

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NEARMAP US, INC.,
Petitioner,

v.

EAGLE VIEW TECHNOLOGIES, INC.,
Patent Owner

IPR2022-00734
Patent 9,135,737

SECOND DECLARATION OF DR. DAVID FORSYTH

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I, Dr. David Forsyth, declare that:

I. INTRODUCTION AND SCOPE OF WORK

1. On March 21, 2022, I provided an initial Declaration in the IPR2022-00734 proceeding. I have been asked to review and respond to the Patent Owner Response and the Declaration of Dr. Bajaj (EX2005). I have focused on portions of the Patent Owner's Response and Dr. Bajaj Declaration that raise new issues or rationales. In this Second Declaration, I provide additional analysis regarding whether the references cited in Grounds 1-2 of the Petition render obvious the claims of the '737 patent, responsive to assertions in the POR. Where the POR and Dr. Bajaj Declaration reach conclusions without contrary evidence or analysis, I adhere to the analysis in my prior testimony.

2. My analysis is directed by my education, training, and experience as a person of ordinary skill in the art as of the priority date of the '737 patent, which for purposes of my analysis here is assumed to be the effective filing date of the '737 patent—August 1, 2004.

3. My compensation in connection with this case is at my normal rate, based on my time actually spent studying the matter and preparing this Declaration. This compensation is not contingent upon my opinions or the outcome of this case.

II. SUMMARY OF OPINIONS

4. Based on my experience and expertise, which is discussed in my initial Declaration (EX1003, ¶¶1-11), and my review of Heller, Quam, Deaton, and the materials below, it is my opinion that claims 1, 6, 7, 9, 10, 16, 17, 25, 26, and 34 of the '737 patent are rendered obvious based on Grounds 1 and 2.

III. BASIS FOR OPINIONS

5. In writing this Declaration, I have considered the following: my own knowledge and experience, including my work experience in the field of computerized image analysis and three-dimensional modeling; my experience teaching; and my experience in working with others involved in those fields. In addition, I have analyzed the following publications and materials, in addition to other materials I cite in my declaration:

EX1001	U.S. Patent No. 9,135,737
EX1002	File History for U.S. Patent No. 9,135,737
EX1004	Heller et al., <i>The Site-Model Construction Component of the RADIUS Testbed System</i> , Proceedings: ARPA Image Understanding Workshop (1997) (“Heller”)
EX1005	Quam et al., <i>The Radius Common Development Environment</i> , RADIUS: Image Understanding for Imagery Intelligence, O. Firschein and T. Strat, eds. (1997) (“Quam”)
EX1006	U.S. Pub. No. 2006/0235611 (“Deaton”)

- EX1010 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00592, Paper 50 (P.T.A.B. August 25, 2017) (Final Written Decision)
- EX1011 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00592, Paper 1 (P.T.A.B. February 8, 2016) (Petition)
- EX1012 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00592, Paper 50 (P.T.A.B. August 25, 2017) (Patent Owner's Response)
- EX1013 District Court Scheduling Order
- EX1015 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00592, Paper 33 (P.T.A.B. November 23, 2016) (Decision on Patent Owner's Motion to Seal)
- EX1016 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, Nos. 2018-1053, 2018-1055, 2018-1056, 2018-1110 (Fed. Cir. 2019) (non-precedential) EX1019 to EX1029 – Exhibits 2019-2020 from IPR2016-00592
- EX1030 *Pictometry® Adopts the EagleView® Brand*, <https://www.eagleview.com/government/pictometry-adopts-eagleview-brand> (April 6, 2017)
- EX1031 *Pictometry® Roof Measurement Reports Now Available Through AccuLynx.com*, <https://www.prnewswire.com/news-releases/pictometry-roof-measurement-reports-now-available-through-acculynxcom-139984893.html> (Feb. 22, 2012)

- EX1032 *Pictometry Demonstrates Aerial Imagery Solutions at International Roofing Expo*,
<https://www.businesswire.com/news/home/20110216006158/en/Pictometry-Demonstrates-Aerial-Imagery-Solutions-at-International-Roofing-Expo> (Feb. 16, 2011)
- EX1033 *What's imagery got to do with it?*,
<https://www.professionalroofing.net/Articles/What-s-imagery-got-to-do-with-it--04-01-2012/2069> (Apr. 1, 2012)
- EX1034 *Oblique Imagery: The New Kids on the Block*,
<https://geospatial-solutions.com/oblique-imagery-the-new-kids-on-the-block/> (July 2, 2013)
- EX1035 *Merger years in the making*, Rochester Business Journal, Vol. 28 No. 44 (Jan. 11, 2013)
- EX1042 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00590, Paper 50 (P.T.A.B. August 25, 2017) (Patent Owner Response)
- EX1043 *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00590, Exhibit 2008 (Declaration of Dr. Bajaj)
- EX1046 *EagleView App for the iPhone*,
<https://www.eagleview.com/construction/press-release-eagleview-app-for-the-iphone> (June 3, 2010)
- EX1047 *EagleView Launches iPad and Tablet Mobile Apps*,
<https://www.eagleview.com/construction/eagleview-launches-ipad-and-tablet-mobile-apps> (March 13, 2012)
- EX1048 *EagleView Technologies and AccuLynx Announce Seamless Integration*,
<https://www.eagleview.com/construction/eagleview-technologies-and-acculynx-announce-seamless-integration> (February 9, 2011)

- EX1049 *EagleView Technologies Introduces Extended Coverage*,
<https://www.eagleview.com/construction/eagleview-technologies-introduces-extended-coverage> (February 21, 2012)
- EX1050 *EagleView Technologies Adds Property Data to Reports*,
<https://www.eagleview.com/construction/eagleview-technologies-adds-property-data-to-reports> (May 15, 2012)
- EX1051 *EagleView Technologies Introduces Wall Measurement Reports*,
<https://www.eagleview.com/construction/eagleview-technologies-introduces-wall-measurement-reports> (Sept. 7, 2012)
- EX1052 *EagleView Technologies Launches GutterReport*,
<https://www.eagleview.com/construction/eagleview-technologies-launches-gutterreport> (March 17, 2014)
- EX1053 *EagleView Technologies Announces QuickSquares Reports for Rapid Estimating*,
<https://www.eagleview.com/construction/eagleview-technologies-announces-quicksquares-reports-for-rapid-estimating/> (Dec. 2, 2013)

Patent Owner Response, IPR2022-00734

- EX2005 Declaration of Dr. Chandrajit L. Bajaj (redacted)
- EX2008 Declaration of Dr. Chandrajit L. Bajaj in IPR2016-00592, November 16, 2016 (redacted) (EX2008 in IPR2016-00592)
- EX2009 Curriculum Vitae of Dr. Chandrajit L. Bajaj
- EX2016 Comparison of claims 1 and 16 of the '737 Patent

(redline comparison), and comparison of claims 1 and 26 of the '737 Patent (redline comparison)

EX2017 Plaintiff's Opening Markman Brief, Eagle View Technologies Inc. et al. v. Nearmap US, Inc., No. 2:21-cv-00283-TS-DAO, ECF No. 245 (D. Utah Jan. 27, 2023) (Stewart)

EX2018 Defendant's Motion for Claim Construction, Eagle View Technologies Inc. et al. v. Nearmap US, Inc., No. 2:21-cv-00283-TS-DAO, ECF No. 244 (D. Utah Jan. 27, 2023) (Stewart)

6. Although this Declaration refers to portions of the cited references, these are examples. A POSITA would have viewed the references in their entirety, and I have done so in my analysis.

IV. INTERPRETATIONS OF THE '737 PATENT CLAIMS AT ISSUE

7. I have been informed that all claim terms should be construed according to the *Phillips* standard. *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005); 37 C.F.R. § 42.100. Besides the claim terms discussed below, in my opinion, based on the evidence presented herein and the prior art's description of the claimed elements being similar to that of the '737 patent specification, no formal claim constructions are necessary in this proceeding because "claim terms need only be construed to the extent necessary to resolve the controversy." *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011).

8. I previously identified claim constructions for two terms in my first declaration. EX1003, ¶¶18-21. I have reviewed Patent Owner’s analysis of these claim terms in the POR. As detailed in my further testimony below, the prior art of Grounds 1-2 demonstrate the challenged claims are unpatentable based on either interpretation.

**A. “generating and outputting a roof estimate report. . .”
(independent claims 1, 12, 16, and 26)**

9. Independent claims 1, 12, 16, and 26 each recite a form of the following limitation:

generating and outputting a roof estimate report using a report generation engine, wherein the roof estimate report includes numerical values for corresponding slope, area, or lengths of edges of at least some of a plurality of planar roof sections of the roof, wherein the generated roof estimate report is provided for repair and/or constructing the roof structure of the building.

19. EX1001, claim 1.

10. I have been informed by counsel that, in its Final Written Decision in a prior IPR challenge¹ to the ’737 patent by a different petitioner, the Board considered these limitations and held that the “the detailed requirements as to the

¹ *Xactware Solutions, Inc. v. Eagle View Technologies, Inc.*, IPR2016-00592, (P.T.A.B. August 25, 2017).

contents of the roof estimate report” recited in these limitations “are not entitled to patentable weight.” EX1010, 18. The Board further explained that “what the content of the information, graphical or textual, may convey to the human mind does not change the functionality of the computer-implemented method and *fails to distinguish over generating and displaying any graphical or textual information.*”² EX1010, 18. As I noted previously, this construction is reasonable and I have endeavored to apply this construction in my analysis.

11. I understand that Patent Owner identifies “features (a)-(b) of limitations [1.5], [16.3], [26.3],” and proposes “features (a)-(b)” are entitled to patentable weight. These features as identified by the POR are reproduced below:

“[(a)] generating and outputting a roof estimate report using a report generation engine, ... [(b)] wherein the generated roof estimate report is provided for repair and/or constructing the roof structure of the building”

POR, 13. I do not see anything in the POR or Dr. Bajaj’s analysis as to how they consider the language of [1.5(b)] to limit claim 1 beyond an intended use or content. And as I describe before, based on my knowledge and experience in the field and my review of Heller, Quam, and Deaton, this feature is disclosed by Grounds 1 and 2.

² Emphasis added unless noted.

12. I note that, as I discussed in my first declaration, “the combined system of Heller and Quam produces a roof estimate report,” and it does so involving software components of its RADIUS system. EX1003, ¶¶34-37; ¶¶57-62. This is significant, because regardless of the interpretation of Limitation [1.5], the combinations in Grounds 1 and 2 describe these features. In short, my original analysis addressed reasons why these features are disclosed, to the extent they are given patentable weight.

B. “transmitting roof measurement information” (claim 9)

13. Claim 9 recites “transmitting roof measurement information based at least in part on the change of the line drawing representing a feature of the roof that overlies the first aerial image of the roof.” As I noted in my previous declaration, the Board previously indicated that the “claim term at issue requires only ‘transmit[ting]’ roof measurement information—it does not specify any particular source or destination for the transmission.” EX1010, 18-20.

14. Based on my review of the ’737 patent, Patent Owner’s proposal is contrary to the ’737 patent’s description and how a POSITA would have understood this term. The ’737 patent describes transmission of “Roof Estimation System 810” content to other components of the “computing system,” including in its description at col. 16, lines 13-17. The ’737 patent indicates that “**some portion of the contents**, some of, or all of the components **of the RES 810** may be

stored on and/or transmitted over the other computer-readable media 805.”

EX1001, 16:13-17. I note that, based on my review of the ’737 patent, a POSITA would have understood from the ’737 patent’s description that the “contents” of the RES 810 includes data associated with the roof estimation system and provides “roof measurement information.” For example, the ’737 patent describes that such information is stored in the data repository of the roof estimation system. *See, e.g.*, EX1001, 16:20-23 (“data repositories, such as data repository 820, also reside in the memory 801); 16:29-36 (“roof estimation system data repository 816”); 16:37-55 (“stores those images in the RES data repository 816”); 16:56-17:2 (“stores the generated model in the RES data repository 816”); 17:3-21 (“the report generation engine 813 generates roof reports based on models stored in the RES data repository 816” and “the report generation engine 813 facilitates transmission of roof measurement information that may or may not be incorporated into a roof estimate report.”). And as noted above, the ’737 patent indicates the “contents” of the RES 810 may be “transmitted over the other computer-readable media 805.”

Id., 16:13-17. To be clear, Patent Owner has not provided any reason why the “components” recited by the ’737 patent at col. 16, lines 13-17 don’t also include roof measurement information, likewise providing an example of transmitting roof measurement information. *Id.*

15. I disagree with Patent Owner’s description of “media 805 in Figure 8” as purportedly “*within* the roof estimate report system (e.g., RES in Figure 8).” Instead, Fig. 8 of the ’737 patent illustrates “media 805” *outside* “RES 810”:

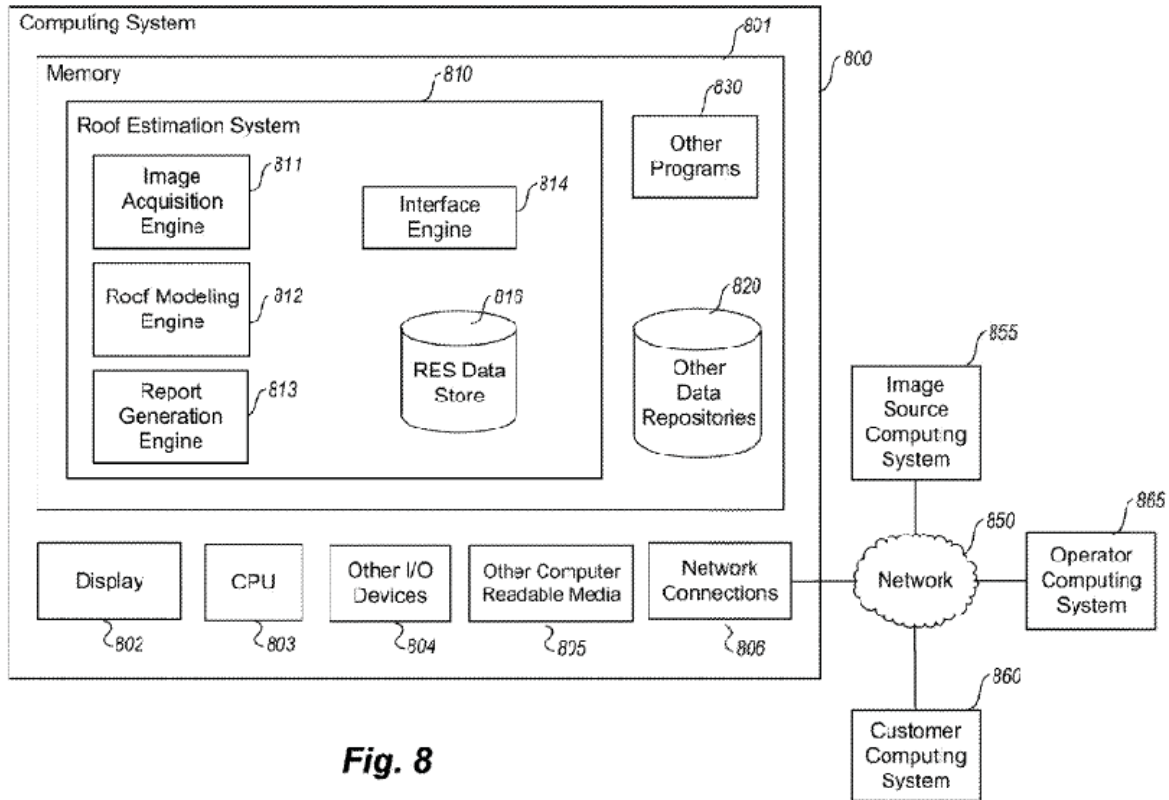


Fig. 8

EX1001, FIG. 8.

16. I additionally note that Patent Owner’s interpretation appears to limit the language of claim 9 based on description in the ’737 patent at col. 17, lines 12-20. POR, 18. Based on the language of claim 9 that does not specify any particular source or destination for the transmission, and the ’737 patent description that explicitly indicates this passage as an “example,” a POSITA would not have understood claim 9 as limited to only this specific example. EX1001,

16:13-17 (“Such roof measurement information may be provided to, for example, third party systems that generate roof estimate reports based on the provided information.”).

V. GROUND 1 – HELLER AND QUAM

17. I have been asked to evaluate the contentions of the Patent Owner Response and Dr. Bajaj regarding the Petition’s analysis of Heller and Quam. I understand that the Patent Owner Response does not dispute that Ground 1 discloses all Limitations [1.0]-[1.4] of independent claim 1. The Patent Owner Response argues that the Heller-Quam combination does not teach limitations [1.5], [16.3], and [26.3]. POR, 21. I disagree with this assertion, and note that the Patent Owner Response reaches this conclusion without addressing teachings of Heller and Quam discussed in my first declaration.

18. As discussed in my first declaration (e.g., EX1003, ¶36), “the combined system of Heller and Quam produces a roof estimate report.” The Heller-Quam combination provides generating and outputting roof data in graphical and textual form through Quam’s description of its RCDE system. EX1003, 57-62. For example, Quam disclosed manipulating and altering roof and associated environment information to be output. *See, e.g.*, NEARMAP-1 (indicating to a POSITA such information was used for “reports” of intelligence information); NEARMAP-1005, 11 (“Project-to-world”); 13-14; 15 (“cached

image”). Ultimately, Quam describes that data, including roof data, is “represented, manipulated, and displayed in the most convenient and precise form” by the system. *Id.*, ¶59; EX1005, 1. Based on my knowledge and experience in the field and my review of Heller and Quam, a POSITA would have recognized, based on the teachings of Heller and Quam, that the combined system generates and outputs a roof estimate report. I further note that this is done using a report generating engine provided by, for example, software components of the RCDE system that are involved in generating and outputting this information. Based on these teachings, Heller and Quam provide the features of Limitation [1.5] that are not based on content. EX1010, 18.

19. To be clear, the combination provides each of the features of limitation [1.5] through Heller and Quam’s teachings, regardless of which interpretation of limitation 1.5 is applied. The Petition and my first declaration provide multiple examples of roof measurement information that is generated and output by the system, and a POSITA would have recognized based on Heller and Quam’s discussion of this information and explicit modeling of roof geometry that the roof information is suitable for use in repair and/or construction. For example, information output in the Heller and Quam system provides information about the geometry of roof structures that would have informed a viewer as to parameters for estimating and implementing roof repair and construction activities. Thus, even if

the “provided for . . .” recitation was entitled to weight, this feature is provided by the Heller-Quam combination. I note that the Patent Owner Response and Dr. Bajaj do not specifically identify any particular limiting aspect of “feature (b)” that is not related to an intent or content.

VI. GROUND 2 – HELLER, QUAM, AND DEATON

20. I understand that the Patent Owner Response argues that the Heller-Quam-Deaton combination does not provide “feature (a)” of Limitation [1.5], and that a POSITA would not have been motivated to combine Deaton with Heller and Quam. As I discuss in more detail below, Patent Owner’s assertions regarding “feature (a)” do not address teachings of Deaton identified in my first declaration. As to Patent Owner’s assertion regarding the combination, based on my knowledge and experience in the field and my review of Heller, Quam, and Deaton, a POSITA plainly would have had reason to make the combination for the reasons set forth in my first declaration and would have reasonably expected success in doing so.

21. Patent Owner and Dr. Bajaj’s declaration conclude that the Petition “does not show that Deaton teaches (a) ‘generating and outputting a roof estimate report using a report generation engine,’ as recited in limitation [1.5(a)].” POR, 28. The remainder of this discussion discusses only paragraph 10 of Deaton, and does not discuss other portions of Deaton or the analysis set forth in my first declaration. *See*, POR, 28-30. For example, these paragraphs of the Patent Owner Response do

not discuss Deaton's teachings related to its reports, such as the "project report." Pet., 53; EX1006, [0107] (describing "reports", including a "project report"); EX1003, ¶¶100-103. Deaton describes a roof estimate report, through its description of reports having roof information, such as a "project report" that is generated to provide "specification details and work items for repairing or replacing the infrastructure." EX1006, [0107].

22. I note that the Patent Owner Response does not dispute that all other features of claim 1 are provided by the Heller-Quam-Deaton combination. In particular, Patent Owner does not dispute that the Heller-Quam-Deaton combination discloses Limitations [1.0]-[1.4] and "feature (b)" of Limitation [1.5].

23. As I discussed in my first declaration, a POSITA would have recognized benefits of utilizing Heller-Quam's imaging and modeling techniques in generating and outputting a roof estimate report for roof repair and construction, in accordance with Deaton. Deaton generates and outputs various roof reports, which a POSITA would have found applicable to the Heller-Quam system that models and outputs information about roofs and other structures. *See, e.g.*, EX1006, [0010]; [0107].

24. I understand that Patent Owner asserts that Deaton is "directed to collecting 'roof measurement information' based on the physical inspection of a roof on-site," and is thus "[u]nlike Heller and Quam that are directed to creating

3D models based on images.” POR, 30-31. I disagree with this conclusion because it does not respond to the actual combination of Heller, Quam, and Deaton, and appears to be based on incorporating “on-site, physical inspection of the roof” to generate reports. POR, 33; 34. For example, the Patent Owner Response remarks are directed to modification to “incorporate ‘roof inspection information’ **from the physical, on-site inspection** that is performed in Deaton”). *See, id.* (“from an on-site inspection” and “created based on the on-site physical inspection”).

25. Based on my knowledge and experience in the field and my review of Heller, Quam, and Deaton, a POSITA would have readily recognized the benefits of implementing Deaton’s suggestions related to its roof reports without necessarily incorporating an on-site physical inspection, and a POSITA would have had a reasonable expectation in doing so. This is especially the case in view of Heller-Quam’s explicit discussion and modeling of roof structures, and outputting of information about the roof structures. A POSITA would not have been limited by anything in Heller, Quam, or Deaton to using an “on-site, physical inspection of the roof” in order to generate a project report or other reports described by Deaton.

26. I note that the Patent Owner Response and Dr. Bajaj Declaration do not address the reasons why a POSITA would have recognized benefits of

generating and outputting a roof estimate report, as suggested by Deaton, in the modeling system of Heller-Quam. POR, 30-35. As I discussed previously, in the combined system, a POSITA would have looked to Deaton for its description of roof estimate reports, such as the “project report,” to the extent Heller-Quam is interpreted as not providing this feature. *Id.* A POSITA would have recognized, from the teachings of Heller-Quam and Deaton, that implementing reports in accordance with Deaton in Heller-Quam would have enhanced efficiency in providing roof reports and related information. Deaton explicitly described objectives of reducing “expensive and labor intensive operations” associated with “recording of information related to the repair and/or replacement of infrastructure at a remote location, and the subsequent generation of reports using this information.” Pet., 52; EX1003, ¶¶95-98; EX1006, [0003]-[0004] (“Roof repair and/or replacement projects are one such example of such a labor-intensive operation.”).

27. Responsive to Patent Owner’s assertions that a POSITA would not have modified Heller-Quam based on Deaton, I note that Deaton provides teachings that highlight the availability and advantages associated with different techniques for collecting roof information and creating associated graphical models. For example, Deaton describes that “a number of other devices may be

used to calculate the relative distances between points.” EX1006, [0070]. “For example, a number of ground-based, or satellite-based, position sensing devices are widely available,” and “[d]evices providing the capability of determining the spatial relationship between points, including the relative directions and distances, provide a number of advantages.” *Id.* Deaton further notes that, for example, “data collected representing these spatial relationships can assist in providing graphical models of a particular target.” *Id.* A POSITA would have further recognized the applicability of Deaton’s reports to Heller-Quam’s systems, especially in view of Deaton’s explicit suggestions.

28. Patent Owner alleges that “there is no disclosure in Deaton of creating a report based on a 3D model.” POR, 31. I disagree because a POSITA would have recognized that Deaton describes modeling of a three-dimensional roof and creating a report associated with the model. *See, e.g.*, EX1006, [0070] (“graphical models of a particular target”). Even if Patent Owner’s assertions were true, however, a POSITA would have recognized the predictable benefit of combining Heller-Quam with Deaton, and would have reasonably expected success in view of the roof information that is already generated and output in Heller-Quam’s system. Generating and outputting a “project report” or other reports related to the infrastructure, using the imaging and modeling system described by Heller-Quam, without the need for an “on-site, physical inspection,” would have enhanced the

functionality of the Heller-Quam system by generating and reporting additional information in an efficient manner.

VII. SECONDARY CONSIDERATIONS OF NON-OBVIOUSNESS

29. I understand that Patent Owner argues that “the commercial success of and industry praise for these products confirmed that the challenged claims are nonobvious. While some information in the Patent Owner Response is redacted and sealed, I have reviewed the public portions.

30. As an initial matter, I note that Patent Owner has previously identified features of Render House and Twister that are critical to the performance and utility of these systems but that are not recited in the ’737 patent claims. For example, I understand that Patent Owner has indicated that Render House and Twister include features related to identifying a building location and determining, manipulating, and outputting pitch values for individual roof portions. Patent Owner previously identified such features in proceedings involving other patents, including that Render House/Twister “allow a user to *input a location corresponding to the location of a building* . . . as claimed in dependent claim 10 of the ’770 patent,” “*perform pitch determination* of the roof based on at least one location over the roof structure to which the user moved the visual marker as claimed in dependent claim 11 of the ’770 patent,” and “receive an indication of a selection of a location on the roof structure indicated by detecting movement of a

visual marker in the graphical user interface,” as claimed in claim 19 of the ’770 patent. EX1042, 59-61. Based on my knowledge and experience in the field and my review of the references cited herein, pitch determination and output is critical to the performance of the system and to generated reports. Pitch is a significant factor in characterizing the geometry of a roof, affecting the overall area and how various portions of the roof relate to one another. Relatedly, pitch affects the repair/construction costs, material costs, etc. In other words, without pitch determination the system and associated reports are unlikely to be perceived as suitable for preparing roof estimate reports and associated information.

31. The Patent Owner Response indicates that “a feature of the patented invention is the increased accuracy of roof measurements by modifying and displaying line drawings overlaid over aerial images of the roof.” POR, 62. I disagree with this statement because none of the claims of the ’737 patent recite “accuracy” or dictate an “increased accuracy.” The POR mentions “modifying and displaying line drawings overlaid over aerial images of the roof,” but modifying the line drawings does not dictate “increased accuracy.” Instead, user modification could result in reduced accuracy, especially due to the introduction of human-based error. Nothing in Limitation [1.3], for example, explains what is changed—the claim simply recites “changing”: “ in response to user input, *changing*, by the

at least one processor of the roof estimate report system, the line drawing representing a feature of the roof that overlies the first aerial image of the roof.

32. Moreover, that Patent Owner Response never explains what the purported “increase” is relative to. There is no dispute that prior art systems likewise provided “modifying and displaying line drawings overlaid over aerial images of the roof.” Indeed, Patent Owner does not dispute that Heller and Quam disclose these features. The Heller-Quam system discloses “modifying and displaying line drawings overlaid over aerial images of the roof,” as set forth in the analysis of Limitation [1.3], for example. The Patent Owner Response does not even allege that Heller-Quam does not disclose Limitation [1.3]. There is no dispute this feature was known and used in the prior art and is not unique. I additionally note that alternative aerial roof measuring services were available at the time. EX1019, 2. The Patent Owner Response and Dr. Bajaj do not assert that these alternative services were based on software that lacked the manual adjustment features recited in the ’737 patent claims.

33. The Patent Owner Response alleges that “Patent Owner pioneered a novel process whereby a user can generate roof estimate reports from complex 3D models based on analysis of particular types of high-resolution aerial photographs and new photogrammetry techniques.” I note that these features are likewise not recited by the claims of the ’737 patent. The ’737 claims do not recite “complex

3D models” or analysis of “high-resolution aerial photographs.” No particular resolution is required.

34. Based on my knowledge and experience in the field and my review of the references cited herein, improved accuracy can be associated with higher-resolution aerial photography (e.g., as compared to lower resolution satellite imagery). The accuracy of the resulting report is dependent on the resolution and accuracy of the imagery used. For example, accuracy of a measurement is dependent on the dimensional relationship with a pixel of the image.

35. This is confirmed by various references in this proceeding. For example, Exhibit 1019 is an article from “Roofing Florida” that discusses the significance of image resolution on measurement accuracy: “When selecting a aerial roof measuring service, it is important to research the *quality of the photographs* that the report will be based upon. Because of Federal restrictions, satellite imagery is limited to 18 inches per pixel while aerial photography is not. The result is that reports based on aerial photography have traditionally provided six times the resolution allowed by satellite.” EX1019, 2. “With new cameras capturing images at one inch per pixel from airplanes, the difference in quality between commercially available satellite images is even more pronounced in favor of plane based images.” *Id.* Notable, Exhibit 1019 explains that “[t]he more accurate the images, the more accurate the measurement report based on those

images will be. *This will make a difference* when it comes time to estimate materials and provide *accurate quotes that you can stand behind* with confidence.” *Id.* Image quality directly impacts the accuracy of measurements, which is limited by the ratio between length of the roof and each image pixel. A report cannot be more accurate than the resolution of the underlying image. Image resolution is not recited in the ’737 claims, but has a critical impact on accuracy of measurements based on the image.

VIII. CLAIMS 16 AND 26 ARE RENDERED OBVIOUS BY GROUNDS 1 AND 2

A. Limitation [16.0]

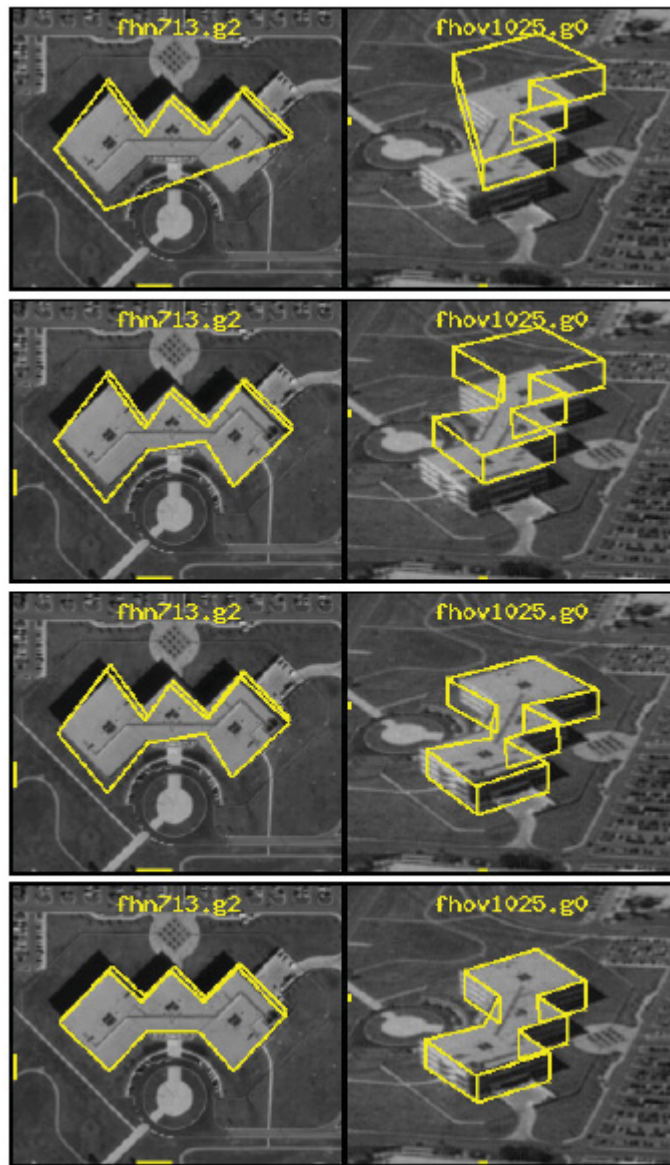
36. Patent Owner alleges that “Petitioner’s analysis of limitation [1.0] does not show that Heller or Quam discloses a non-transitory computer-readable storage medium that stores computer executable instructions, which cause at least one processor of a computing system to generate a roof estimate report for a building having a roof, as required by limitation [16.0].” As an initial matter, I note that this language is in the preamble of the claim, and recites computing system components that “generate a roof estimate report for a building have a roof.” The generic computing features recited in the preamble are plainly present in the cited references. *See, Pet.*, 12-16; 19-22. For example, Heller-Quam’s system includes software that provides computer executable instructions that are stored in a non-transitory computer-readable storage medium so that the software

can be executed by a processor of the computing system to carry out the operations described by Heller-Quam. A POSITA would have recognized these features from Quam's explicit description. The RADIUS platform is implemented as "over 200,000 lines of Lisp/CLOS and 6,000 lines of C," "runs on both SunMicrosystems and Silicon Graphics RISC-based workstations, under the UNIX operating system." EX1005, 2. A POSITA would have further recognized the common commuting component arrangement based on Quam's description of examples of "memory," highlighting that it is a software-based system. The software is stored in a non-transitory storage medium in order to effectuate its purpose and carry out its functions, as described in the analysis of claim 16.

B. Limitation [16.1]

37. I understand that Patent Owner alleges that the "wireframe in the 'Second aerial image' does not intersect the roof and therefore cannot be a corresponding location of the roof feature." POR, 72. I disagree with this assertion because it appears inconsistent with Heller and Quam and how a POSITA would have understood the language of claim 16. Heller describes that features of the line drawing are "placed at the approximate position and orientation of the image feature to be modeled." EX1004, 3. Based on my knowledge and experience in the field and my review of Heller and Quam, a POSITA would have understood from Heller's description that the line drawings are overlaid on

corresponding locations of a roof feature consistent with the plain language of Limitation [16.1]. The images including line drawings shown in Heller further confirm the POSITA's understanding.



Pet., 26 (EX1004, FIG. 5 (partial)). As one example, the “W” shape of the yellow line drawings is overlaid on corresponding locations of the roof feature of the roof

in both the first and second images. I note that the plain language of Limitation [16.1] does not recite the term “intersect,” and I do not see any explanation in the Patent Owner Response that supports narrowing the claim in the manner Patent Owner proposes. Regardless, a POSITA would have plainly understood Heller/Quam to disclose “overlaying a line drawing on corresponding locations of a roof feature of the roof on first and second aerial images of the roof based on Heller’s FIG. 5. I note that the line drawing is shifted between the sets of views shown in respect views, and includes features plainly aligned with the roof image, particularly in the bottom two rows of FIG. 5.

C. Limitation [26.0]

38. Patent Owner alleges that “Petitioner’s analysis of limitation [1.0] does not show that the Heller-Quam combination teaches “a roof estimate report system” and a “computer system,” as recited in limitation [26.0]. POR, 76. As an initial matter, I note that this language is in the preamble of the claim. The full preamble recites “A computer-implemented method in a roof estimate report system including a computer system and a memory coupled to the computer system, the method comprising.” A POSITA would have recognized the claim 26 is thus directed to a computer-implemented method” and the preamble recites a roof estimate report system having computing components including a computer system and a memory coupled to the computer system. Such computing

components would not have been considered significant to the meaning of the claim, and are plainly present in the Heller-Quam system.

39. I note that the preamble of Claim 26 is similar to the preamble of Claim 1, which Patent Owner does not dispute that Heller and Quam discloses. Claim 26 merely recites “a computer system” and a memory coupled to the “computer system” versus the recitation of Claim 1 of a “processor” and a memory coupled to the “processor.” A POSITA would have plainly recognized that components of the “workstations” provide a computer system as claims, such as the workstation processor and associated components, which is in turn coupled to memory associated with the system that stores software components. The overall system including these components, software, associated I/O components, etc., provide an example of the roof estimate report system, as claimed.

40. Patent Owner’s assertions are based on an incorrect and artificially rigid interpretation of the Petition that Quam’s workstations “correspond” to both the claimed “computer system and a memory coupled to the computer system” and “roof estimate report system.”

D. Limitation [26.2]

41. I understand that Patent Owner argues that “Petitioner’s analysis of limitation [1.4] does not show where Heller teaches “changing...a line in a second line drawing that corresponds to the same feature in the first line drawing that was

changed,” as recited in limitation [26.2].” POR, 77. Patent Owner’s assertion does not address Heller’s description that “[a]fter the primitive is added to the scene, the user grabs an upper corner of the object” (i.e., user input) “and adjusts the pose and size of the box to match the building being modeled,” for example. Pet., 27-33.

As I discussed previously, this process is illustrated in FIG. 4 of Heller. EX1003, ¶53-54 (referring to analysis of Limitation [1.3]). The line that is changed in the second line drawing corresponds to the same feature in the other line drawing that was changed. *Id.*

IX. CLAIMS 9 AND 10 ARE RENDERED OBVIOUS BY GROUNDS 1 AND 2

A. Claim 9

42. I understand that Patent Owner argues that “Petitioner does not allege that Heller or Quam teaches transmitting roof measurement information outside of Heller’s RADIUS Testbed System as implemented on Quam’s RCDE.” POR, 84. Patent Owner’s argument is based on an improperly narrow interpretation of claim 9 that contradicts the ’737 patent and how a POSITA would have understood claim 9. As I discussed above, the transmitting language “requires only ‘transmit[ting]’ roof measurement information—it does not specify any particular source or destination for the transmission.” *Supra*, Interpretation of Claim 9.

43. I additionally note that the Patent Owner Response relies on an interpretation that limits roof measurement information based on language recited

at col. 2, lines 55-58 of the '737 patent. POR, 85 (“lengths of the edges of sections of the roof, pitches of sections of the roof, areas of sections of the roof, etc.”). This list of measurements is prefaced with “may include” and followed by “etc.” *Id.* A POSITA would not have understood this list to be exhaustive or the only type of information that can provide roof measurement information.

44. To be clear, even if the roof measurement information recited in claim 9 was limited in the manner proposed by Patent Owner, this feature is disclosed by Grounds 1 and 2. Heller explicitly indicates that the “slope of the roof can be adjusted.” EX1005, 3. Slope is an example of roof measurement information that provides the pitch of a section of the roof.

45. I note that the analysis in the Patent Owner Response attempts to narrow claim 9 in an additional manner to require “linking precise measurements to its 3D models.”³ POR, 86-87 (“explicit link”); (“**specific** measurement information”). The actual language of claim 9 recites “the change of the line drawing representing a feature of the roof that overlies the first aerial image of the roof.” As I noted previously, Heller-Quam plainly disclose this feature. In the

³ EagleView’s assertions ring hollow in view of its terse assumption that Render House/Twister embody claim 9, with no explanation of the features that EagleView alleges to be missing from Grounds 1 and 2. *Supra*, V.D.

Heller-Quam system, the line drawings are used to model the roof structure of a building. Accordingly, a change in the size of the line drawing represents a change in the measurements of the roof represented by the model. Moreover, this change is relative to a “Map Grid,” which further allows determination of dimensions and areas of the modeled structure, similar to placing a ruler next to an object.

EX1005, 8. I additionally note that Heller and Quam provide specific description that a POSITA would have recognized as demonstrating the system includes a dimensional relationship between the model and real-world images. For example, Heller’s description of “[u]sing the MBO system on structures,” including that the “system can be used to both automatically triangulate the elevation of the structure and then refine its shape to the features in the image,” would have been recognized by a POSITA as indicating that the height of the structure is determined. EX1004, 5. Heller also describes “[w]e have also implemented a metric to estimate the precision of an extracted road by comparing the centerline of the extracted road to the ground truth centerline. For each vertex of the extracted road, the distance to the nearest centerline point of the ground truth centerline is computed,” highlighting that the system includes dimensional relationship information that can be used to determine measurements. EX1004, 8. Relatedly, Quam describes use of a calibrated camera, which a POSITA would have recognized as necessary for determining measurement information. EX1005, 3 (“For an image taken on film

with a photogrammetrically calibrated camera, film plane measurements in microns are the natural units . . .”).

B. Claim 10

46. I understand that Patent Owner argues that the Heller-Quam system does not provide the recitation in claim 10 of “registering, based on the received indication of the point, the aerial image to a reference grid corresponding to a three-dimensional model of the roof.” POR, 88-90. Patent Owner argues that the “world coordinate system” of Quam is not a “reference grid corresponding to a three-dimensional model of the roof” because it “is not shown to correspond to a 3D model of the roof.” POR, 88-89. I disagree with Patent Owner’s assertion. Quam provides for “[r]egistration of multiple data sources, including stereographic or multiple **images**, terrain elevation models, **and 3-D object models, to the same world coordinate system.**” quoting EX1005, 5. Based on my knowledge and experience in the field and my review of Heller and Quam, a POSITA would have understood, based on Quam’s description, that the ‘world coordinate system’ provides a ‘reference grid’ relative to the roof structure. EX1005, 1, 5, 8, FIG. 4. I note that the analysis of claim 10 in the Patent Owner Response does not mention this description of Quam.

X. LEGAL PRINCIPLES

A. Anticipation

47. I have been informed that a patent claim is invalid as anticipated under 35 U.S.C. § 102 if each and every element of a claim, as properly construed, is found either explicitly or inherently in a single prior art reference. Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes the claimed limitations, it anticipates. I have been informed that a claim is invalid under 35 U.S.C. § 102(a) if the claimed invention was known or used by others in the U.S., or was patented or published anywhere, before the applicant's invention. I further have been informed that a claim is invalid under 35 U.S.C. § 102(b) if the invention was patented or published anywhere, or was in public use, on sale, or offered for sale in this country, more than one year prior to the earliest effective filing date of the patent application (*i.e.*, the Critical Date). And a claim is invalid, as I have been informed, under 35 U.S.C. § 102(e), if an invention described by that claim was described in a U.S. patent granted on an application for a patent by another that was filed in the U.S. before the date of invention for such a claim.

B. Obviousness

48. I have been informed that a patent claim is invalid as "obvious" under 35 U.S.C. § 103 in light of one or more prior art references if it would have been

obvious to a POSITA, taking into account (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any so called “secondary considerations” of non-obviousness, which include: (i) “long felt need” for the claimed invention, (ii) commercial success attributable to the claimed invention, (iii) unexpected results of the claimed invention, and (iv) “copying” of the claimed invention by others. For purposes of my analysis above and because I know of no indication from the patent owner or others to the contrary, I have applied the Critical Date as the date of invention in my obviousness analyses, although in many cases the same analysis would hold true even at an earlier time than the Critical Date.

49. I have been informed that a claim can be obvious in light of a single prior art reference or multiple prior art references. To be obvious in light of a single prior art reference or multiple prior art references, there must be a reason to modify the single prior art reference, or combine two or more references, in order to achieve the claimed invention. This reason may come from a teaching, suggestion, or motivation to combine, or may come from the reference or references themselves, the knowledge or “common sense” of one skilled in the art, or from the nature of the problem to be solved, and may be explicit or implicit from the prior art as a whole. I have been informed that the combination of familiar elements according to known methods is likely to be obvious when it does no more

than yield predictable results. I also understand it is improper to rely on hindsight in making the obviousness determination.

XI. CONCLUSION

50. I currently hold the opinions expressed in this declaration. However, my analysis may continue after the signing of this declaration. If and as my analysis continues, I may acquire additional information and/or obtain supplemental insights that result in added observations. Therefore, I reserve the right to supplement this declaration with additional opinions or to expound on the opinions that are already included here.

51. I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true. I further declare that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date:

16 MAY 2023

Respectfully submitted,

Dr. David Forsyth