

***Nearmap US, Inc.
v.
Eagle View Technologies, Inc.
Inter Partes Review of
U.S. Patent No. 9,135,737***

Petitioner's Demonstratives

Case No. IPR2022-00734

Oral Hearing Date: August 8, 2023

Before Hon. Thomas L. Giannetti , Garth D. Baer, and Russell L. Cass



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

NEARMAP-1055
Nearmap US, Inc. v. Eagle View Technologies Inc.
IPR2022-00734

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Issue 1

Patent Owner's Claim Construction Analysis of
Element [1.5] Is Incorrect

Patent Owner's Claim Construction Analysis of Limitation [1.5] Is Incorrect

Limitation [1.5]

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.

FWD in Xactware IPR (NEARMAP-1010)

presented with no such relationship. The roof report is merely a printed description of the method's output and it adds no functional or structural elements to the paper or computer screen on which the report appears. We

non-functional descriptive material). In other words, 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.

Pet, 6-7; NEARMAP-1010, 17-18

Patent Owner's Claim Construction Analysis of Limitation [1.5] Is Incorrect

Reply

weight.” POR, 11. Instead, the Petition indicated that the Board’s prior construction is applied, and mapped the prior art to recitations of Limitation [1.5] not directed to content, rendering EagleView’s assertions moot. *See, infra*, III.A; Pet. 21 (explaining Heller/Quam “produces a roof estimate report.”), 33-35; 53-54 (analysis of [1.5]); NEARMAP-1041, ¶¶7-12.

Reply, 2

Dr. Forsyth Deposition Testimony (EX2006)

THE WITNESS: I believe it's a logical possibility that the board may feel they misdirected themselves or that the patent owner may make a compelling argument that these -- that I hadn't anticipated that these are entitled to patentable weight. And in that circumstance, I want to be clear that there is, in fact, prior art as well.

Reply, 2; EX2006, 79:12-23

Q. So are you relying on Deaton only if any portion of Limitation 1.5 is given patentable weight?

MR. SMITH: Objection. Form.

THE WITNESS: I think that may be a legal rather than a technical question. The -- if no aspect of 1.5 is given patentable weight, it's hard to see why one would bother with Deaton. But if some aspect is given patentable weight, then Deaton renders it's obvious.

Reply, 2; EX2006, 139:7-15

Issue 2

Issue 2: Patent Owner's Claim Construction of Claim 9 Is Unsupported by the '734 Patent

Patent Owner's Claim Construction of Claim 9 Is Unsupported by the '737 Patent

Claim 9

9. The method of claim 1 further comprising:
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.

FWD in Xactware IPR (NEARMAP-1010)

Pet. 46; Reply 16–17. The claim term at issue requires only “transmit[ing]” roof measurement information—it **does not specify any particular source or destination for the transmission**. The '737 patent's specification references transmission within the same system. *See* Reply 16 (citing Ex. 1001, 16:15–17, Fig. 8). Thus, it is of no moment that Avrahami does not disclose

Pet, 11-12; NEARMAP-1010, 18-20

Dr. Forsyth (NEARMAP-1003)

media 805”); *see* NEARMAP-1010, 20. Accordingly, interpreting this claim term to **encompass transmission of roof measurement information between components of the same computer system** is proper because 1) it is consistent with the plain and ordinary meaning the term would have had to a POSITA; 2) it is consistent with the '737 patent's specification; and 3) it is consistent with the Board's prior finding with respect to this term. *See, e.g.*, NEARMAP-1010, 18-20; NEARMAP-1001, 16:15–17, FIG. 8.

Pet, 11-12; NEARMAP-1003, ¶21

Patent Owner's Claim Construction of Claim 9 Is Unsupported by the '734 Patent

Patent Owner: "a POSITA would construe claim 9 as transmitting the roof measurement information outside the roof estimate report system (e.g., RES in Figure 8), such as to 'third-party systems that generate roof estimate reports based on the provided information.' EX1001, 17:12-20." POR, 18.

'737 Patent

sections of the roof, areas of sections of the roof, etc. In some embodiments, the report generation engine 813 facilitates transmission of roof measurement information that may or may not be incorporated into a roof estimate report. For example, the roof generation engine 813 may transmit roof measurement information based on, or derived from, models stored in the RES data repository 816. Such roof measurement information may be provided to, for example, third-party systems that generate roof estimate reports based on the provided information.

NEARMAP-1001, 17:12-20

810 is shown residing in memory 801. In other embodiments, 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. The compo-

NEARMAP-1001, 16:13-17

Dr. Forsyth's Second Declaration

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.").

NEARMAP-1041, ¶16; Reply, 4

Patent Owner's Claim Construction of Claim 9 Is Unsupported by the '734 Patent

Patent Owner: "There is no correspondence between 'contents' and 'roof measurement information' as Petitioner incorrectly alleges." Sur-Reply, 6.

Dr. Forsyth's Second Declaration

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

'737 Patent

NEARMAP-1041, ¶14; Reply, 11-12

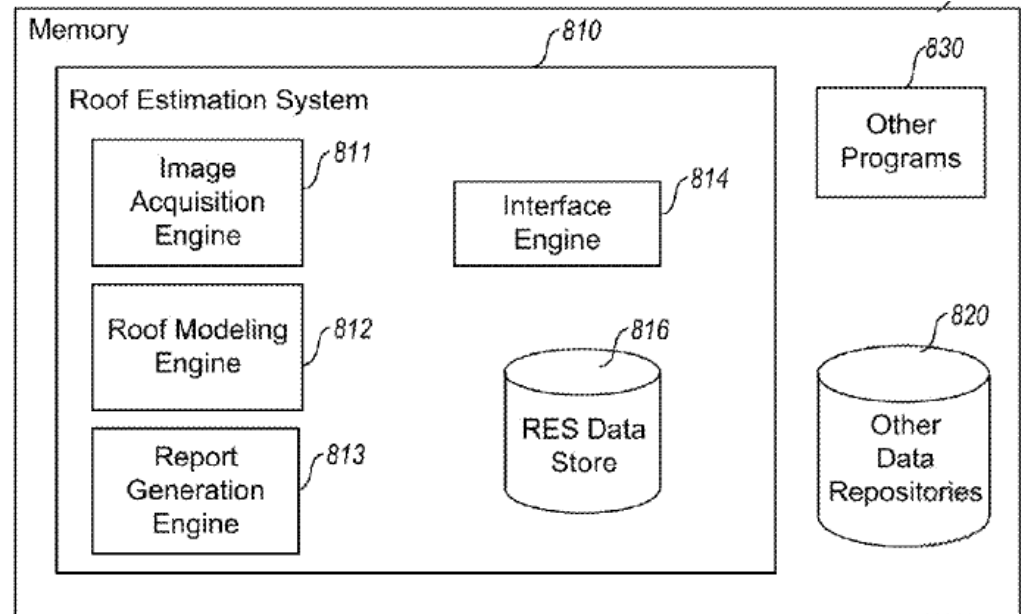
In a typical embodiment, the RES 810 includes an image acquisition engine 811, a roof modeling engine 812, a report generation engine 813, an interface engine 814, and a roof estimation system data repository 816. Other and/or different

Reply, 4; NEARMAP-1001, 16:29-36

The report generation engine 813 performs at least some of the functions of the report generation engine 103 described with reference to FIG. 1. In particular, the report generation engine 813 generates roof reports based on models stored in the RES data repository 816. Generating a roof report may

Reply, 4; NEARMAP-1001, 17:3-21

'737 Patent – FIG. 8 (partial)



Issue 3

Heller-Quam Discloses Limitation [1.5]

Heller-Quam discloses “generating and outputting a roof estimate report using a report generation engine” and “wherein the generated roof estimate report is provided for repair and/or constructing the roof structure of the building” (Limitation [1.5])

POR

However, Petitioner’s analysis of limitation [1.5] does not even attempt to address feature (a) or feature (b) of limitation [1.5], much less show how Heller or Quam allegedly teach these features (a)-(b). Petitioner addresses limitation [1.5]

POR, 26

Dr. Forsyth’s First Declaration

36. As described in greater detail below (*see* [1.5], *infra*), the combined system of Heller and Quam produces a roof estimate report.

Pet. 21; NEARMAP-1003, 36

1; NEARMAP-1004, 1. The RCDE “provides a system to carry out interactive cartographic modeling of three-dimensional scenes from multiple images, as well as to provide an infrastructure to support the research in, and implementation of, image-understanding-based algorithms for this and other tasks.” NEARMAP-1005, 1.

Pet. 15; NEARMAP-1003, 27

Quam (NEARMAP-1005)

self. These entities are tied together through a flexible and efficient network of coordinate transformations. This allows each type of data to be represented, manipulated, and displayed in the most convenient and precise form, without sacrificing func-

Contour Map This object displays a set of contours of constant elevation computed from a digital terrain model. The elevation spacing can be set to any convenient quantity.

Map Grid This object displays lines of constant latitude and longitude or UTM coordinates.

Text displays a string of text at a 3-D location in a site.

section. This functionality can be exercised by using the mouse to click on an image being displayed by the RCDE. In response, the RCDE displays both the image coordinates and apparent 3-D coordinates of the selected point.

Pet. 34-35; NEARMAP-1005, 1, 8, 11

Heller-Quam discloses “generating and outputting a roof estimate report using a report generation engine” and “wherein the generated roof estimate report is provided for repair and/or constructing the roof structure of the building” (Limitation [1.5])

POR

Neither Heller nor Quam discloses “generating and outputting a roof estimate report using a report generation engine.” First, there is no teaching in Heller or Quam that corresponds to “generating and outputting a roof estimate report” at all. Heller and Quam each fail to disclose the feature of a “roof estimate report,” let alone generating and outputting such a report using a report generation engine. EX2032, ¶89. Second, there is no disclosure whatsoever in either Heller or Quam of such a generated roof estimate report being “provided for repair and/or constructing the roof structure of the building.” On the contrary, Heller and Quam

POR, 27

FWD in '592 proceeding (EX1010)

non-functional descriptive material). In other words, 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.

Pet, 6-7; NEARMAP-1010, 17-18

Heller-Quam discloses “generating and outputting a roof estimate report using a report generation engine” and “wherein the generated roof estimate report is provided for repair and/or constructing the roof structure of the building” (Limitation [1.5])

Dr. Forsyth’s Second Declaration (NEARMAP-1041)

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

Reply, 6; NEARMAP-1041, ¶18

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

Reply, 7; NEARMAP-1041, ¶19

Heller-Quam discloses Limitation [1.5]

Patent Owner: *“... Petitioner newly argues in the Reply that ‘Heller/Quam discloses generating and outputting particular roof data in graphical and textual form through Quam’s description of its RCDE system,’ and never made any arguments, nor cited to any teachings in Heller or Quam, about ‘generating and outputting particular roof data.’” Sur-Reply at 9*

Dr. Forsyth’s First Declaration

1; NEARMAP-1004, 1. The RCDE “provides a system to carry out interactive cartographic modeling of three-dimensional scenes from multiple images, as well as to provide an infrastructure to support the research in, and implementation of, image-understanding-based algorithms for this and other tasks.” NEARMAP-1005, 1.

Pet. 15; NEARMAP-1003, ¶27

Quam (NEARMAP-1005)

self. These entities are tied together through a flexible and efficient network of coordinate transformations. This allows each type of data to be represented, manipulated, and displayed in the most convenient and precise form, without sacrificing func-

Contour Map This object displays a set of contours of constant elevation computed from a digital terrain model. The elevation spacing can be set to any convenient quantity.

Map Grid This object displays lines of constant latitude and longitude or UTM coordinates.

Text displays a string of text at a 3-D location in a site.

section. This functionality can be exercised by using the mouse to click on an image being displayed by the RCDE. In response, the RCDE displays both the image coordinates and apparent 3-D coordinates of the selected point.

Pet. 34-35; NEARMAP-1005, 1, 8, 11

Heller-Quam discloses Limitation [1.5]

Patent Owner: *“Petitioner relies on portions of Heller (**EX1004, 1**) and Quam (**EX1005, 11**) not cited in its analysis of limitation [1.5] to newly allege that Quam “articulates...the presentation of roof data generated and outputted from manipulating and altering roof and associated environment information.” Reply, 6.” Sur-Reply at 9*

Petition

Quam also teaches that “functionality can be exercised by using the mouse to click on an image being displayed by the RCDE,” which, in response, “*displays both the image coordinates and apparent 3-D coordinates of the selected point.*” NEARMAP-1005, 11.

Pet. 34, Analysis of [1.5]

Quam further describes a “ContourMap” object that “displays a set of contours of constant elevation computed from a digital terrain model,” a “Map Grid” object that “displays lines of constant latitude and longitude or UTM coordinates,” and a “Text” object that “displays a string of text at a 3-D location in a site.” *Id.*, 8.

Pet. 34-35, Analysis of [1.5]

Quam describes the “RADIUS Common Development Environment (RCDE),” a portion of the RADIUS platform that “provides the foundation for the RADIUS Testbed System” or “RTS” described in Heller. *See* NEARMAP-1005, 1; NEARMAP-1004, 1. The RCDE “provides a system to carry out interactive

Pet. 15

3. The combination of Heller and Quam

As previously discussed, Heller describes using the “RADIUS Testbed System” (RTS) to create three-dimensional models of buildings and other structures through the analysis of one or more images of the structures. NEARMAP-1004, 1. As also previously discussed, Quam describes the “RADIUS

Pet. 16

Heller-Quam discloses Limitation [1.5]

Patent Owner: *“Petitioner’s analysis of limitation [1.5] in Ground 1 never addresses how Heller or Quam allegedly “produces a roof estimate report.” Sur-Reply at 8*

Dr. Forsyth’s First Declaration

1; NEARMAP-1004, 1. The RCDE “provides a system to carry out interactive cartographic modeling of three-dimensional scenes from multiple images, as well as to provide an infrastructure to support the research in, and implementation of, image-understanding-based algorithms for this and other tasks.” NEARMAP-1005, 1.

Pet. 15; NEARMAP-1003, ¶27

Petition

Quam also teaches that “functionality can be exercised by using the mouse to click on an image being displayed by the RCDE,” which, in response, “displays both the image coordinates and apparent 3-D coordinates of the selected point.” NEARMAP-1005, 11.

Quam further describes a “ContourMap” object that “displays a set of contours of constant elevation computed from a digital terrain model,” a “Map Grid” object that “displays lines of constant latitude and longitude or UTM coordinates,” and a “Text” object that “displays a string of text at a 3-D location in a site.” *Id.*, 8.

Pet. 34-35

Dr. Forsyth’s Second Declaration

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

Reply, 6; NEARMAP-1041, ¶18

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

Reply, 7; NEARMAP-1041, ¶19

Issue 4A

Heller-Quam-Deaton Discloses Limitation
[1.5(a)]

Heller-Quam-Deaton discloses “generating and outputting a roof estimate report using a report generation engine” (Limitation [1.5 (a)])

Petition

2. The combination of Heller, Quam, and Deaton

In the combination, the combined system of Heller and Quam is modified to produce a roof estimate report, as taught by Deaton, based on the site models described in Heller and Quam. NEARMAP-1003, [94].

Dr. Forsyth’s First Declaration

101. In the combination, Deaton describes “a roof inspection system” that generates and outputs various reports. NEARMAP-1006, [0010]. For example, Deaton describes a “project report” that “provides specification details and work items for repairing or replacing the infrastructure” (the roof) “in accordance with the conditions identified.” *Id.*, [0107]. The project report can include numerical values for “lengths (e.g. linear feet of metal flashing)” and “areas (e.g. square footage of roofing membrane)” associated with the roof. *Id.*

Pet. 53; NEARMAP-1003, ¶101

Deaton (NEARMAP-1006)

[0107] A project report provides specification details and work items for repairing or replacing the infrastructure in accordance with the conditions identified in the assessment report. The project report links the inspection data to either

a quantity to that product. Quantities could, for example, include counts (e.g. a number of roof drain covers), lengths (e.g. linear feet of metal flashing) or areas (e.g. square footage of roofing membrane). In one embodiment, each

Pet. 53; NEARMAP-1006, ¶107

Heller-Quam-Deaton discloses “generating and outputting a roof estimate report using a report generation engine” (Limitation [1.5(a)])

POR

Citing only paragraph 10 of Deaton, Petitioner argues that “[i]n the combination, Deaton describes ‘a roof inspection system’ that generates and outputs various reports.” Petition, 53 (citing EX1006, ¶10). There is no discussion

POR, 29

Patent Owner Sur-Reply

Relying on Deaton’s paragraph 10, Petitioner alleges that “Deaton describes ‘a roof inspection system’ that generates and outputs various reports.” Petition, 53

Sur-Reply, 11

Deaton’s “project report” cannot correspond to the claimed “roof estimate report” because Deaton does not teach that the “project report” (or any report for that matter) is “generat[ed] and output[]...using a report generation engine,” as recited in limitation [1.5(a)]. POR, 29-30 (citing EX2032, ¶¶153-156). Petitioner does not attribute any teaching of Deaton to a “report generation engine.” Petition, 53; POR,

Sur-Reply, 11

Petition

Deaton describes a “project report” that “provides specification details and work items for repairing or replacing the infrastructure” (the roof) “in accordance with the conditions identified.” *Id.*, [0107]. The project report can include numerical

Pet., 53

Dr. Forsyth’s Second Declaration

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.

Reply, 10; NEARMAP-1041, ¶25

Issue 4B

A POSITA would have been motivated to apply Deaton's teachings of reports, including a project report, to Heller-Quam

A POSITA would have been motivated to apply Deaton's teachings of reports, including a project report, to Heller-Quam

Dr. Forsyth's First Declaration

93. Deaton describes "a roof inspection system" that generates and outputs various reports. NEARMAP-1006, [0010]. For example, Deaton describes a "project report" that "provides specification details and work items for repairing or replacing the infrastructure" (the roof) "in accordance with the conditions identified." *Id.*, [0107]. The project report can include numerical

NEARMAP-1003, ¶ 93; Pet., 50

2. The combination of Heller, Quam, and Deaton

94. In the combination, the combined system of Heller and Quam is modified to produce a roof estimate report, as taught by Deaton, based on the site models described in Heller and Quam.

NEARMAP-1003, ¶ 94; Pet., 50

95. A POSITA would have been motivated and found it obvious to modify the combined system of Heller and Quam to produce the roof estimate report described in Deaton. As described in the Deaton, the "project report...provides specification details and work items for repairing or replacing the infrastructure" (the roof) "in accordance with the conditions identified," and including the production of such a report in the system resulting from the combination of Heller and Quam would advantageously enable the site models described in Heller and Quam to be utilized to plan and execute maintenance, repair, and new construction projects, thereby increasing the utility of the combined system. NEARMAP-1006, [0107].

NEARMAP-1003, ¶ 95; Pet., 51

Inc., 550 U.S. 398, 417 (2007). A POSITA would have recognized that applying Deaton's teachings to augment the Heller-Quam system would have led to predictable results without significantly altering or hindering the functions performed by the Heller-Quam system.

NEARMAP-1003, ¶ 95; Pet., 51

Heller-Quam discloses Limitation [1.5]

Patent Owner: “Unlike Heller and Quam that are directed to creating 3D models based on images, Deaton is instead directed to collecting ‘roof measurement information’ based on the physical inspection of a roof on-site.” POR, 31

Dr. Forsyth’s Second Declaration

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].

NEARMAP-1041, ¶ 23; Reply, 10

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.”).

NEARMAP-1041, ¶ 26; Reply, 10

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.

NEARMAP-1041, ¶ 25; Reply, 10

Heller-Quam discloses Limitation [1.5]

Patent Owner: *Deaton's 'project report' cannot correspond to the claimed 'roof estimate report' because Deaton does not teach that the 'project report' . . . is 'generat[ed] and output[ed] . . . using a report generating engine.' Sur-Reply, 11.*

Petition

Deaton describes a “project report” that “provides specification details and work items for repairing or replacing the infrastructure” (the roof) “in accordance with the conditions identified.” *Id.*, [0107]. The project report can include numerical

Pet., 53

Dr. Forsyth's First Declaration

including the production of such a report in the system resulting from the combination of Heller and Quam would advantageously enable the site models described in Heller and Quam to be utilized to plan and execute maintenance, repair, and new construction projects, thereby increasing the utility of the combined system. NEARMAP-1006, [0107].

Pet., 51; NEARMAP-1003, ¶ 95

Dr. Forsyth's Second Declaration

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.

Reply, 10; NEARMAP-1041, ¶25

Heller-Quam discloses Limitation [1.5]

Patent Owner: “there is no disclosure in Deaton of creating a report based on a 3D model.” POR, 32.

Deaton

position sensing devices are widely available. Devices providing the capability of determining the spatial relationship between points, including the relative directions and distances, provide a number of advantages. For example, data collected representing these spatial relationships can assist in providing graphical models of a particular target.

NEARMAP-1006, ¶70; Pet., 52 (describing motivation to combine Deaton with Heller-Quam)

Dr. Forsyth’s Second Declaration

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.

NEARMAP-1041, ¶28; Reply, 11

Dr. Forsyth’s Second Declaration

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.

NEARMAP-1041, ¶27; Reply, 11

Issue 5A

There is no presumption of nexus because
Render House and Twister are not
“coextensive with” the '737 claims.

There is no presumption of nexus because Render House and Twister are not “coextensive with” the ’737 claims.

Patent Owner’s Sur-Reply

Law

’737 claims). Petitioner is wrong for two reasons. First, the Federal Circuit clarified that to establish a presumption of nexus, “the patentee [must] demonstrate that the product is essentially the claimed invention.” *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1374 (Fed. Cir. 2019). Patent Owner has done that by showing how the Twister and Render House products embody the challenged claims. EX2032, ¶179 (Dr. Bajaj’s claim charts across pages 113-173 showing how challenged claims are embodied by Twister and Render House); POR, 38-57 (similar showing).

**Patent Owner’s
analysis**

NEARMAP-1003, ¶ 95; Pet., 51

There is no presumption of nexus because Render House and Twister are not “coextensive with” the ’737 claims.

Petitioner’s Reply

Reply, 13

Render House and Twister include critical features that are not mentioned in the ’737 claims and that are the subject of other patents. EagleView previously

Patent Owner (NEARMAP-1042)

Render House and Twister also allow a user to input a location corresponding to the location of a building using the [REDACTED] as claimed in dependent claim 10 of the ’770 patent. Ex. 2007 ¶ 80 at claim 10.a [REDACTED], which allows ‘a user to input location data corresponding to a location of a building’”). In response to the

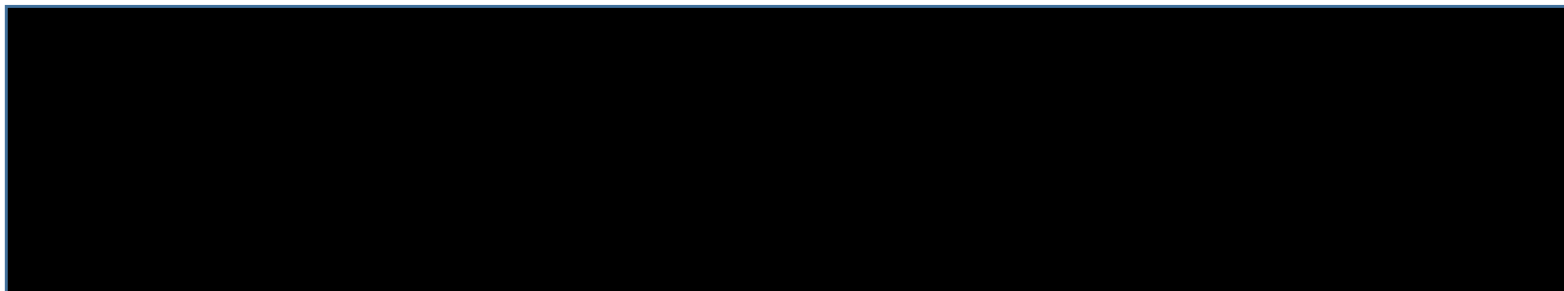
NEARMAP-1042, 59; Reply, 13

Render House and Twister also 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. Render House and Twister each perform a pitch determination based on the location of the moved visual marker. For example, the Render House software performs a pitch

NEARMAP-1042, 60; Reply, 13

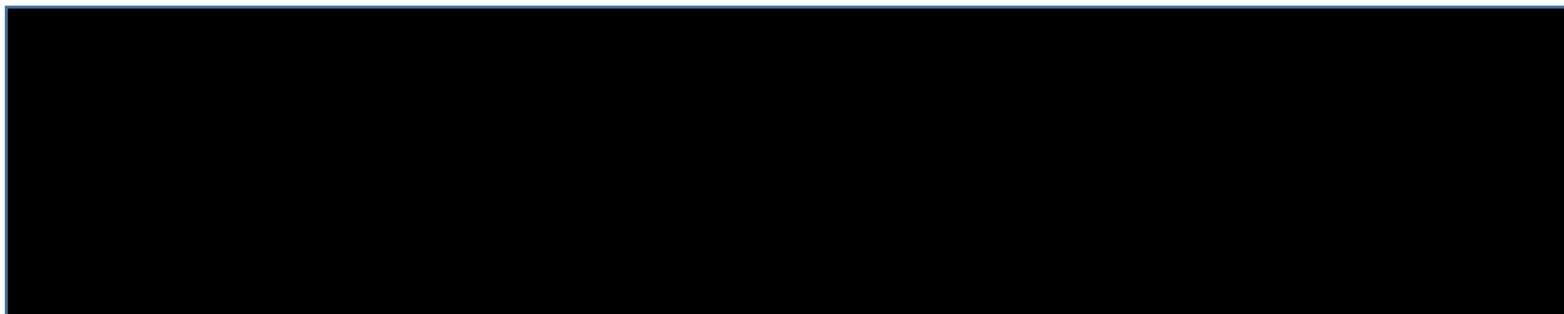
There is no presumption of nexus because Render House and Twister are not “coextensive with” the ’737 claims.

Twister Manual (EX2007)

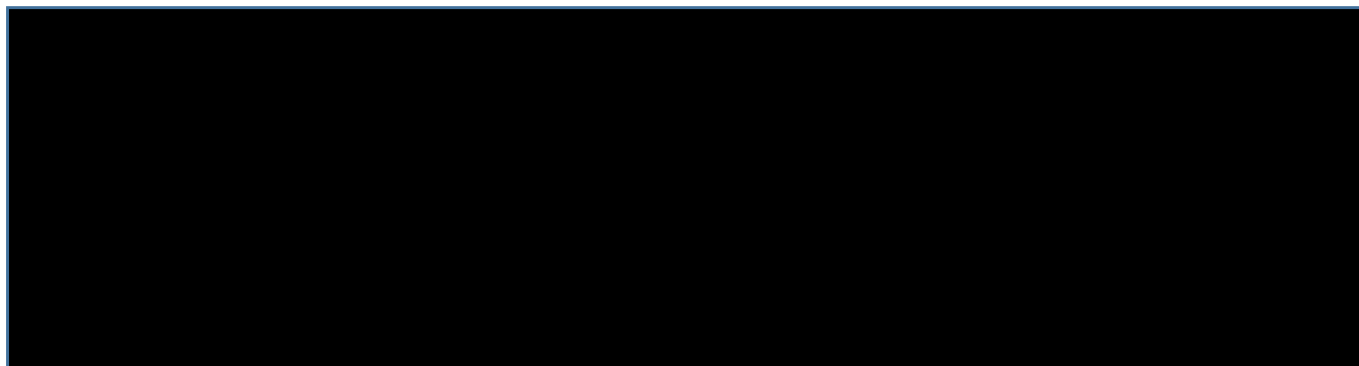


Reply, 13-14; EX2007, 21

Render House Manual (EX2030)



Reply, 13-14; EX2030, 4, 19-23



Reply, 13-14; EX2030, 4, 19-23

There is no presumption of nexus because Render House and Twister are not “coextensive with” the ’737 claims.

Dr. Bajaj

A. As far as I recall, it was really based on, you know, show me this or show me that. It wasn't like they were giving me a tutorial on all the features of their products. So this was very directed to what I needed for my declaration, and that's what I used to present in these claim charts.

NEARMAP-1044, 46:20-47:4; Reply, 14

NEARMAP-1044, 18:14-21; Reply, 13

And so I went down each one to see the functionality, and this was a live session where I instructed the software engineers to show me this and show me that, and thereby I had them confirm -- or I confirmed that, yes, the system was practicing both Twister and Render House products.

NEARMAP-1044, 46:10-16; Reply, 14

A. You know, implementing it in software is based on the computing system where those instructions would run, and so for speed and efficiency, you know, it's always important to understand that software systems as complicated as Render House and Twister with many, many components can be mapped to different parts of the architecture of the computing system.

Issue 5B

Improved “accuracy” and “high-resolution” photography, the bases of EagleView’s secondary considerations, are not requirements of the claims

Improved “accuracy” and “high-resolution” photography, the bases of EagleView’s secondary considerations, are not requirements of the claims

POR

POR, 57

and at less expense than previous solutions. 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. The inventiveness of Patent Owner’s process generates more consistently accurate roof measurements than could be achieved using older methods. *See, e.g.*, EX1019 at 3 (“We also know the total bottom line

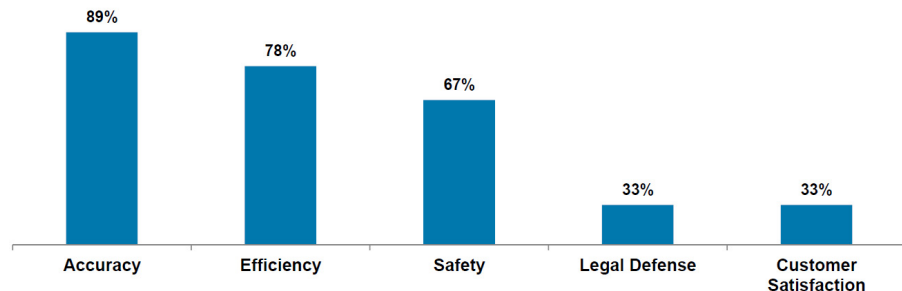
NEARMAP-1019

Arry Housh, president and CEO of *Arry’s Roofing Services, Inc.* of Tarpon Springs, says that aerial measurement technology has allowed his company to put new systems in place for increased safety and efficiency. “We work on a lot of high-end custom homes where measuring and estimating was traditionally very involved and time consuming,” explains Housh. “Using this technology makes it less dangerous for our estimators. It saves time, provides accurate takeoffs and gives us a professional presentation.”

NEARMAP-1019, 3; Reply, 15-16

NEARMAP-1029

Perceived Benefits of Aerial Imagery and Measurement



NEARMAP-1029, 9; Reply, 16

of plane based images. Contractors should ask about image resolution. The 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.

NEARMAP-1019, 3; Reply, 16

Improved “accuracy” and “high-resolution” photography, the bases of EagleView’s secondary considerations, are not requirements of the claims

NEARMAP-1031

Pictometry creates highly accurate Roof Measurement Reports with data derived from Pictometry imagery. Pictometry imagery is captured using a patented process that geo-references images, attributing a latitude/longitude coordinate to each pixel and enables users to make highly accurate remote measurements of structures and land features including area, height, distance, elevation, bearing, pitch and more – directly on imagery.

NEARMAP-1031, 2; Reply, 17

NEARMAP-1030

In 2013, Pictometry merged with the Bothell, Wash., EagleView Technology Corporation, which provides aerial roof measurements and property data reports derived from Pictometry imagery. Property value assessors, public safety professionals, GIS departments and other government organizations also rely on Pictometry’s orthogonal and oblique aerial imagery to review and analyze property-related data.

NEARMAP-1031, 2; Reply, 17

NEARMAP-1023

Additionally, EVT has significant intellectual property, including over 20 issued patents. Today, EVT through its Pictometry division, is the leader in supplying image data to governments and municipalities for the purposes of public safety, infrastructure monitoring, tax assessment, and other uses.

NEARMAP-1023, 3; Reply, 18

Improved “accuracy” and “high-resolution” photography, the bases of EagleView’s secondary considerations, are not requirements of the claims

Patent Owner: *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)*

Dr. Forsyth Second Declaration (NEARMAP-1041)

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.

NEARMAP-1041, ¶31; Reply, 15

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

NEARMAP-1041, ¶32; Reply, 16-17

Other factors contributed to purported commercial success and industry praise.

Press Release: EagleView App for the iPhone®

footage, lineal footage and much more from their iPhone or iPod touch(R). This progressive App offers users the ability to easily place new orders anytime, anywhere with a photo image from their iPhone while also being able to receive completed orders as soon as they are ready. EagleView customers can access

NEARMAP-1046, 1; Reply, 19

EagleView® Technologies and AccuLynx™ Announce Seamless Integration

(Bothell, Wash., February 1, 2010) – EagleView Technologies, the leader in aerial roof measurements, is excited to announce that it now offers total integration with AccuLynx, the leader in web-based roofing management software. Roofing contractors can now order an EagleView report directly from within AccuLynx, saving time and eliminating the need for a manual import.

NEARMAP-1048, 1; Reply, 19

Other factors contributed to purported commercial success and industry praise.

EagleView® Technologies Introduces Extended Coverage

multiple sources and types. This extended coverage capability meets the demand for greater geographic coverage as sought by both the insurance and contractor sectors.

The combination of these advanced technologies allows the company to provide reports for properties that previously could not be measured. EagleView now offers not only the most accurate measurement reports within the industry, but also the broadest image set available.

NEARMAP-1049; Reply, 20

Mr. Johnson Transcript (NEARMAP-1045)

Q Now, what would happen if there was not imagery available for a property a customer wanted to order a report for?

MR. BOWSER: Objection. Scope.

A If there's no imagery, we would not be able to produce the work.

NEARMAP-1045, 31:6-11; Reply, 20

Other factors contributed to purported commercial success and industry praise.

EagleView® Technologies Adds Property Data to Reports

EagleView Technologies, the leader in aerial and satellite measurement technologies, continues to provide innovative solutions to contractors through the addition of key property and weather data to its measurement reports. The date of the last known roof permit, the most recent hail event and the hail count for a property are now included on EagleView measurement reports.

Reply, 20; NEARMAP-1050, 1

EagleView® Technologies Introduces Wall Measurement Reports

“The introduction of wall measurement reports affirms EagleView’s commitment to continue creating solutions through technology for the insurance and construction industries,” said Rishi Daga, vice president of insurance and client relations, EagleView Technologies. “This first-of-its-kind technology offers an automated process to gather measurements and information faster and with a higher degree of accuracy.”

Reply, 20; NEARMAP-1051, 1

Other factors contributed to purported commercial success and industry praise.

NEARMAP-1030

In 2013, Pictometry merged with the Bothell, Wash., EagleView Technology Corporation, which provides aerial roof measurements and property data reports derived from Pictometry imagery. Property value assessors, public safety professionals, GIS departments and other government organizations also rely on Pictometry's orthogonal and oblique aerial imagery to review and analyze property-related data.

Pet., 65; NEARMAP-1030, 1

NEARMAP-1031

About Pictometry -- Pictometry International Corp. -- the leading provider of data-rich aerial Imagery, Analytics, Integrations and Reports -- specializes in the capture of high resolution aerial oblique imagery. Using its patented capture technology, Pictometry produces imagery that is among the highest quality, highest resolution imagery in the world. Geo-

Pet., 65; NEARMAP-1031, 2

Other factors contributed to purported commercial success and industry praise.

EagleView® Technologies Announces QuickSquares™ Reports for Rapid Estimating

EagleView Technologies, Inc., a leading technology provider of aerial imagery, data analytics and GIS solutions, is proud to introduce the QuickSquares Report. An excellent sales and marketing tool for roofing sales teams, this report delivers an overall estimate of the roof size within approximately one hour from the time that the order is placed.

Reply, 20; NEARMAP-1053

Other factors contributed to purported commercial success and industry praise.

NEARMAP-1027



Eagle View made one of the biggest breakthroughs in the

history of the industry by creating a state-of-the-art software program that remotely snaps sophisticated aerial pictures of roofs and accurately measures lengths, pitches, valleys and other hard-to-see areas on roofs.

Reply, 21-22; NEARMAP-1027

NEARMAP-1029

- Aerial imagery emerging as a disruptive innovation for insurance
 - Initial use is claims related; underwriting to develop in future

Reply, 19, 22; NEARMAP-1029, 12

Other factors contributed to purported commercial success and industry praise.

Mr. Long Transcript (NEARMAP-1054)

Q. Do you know if the customer that marked the [REDACTED] as [REDACTED] provided any comments with their survey response?

A. I don't recall outside of what's [REDACTED], which there doesn't appear to be any responses specifically about

Z. Long - Confidential

[REDACTED] or [REDACTED].

Reply, 22; NEARMAP-1054, 26:4-12

Q. Is there [REDACTED] that captures the type of information that are included in the report?

A. I don't -- I mean, technically the [REDACTED] would fall in line with that, but nothing specific.

Reply, 22; NEARMAP-1054, 30:4-9

Issue 6

EagleView fails to demonstrate Render House and Twister embody claim 9 of the '737 patent

EagleView fails to demonstrate Render House and Twister embody claim 9 of the '737 patent

POR

Twister and Render House also meet the limitations of claim 9 by “transmit[ting] updated roof measurement information to a file when a change is made” as claimed in dependent claim 9 of the '737 Patent. EX2032, ¶179, claim 9.

POR, 47

Claim 9

9. The method of claim 1 further comprising: 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.

Dr. Bajaj (NEARMAP-1044)

A. Again, I don't recall the details, and I don't want to be incorrect in my sworn testimony. And I'm being truthful, I don't know what that -- it's just that they were -- this is what I was seeing was happening. Every time [REDACTED], there was this activity, and they said, Oh, this is showing you the communication as called out. And I said, Oh, that's good evidence, yeah. So I put that in there.

Q. And does anything in the screenshot on page 133 indicate [REDACTED]?

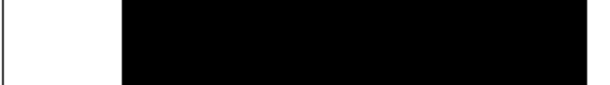
A. Not in this screenshot, no, I don't see any indication.

NEARMAP-1044, 41:16-42:3; 45:11-15; Reply, 23

EagleView fails to demonstrate Render House and Twister embody claim 9 of the '737 patent

Dr. Bajaj

Claim 9	
Limitation	Patent Owner's Twister and Render House Products
[9.0] The method of claim 1 further comprising: transmitting roof measurement information based at least in part on the change of the line drawing representing a feature of the	[REDACTED]

roof that overlies the first aerial image of the roof.	
---	--

Claim 9	
Limitation	Patent Owner's Twister and Render House Products
	[REDACTED]

EX2005, 132-133; EX2032, 132-133

Issue 7

Claims 16, 26, 9, and 10 are rendered obvious by
Grounds 1 and 2

Limitation [16.0] – Claim 16 is rendered obvious by Grounds 1 and 2

Limitation [16.0]

16. A non-transitory computer-readable storage medium, having computer executable instructions stored thereon that, when executed by at least one computer processor, cause the at least one processor to enable a computing system to generate a roof estimate report for a building having a roof, by performing a method comprising:

Dr. Forsyth Second Declaration

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.

NEARMAP-1041, ¶36; Reply, 24

Petition

NEARMAP-1004, 1. Quam describes the RADIUS system as an “an extensible, interactive, object-oriented, workstation-based image processing system” that “represents over 20 person years of continuous development of *software environments* for image understanding, cartographic feature extraction, and visualization at SRI’s Artificial Intelligence Center.” NEARMAP-1005, 2. “The current implementation” of RADIUS “comprises over *200,000 lines of Lisp/CLOS* and *6,000 lines of C*,” which confirms that RADIUS is a software program. *See id.*; NEARMAP-1003, [35]. Quam describes that RADIUS “runs on both SunMicrosystems and Silicon Graphics RISC-based workstations,” which indicates that the RADIUS software is executed by the processors of these workstations. *Id.*; *see also* 2, 5, 8, 10 (several references to computation, which indicates operations performed by a processor); NEARMAP-1003, [35]. Quam also makes clear that the RADIUS system utilizes “*memory*” when performing computations, such as using a “[t]iled memory layout for image storage.” NEARMAP-1005, 17; *see also* 4, 5, 8, 16; NEARMAP-1003, [35].

Pet., 20

Limitation [16.1] – Claim 16 is rendered obvious by Grounds 1 and 2

Limitation [16.1]

overlaying a line drawing on corresponding locations of a roof feature of the roof on first and second aerial images of the roof, wherein the first aerial image provides a first view of the roof of the building and the second aerial image provides a second view of the roof of the building;

POR

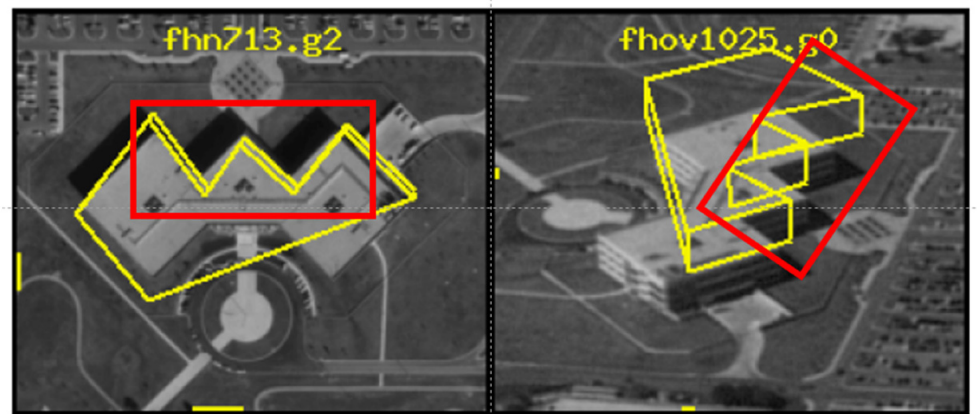
images in Heller's Figure 5 correspond to a "line drawing," Petitioner has not shown that the line drawings for the first and second images are the same such that "a line drawing" is overlaid "on corresponding locations of a roof feature of the roof on first and second aerial images of the roof," as required by limitation [16.1].

POR, 72

Petition

"line drawing"). NEARMAP-1003, [44]; *see, e.g.*, NEARMAP-1004, 3 ("A shape is selected to approximate a structure found in the image, e.g., cylinders for towers, or rectangular wireframes for buildings. The primitive shape is placed at the approximate position and orientation of the image feature to be modeled."):

Pet. , 25

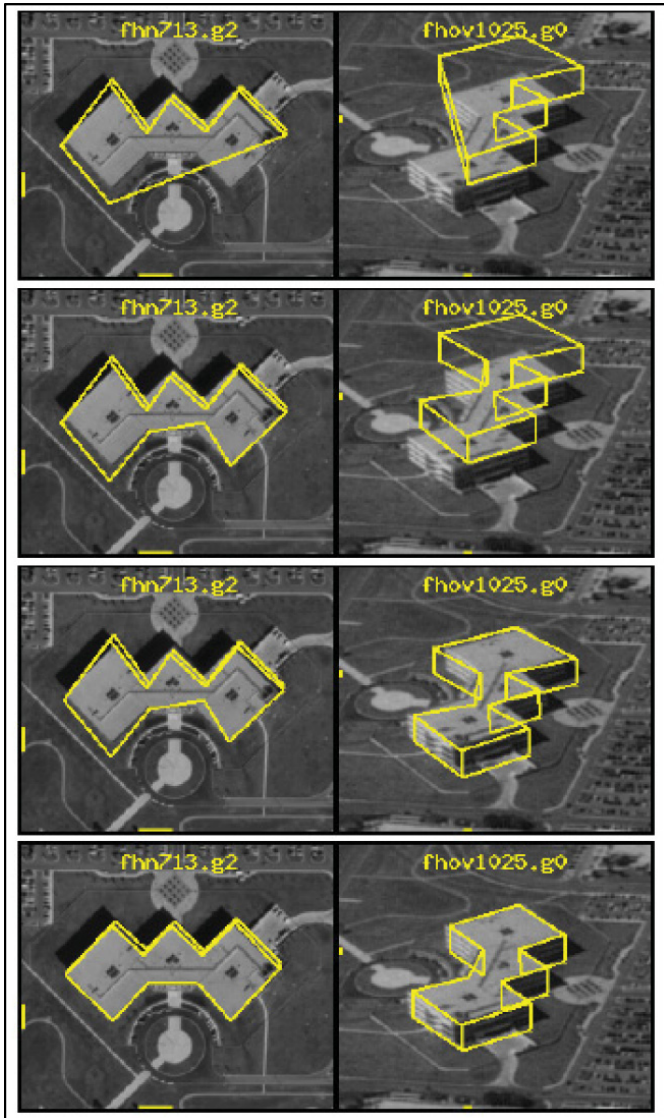


NEARMAP-1004, Detail of FIG. 5 (annotated)

Pet., 26

Limitation [16.1] – Claim 16 is rendered obvious by Grounds 1 and 2

Heller



Pet., 26; NEARMAP-1004, FIG. 5 (partial)

Dr. Forsyth Second Declaration

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.

NEARMAP-1041, ¶ 37; Reply, 24

Limitation [26.0] – Claim 26 is rendered obvious by Grounds 1 and 2

Limitation [26.0]

26. 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:

Dr. Forsyth Second Declaration

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.

NEARMAP-1041, ¶¶39; Reply, 25-26

Petition

NEARMAP-1004, 1. Quam describes the RADIUS system as an “an extensible, interactive, object-oriented, workstation-based image processing system” that “represents over 20 person years of continuous development of *software environments* for image understanding, cartographic feature extraction, and visualization at SRI’s Artificial Intelligence Center.” NEARMAP-1005, 2. “The current implementation” of RADIUS “comprises over *200,000 lines of Lisp/CLOS* and *6,000 lines of C*,” which confirms that RADIUS is a software program. *See id.*; NEARMAP-1003, [35]. Quam describes that RADIUS “runs on both SunMicrosystems and Silicon Graphics RISC-based workstations,” which indicates that the RADIUS software is executed by the processors of these workstations. *Id.*; *see also* 2, 5, 8, 10 (several references to computation, which indicates operations performed by a processor); NEARMAP-1003, [35]. Quam also makes clear that the RADIUS system utilizes “*memory*” when performing computations, such as using a “[t]iled memory layout for image storage.” NEARMAP-1005, 17; *see also* 4, 5, 8, 16; NEARMAP-1003, [35].

Pet., 20

[26.0] – Claim 26 is rendered obvious by Grounds 1 and 2

Patent Owner: *“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*

Dr. Forsyth Second Declaration (NEARMAP-1041)

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.”

NEARMAP-1041, ¶31; Reply, 15

Petition

NEARMAP-1004, 1. Quam describes the **RADIUS system** as an “an extensible, interactive, object-oriented, workstation-based image processing system” that “represents over 20 person years of continuous development of **software environments** for image understanding, cartographic feature extraction, and visualization at SRI’s Artificial Intelligence Center.” NEARMAP-1005, 2. “The current implementation” of RADIUS “comprises over **200,000 lines of Lisp/CLOS** and **6,000 lines of C**,” which confirms that RADIUS is a software program. *See id.*; NEARMAP-1003, [35]. Quam describes that RADIUS “runs on both SunMicrosystems and Silicon Graphics RISC-based **workstations**,” which indicates that the RADIUS software is executed by the processors of these workstations. *Id.*; *see also* 2, 5, 8, 10 (several references to computation, which

Pet., 20

Limitation [26.2] – Claim 26 is rendered obvious by Grounds 1 and 2

Limitation [26.2]

changing, by the computer system of the roof estimate report system, a line in a second line drawing that corresponds to the same feature in the first line drawing that was changed, the change in the second line drawing being made by the computer system in response to the change that was made in the first line drawing; and

POR

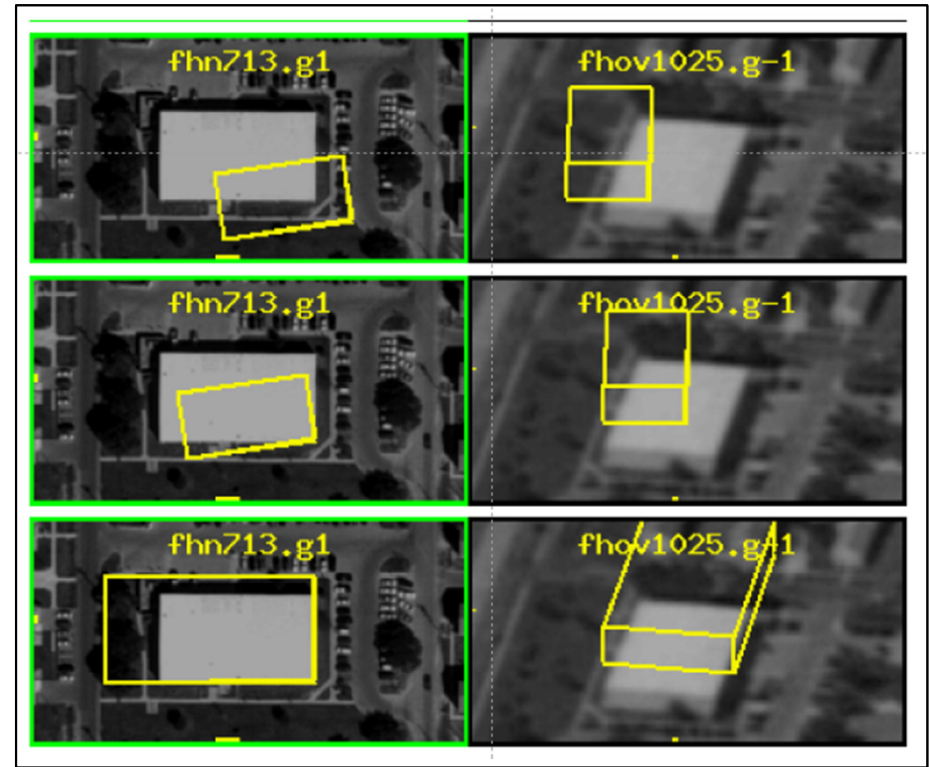
Petitioner's analysis of limitation [1.4] does not show where Heller teaches "changing...a line in a second line drawing that *corresponds to the same feature in the first line drawing* that was changed," as recited in limitation [26.2]. Petition, 30-33; EX1003, ¶¶52-55. With reference to the annotated version of Heller's

POR, 77

Heller

After the primitive is added to the scene, the user grabs an upper corner of the object and adjusts the pose and size of the box to match the building being modeled with this sequence of operations:

NEARMAP-1004, 2; Pet., 28



NEARMAP-1004, FIG. 4 (partial); Pet., 31

Limitation [26.2] – Claim 26 is rendered obvious by Grounds 1 and 2

Limitation [26.2]

changing, by the computer system of the roof estimate report system, a line in a second line drawing that corresponds to the same feature in the first line drawing that was changed, the change in the second line drawing being made by the computer system in response to the change that was made in the first line drawing; and

POR

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]. Petition, 30-33; EX1003, ¶¶52-55. With reference to the annotated version of Heller's

POR, 77

Dr. Forsyth Second Declaration

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.*

NEARMAP-1041, ¶ 41; Reply, 26

Claim 9 is rendered obvious by Grounds 1 and 2

Claim 9

9. The method of claim 1 further comprising:
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.

Petition

change in the size of the line drawing during the adjustment. *Id.* Because the line drawings are used to model the roof structure of a building (*see* [1.2]-[1.4]), a change in the size of the line drawing represents a change in the measurements of the roof represented by the model. *Id.* Thus, the object adjustment events in the event history include roof measurement information, and that information is transmitted to the event history when an adjustment to a wireframe is made (*i.e.*, based at least in part on the change of the line drawing). NEARMAP-1003, [69]; *see, e.g.*, [1.2]-[1.4]; NEARMAP-1004, 4, 5, FIG. 4, FIG. 5.

Pet., 38

Heller

We have developed and installed code that captures low level information from the RTS user interface about individual actions taken by the analyst. Every mouse motion associated with making adjustments to object parameters, and every mouse click is captured into an event history. Below is a list of the information being recorded:

- Object Adjustment Events:
 - Object ID
 - Event start time
 - Adjustment type: (for example: vertex-xy, vertex-z, vertex-width, ...)
 - 2-D world ID
 - Zoom level
 - Sequence of time deltas and mouse-position deltas of the form: (delta-t dx dy)

NEARMAP-1004, 5; Pet., 38

Claim 9 is rendered obvious by Grounds 1 and 2

Patent Owner: *“Heller is directed to ‘the creation of a 3-dimensional model that captures the basic geometry of the site under examination,’ and contains no disclosure linking precise measurements to its 3D models.”* POR, 87

Dr. Forsyth Second Declaration (NEARMAP-1041)

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.

NEARMAP-1041, ¶45; Reply, 28

determined 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 . . .”).

NEARMAP-1041, ¶ 41; Reply, 26

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 determined measurements. EX1004, 8. Relatedly, Quam describes use of a

NEARMAP-1041, ¶ 41; Reply, 26

Claim 9 is rendered obvious by Grounds 1 and 2

Patent
Owner:

“none of Heller’s ‘object adjustment events’ amount to ‘measurement information’ about a roof, as the term ‘roof measurement information’ requires. The ‘737 Patent explains that ‘roof measurement information may include measurements such as lengths of the edges of sections of the roof, pitches of sections of the roof, areas of sections of the roof, etc.’ EX1001, 2:55-58. ” POR, 85

Dr. Forsyth Second Declaration

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.

NEARMAP-1041, ¶43; Reply, 27

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.

NEARMAP-1041, ¶43; Reply, 27

Claim 10 is rendered obvious by Grounds 1 and 2

Claim 10

10. The method of claim 1 further comprising:
displaying a marker operable to specify a point on an image;
receiving, via the marker, an indication of a point on the first aerial image; and
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.

Reply

EagleView asserts that Heller/Quam fail to teach claim 10's recitation of "registering." EagleView argues 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; EX2005, [145]-[148].

Reply, 28

Quam

Registration of multiple data sources, including stereographic or multiple images, terrain elevation models, and 3-D object models, to the same world coordinate system. This capa-

NEARMAP-1005, 5; Pet., 43 (Analysis of [10.2])

Dr. Forsyth Second Declaration

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

NEARMAP-1041, ¶46; Reply, 28

Overview of the '737 Patent

Overview of the '737 Patent

(12) **United States Patent**
Pershing

(10) **Patent No.:** **US 9,135,737 B2**
(45) **Date of Patent:** ***Sep. 15, 2015**

(54) **CONCURRENT DISPLAY SYSTEMS AND METHODS FOR AERIAL ROOF ESTIMATION**

(71) Applicant: **Eagle View Technologies, Inc., Bothell, WA (US)**

(72) Inventor: **Chris Pershing, Redmond, WA (US)**

(73) Assignee: **Eagle View Technologies, Inc., Bothell, WA (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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USPC 703/1
See application file for complete search history.

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(57) **ABSTRACT**

User interface systems and methods for roof estimation are described. Example embodiments include a roof estimation system that provides a user interface configured to facilitate roof model generation based on one or more aerial images of a building roof. In one embodiment, roof model generation includes image registration, image lean correction, roof section pitch determination, wire frame model construction, and/or roof model review. The described user interface provides user interface controls that may be manipulated by an operator to perform at least some of the functions of roof model generation. The user interface is further configured to concurrently display roof features onto multiple images of a roof. This abstract is provided to comply with rules requiring an abstract, and it is submitted with the intention that it will not be used to interpret or limit the scope or meaning of the claims.

37 Claims, 29 Drawing Sheets

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graph TD
    1000[Plan Determination] --> 1001[Display an aerial image of a building having a roof comprising a plurality of planar roof sections that each have a corresponding pitch]
    1001 --> 1002[Display a pitch determination marker overlying the planar roof section]
    1002 --> 1003[Repeat, for the displayed pitch determination marker, an indication of the pitch of one or more planar roof sections of the building]
    1003 --> 1004[Modify a three-dimensional model of the roof based on the measured inclination and the pitch of the planar roof sections]
    1004 --> End([End])
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The invention claimed is:

1. A computer-implemented method in a roof estimate report system including at least one processor and a memory coupled to the at least one processor, the method comprising: displaying, by the at least one processor of the roof estimate report system, a plurality of aerial images of a roof at the same time, each of the aerial images providing a different view, taken from a different angle of the same roof; displaying, by the at least one processor of the roof estimate report system, respective line drawings representing features of the roof, the respective line drawings overlying a first and a second aerial image of the plurality of aerial images of the roof, the line drawing overlying the first aerial image of the roof having features in common with the line drawing overlying the second aerial image of the roof; 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; in response to the changing, making corresponding changes, by the at least one processor of the roof estimate report system, to the line drawing overlying the second aerial image; and 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.