

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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GOOGLE, INC.,  
Petitioner,

v.

VISUAL REAL ESTATE, INC.,  
Patent Owner.

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Case IPR2014-01341  
Patent 8,078,396 B2

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

ZECHER, *Administrative Patent Judge*.

DECISION  
Institution of *Inter Partes* Review  
37 C.F.R. § 42.108

## I. INTRODUCTION

Petitioner, Google, Inc. (“Google”), filed a corrected Petition (“Pet.”) 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. Patent Owner, Visual Real Estate, Inc. (“VRE”), timely filed a Preliminary Response (“Prelim. Resp.”). Paper 9. We have jurisdiction under 35 U.S.C. § 314.

The standard for instituting an *inter partes* review is set forth in 35 U.S.C. § 314(a), which provides:

THRESHOLD.—The Director may not authorize an *inter partes* review to be instituted unless the Director determines that the information presented in the petition filed under section 311 and any response filed under section 313 shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.

Taking into account the arguments presented in VRE’s Preliminary Response, we conclude that the information presented in the Petition establishes that there is a reasonable likelihood that Google will prevail in challenging claims 1, 2, 5, 8–13, and 16 of the ’396 patent as unpatentable under 35 U.S.C. §§ 102(b) and 103(a). Pursuant to 35 U.S.C. § 314, we hereby authorize an *inter partes* review to be instituted as to these claims of the ’396 patent.

### A. *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 (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.

*B. The '396 Patent*

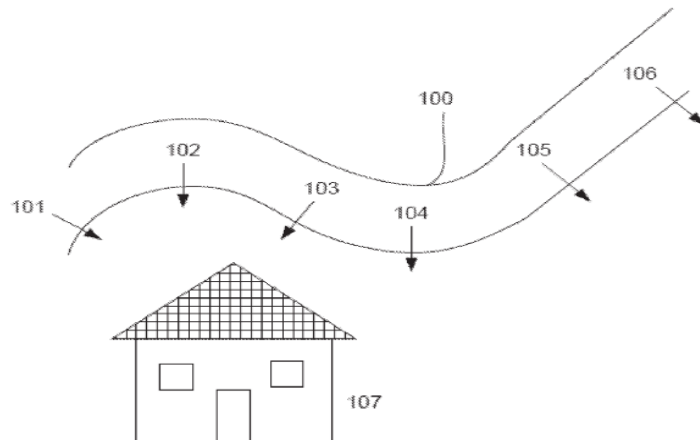
The '396 patent, titled “Methods for and Apparatus for Generating a Continuum of Three Dimensional Image Data,” issued December 23, 2011, from U.S. Patent Application No. 12/035,423 (“the '423 application”), filed on February 21, 2008. Ex. 1002, at [54], [45], [21], and [22]. The '396 patent claims priority 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.

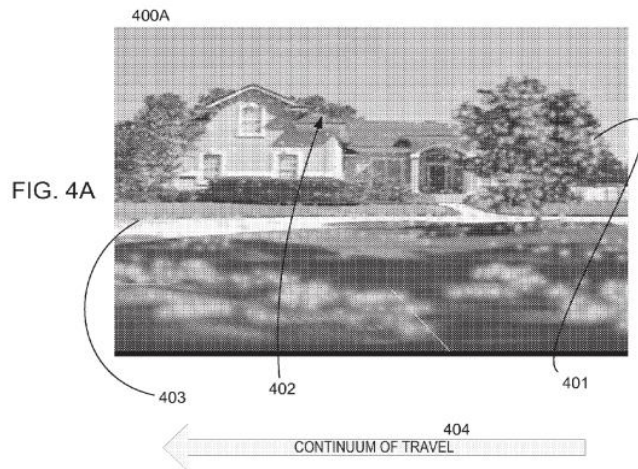


As shown in Figure 1, continuum 100 includes the path of a vehicle carrying a digital camera, or other image data capturing device. *Id.* at 3:15–18. The image data sets of subject matter 107 are captured by, e.g., the digital camera, at separate points 101–106 along continuum 100. *Id.* at

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 the continuum. *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.

*C. 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.

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

Akbarzadeh, et al., *Towards Urban 3D Reconstruction From Video*, (June 14, 2006) (thesis, University of Kentucky and University of North Carolina at Chapel Hill) (on file with their Departments of Computer Science) (Ex. 1006, “Akbarzadeh”).

*E. Asserted Grounds of Unpatentability*

Google challenges claims 1, 2, 5, 8–13, and 16 of the ’396 patent based on the asserted grounds of unpatentability set forth in the table below.

Pet. 3–4, 12–54.

| References                 | Basis    | Challenged Claims                         |
|----------------------------|----------|-------------------------------------------|
| Fruh                       | § 102(b) | 1, 2, 5, and 8–13                         |
| Fruh                       | § 103(a) | 1, 2, 5, and 8–13                         |
| Fruh and Di Bernardo       | § 103(a) | 1, 2, 5, 8, 9, 11–13, and 16 <sup>1</sup> |
| Akbarzadeh                 | § 102(a) | 1, 2, 5, and 8–10                         |
| Akbarzadeh                 | § 103(a) | 1, 2, 5, and 8–10                         |
| Akbarzadeh and Di Bernardo | § 103(a) | 1, 2, 5, 8–13, and 16                     |

## II. ANALYSIS

### A. Claim Construction

In an *inter partes* review, we construe claims by applying the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b); *see* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). 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). Any special definitions for claim terms or phrases

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<sup>1</sup> Although Google includes dependent claim 10 in at least one statement describing this ground of unpatentability (Pet. 18), Google nonetheless does not provide corresponding analysis for dependent claim 10 (*id.* at 18–23, 37–43). We will treat the incorrect statement of the ground of unpatentability as a typographical error and presume Google intended to assert that only claims 1, 2, 5, 8, 9, 11–13, and 16 are unpatentable under 35 U.S.C. § 103(a) over the Fruh and Di Bernardo. *Accord* Pet. 3 (confirming that depend claim 10 was not intended to be included in this ground of unpatentability).



must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Google proposes 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. VRE proposes an alternative claim construction for the claim phrase “point cloud array” and presents 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 proposes 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 this decision, we need only assess 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.” *See, e.g., Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (only those terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy).

1. “*point cloud array*” (*all challenged claims*)

Google contends that the broadest reasonable interpretation of “point cloud array” is ““a set of points corresponding to locations of features.”” Pet. 10. To support its construction, Google directs us to the specification of the ’396 patent, and the supporting testimony of its expert witness, Dr. Henry Fuchs. *Id.* (citing Ex. 1002, 2:41–44; Ex. 1001 ¶ 20).

In response, VRE contends that Google's proposed construction for "point cloud array" is incomplete because it fails to consider the full scope of the explicit definition set forth in the specification of the '396 patent. Prelim. Resp. 11–12. VRE asserts that the specification explicitly defines a "point cloud array" as "'a set of points generated utilizing the location of feature points present in multiple image data sets in combination with the position and orientation of a camera capturing the image data set.'" *Id.* at 11.

Contrary to VRE's assertions, the specification of the '396 patent does not set forth an explicit definition for the claim phrase "point cloud array." For convenience, the portion of the specification relied upon by both parties states that: "[i]n general, point clouds are generated utilizing the location of feature points present in multiple image sets in combination with the position and orientation of a camera capturing the image data set." Ex. 1002, 2:41–44. This portion of the specification describes, in general terms, how "point clouds" are generated. This portion of the specification, however, does not define "point clouds" with reasonable clarity, deliberateness, and precision.

We agree with Google that its proposed construction for the claim phrase "point cloud array" constitutes the broadest reasonable interpretation. This construction is consistent with its ordinary and customary meaning as would be understood by one with ordinary skill in the art in light of the specification of the '396 patent. *See, e.g.*, Ex. 1002, 2:41–44 ("point clouds are generated utilizing the location of feature points present in multiple image sets"), 5:50–67 ("point cloud arrays 501A-503A can be generated which represent various aspect[s] of the image data sets"). Therefore, for

purposes of this decision, we adopt Google’s construction of the claim phrase “point cloud array” as “a set of points corresponding to locations of features.”

2. “*image data set*” (*all challenged claims*)

Google does not propose a construction for the claim phrase “image data set.” VRE contends that the broadest reasonable interpretation of this claim phrase is a “data set associated with an image captured by a camera.” Prelim. Resp. 10. To support its construction, VRE directs us to various portions of the specification of the ’396 patent, as well as a technical dictionary definition for the term “data set.” *Id.* at 9–10 (citing Ex. 1002, 4:49–55, 5:9–10, 5:24–25; Ex. 2003).

Upon reviewing the specification of the ’396 patent, we do not find an explicit definition for the claim phrase “image data set.” We, therefore, refer to its ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *Translogic*, 504 F.3d at 1257. We decline to adopt all the language in VRE’s proposed construction, particularly the language of “captured by a camera,” because this language is limited to a specific example disclosed in the specification of the ’396 patent. We must be careful not to read limitations from a particular embodiment appearing in the specification into the claim if the claim language is broader than that embodiment. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). For convenience, the portion of the specification relied upon by VRE states that, “[f]or example, a plurality of cameras can be fixedly attached to a vehicle capturing Video DriveBy™ data.” Ex. 1002, 4:49–50 (emphasis added). This disclosure in the specification clearly refers to a camera as merely an example of a device that

is capable of capturing image data sets. Moreover, we note that, in at least one instance, the specification generically refers to a device capable of capturing image data sets as an “image data capturing device.” *Id.* at 3:16–18.

For purposes of this decision, we construe the claim phrase “image data set” as “a data set associated with an image.” This construction is consistent with its ordinary and customary meaning as would be understood by one with ordinary skill in the art in light of the specification of the ’396 patent. *See, e.g.*, Ex. 1002, 3:14–21 (“the continuum 100 includes the path of a vehicle carrying a digital camera, or other image data capturing device. Image data sets are captured at disparate points 101-106 along the continuum”), 5:23–29 (“image data sets 201-203 are illustrated which capture images of a subject 200 from different points along a continuum,” “[i]n some embodiments, . . . image data sets 304-307 overlap the subject matter captured”), Figs. 1–3.

### 3. “*composite image*” (*all challenged claims*)

Google does not propose a construction for the claim phrase “composite image.” VRE contends that the broadest reasonable interpretation of this claim phrase is “an image formed by aligning portions of at least two or more image data sets.” Prelim. Resp. 11. To support its construction, VRE directs us to the specification of the ’396 patent. *Id.* at 10 (citing Ex. 1002, 7:3–9, Fig. 7).

Upon reviewing the specification of the ’396 patent, we do not find an explicit definition for the claim phrase “composite image.” We, therefore, refer to its ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *Translogic*,

504 F.3d at 1257. We agree with VRE that its proposed construction for the claim phrase “composite image” constitutes the broadest reasonable interpretation. This construction is consistent with its ordinary and customary meaning as would be understood by one with ordinary skill in the art in light of the specification of the ’396 patent. *See, e.g.*, Ex. 1002, 7:1–13 (“creates a composite through alignment of portions of data from more than one data set,” “images 701-703 are aligned to form composite image 700”), Fig. 7. Therefore, for purposes of this decision, we adopt VRE’s proposed construction for the claim phrase “composite image” as “an image formed by aligning portions of at least two or more image data sets.”

*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.

Google contends that the ’465 application, the ’707 application, and the ’708 application do not provide sufficient written description support for all the method steps recited in independent claim 1 of the ’396 patent. Pet. 8. In particular, Google argues that these non-provisional applications do not disclose 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. *Id.* at 8. Google argues that, although the ’707 application discloses polygon overlaid images, neither the ’707 application, the ’465 application, nor the ’708

application provide written description support for generating point clouds, much less support processing the point clouds to generate polygon based models. *Id.* at 8–9 (citing Ex. 1008 ¶¶ 26, 28, 33, 35, 38–41, 44, 46, 60; Ex. 1001 ¶ 17). Google asserts that, because these non-provisional applications do not disclose the aforementioned method steps recited in independent claim 1, the '396 patent is entitled only to a priority date of February 21, 2008—the filing date of the '423 application that led to the '396 patent. *Id.* at 8. VRE does not present arguments as to whether the '396 patent is entitled to claim a priority date earlier than February 21, 2008.

On the present record, we are 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. For purposes of this decision, Google has presented sufficient rebuttal 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.

### *C. Anticipation by Fruh*

Google contends that claims 1, 2, 5, and 8–13 are anticipated under 35 U.S.C. § 102(b) by Fruh. Pet. 12–18, 28–37. Google explains how Fruh describes the claimed subject matter of each challenged claim, and relies upon the Declaration of Dr. Fuchs (Ex. 1001 ¶¶ 24–39) to support its positions. *Id.* We are persuaded by Google's explanations and supporting evidence.

We begin our analysis with the principles of law that generally apply to a ground of unpatentability based on anticipation, followed by a brief discussion of Fruh, and then we address the arguments presented by VRE in its Preliminary Response.

### *1. Principles of Law*

To establish anticipation under § 102(b), “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.<sup>2</sup> 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

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<sup>2</sup> 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.

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. *Id.*

### 3. VRE's Contentions

- a. *Claim 1—“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”*

Independent claim 1 recites, in relevant part, “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.

In its Petition, Google contends that Fruh discloses a truck equipped with one camera and two laser scanners that capture drive-by scanning data while driving on city streets. Pet. 12, 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 citations, Google asserts that Fruh describes the “receiving” method step recited in independent claim 1. *See id.*

In response, VRE contends that Google improperly relied upon Fruh's drive-by scanning data to account for the “receiving” method step. Prelim. Resp. 18 (citing Pet. 29). VRE argues that, although Fruh's drive-by scanning data includes image data captured by a camera, this particular



image data are not used to generate the point cloud. *Id.* Instead, VRE argues that image data captured by Fruh’s laser scanners are used to generate the point cloud. *Id.* VRE then asserts that, based on its proposed construction of “image data set,” the image data captured by Fruh’s laser scanners do not satisfy the “receiving” method step because it is not image data captured by a camera. *Id.* at 18–19.

In our claim construction section above, we declined to adopt VRE’s proposed construction for the claim phrase “image data set.” *See supra* Section II(A)(2). Instead, for purposes of this decision, we construed this claim phrase according to its ordinary and customary meaning—namely, “a data set associated with an image.” Based on the current record, we are persuaded that Google’s position regarding Fruh’s drive-by scanning data is consistent with this claim construction. That is, Google presents sufficient evidence to support a finding that the drive-by scanning data captured by Fruh’s laser scanners amounts to a data set associated with an image.

Next, VRE contends that, even if the claimed “image data sets” could be construed to include scanned data, Fruh’s drive-by scans cannot satisfy this feature because it requires “multiple two-dimensional data sets of a subject.” Prelim. Resp. 19 (emphasis omitted). In particular, VRE argues that the claimed “image data sets” overlap the captured subject matter, whereas Fruh discloses that the drive-by scans are parallel and do not overlap. *Id.* (citing Ex. 1002, 5:26–29; Ex. 1004, 6).

We are not persuaded by VRE’s argument in this regard because it is not commensurate in scope with the claim limitation at issue. VRE’s argument is predicated on the notion that independent claim 1 requires that the multiple, 2-D image data sets overlap the subject matter captured.

Instead, independent claim 1 simply recites “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 independent claim 1, itself, that requires the multiple, 2-D image data sets to overlap the captured subject matter.

*b. Claim 1—“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”*

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.

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 maintains 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 these disclosures, Google asserts that Fruh’s disclosure of texturing a 3-D model describes the “generating” method step recited in independent claim 1. *See id.*

In response, VRE contends that both Google and its expert witness, Dr. Fuchs, take the position that the claimed “composite image” includes a single vertical slice of each of the two or more images. Prelim. Resp. 20 (citing Pet. 13; Ex. 1001 ¶ 27). VRE then argues that Google does not provide a citation from Fruh to describe the claimed “composite image,” but rather relies upon citations to other elements recited in independent claim 1 to satisfy this feature. *Id.*

In our claim construction section above, we adopted VRE’s construction of the claim phrase “composite image” as “an image formed by aligning portions of at least two or more image data sets.” *See supra* Section II(A)(3). On the current record, we are persuaded that Google’s position regarding Fruh’s disclosure of texturing a 3-D model is consistent with this claim construction. That is, Google presents sufficient evidence to support a finding that Fruh’s disclosure of texturing a 3-D model amounts to forming an image by aligning portions of at least two or more image data sets.

Next, VRE contends that Fruh teaches away from independent claim 1 because the drive-by scans do not overlap. Prelim. Resp. 20. We are not persuaded by VRE’s argument because Google’s proposed ground of unpatentability 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).

#### 4. Summary

Based on the record before us, Google has demonstrated a reasonable likelihood that it will prevail on its assertion that claims 1, 2, 5, and 8–13 are anticipated by Fruh.

*D. Obviousness Based on the Combination of Fruh and Di Bernardo*

Google contends that claims 1, 2, 5, 8, 9, 11–13, and 16 are unpatentable under 35 U.S.C. § 103(a) over the combination of Fruh and Di Bernardo. Pet. 18–23, 37–43. Google explains how the combination of Fruh and Di Bernardo collectively teaches the claimed subject matter of each challenged claim, and provides multiple rationales to combine the respective teachings of these prior art references. In addition, Google relies upon the Declaration of Dr. Fuchs (Ex. 1001 ¶¶ 40–50) to support its positions. *Id.* We are persuaded by Google’s explanations and supporting evidence.

We begin our analysis with the principles of law that generally apply to a ground of unpatentability based on obviousness, followed by a brief discussion of Di Bernardo, and then we address the arguments presented by VRE in its Preliminary 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 analyze this asserted ground based on obviousness with the principles identified above in mind.

## 2. *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 record 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 creates 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, in turn, is transmitted back to the remote terminal and displayed to the user. *Id.* at 11:62–67.



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 (Ex. 1001 ¶ 49).

In response, VRE contends that Google provides insufficient rationales for combining the teachings of Fruh and Di Bernardo. Prelim. Resp. 23. VRE argues that Google’s first rationale to combine relates to overlaying metadata and has nothing to do with independent claim 1, nor does it account for the elements 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—makes no sense. *Id.*

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 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).

On the current record, we are persuaded that Google’s rationales for combining the teachings of Fruh and Di Bernardo suffice as an articulated reasoning with a rational underpinning 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 disclose the “generating” method step recited in independent claim 1, Di Bernardo discloses a post-processing system that uses image and position sequences to synthesize the acquired images and creates composite images of a geographic location that was recorded. Ex. 1005, 5:46–48. It is well settled that, if a technique has been used to improve one device (Di Bernardo discloses generating a composite image of a geographic location by aligning two or more 2-D images), and an ordinarily skilled artisan would recognize that it would improve similar devices in the same way (using this 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 his or her skill. *See KSR*, 550 U.S. at 417.

*b. Teaching Away*

VRE contends that Fruh and Di Bernardo teach away from their combination and, as a result, teach away from the invention claimed in the ’396 patent. *See* Prelim. Resp. 24–25. First, VRE argues that Fruh discloses that there are challenges associated with implementing vision-based methods for acquiring detailed building models from a ground-level view, such as that taught by Di Bernardo, and instead proposes drive-by scanning as a method that is capable of acquiring 3-D geometry and texture data of city



buildings. *Id.* at 24 (citing Ex. 1004, 6). Second, VRE argues that Di Bernardo discloses that its system does not require the reconstruction of 3-D scene geometry and, therefore, teaches away from Fruh's system that requires 3-D scene geometry. *Id.* at 24–25 (Ex. 1005, 2:3–5)

A reference teaches away from a claimed invention if it “criticizes, discredits, or otherwise discourages” 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 teaching away arguments. With respect to the first teaching away argument, although Fruh discloses that there are challenges associated with implementing vision-based methods for acquiring detailed building models from a ground-level view, such as that taught by Di Bernardo, the current record does not include sufficient or credible evidence that one of ordinary skill in the art would be incapable of overcoming these challenges to combine the teachings of Fruh and Di Bernardo. With respect to the second teaching away argument, although Di Bernardo discloses that its systems does not require the reconstruction of 3-D scene geometry, this disclosure, by itself, does not mean that Di Bernardo is incapable of being combined with Fruh's system that requires 3-D geometry. In our view, VRE has read into Fruh and Di Bernardo a teaching away where no such language exists.

#### 4. Summary

Based on the record before us, Google has demonstrated a reasonable likelihood that it will prevail on its assertion that claims 1, 2, 5, 8, 9, 11–13,

and 16 would have been obvious over the combination of Fruh and Di Bernardo.

*E. Obviousness Based on Fruh*

Google contends that claims 1, 2, 5, and 8–13 are unpatentable under 35 U.S.C. § 103(a) over Fruh. Pet. 18. In particular, Google argues that, should any limitation not be anticipated by Fruh alone, such limitations are rendered obvious over Fruh because one of ordinary skill in the art would have found them obvious in light of the knowledge level of an ordinarily skilled artisan as of 2008, as well as the state of the art known at that time. *Id.* (citing Ex. 1001 ¶ 39). Google further argues that, to the extent any variances in the claim scope are not shown necessarily by the citations included in the claim charts, the accompanying Declaration of Dr. Fuchs provides supporting evidence that such variances would have been obvious to one of ordinary skill in the art at the time of the invention claimed in the '396 patent. *Id.* (citing Ex. 1001 ¶¶ 24–66). We are not persuaded by Google's explanation and supporting evidence.

Google does not provide a fact-based rationale to support its conclusion that such variances would have been obvious. See Pet. 18. Although Google refers to the Declaration of Dr. Fuchs to support its position, Dr. Fuchs fails to proffer any explanation or persuasive evidence demonstrating it would have been obvious to combine the teachings of Fruh with the general knowledge of one of skill in the art.<sup>3</sup>

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<sup>3</sup> Google's reliance on information not provided expressly in the Petition, but instead incorporated by reference to the cited paragraphs in the Declaration of Dr. Fuchs, is not in accordance with our rules. As a result, the Declaration of Dr. Fuchs is given consideration only to the extent that it

It is not sufficient to demonstrate that each of the components in a challenged claim is known in the prior art. *See KSR*, 550 U.S. at 418 (“a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art”). Google must also explain how a person of ordinary skill in the art would combine the elements disclosed in Fruh, and why such a person would be motivated to do so. *See, e.g., In re Chaganti*, 554 F. App’x 917, 922 (Fed. Cir. 2014) (“It is not enough to say that . . . to do so would ‘have been obvious to one of ordinary skill.’ Such circular reasoning is not sufficient—more is needed to sustain an obviousness rejection.”). We, therefore, are not persuaded that Google has provided an articulated reasoning with some rational underpinning to justify the legal conclusion of obviousness. *See KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

Based on the record before us, Google has not demonstrated a reasonable likelihood that it will prevail on its assertion that claims 1, 2, 5, and 8–13 would have been obvious over Fruh.

#### *F. Remaining Grounds of Unpatentability*

Google also contends that: (1) claims 1, 2, 5, and 8–10 are anticipated under 35 U.S.C. § 102(a) by Akbarzadeh; (2) claims 1, 2, 5, and 8–10 are

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provides specifically identified facts or opinions that support arguments that are presented and developed properly in the Petition. *See* 37 C.F.R. § 42.6(a)(3); *see also* Rules of Practice for Trials Before The Patent Trial and Appeal Board and Judicial Review of Patent Trial and Appeal Board Decisions; Final Rule, 77Fed. Reg. 48,612, 48,617 (Aug. 14, 2012) (prohibition against incorporation by reference is to eliminate abuses that arise from incorporation).

unpatentable under 35 U.S.C. § 103(a) over Akbarzadeh; and (3) claims 1, 2, 5, 8–13, and 16 are unpatentable under 35 U.S.C. § 103(a) over the combination of Akbarzadeh and Di Bernardo. Pet. 23–28, 43–54. We exercise our discretion not to institute an *inter partes* review of these asserted grounds for reasons of administrative necessity to ensure timely completion of the instituted proceeding. See 37 C.F.R. § 42.108(a).

### III. CONCLUSION

Taking into account the arguments presented in VRE’s Preliminary Response, we conclude that the information presented in the Petition establishes that there is a reasonable likelihood that Google will prevail in challenging claims 1, 2, 5, 8–13, and 16 of the ’396 patent as unpatentable under 35 U.S.C. §§ 102(b) and 103(a). At this stage in the proceeding, we have not made a final determination with respect to the patentability of the challenged claims.

### IV. ORDER

In consideration of the foregoing, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 1, 2, 5, 8–13, and 16 of the ’396 patent for the following grounds of unpatentability:

- A. Claims 1, 2, 5, and 8–13 as anticipated under 35 U.S.C. § 102(b) by Fruh; and
- B. Claims 1, 2, 5, 8, 9, 11–13, and 16 as unpatentable under 35 U.S.C. § 103(a) over the combination Fruh and Di Bernardo;

FURTHER ORDERED that no other grounds of unpatentability are authorized for this *inter partes* review other than those identified above; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial. The trial will commence on the entry date of this decision.

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Patent 8,078,396 B2

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