fruh's 2-D scans to disclose the claimed “two-dimensional image data sets.” Instead, Google relies upon both Fruh's drive-by camera images and associated laser scan data to account for this claimed feature. *See* Pet. 12, 28–29; Pet. Reply 6.

Indeed, Fruh discloses that its drive-by camera images include both horizontal and vertical 2-D scans. Ex. 1004, Abstract. Although Fruh discloses that its vertical 2-D scans do not overlap (*id.* at 6), it nonetheless discloses matching successive horizontal 2-D scans to provide an estimate of the vehicle's motion, which, in turn, is concatenated to form an initial path. *Id.* at Abstract, 7. Fruh further discloses that it is “necessary” to determine a pose of successive drive-by camera images and laser scans to reconstruct a consistent 3-D model. *Id.* at 6.

To bolster its position regarding Fruh's 2-D horizontal scans, Google directs us to the supporting testimony of Dr. Fuchs. Dr. Fuchs testifies that matchings successive horizontal 2-D scans includes “tracking the position of the same objects in successive [2-D] images captured by the camera . . . because the camera and laser scanners are synchronized and calibrated in the [3-D] coordinate system.” Ex. 1001 ¶ 29. We credit Dr. Fuchs's testimony in this regard because it is consistent with the disclosure in Fruh discussed above. *Compare* Ex. 1004, Abstract, 6, 7, *with* Ex. 1001 ¶ 29. We also note that VRE does not address Dr. Fuchs's cited testimony in its Patent Owner Response, nor does VRE offer additional argument or evidence that would undermine this testimony.

In considering the record in its entirety, Google has presented sufficient evidence to support a finding that Fruh describes the “tracking” step recited in independent claim 1.

d. Fruh describes the remaining method steps

In its Patent Owner Response, VRE does not address separately whether Fruh describes the remaining method steps recited in independent

claim 1. *See generally* PO Resp. 10–18. We have reviewed Google’s explanations and supporting evidence as to how Fruh describes these remaining method steps, and find them persuasive. *See* Pet. 12–15, 28–32.

e. Summary

Based on the record developed during trial, we conclude that Google has demonstrated by a preponderance of the evidence that independent claim 1 is anticipated by Fruh.

4. Claims 2, 5, and 8–13

In its Patent Owner Response, VRE relies upon the same arguments presented against independent claim 1 to rebut Google’s explanations and supporting evidence as to how Fruh describes the subject matter of dependent claims 2, 5, and 8–13. *See* PO Resp. 18–19, 23–24. For the same reasons discussed above with respect to independent claim 1, VRE’s arguments are not persuasive.

We have reviewed Google’s arguments and supporting evidence set forth in the Petition regarding dependent claims 2, 5, and 8–13, and find them persuasive. *See* Pet. 15–18, 32–37. Based on the record developed during trial, we conclude that Google has demonstrated by a preponderance of the evidence that these dependent claims are anticipated by Fruh.

D. Obviousness Over the Combination of Fruh and Di Bernardo

In its Petition, Google contends that claims 1, 2, 5, 8, 9, 11–13, and 16 are unpatentable under § 103(a) over the combination of Fruh and Di Bernardo. Pet. 18–23, 37–43. In support of this asserted ground, Google explains how this proffered combination teaches the claimed subject matter of each challenged claim, and provides multiple rationales to combine their

respective teachings. *Id.* In addition, Google relies upon the Declaration of Dr. Fuchs (Ex. 1001 ¶¶ 40–50) to support its positions. In its Patent Owner Response, VRE presents the following two arguments: (1) Google’s rationales for combining the teachings of Fruh and Di Bernardo are insufficient; and (2) Fruh and Di Bernardo teach away from their combination and, as a result, teach away from the invention embodied in the challenged claims of the ’396 patent. PO Resp. 19–23.

We begin our analysis with the principles of law that generally apply to a ground of unpatentability based on obviousness, followed by an assessment of the level of skill in the art, a brief overview of Di Bernardo, and then we address each of the arguments presented by VRE in its Patent Owner Response.

1. Principles of Law

A claim is unpatentable under § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We also recognize that prior art references must be “considered together with the knowledge of one of ordinary skill in the pertinent art.” *In re Paulsen*, 30 F.3d 1475, 1480

(Fed. Cir. 1994) (quoting *In re Samour*, 571 F.2d 559, 562 (CCPA 1978)).

We analyze this ground based on obviousness with the principles stated above in mind.

2. *Level of Skill in the Art*

In determining the level of skill in the art, various factors may be considered, including the “type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field.” *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (quoting *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). There is evidence in the record before us that reflects the knowledge level of a person with ordinary skill in the art. Google’s expert witness, Dr. Fuchs, attests that a person with ordinary skill in the art in the relevant time frame would be an individual who possesses a combination of experience and education in computer science, computer graphics, and imaging technology. Ex. 1001 ¶ 16. According to Dr. Fuchs, this would consist of the following: (1) a minimum of a bachelor degree in computer science or a related engineering field; and (2) 2–5 years of work or research experience in the field of computer science and its sub-field of imaging technology. *Id.* Google’s rebuttal witness, Dr. John R. Grindon, offers testimony as to the knowledge level of a person with ordinary skill in the art at the relevant time frame that is essentially the same as Dr. Fuchs’s assessment. *Compare* Ex. 1001 ¶ 16, *with* Ex. 1012 ¶ 12.

Additionally, we note that the prior art of record in this proceeding—namely, Fruh and Di Bernardo—is indicative of the level of ordinary skill in

the art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

3. *Di Bernardo*

Di Bernardo generally relates to creating and using visual databases of geographic locations. Ex. 1005, 1:17–19. Di Bernardo discloses a data acquisition and processing system that includes an acquisition device, such as a digital video camera, that records images while moving along a path. *Id.* at 3:51–55, Fig. 1. At the same time, the GPS position of the moving camera is used to acquire positional information, which is associated with the recorded video images. *Id.* at 3:62–65, Fig. 1. A post-processing system uses image and position sequences to synthesize the acquired images and create composite images of the geographic location that was recorded. *Id.* at 5:46–48. The composite image is stored in an image database and associated with an identifier identifying the particular geographic location depicted in the image. *Id.* at 6:15–19. In addition, close-ups and fish-eye views of each object are extracted from the video sequences using well-known methods and, subsequently, stored in the image database. *Id.* at 6:19–21.

Di Bernardo also discloses an object information database containing information regarding objects depicted in the composite images, wherein each record in the object information database is indexed preferably by a city address. Ex. 1005, 10:26–32. In response to an inquiry regarding a location, i.e., by entering an address of the location, received from a remote terminal, the host computer accesses both the geographic and object information databases to retrieve maps and information on the businesses in

the geographic area, which then are transmitted back to the remote terminal and displayed to the user. *Id.* at 11:62–67.

Figure 16 of Di Bernardo, reproduced below, illustrates a graphical user interface (“GUI”) that allows a prospective user to place requests and receive information about particular geographic locations. Ex. 1005, 3:28–30, 12:27–29.

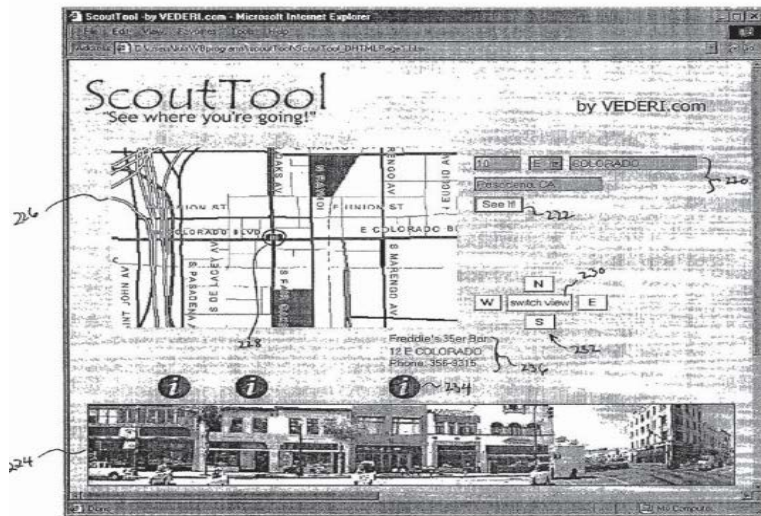


FIG. 16

As shown in Figure 16, the GUI includes address input fields 220 that allow the user to enter a street number, street name, city, and state, as well as “See it” button 222 that causes the user terminal to transmit the address information to the host computer. *Id.* at 12:30–36. The retrieved composite image is displayed in map area 226 and image area 224. *Id.* at 12:40–42.

4. Claim 1

In its Petition, Google relies upon Fruh to teach the seven method steps recited in independent claim 1. Pet. 18–20, 37–39. Google, however, contends that, to the extent we determine that Fruh does not teach the first “generating” method step recited in independent claim 1, Di Bernardo

teaches this method step. *Id.* at 18–20, 38. In particular, Google argues that Di Bernardo discloses synthesizing images of a geographic location to generate composite images of that location. *Id.* at 19, 38 (citing Ex. 1005, 2:16–21). Google asserts that the geographic location may be a particular street in a geographic area with the composite images providing a view of the objects on each side of the street. *Id.* at 19. Google further argues that, to form the claimed “composite image,” Di Bernardo discloses the conventional practice of extracting image data from selected image frames, e.g., by extracting an optical column that consists of a vertical set of pixels, and combining them, e.g., by stacking the column of pixels side-by-side to generate a single image. *Id.* at 19, 38 (Ex. 1005, 5:67–6:15, 9:34–43, Fig. 2; Ex. 1001 ¶ 43).

Google also contends that there are number of reasons that would have prompted one of ordinary skill in the art to combine the teachings of Fruh and Di Bernardo. Pet. 21. First, Google argues that one of ordinary skill in the art would have modified Fruh’s system to incorporate Di Bernardo’s overlaying metadata, such that the resulting system provides context to the objects being depicted. *Id.* at 22 (citing Ex. 1005, Abstract, 2:6–8; Ex. 1001 ¶ 48). Second, Google argues that one of ordinary skill in the art would have modified Fruh’s system with the teachings of Di Bernardo because doing so would be using known techniques, e.g., generating a composite image of a geographic area, recording positional data descriptive of the geographic area, or both, to improve similar devices, e.g.,

Fruh's system for generating 3-D models from 2-D scans and images, in the same way. *Id.* at 22 (citing Ex. 1001 ¶ 49; *KSR*, 550 U.S. at 417).

a. Google Provides a Sufficient Rationale to Combine the Teachings of Fruh and Di Bernardo

In its Patent Owner Response, VRE contends that Google's rationales for combining the teachings of Fruh and Di Bernardo are insufficient. Pet. 19. VRE argues that Google's first rationale to combine the teachings of Fruh and Di Bernardo that relates to overlaying metadata has nothing to do with independent claim 1, much less the first "generating" step purportedly missing from Fruh. *Id.* VRE also argues that Google's second rationale to combine—namely, using known techniques to improve a similar device in the same way—is illogical because Fruh's first three columns of text are devoted to discussing an alternative to image-based systems. *Id.* at 19–20 (citing Ex. 1004, 5–6). To further support this argument, VRE introduces that testimony of Dr. Grindon from litigation involving a subset of Di Bernardo patents. *Id.* at 20 (citing Ex. 2002 ¶ 39). VRE then asserts that one of ordinary skill in the art would not have combined Fruh's scanning process with Di Bernardo's vision-based technology because such a combination would become cumbersome and computationally intensive. *Id.* at 20–21 (citing Ex. 1004, 6).

In its Reply, Google counters that VRE merely relies upon attorney argument to explain that Google's rationales for combining the teachings of Fruh and Di Bernardo are insufficient. Pet. Reply 21. Google asserts that such attorney argument cannot supplant or overcome the overwhelming testimonial evidence supporting each of Google's rationales for combining

the teachings of Fruh and Di Bernardo. *Id.* (citing Ex. 1001 ¶¶ 48, 49).

Google also asserts that VRE’s attorney arguments are based on a number of legal and factual errors, after which it essentially repeats the same reasons that would have prompted one of ordinary skill in the art to combine the teachings of Fruh and Di Bernardo advocated in the Petition. *Id.* at 21–22. Lastly, Google asserts that Dr. Grindon confirmed in his Rebuttal Declaration that VRE mischaracterized his testimony from the litigation involving a subset of Di Bernardo patents. *Id.* at 22–23 (citing Ex. 1012 ¶¶ 17, 21).

The Supreme Court has held that an obviousness evaluation “cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation, or by overemphasis on the importance of published articles and the explicit content of issued patents.” *KSR*, 550 U.S. at 419. Instead, the relevant inquiry here is whether Google has set forth “some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006), *cited with approval in KSR*, 550 U.S. at 418.

When describing examples of what may constitute a sufficient rationale to combine, the Supreme Court elaborated that, “if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.” *KSR*, 550 U.S. at 417.

Based on the record developed during trial, we are satisfied that Google’s rationales for combining the teachings of Fruh and Di Bernardo

suffice as articulated reasoning with rational underpinnings to justify the legal conclusion of obviousness. For instance, both Fruh and Di Bernardo disclose similar systems for generating visualizations of geographic locations from multiple 2-D images. *Compare* Ex. 1004, Abstract, 6, *with* Ex. 1005, Figs. 1, 2. To the extent Fruh does not teach the first “generating” method step recited in independent claim 1, Di Bernardo discloses a system that uses image and position sequences to synthesize acquired images of a geographic location to create a composite image of that location. *See, e.g.*, Ex. 1005, 2:16–21 (disclosing “a computer-implemented system and method for synthesizing images of a geographic location to generate composite images of the location”), 5:46–48 (disclosing that “post-processing computer 28 uses the image and position sequences to synthesize the acquired images and create composite images of the location that was filmed”).

We agree with Google that where, as here, a technique has been used to improve one device, i.e., Di Bernardo discloses generating a composite image of a geographic location by aligning two or more 2-D images, and one of ordinary skill in the art would have recognized that it would improve similar devices in the same way, i.e., using the aforementioned disclosure in Di Bernardo to improve Fruh’s system of acquiring large-scale 3-D models of a geographic location, using the technique is obvious unless its actual application is beyond the skill level of an ordinary skilled artisan. *See* Pet. 22 (citing *KSR*, 550 U.S. at 417).

We recognize that VRE presents the Declaration of Dr. Grindon from litigation involving a subset of Di Bernardo patents to support its assertion that combining the teachings of Fruh and Di Bernardo would have been

cumbersome and computationally intensive and, therefore, beyond the skill level of an ordinary skilled artisan. Prior to addressing Dr. Grindon's testimony cited by VRE, we first address how Dr. Grindon was introduced into this proceeding.

It is noteworthy that Dr. Grindon was retained by Google as an expert witness in an unrelated matter that did not involve the '396 patent—namely, *Vederi, LLC, v. Google, Inc.*, No. 2:10-cv-07747-AK-CW (C.D. Cal.) (“*Vederi* litigation”). Ex. 2002 ¶ 3. As we explained above, VRE avers that, in the *Vederi* litigation, Dr. Grindon testified that “[t]he patents-in-suit [Di Bernardo], in seeking to improve upon the so-called ‘computationally intensive’ and ‘cumbersome’ methods of forming composite images in the prior art, teach a single way to form composite images that seeks to minimize this computational burden.” PO Resp. 20 (quoting Ex. 2002 ¶ 39). As a result of VRE's introduction of Dr. Grindon into this proceeding, Google sought clarification from Dr. Grindon regarding his testimony in the *Vederi* litigation via a rebuttal declaration. Pet. Reply 1–2 (citing Ex. 1012). In his Rebuttal Declaration, Dr. Grindon provides a number of reasons as to why VRE mischaracterized this “previous testimony,” one of which being that “[a]t no point in my prior testimony did I address the primary teachings of Fruh in view of Di Bernardo.” Ex. 1012 ¶¶ 17, 18.

The parties confirmed our understanding regarding the introduction of Dr. Grindon into this proceeding and the relevance of his testimony at oral argument. Tr. 87:22–98:1. Given that Dr. Grindon's testimony from the *Vederi* litigation did not consider the teachings of Di Bernardo with respect to the challenged claims of the '396 patent, much less address the combined

teachings of Fruh and Di Bernardo relied upon by Google to support its asserted ground based on obviousness, his testimony in this regard, particularly the statement suggesting that the Di Bernardo patents, in general, seek to minimize computational burdens (Ex. 2002 ¶ 39), are of little probative value. *See Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985) (suggesting expert opinion that fails to address the relevant question “may render the testimony of little probative value in [a patentability] determination”).

b. Neither Fruh Nor Di Bernardo Teach Away From Their Combination

In its Patent Owner Response, VRE contends that there are at least three reasons why both Fruh and Di Bernardo teach away from their combination and, as a result, teach away from the invention embodied in the challenged claims of the '396 patent. PO Resp. 21. First, VRE argues that Fruh emphasizes “enormous challenges to purely vision-based methods,” such as those used in Di Bernardo, and instead proposes using drive-by scanning as a method that is capable of acquiring 3-D geometry and texture data. *Id.* (citing Ex. 1004, 6). Second, VRE argues that Di Bernardo teaches away from its combination with Fruh’s system that requires 3-D scene geometry because Di Bernardo explicitly discloses that its system “[does] not require the reconstruction of [3-D] scene geometry.” *Id.* at 22 (emphasis omitted) (citing Ex. 1005, 2:3–5). Third, VRE identifies purported incompatibilities or differences between Fruh and Di Bernardo, and asserts that, based on these differences, the teachings of Fruh and Di Bernardo cannot be combined into a cohesive working system. *Id.* at 22–23 (citing Ex. 1004, 6).

In its Reply, Google counters that VRE has read into both Fruh and Di Bernardo a teaching away where no such language exists. Pet. Reply 17. First, Google disagrees with VRE's assertion that Fruh teaches away from vision-based technology, as taught by Di Bernardo. *Id.* at 18. Google argues that the passage in Fruh relied upon by VRE specifically refers to challenges associated with prior art practices of generating 3-D building models using purely vision-based technology, and does not disparage implementing any and all vision-based technology in Fruh's system. *Id.* (citing Ex. 1004, 5–6; Ex. 1012 ¶ 21).

Second, Google disagrees with VRE's assertion that Di Bernardo teaches away from Fruh's system. Pet. Reply 18. Google argues that the passage in Di Bernardo's Background of the Invention section relied upon by VRE specifically refers to prior art practices that were cumbersome and inefficient in the 2000 time frame, and does not disparage implementing any and all computationally intensive processes in Di Bernardo. *Id.* (citing Ex. 1005, 2:3–5; Ex. 1012 ¶ 17). Finally, Google asserts that the evidence of record demonstrates that, by the 2008 timeframe, a person of ordinary skill in the art would have recognized that Di Bernardo's conventional suggestions would have improved Fruh's system in a predictable way by generating a composite image of a geographic area, recording positional data descriptive of the geographical area, and adding context/meaning for a viewer of the composite image. *Id.* at 19 (citing Ex. 1001 ¶¶ 48, 49).

A reference teaches away from a claimed invention if it “criticize[s], discredit[s], or otherwise discourage[s]” modifying the reference to arrive at the claimed invention. *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004).

We will not, however, “read into a reference a teaching away from a process where no such language exists.” *DyStar Textilfarben GmbH & Co.*

Deutschland KG v. C.H. Patrick Co., 464 F.3d 1356, 1364 (Fed. Cir. 2006).

We are not persuaded by VRE’s three teaching away arguments.

With respect to the first teaching away argument, we agree with Google that Fruh’s disclosure of the challenges associated with implementing vision-based methods (Ex. 1004, 6) specifically refers to prior art practices, and does not criticize, discredit, or otherwise discourage implementing any and all vision-based technology in Fruh’s system. Indeed, this cited disclosure in Fruh is directed to “detailed building models from a ground-level view . . . in previous work” *Id.* at 5 (emphasis added). In our view, the emphasized language “in previous work” fairly suggests prior art practices and, as a result, the disparaging disclosure associated therewith does not apply to Fruh’s “drive-by scanning” method.

With respect to the second teaching away argument, Di Bernardo’s disclosure in its Background of the Invention section of a system that “[does] not require the reconstruction of [3-D] scene geometry” (Ex. 1005, 2:3–5) refers to an objective of the invention disclosed in Di Bernardo. This cited disclosure, by itself, does not stand for the proposition that Di Bernardo, particularly its teaching of generating a composite image of a geographic location by aligning two or more 2-D images, is incapable of being combined with Fruh’s system that requires 3-D scene geometry. Apart from mere attorney argument, the record developed during trial does not include sufficient or credible evidence that the references teach away from modifying Fruh with the teachings of Di Bernardo. *Cf. In re Geisler*,

116 F.3d 1465, 1470 (Fed. Cir. 1997) (attorney arguments and conclusory statements that are unsupported by factual evidence are entitled to little probative value).

Lastly, with respect to VRE's third teaching away argument, simply identifying purported incompatibilities or differences between Fruh and Di Bernardo does not constitute a teaching away. For instance, when asserting that Di Bernardo does not teach or suggest how to make vertical 2-D scans align in a dimension consistent with a continuum, VRE again narrowly focuses on Fruh's disclosure that its vertical 2-D scans do not overlap. PO Resp. 22. This disclosure in Fruh, by its mere existence, does not constitute a teaching away simply because it may be different from what is disclosed in Di Bernardo. VRE also argues that Di Bernardo relies upon GPS for positional data, whereas Fruh deliberately discards GPS and relies upon an airborne DSM. *Id.* These differences, however, do not constitute a teaching away. Instead, we view these respective disclosures in Fruh and Di Bernardo as proposing two, alternative methodologies for positioning and aligning different image sets that fall within the store of public knowledge that one of ordinary skill in the art would generally consider in an obviousness evaluation. The underlying theme in each of the purported differences between Fruh and Di Bernardo identified by VRE is that VRE in essence has read into each reference a teaching away where no such language exists.

c. Summary

Based on the record developed during trial, we conclude that Google has demonstrated by a preponderance of the evidence that independent claim 1 would have been obvious over the combination of Fruh and Di Bernardo.

5. Claims 2, 8, 9, 11–13, and 16

In its Patent Owner Response, VRE relies upon the same arguments presented against independent claim 1 to rebut Google’s explanations and supporting evidence as to how the combination of Fruh and Di Bernardo teaches the subject matter of dependent claims 2, 5, 8, 9, 11–13, and 16. *See* PO Resp. 23–24. For the same reasons discussed above with respect to independent claim 1, VRE’s arguments are not persuasive.

We have reviewed Google’s arguments and supporting evidence set forth in the Petition regarding dependent claims 2, 8, 9, 11–13 and 16, and find them persuasive. *See* Pet. 20–23, 39–43. Based on the record as developed during trial, we conclude that Google has demonstrated by a preponderance of the evidence that these dependent claims would have been obvious over the combination of Fruh and Di Bernardo.

6. Claim 5

During the preliminary phase of this proceeding, we overlooked that, although Google includes dependent claim 5 in its statements of the asserted ground based on obviousness over Fruh and Di Bernardo (Pet. 3, 18, 37), Google does not address this dependent claim in its corresponding analysis (*see generally id.* at 18–23, 37–43). We, nonetheless, recognize that Google accounts for all the features of dependent claim 5 in its asserted ground based on anticipation by Fruh. *Id.* at 16, 33–34.

“It is well settled that ‘anticipation is the epitome of obviousness.’” *In re McDaniel*, 293 F.3d 1379, 1385 (Fed. Cir. 2002) (citations omitted). With this in mind, we presume that, based on these particular circumstances, Google intended that the same analysis for dependent claim 5 in its asserted ground based on anticipation by Fruh equally applies to its asserted ground based on obviousness over Fruh and Di Bernardo. As we explained previously, we have reviewed Google’s arguments and supporting evidence regarding this dependent claim, and find them persuasive. *See* Pet. 16, 33–34.

Based on the record developed during trial, we conclude that Google has demonstrated by a preponderance of the evidence that dependent claim 5 would have been obvious over the combination of Fruh and Di Bernardo.

E. VRE’s Motion to Exclude

In its Motion to Exclude, VRE seeks to exclude the following evidence: (1) certain portions of the Declaration of Dr. Fuchs accompanying the Petition (Ex. 1001) based on Federal Rule of Evidence (“FRE”) 402, 403, 702, 703, 802, 901, and 903, as well as 37 C.F.R. §§ 42.62 and 42.65(a); (2) the Akbarzadeh article (Ex. 1006) based on FRE 402 and 403, as well as 37 C.F.R. § 42.62; and (3) certain portions of the Rebuttal Declaration of Dr. Grindon accompanying Petitioner’s Reply based on FRE 402, 403, 702, and 703, as well as 37 C.F.R. §§ 42.62 and 42.65(a). Mot. to Exclude 1–4. In its Opposition, Google counters that VRE fails to provide legally sufficient objections under the FREs and, as a consequence, its Motion to Exclude should be denied. Exclude Opp. 2–13. For the reasons discussed below, VRE’s Motion to Exclude is denied.

As an initial matter, we note that the party moving to exclude evidence bears the burden of proving that it is entitled to the relief requested—namely, that the material sought to be excluded is inadmissible under the FREs. *See* 37 C.F.R. §§ 42.20(c), 42.62(a). A motion to exclude must, among other things, explain each objection. *See* 37 C.F.R. § 42.64(c); *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,767 (Aug. 14, 2012). In this case, VRE does not explain adequately its objections to certain portions of Dr. Fuchs’s testimony, the Akbarzadeh article, and certain portions of Dr. Grindon’s rebuttal testimony. Consequently, VRE has not met its burden of demonstrating that the aforementioned evidence should be excluded. For this reason alone, VRE has not presented a sufficient basis to exclude certain portions of Dr. Fuchs’ testimony, the Akbarzadeh article, and certain portions of Dr. Grindon’s rebuttal testimony.

We note that there are additional considerations that weigh in favor of denying VRE’s Motion to exclude. We highlight a few of these considerations as follows. VRE moves to exclude paragraphs 12, 16, 39, 40, 47, 50, 62, 63, and 66 in the Declaration of Dr. Fuchs because, according to VRE, these paragraphs draw legal conclusions and are not limited to Dr. Fuchs’s purported area of expertise. Mot. to Exclude 2. VRE also moves to exclude paragraphs 52–70 in the Declaration of Dr. Fuchs because these paragraphs reference the Akbarzadeh article, and an *inter partes* review was not instituted based on the Akbarzadeh article. *Id.* VRE’s arguments go more towards the weight we should afford the cited paragraphs in the Declaration of Dr. Fuchs, rather than their admissibility. It is within our discretion to assign the appropriate weight to the testimony offered by Dr.

Fuchs. *See, e.g., Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding the Board has discretion to give more weight to one item of evidence over another “unless no reasonable trier of fact could have done so”); *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) (“[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations.”).

Next, VRE moves to exclude the Akbarzadeh article (Ex. 1006) based on relevance. Mot. to Exclude 2. In particular, VRE argues that, because the Akbarzadeh article does not serve as the basis of a ground instituted in this proceeding, this exhibit should be excluded. *Id.* at 2. Google did not rely upon the Akbarzadeh article in its Petitioner’s Reply, much less reference this article during oral argument. Nor did we rely upon the Akbarzadeh article in reaching this Final Written Decision. Accordingly, this aspect of VRE’s Motion to Exclude is moot.

Lastly, VRE moves to exclude paragraphs 9, 10, 12, 13, 17, 18, 20, and 22 in the Rebuttal Declaration of Dr. Grindon because, among other things, Google does not provide a sufficient reason as to why this testimony could not have been included with the Petition. Mot. to Exclude 3–4. A motion to exclude is not a proper vehicle for a party to raise the issue of testimony in a rebuttal declaration exceeding the permissible scope of reply testimony. *See Vibrant Media Inc. v. General Electric Co.*, Case IPR2013-00170, slip op. at 31 (PTAB June 26, 2014) (Paper 56) (“Whether a reply contains arguments or evidence that are outside the scope of a proper reply under 37 C.F.R. § 42.23(b) is left to our determination.”).

In any event, based on our review of the arguments presented by VRE in its Patent Owner Response, as well as the relevant paragraphs in the Rebuttal Declaration of Dr. Grindon, we determine that Dr. Grindon's rebuttal testimony is responsive to VRE's argument directed to Dr. Grindon's testimony from the *Vederi* litigation. *Compare* PO Resp. 20–21, with Ex. 1012 ¶¶ 17, 18. In other words, Dr. Grindon's rebuttal testimony that seeks to clarify his testimony in the *Vederi* litigation falls within the purview of 37 C.F.R. § 42.23(b), which provides that a petitioner's reply may only respond to arguments or evidence raised in the patent owner response. For these additional reasons, VRE has not presented a sufficient basis to exclude certain portions of Dr. Fuchs's testimony, the Akbarzadeh article, and certain portions of Dr. Grindon's rebuttal testimony.

In summary, VRE's Motion to Exclude certain portions of the Declaration of Dr. Fuchs, the Akbarzadeh article, and certain portions of the Rebuttal Declaration of Dr. Grindon is denied.

F. VRE's Motion for Observation

VRE filed a Motion for Observation on the cross-examination testimony of Google's rebuttal witness, Dr. Grindon. Paper 28 ("Obs."). Google, in turn, filed a Response. Paper 34 ("Obs. Resp."). To the extent VRE's Motion for Observation pertains to testimony purportedly impacting Dr. Grindon's credibility, we have considered VRE's observations and Google's responses in rendering this Final Written Decision, and accorded Dr. Grindon's rebuttal testimony appropriate weight where necessary. *See* Obs. 1–7; Obs. Resp. 1–7.

III. CONCLUSION

Google has demonstrated by a preponderance of the evidence that (1) claims 1, 2, 5, and 8–13 of the '396 are anticipated under § 102(b) by Fruh; and (2) claims 1, 2, 5, 8, 9, 11–13, and 16 of the '396 patent are unpatentable under § 103(a) over the combination of Fruh and Di Bernardo.

IV. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1, 2, 5, 8–13, and 16 of the '396 patent are held to be unpatentable;

FURTHER ORDERED that VRE's Motion to Exclude is DENIED; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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