

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

**PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE FOR INTER
PARTES REVIEW OF UNITED STATES PATENT NO. 8,078,396
PURSUANT TO 37 C.F.R. § 42**

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EXHIBIT LIST

- Ex. 1001 Declaration of Dr. Fuchs
- Ex. 1002 U.S. Patent No. 8,078,396 (“the ’396 patent”)
- Ex. 1003 Select Prosecution History of the ’396 patent (Serial No. 12/035,423)
- Ex. 1004 “An Automated Method for Large-Scale, Ground-Based City Model Acquisition” by Früh et al. (October 2004) (“Fruh”)
- Ex. 1005 U.S. Patent No. 6,895,126 to Di Bernardo et al. (“Di Bernardo”)
- Ex. 1006 “Towards Urban 3D Reconstruction From Video” by Akbarzadeh et al. (June 14, 2006) (“Akbarzadeh”)
- Ex. 1007 U.S. Patent 7,929,800 to Meadows et al. (Application No. 11/702,708)
- Ex. 1008 U.S. Publication No. 2008/0189031 to Meadows et al. (Application No. 11/702,707)
- Ex. 1009 Exhibit C to VRE’s Disclosure of Asserted Claims and Infringement Contentions for U.S. Patent No. 8,078,396
- Ex. 1010 U.S. Patent 7,389,181 to Meadows et al. (Application No. 11/216,465)
- Ex. 1011 Declaration of David Almeling in Support of Pro Hac Vice Admission
- Ex. 1012 Declaration of Dr. John R. Grindon

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I. Introduction

The arguments of Patent Owner (“PO”) rely upon overly narrow claim constructions or mischaracterized “teaching away” arguments—all of which were previously considered and rejected by the Board. Not only does the Response recycle arguments that were rejected by the Board, it does so based upon attorney argument alone, without any supporting evidence. This is insufficient to overcome the Board’s rejections.

PO’s attorney argument fails to supplant the testimony evidence of Dr. Fuchs (Ex. 1001) that was considered in the Institution Decision and that Petitioner continues to rely upon here. In fact, PO fails to rebut any of Dr. Fuchs’ testimony regarding what would have been understood from the cited publications by a person of ordinary skill in the art *in 2008*. Rather, PO cites to earlier testimony from an unrelated litigation, in which a different expert (Dr. Grindon) testified about a patent in the same family as Di Bernardo (Ex. 1005) from the perspective of a person of ordinary skill in the art *in 2000* (the priority date of that particular Di Bernardo patent). Again, this is insufficient.

Not only does PO unnecessarily inject Dr. Grindon into this proceeding, PO mischaracterizes his earlier testimony in an effort to falsely disparage the teachings of Di Bernardo. In contrast to PO’s attempt to mischaracterize Dr. Grindon’s opinions, Petitioner has contacted Dr. Grindon and asked him to submit a

declaration (Ex. 1012). Dr. Grindon's new declaration puts his prior opinions in context and fully refutes and disproves PO's arguments.

PO's attorney argument in the Response fails under the weight of the actual testimony evidence and the proper interpretation of the claims under the broadest reasonable interpretation ("BRI") standard. The Board's findings in the Institution Decision should stand.

II. Fruh anticipates claims 1, 2, 5, and 8-13 [Instituted Ground 1]

A. Fruh anticipates claims 1, 2, 5, and 8-13 because Fruh discloses "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."

The Board construed the phrase "image data set" as "a data set associated with an image." Inst. Dec. at 12. The Board also determined that "the drive-by scanning data captured by Fruh's laser scanners amounts to a data set associated with an image." Inst. Dec. at 17. PO does not dispute the Board's construction of "image data set" or the Board's findings that Fruh's drive-by scanning data is consistent with this claim construction. *See* Resp. at 3.

Instead, PO presents attorney argument that the step of "receiving multiple two-dimensional image data sets ..." in claim 1 must be narrowly interpreted so that the image data sets of a subject are "captured at a single point of the same continuum of a vehicle travelling down a street by *using multiple cameras* in an array and capturing images simultaneously," thereby receiving "image data sets

[that] **overlap** the subject matter captured.” Resp. at 6, 7; *see also id.* at 12, 14-15,

18. PO’s argument ignores the plain language of the claims, as illustrated in the image below:

CLAIM 1 (ORIGINAL)	CLAIM 1 (AS IMPROPERLY CONSTRUED BY PATENT OWNER)
<p>1. A method for creating a continuum of image data, the method comprising:</p> <p>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;</p> <p>...</p>	<p>1. A method for creating a continuum of image data, the method comprising:</p> <p>a) receiving multiple two-dimensional image data sets of a ^{that overlap} subject, wherein each image data set is captured from a disparate point on a continuum and each image data set ^{singular} of a vehicle travelling down a street by using multiple cameras in an array capturing images simultaneously comprises a plurality of features;</p> <p>...</p>

Compare Ex. 1002 at cl. 1, with Resp. at 6, 7. For the reasons set forth below and as applied in the previous declaration testimony of Dr. Fuchs and in the Petition, the BRI of this claim element does not require that the multiple image data sets “overlap” the captured subject matter and be captured from “a single point” on a “singular continuum” of a vehicle travelling down a street by using multiple cameras in an array capturing images simultaneously.

First, the Board has already properly determined that PO’s argument that the claimed “image data sets” must “overlap” the captured subject matter is not commensurate in scope with the BRI of claim 1. Inst. Dec. at 17-18. Claim 1 simply recites “multiple two-dimensional image data sets of a subject.” Nowhere in the language of independent claim 1 is there a requirement for the multiple 2-D

image data sets to “overlap” the captured subject matter. *Id.* at 18 (citing to col. 10:45-46 of the ’396 patent).

Furthermore, claim 1 requires that “each image data set [not multiple data sets] is captured from a disparate point on a continuum.” PO’s unsupported argument that claim 1 requires “receiving multiple two-dimensional image data sets of a subject ... captured from a disparate point on a continuum” ignores the plain language of claim 1. *See* Resp. at 14. The meaning of the phrase “multiple two-dimensional image data sets” should not be imported into the subsequent “wherein” clause that instead describes a characteristic for “each image data set” because the former refers to multiple image data sets and the latter refers to a single image data set. PO’s proposed construction would render the phrase “each image data set” redundant or superfluous, which is contrary to claim construction law. *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950 (Fed. Cir. 2006); *see also Stumbo v. Eastman Outdoors, Inc.*, 508 F.3d 1358, 1362 (Fed. Cir. 2007).

Additionally, nowhere in the language of claim 1 itself is there a requirement that “a continuum” be “a singular continuum” of “a vehicle travelling down a street ... using multiple cameras in an array and capturing images simultaneously.” *See* Resp. at 6. To support this overly narrow construction of “a continuum,” and despite the absence of such language in the claim, PO attempts to import various portions of the ’396 patent specification. Resp. at 6 (citing Ex. 1002 at 3:15-19,

5:23-25, 5:38-40). But PO's narrow construction here is limited to the specific examples of the '396 patent cited by PO and ignores several broader examples for "each image data set is captured from a disparate point on a continuum" disclosed in the '396 patent:

Referring now to FIG. 5B point cloud arrays **501B-503B** are illustrated based on additional image data sets of the same geographic area as that illustrated in FIG. 5A. Additional image data sets can be generated, for example, from one or more of: multiple cameras capturing image data from a vehicle traversing a continuum; from one or more cameras traveling a separate continuum proximate to the same geographic area; and from a single camera with a split image capture of a geographic area.

Multiple cameras can include, for example an array of cameras mounted to a vehicle in fixed positions relative to one another. The cameras may capture image data simultaneously or in timed sequence in order to capture related data. One or more cameras traveling a separate continuum can include a vehicle making multiple passes proximate to a geographic parcel. The passes may be during different time periods, such as, for example, once per month, or during the same general time period, such as driving up and down a street multiple times. A single camera with a split image can include, for example, a high resolution camera with mirrors fixed proximate to the camera lens. The mirrors can be maintained at a set distance apart and direct separate images to predetermined portions of the camera lens. The set distance between the mirrors can be useful, for example, for triangulation processing of distinct feature points.

Ex. 1002 at 5:59-6:10 (emphasis added). As evidenced by these examples, the intrinsic record provides evidence that PO's overly narrow interpretation of this claim element is necessarily inconsistent with the BRI of claim 1. The extrinsic record confirms that a person of ordinary skill in the art would have understood that the BRI of claim 1 is not so limited because, as Dr. Fuchs' declaration indicates, "using laser scanners and a digital camera to continuously acquire

ground-level 3D geometry and texture data” provides the claimed “receiving” function. *See* Ex. 1001 at ¶ 26.

Contrary to PO’s assertions, the Board properly concluded that Fruh discloses “receiving multiple two-dimensional image data sets of a subject” under the BRI of this claim element. *Compare* Resp. at 3, 12, 14, *with* Inst. Dec. at 16-18. For the same reasons previously explained by the Board, the evidence in the record shows that Fruh’s drive-by camera images and associated laser scan data (e.g., which together provide “multiple two-dimensional image data sets”) of buildings (e.g., each being “a subject”) captured using a truck equipped with a camera and two laser scanners driving on a city street (e.g., “a continuum”) falls within the scope of the BRI of this “receiving” step recited in claim 1. Inst. Dec. at 16-17; *see also* Ex. 1001 at ¶ 26; *see also* Ex. 2005 at 266:5-268:16. Petitioner maintains its positions and detailed analysis set forth in the Petition and supported by the Fuchs Declaration. Pet. at 12, 28-29; Ex. 1001 at ¶ 26. PO’s flawed attempt to import a narrow claim interpretation here must fail.

PO further contends that Fruh cannot meet this claim element because “Fruh is directed to a distinct (and different) problem and offers a completely different solution” that “uses laser scan data,” which is a “very different technology than the claimed drive-by video cameras used to capture ‘image data sets’.” Resp. at 3-4, 9, 12, 14. Here again, PO is ignoring the actual language of the claims. To be clear,

neither the claims nor the specification of the '396 patent require using exclusively video cameras and no other data capture devices. As properly and reasonably concluded by the Board, claim 1 is not limited to image data sets captured by a camera, and thus is certainly not limited to one specific technology for capturing image data sets. Inst. Dec. at 11-12. The Board's conclusion is supported by the evidence in the record, including Dr. Fuchs' testimony that "using laser scanners and a digital camera to continuously acquire ground-level 3D geometry and texture data" provide the claimed "receiving" function. Ex. 1001 at ¶ 26.

Lastly, PO contends that Petitioner's expert, Dr. Fuchs, conceded at his deposition that "Fruh cannot and does not disclose this first critical element because the vertical scans of Fruh do not overlap and therefore cannot include multiple image data sets at a given point." Resp. at 14-15 (citing Ex. 2005 at 247:20-21). This is another example of PO mischaracterizing the testimony in the record. While Dr. Fuchs stated that the vertical 2D scans do not "overlap," nowhere in his deposition did Dr. Fuchs concede that Fruh does not disclose this claim element or that Fruh cannot include multiple image data sets at a given point (although, again, for reasons described above, multiple image data sets at a given point is not required by the claims). Rather, Dr. Fuchs' deposition testimony is consistent with his declaration and clarifies that Fruh discloses receiving multiple 2-D "image data sets." Ex. 2005 at 150:19-151:12; *see also id.* at 266:22-268:16;

Ex. 1001 at ¶ 26 (“using laser scanners and a digital camera to continuously acquire ground-level 3D geometry and texture data”). Dr. Fuchs’ testimony thus confirms that Fruh discloses this claim element.

B. Fruh anticipates claims 1, 2, 5, and 8-13 because Fruh discloses “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.”

The Board adopted PO’s construction for the claimed “composite image” as meaning “an image formed by aligning portions of at least two or more image data sets,” but PO now argues that this claim element requires much more. Inst. Dec. at 12-13 and 19; *see also* Resp. at 17. In particular, PO relies upon an extremely narrow construction for the term “aligned” in this claim element. PO asserts that “in order to align ‘portions’ of multiple two-dimensional image sets, features within the image sets *need to be in common and overlap.*” Resp. at 17, 16 (“must overlap”); *see also id.* at 2 (“common feature is used as a reference point to align the different portions of the two or more images”), 5 (“aligning overlapping features”). PO’s argument here improperly imports narrow language from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). As illustrated in the image below, the claim language is broader than PO’s purported embodiment:

CLAIM 1 (ORIGINAL)

1. A method for creating a continuum of image data, the method comprising:
 - ...
 - 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;
 - ...

**CLAIM 1 (AS IMPROPERLY
CONSTRUED BY PATENT OWNER)**

1. A method for creating a continuum of image data, the method comprising:

...

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;

...

Compare Ex. 1002 at cl. 1, with Resp. at 16, 17.

In a flawed effort to establish that claim 1 requires “overlapping” features in order to generate a composite image, PO points to examples in the ’396 patent that describe the claimed process of generating a composite image. Resp. at 16 (citing Ex. 1002 at 7:1-13, 7:48-52). But neither these nor any other portions of the ’396 patent provide a lexicographic definition or disavowal of claim scope to justify PO’s overly narrow interpretation of this claim element. *GE Lighting Solutions, LLC v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) (“only compel departure from the plain meaning in two instances: lexicography and disavowal”). In fact, the only portion of the ’396 patent that even mentions the terms “overlap” and “features” describes them in connection with only “some embodiments”:

Referring now to FIG. 2, exemplary image data sets 201-203 are illustrated which capture images of a subject 200 from different points along a continuum. In some embodiments, as illustrated in FIG. 3, image data sets 304-307 overlap the subject matter captured. The overlap allows for features present in one image data set to be present in a second image data set, and preferably in a tertiary image data set.

Ex. 1002 at 5:23-29 (emphasis added). The term “overlap” does not appear anywhere else in the Detailed Description section of the ‘396 patent, not in the

claims, and certainly not in the passages of the '396 patent that are relied upon by PO for its importation of this narrowing limitation into claim 1. *See* Inst. Dec. at 17 (rejecting PO's argument that the claimed image data sets must "overlap" the captured subject matter). Under the BRI standard, the '396 patent claims cannot be narrowly construed to apply to only "some embodiments" contemplated in the '396 patent specification. *See In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1369 (Fed. Cir. 2004).

PO asserts that Fruh does not meet, and apparently teaches away from, this claim element of "generating a composite image ... wherein the portions are aligned in a dimension consistent with the continuum." Resp. at 15-17. In particular, PO seizes upon its overly narrow interpretation of "aligned" and then argues that Fruh's image data includes vertical 2D scans that "are parallel and do not overlap." Resp. at 16-17. This mere attorney argument rests upon an improperly narrow claim construction (described above), a factual error (described below), and a legal error (also described below), and is thus insufficient to overcome the testimony evidence in the record. Regarding the factual error, PO ignores that Fruh plainly describes how aligning vertical scans is performed using the pose of the laser scans and camera images. Ex. 1004 at 6 ("since vertical 2D scans are parallel and do not overlap, ... it is necessary to determine the pose of successive laser scans and camera images in a global coordinate system with

centimeter and sub-degree accuracy in order to reconstruct a consistent model.”);

Ex. 2005 at 154:8-22; *see also* Ex. 1012 at ¶ 20. Further, PO’s argument rests upon a legal error because “[t]eaching away is irrelevant to anticipation.”

Seachange Int’l, Inc., v. C-Cor, Inc., 413 F.3d 1361, 1380 (Fed. Cir. 2005).

As stated in the Petition, Fruh discloses “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.” Petition at 29-30; *see also* Ex. 1001 at ¶ 27. For example, Fruh discloses generating a textured 3D model (e.g., “a composite image”) of buildings from camera images and associated vertical laser scans (e.g., which together provide “multiple two-dimensional image data sets”) by aligning vertical scans using pose estimation to generate point clouds and aligning camera images by matching the camera coordinate system to the laser coordinate system for the scans used to generate the point clouds. Ex. 1004 at 16, 20; *see also* Petition at 12-13, 29-30; *see also* Ex. 1001 at ¶ 27. The Board properly and reasonably determined that Fruh discloses this element, and the evidence in the record supports the Board’s findings. Inst. Dec. at 18-19; *see also id.* at 17; Ex. 1012 at ¶ 20.

C. Fruh anticipates claims 1, 2, 5, and 8-13 because Fruh discloses “tracking the position of at least one of the plurality of features in two or more of the two-dimensional images.”

PO contends that, because Fruh's 2D scans do not "overlap," a feature in a first scan of Fruh would not be present in a second scan of Fruh, which then leads PO to erroneously assume that tracking the position of at least one of the plurality of features in two or more of the 2-D images is "impossible." Resp. at 18. Yet again, PO presents no evidence to support its argument and instead relies upon attorney argument alone that attempts to import language from the specification into the claims. As illustrated in the image below, the claim language is broader than PO's purported embodiment:

CLAIM 1 (ORIGINAL)

1. A method for creating a continuum of image data, the method comprising:
...
d) tracking the position of at least one of the plurality of features in two or more of the two-dimensional images;
...

CLAIM 1 (AS IMPROPERLY CONSTRUED BY PATENT OWNER)

1. A method for creating a continuum of image data, the method comprising:
...
d) tracking the position of at least one of the plurality of features in two or more of the two-dimensional images;
that are in common and overlap
...

Compare Ex. 1002 at cl. 1, *with Resp. at* 16, 17. The only portion of the '396 patent that PO relies on for this overly narrow interpretation of the "tracking" step mentions the terms "overlap" and "features" as they relate to only "some embodiments" of the method, not for providing a lexicographic definition or disavowing claim scope. Ex. 1002 at 5:23-29; *see also, supra*, Section II.B (showing the text of col. 5:23-29 of the '396 patent). Except for this terse description of "some embodiments" at column 5:23-29 of the '396 patent, the terms "overlap" and "feature" do not appear together anywhere else in the '396

patent, and certainly not in the passages that describe the claimed “tracking the position” of a feature. *See* Ex. 1002 at 5:43-45.

In contrast to Fruh’s description, the ’396 patent is lacking in any detailed teaching as to how the claimed “tracking” step is accomplished. Fruh discloses at least as much, if not more, than the ’396 patent about tracking the position of a feature in the 2-D images. For example, Fruh discloses matching horizontal laser scans. Ex. 1004 at Abstract (“Successive horizontal scans are matched with each other in order to determine an estimate of the vehicle’s motion.”), 7-8 (providing a detailed technique for matching horizontal scans); *see also* Petition at 30. Fruh also discloses transforming vertical scan coordinates to a world coordinate system to generate a point cloud. Ex. 1004 at 16 (“applying a coordinate transformation from the local to the world coordinate system... the processed point cloud can easily be transformed into a triangular mesh by connecting adjacent vertices”), 19 (“Using the accurate pose information, we transform the vertical laser scans into global coordinates and obtain a structured point cloud for a city block...”); Petition at 30-31. Fruh further discloses computing an image coordinate for every 3D point of the point cloud. Ex. 1004 at 16 (“for every arbitrary 3D point, we can compute the corresponding image coordinate and map the texture onto each mesh triangle”); Petition at 31.

While PO fails to submit any testimony or other evidence to support its

assertion, Dr. Fuchs' declaration confirms that Fruh discloses "tracking the position of at least one of the plurality of features in two or more of the two-dimensional images" under the BRI of the claims in that Fruh discloses computing an image coordinate for every 3D point of the point cloud and matching horizontal laser scans, which would include tracking the position of the objects in the camera images and laser scans. Ex. 1001 at ¶ 29. PO's mere attorney argument based on an overly narrow claim interpretation fails to supplant the sworn testimony evidence of Dr. Fuchs (Ex. 1001) that Petitioner continues to rely upon here, and, in fact, PO fails to rebut any of Dr. Fuch's testimony regarding what would have been understood from the cited publications by a person of ordinary skill in the art *in 2008*.

D. Fruh anticipates claims 1, 2, 5, and 8-13 because Fruh discloses generating a point cloud array for the at least one of the plurality of features.

In the introduction of PO's Response, PO also makes the unsupported argument that a "significant innovative aspect of the present invention was the use of image data captured by cameras to generate point cloud arrays by taking portions of overlapping captured images" and that the tracked position of the features in the images are used to generate a point cloud array. Resp. at 2, 5. From this assumption, PO then implies that Fruh's system uses only vertical laser scans, not the camera images, to generate a point cloud, and thus claim 1 is not

anticipated by Fruh. Resp. at 14; *see also id.* at 9, 11. Here again, PO's attorney argument is nothing more than an improper attempt to import language from the specification into the claims. As illustrated in the image below, the original claim language is broader than PO's asserted interpretation of the "present invention":

CLAIM 1 (ORIGINAL)	CLAIM 1 (AS IMPROPERLY CONSTRUED BY PATENT OWNER)
1. A method for creating a continuum of image data, the method comprising: ... e) generating a point cloud array for the at least one of the plurality of features; ...	1. A method for creating a continuum of image data, the method comprising: ... e) generating a point cloud array for the at least one of the plurality of features; using portions of overlapping image data captured by cameras and the tracked position of the features ...

Compare Ex. 1002 at cl. 1, *with Resp.* at 2, 5. Contrary to PO's unsupported attorney argument, Petitioner's position regarding Fruh's use of laser scans to obtain a structured point cloud for a city block is consistent with the BRI of this claim element. As properly determined by the Board when rejecting the PO's argument on this element, "a camera is merely an example of a device that is capable of capturing image data sets," and the claims are not limited to a specific example disclosed in the '396 patent. Inst. Dec. at 11-12. Petitioner maintains its positions and detailed analysis set forth in the Petition and supported by the Fuchs Declaration. Petition at 31; Ex. 1004 at 16; Ex. 1001 at ¶ 30. PO's flawed attempt to import a narrow claim interpretation here must fail.

III. The combination of Fruh and Di Bernardo renders obvious each of claims 1, 2, 5, 8, 9, 11-13, and 16 [Instituted Ground 2]

As discussed above and in the Petition, Petitioner has shown that Fruh anticipates the challenged claims under the proper interpretation of the claim language. The combination of Fruh and Di Bernardo also renders the claims obvious even under a narrower construction and as specified in some of the dependent claims.

A. Patent Owner’s mere attorney argument ignores the evidence in the record showing that the combination of Fruh and Di Bernardo teaches “generating a composite image...” as recited in claim 1.

As explained in the Petition, Fruh’s system includes a truck equipped with a camera that acquires texture data while being driven on city streets, and Di Bernardo suggests the well-known prior art option of “synthesizing images of a geographic location to generate composite images of the location.” Ex. 1004 at Abstract, 6; Ex. 1005 at 2:16-18; Petition at 28-29, 38; Ex. 1001 at ¶¶ 26, 43. Thus, the un rebutted evidence here shows that the resulting and predictable combination of Fruh and Di Bernardo provides for synthesizing images of the city streets captured by Fruh’s camera to generate composite images of the city streets for texturing the 3D city models. Ex. 1001 at ¶¶ 43, 48-49. This combination of Fruh and Di Bernardo substantially corresponds to the preferred embodiment described in the ’396 patent for generating a composite image to spray over the 3-D polygon model. Ex. 1002 at 7:1-4 (“in some preferred embodiments, image data sprayed over the three-dimensional polygon formats includes a composite image is

[sic] formed by aligning two or more of the image data sets”). PO’s unsupported attorney argument that Di Bernardo does not suggest how to make the vertical linear scans of Fruh align is incorrect. This newly presented attorney argument must fail because Di Bernardo teaches how to make the camera images of Fruh align to generate a composite image, which also provides the claimed functionality of “generating a composite image.” Ex. 1001 at ¶ 43; Ex. 1005 at 5:67-6:25, 9:34-43, FIG. 2.

B. Fruh and Di Bernardo do not “teach away” from their obvious combination, and the evidence shows a number of articulated reasons that would have prompted the predictable combination.

PO next recycles another argument from its preliminary response—that Fruh and Di Bernardo “teach away” from their obvious combination because Fruh discloses challenges associated with implementing vision-based methods and Di Bernardo discloses that its system does not require the reconstruction of 3-D scene geometry. Resp. at 19-22. As recognized by the Board (Inst. Dec. at 24-25), PO has read into Fruh and Di Bernardo a teaching away where no such language exists. *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1364 (Fed. Cir. 2006) (“We will not read into a reference a teaching away from a process where no such language exists.”). A reference teaches away from a claimed invention only 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).

PO erroneously contends that Fruh teaches against vision-based technology, but the passages on pages 5-6 of Fruh specifically refer to the challenges associated with prior art practices of generating 3D building models using purely vision-based technology. Ex. 1012 at ¶ 21; Ex. 1004 at 5-6. This limited discussion of “purely” vision-based technology for generating 3D building models is notably different than PO’s broad and unwarranted assertion that Fruh disparages implementing any vision-based technology in Fruh’s system (which already employs vision-based technology combined with laser scan data). Ex. 1012 at ¶ 21.

PO further cites to column 2:3-5 of Di Bernardo for the erroneous assumption that Di Bernardo teaches against Fruh’s system. Resp. at 10, 22. But this passage from Di Bernardo’s background section specifically refers to prior art practices (apparently considered to be “cumbersome and inefficient” *in 2000*) of generating a high quality composite image due to a high image sampling density and reconstruction of 3D scene geometry. Ex. 1012 at ¶ 17; Ex. 1005 at 2:3-5; Resp. at 22. This limited discussion (in 2000) of a narrow group of practices related to image quality of the final composite image is notably different than PO’s broad and unwarranted assertion that Di Bernardo is somehow disparaging any and all computationally intensive processes. Ex. 1012 at ¶ 17. As the Board properly

concluded, these passages of Fruh and Di Bernardo do not mean that Di Bernardo's suggestion (for generating composite images from images captured by a camera) is incapable of being implemented in Fruh's system (that employs 3D geometry) or that a POSITA *in 2008* would have avoided implementing Di Bernardo's suggestion (for generating composite images) in Fruh's system. Inst. Dec. 25; *see also* Ex. 1012 at ¶ 17 (“[A] POSITA would have recognized before February 2008 that Fruh's system was not considered ‘cumbersome or inefficient’ during that time frame and that applying Di Bernardo's then-conventional suggestion (for generating composite images) to Fruh's system (which already uses image data sets including images captured by a digital camera) was a predictable and ordinary task at that time.”). Again, PO's unsupported attorney argument is insufficient to overcome the testimony evidence in the record regarding the perspective of a POSITA *in 2008* and what would have been suggested from the teachings of Fruh in view of Di Bernardo in 2008. *See* Ex. 1001 at ¶¶ 15-16, 48-49, 69. For example, the evidence in the record shows that, by 2008, a POSITA would have recognized that Di Bernardo's conventional suggestions would have predictably improved Fruh by generating a composite image of a geographic area, recording positional data descriptive of the geographic area, and adding context/meaning for a viewer of the composite image. Ex. 1001 at ¶¶ 48-49.

Nor is there any persuasiveness to PO's mischaracterizations of Dr. Grindon's previous testimony. *See* Resp. at 20-21. Dr. Grindon's statement in his earlier testimony that Di Bernardo "seeks to minimize this computational burden" never contemplates the teachings of Fruh in view of Di Bernardo. Ex. 1012 at ¶ 17-18. Rather than speculate about Dr. Grindon's prior testimony, as PO does, Petitioner asked Dr. Grindon to clarify those statements and their context, which he did here in Exhibit 1012. For instance, Dr. Grindon stated that "my previous declaration testimony (Ex. 2002) in the *Verderi* litigation was premised on the knowledge that a person of ordinary skill in the art would have possessed in October 2000 and earlier (the alleged priority date of the patents in the same family as the Di Bernardo reference). At no point in my prior testimony did I address the primary teachings of Fruh in view of Di Bernardo, for I never performed such an analysis during my work in the earlier *Verderi* litigation. I believe that a POSITA would have understood that these particular processes that Di Bernardo previously considered 'computationally intensive' in 2000 and earlier were no longer considered computationally intensive by February 2008 due to drastic and well known improvements in computing power, networking and memory capacity that occurred over that time period. Indeed, the Fruh reference serves as one example of this fact, as its system (using camera scene images and laser scan data) was clearly conventional by 2004 and later." Ex. 1012 at ¶ 18.

As a last resort, PO presents mere attorney argument that the articulated reasons for the obviousness combination were insufficient. Resp. at 19-20 (“... is not logical ...”). First, such attorney argument cannot supplant or overcome the overwhelming weight of the testimony evidence (e.g., Ex. 1001 at ¶¶ 48-49) on this exact issue. *See BAE Systems Info. and Electronic Sys. Integration, Inc. v. Cheetah Omni, LLC*, IPR2013-00175, Pap. 45 at p. 11 (finding that Patent Owner’s unsupported “attorney argument is not persuasive,” especially in light of the unrebutted testimony from Petitioner’s expert regarding what “a person of ordinary skill in the art would understand” from the prior art at the time).

Second, PO’s attorney argument is based upon a number of legal and factual errors. 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 Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007). Instead, the relevant inquiry is whether Petitioner 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).

Both Fruh and Di Bernardo disclose similar systems for generating visualizations of geographic locations. Ex. 1004 at 5; Ex. 1005 at 1:16-18. To the

extent that Fruh does not expressly disclose “generating a composite image of the subject from portions of two or more of the multiple two-dimensional image data sets” (e.g., even under an improperly narrow claim interpretation), Di Bernardo expressly suggests generating composite images from images captured by a camera. See, e.g., Ex. 1005 at 2:15-24. The evidence in the record shows that, by 2008, a POSITA would have recognized that Di Bernardo’s suggestion would have predictably improved Fruh by generating a composite image of a geographic area, recording positional data descriptive of the geographic area, and adding context/meaning for a viewer of the composite image. Ex. 1001 at ¶¶ 48-49; Petition at 21-22. It is well settled that, if a technique has been used to improve one device (e.g., Di Bernardo discloses generating a composite image, recording positional data descriptive of the geographic area, and overlaying information on the composite image), and an ordinarily skilled artisan would recognize that it would improve similar devices in the same way (e.g., using this disclosure in Di Bernardo to improve Fruh’s system for generating textured 3D 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.

As previously addressed herein (pp. 18-19 above), all of PO’s assumptions ignore the perspective of a POSITA in 2008, but the sworn testimony of Dr. Fuchs does not. See Ex. 1001 at ¶¶ 15-16, 69. Further, Dr. Grindon confirms that PO’s

argument is mischaracterizing his earlier testimony and that Fruh and Di Bernardo do not disparage or criticize implementing vision-based technology for generating composite images in a system for 3D modeling of a geographic location. Ex. 1012 at ¶¶ 17, 21. Thus, Fruh and Di Bernardo are not “incompatible” methodologies, and in fact, the unrebutted evidence here shows the opposite—that a POSITA in 2008 would have recognized the teachings from Fruh and Di Bernardo were predictably combinable into a cohesive working system, and that the combination of Fruh and Di Bernardo would not change Fruh’s principle of operation. Ex. 1001 at ¶ 49.

IV. All of the dependent claims in this proceeding fall with claim 1.

Regarding Grounds 1-2 (anticipation and obviousness), the Patent Owner’s Response does not individually address any of the dependent claims at issue in this proceeding (claims 2, 5, 8–13, and 16), but instead merely relies upon their dependency from claim 1. *See* Resp. at 18-19 and 23-24. Therefore, the patentability of claims 2, 5, 8–13, and 16 falls with that of claim 1.

For the reasons discussed above, Petitioners request that this Board find all the challenged claims at issue in this proceeding invalid upon the instituted ground.

Respectfully submitted,

Dated: September 2, 2015
(Trial No. IPR2014-01341)

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(4) and 42.205(b), the undersigned certifies that on September 2, 2015, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response was provided via email to the Patent Owner by serving the correspondence address of record as follows:

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