Xactware Solutions, Inc.

EXHIBIT 1006

Xactware Exhibit 1006
Inter Partes Review of
US Patent No. 8,078,436

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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For	:	AERIAL ROOF ESTIMATION SYSTEMS AND METHODS

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT

Commissioner for Patents:

In response to the Office Action dated July 25, 2013, please amend the application as follows:

Amendments to the Claims are reflected in the listing of claims which begins on page 2 of this paper.

Amendments to the Abstract begin on page 8 of this paper.

Remarks begin on page 9 of this paper.

Amendments to the Claims:

1. (Amended) A computing system for generating a roof estimate report, the computing system comprising:

a memory;

a roof estimation module that is stored on the memory and that is configured, when executed, to:

receive a first and a second aerial image of a building having a roof, each of the aerial images providing a different view of the roof of the building, wherein the first aerial image provides a top plan view of the roof and the second aerial image provides an oblique perspective view of the roof, and are not a stereoscopic pair;

correlate the first aerial image with the second aerial image;

generate, based at least in part on the correlation between the first and second aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and

generate and transmit a roof estimate report that includes one or more top plan views of the three-dimensional model annotated with numerical values that indicate the corresponding slope, area, and length of edges of at least some of the plurality of planar roof sections using at least two different indicia for different types of roof properties.

18. (Amended) A computer-implemented method for generating a roof estimate, the method comprising:

receiving a first and a second aerial image of a building having a roof, each of the aerial images providing a different view of the roof of the building wherein the first aerial image provides a top plan view of the roof and the second aerial image provides a view of the roof that is other than a top plan view and neither of the two images are part of a stereoscopic pair;

correlating the first aerial image with the second aerial image;

generating, based at least in part on the correlation between the first and second aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and

transmitting a roof estimate report that includes one or more top plan views of the three-dimensional model annotated with numerical indications of at least one of the slope, area, and lengths of the edges of the plurality of planar roof sections, wherein the roof estimate report includes at least two different indicia for different types of roof properties.

36. (Amended) A non-transitory computer-readable storage medium whose contents, which are computer executable instructions stored on the non-transitory computer-readable storage medium, when executed by a computer processor of a computing system, enable [a] the computing system to generate a roof estimate report for a building having a roof, by [performing] causing, when executed by the computer processor of the computing system, the computing system to perform a method comprising:

receiving [one] two or more images of the building, wherein at least one of the two or more images provides an oblique perspective view of the roof and one of the images provides a top plan view of the roof;

receiving an indication of pairs of points on the two or more images, each pair of points corresponding to substantially the same point on the roof depicted in each of the two or more images;

generating, based on the [one] two or more images of the building, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding area and edges, wherein the generating, based on the two or more images of the building, the model of the roof includes generating the model of the roof based on the receiving the indication of the pairs of points on the two or more images of the building; and

transmitting a roof estimate report that includes one or more views of the model, the report being annotated with numerical indications of the area and lengths of the edges of at least some of the plurality of planar roof sections, wherein the roof estimate report includes at least two different indicia for different types of roof properties.

37. (Amended) The non-transitory computer-readable storage medium of claim 36 wherein generating the model of the roof based on the receiving the indication of the pairs of points on the two or more images includes:

correlating two of the two or more images by registering the pairs of points; and

generating [a] the three-dimensional model based on [a] the correlation between the two of the [one] two or more images.

41. (Amended) The non-transitory computer-readable storage medium of claim 36 wherein the contents are instructions that when executed cause the computing system to perform the receiving two or more images step of the method by causing, when executed by the computer processor of the computing system, the computing system to provide access to a repository of aerial images of one or more buildings.

43-45. (Canceled)

57. (New) The method according to 18 wherein the second aerial image provides an oblique perspective view of the roof.

58. (New) A computer-implemented method for generating a roof estimate, the method comprising:

receiving a first aerial image of a building having a type of view of the roof that is a top plan view of the roof;

receiving a second aerial image of the building having a type of view of the roof that is a perspective oblique view of the roof;

receiving a third aerial image having a type of view of the roof that is an oblique perspective from a different direction than the second aerial image, each of the aerial images providing a different view of the roof of the building;

correlating the first aerial image with the second aerial image and third aerial images;

generating, based at least in part on the correlation between the first, second and third aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and

transmitting a roof estimate report that includes one or more top plan views of the three-dimensional model annotated with numerical indications of at least one of the slope, area, and lengths of the edges of the plurality of planar roof sections, wherein the roof estimate report includes at least two different indicia for different types of roof properties.

59. (New) The method of claim 58 wherein the different types of roof properties include a ridge line and a valley line and the at least two different indicia include one color of a line conveying the meaning of a roof ridge and a different color of a line conveying the meaning of roof valley.

60. (New) A computer-implemented method for generating a roof estimate, the method comprising:

receiving a first aerial image of a building;

receiving a second aerial image of the building having the roof;

receiving a third aerial image of the building, each of the aerial images providing a different view of the roof of the building;

correlating the first aerial image with the second aerial image and third aerial image;

generating, based at least in part on the correlation between the first, second and third aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and

generating and transmitting a roof estimate report that includes one or more top plan views of the three-dimensional model annotated with numerical indications of at least one of the slope, area, and lengths of the edges of the plurality of planar roof sections, wherein the roof estimate report includes at least two different indicia for different types of roof properties.

61. (New) The method of claim 60 wherein the correlating the first aerial image with the second and third aerial image includes receiving an indication of pairs of points on each of the images corresponding to substantially the same point on the roof depicted in each of the images.

62. (New) The method of claim 61 wherein the correlating the first aerial image with the second and third aerial image further includes registering the pairs of points and the generating the three-dimensional model includes generating the three-dimensional model based on the registering of the pairs of points.

63. (New) A computer-implemented method for generating a roof estimate, the method comprising:

receiving a request for a roof estimate report for the roof of the building;

receiving location information regarding the building;

receiving a first aerial image of the building having the roof;

receiving a second aerial image of the building having the roof, the first and second images of the roof being independent of each in the views provided of the roof, each of the aerial images providing a different view of the roof of the building;

correlating the first aerial image with the second aerial image;

generating, based at least in part on the correlation between the first and second aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding pitch, area, and edges;

determining a pitch of a plurality of sections of the roof;

determining a direction of the pitch for each of the plurality of sections of the roof for which a pitch was determined;

generating a roof estimate report that includes a top plan views of the three-dimensional model annotated with numerical indications of the determined pitch and the direction of the pitch;

displaying on at least one top plan view a graphical indication of the pitch value of the respective roof sections that conveys the pitch value;

determining a ridge line and a valley line of the roof;

displaying on at least one top plan view a ridge line in which the property of it being a ridge line is conveyed by it being displayed in a first color and a valley line in which the property of it being a valley line is convey by it being in a second color, different from the first color; and

transmitting the generated roof report.

64. (New) The method of claim 63 further comprising:

displaying on at least one top plan view of the roof a graphical indication of the pitch direction of the respective roof sections that conveys the direction of the pitch.

65. (New) The method of claim 63 wherein the top plan view showing the pitch value is a different top plan view than the one showing the ridge line and the valley line.

66. (New) The method of claim 65 wherein the correlating the first aerial image with the second aerial image further includes registering pairs of points and the generating the three-dimensional model includes generating the three-dimensional model based on the registering of the pairs of points.

Amendments to the Abstract:

Please replace the previous Abstract with the following redlined Abstract:

Methods and systems for roof estimation are described. Example embodiments include a roof estimation system, which generates and provides roof estimate reports annotated with indications of the size, geometry, pitch and/or orientation of the roof sections of a building. Generating a roof estimate report may be based on one or more aerial images of a building. The slope and orientation images are typically oblique perspective views and top plan views of the buildings in the area. In some embodiments, generating a roof estimate report of a specified building roof may include generating a three-dimensional model of the roof, and generating a report that includes one or more views of the three-dimensional model, the views annotated with indications of the dimensions, area, and/or slope of sections of the 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.

REMARKS

Claims 1-56 are subject to reexamination upon entry of the present amendment. Claims 1, 18, 36, 37, and 41 are amended herein. Claims 43, 44 and 45 are canceled herein. Claims 57-66 are new. The Abstract is also amended herein. No new matter is being presented by way of this Amendment.

The Examiner is thanked for the in-person interview conducted on October 17, 2013. This amendment and these remarks are based on that interview. The patent owner's summary of the interview is provided herein as part of these remarks.

No new matter is being presented by way of this amendment. All claim amendments find support in the Application of the '436 Patent as filed and do not broaden any claim. The patent owner, and two consultants Brian Curless and Kevin Jones, along with the undersigned law firm make no representation herein regarding whether any reference provided in any information disclosure statement, any reference referred to herein or any reference referred to in any Declaration or Exhibit filed herewith is or is not prior art with respect to the '436 Patent.

Interview Summary

During the interview, the Examiner indicated that any amendments to the claims should specifically use language from the specification to ensure that there was proper support in the Application as filed. As one example, the term "orthogonal view" was discussed as the term used in this industry for a downward looking aerial view of a home. It was discussed at the interview that Figure 5A is an actual photographic image that is such an orthogonal view and that Figure 3 shows image files having an orthogonal view. The term used in the Application as filed was "top plan view," which was discussed at the interview as having the same meaning as orthogonal view within the context of the '436 Patent. The Examiner requested that the claims use the term from the '436 Patent, "top plan view," to cover images of the type of views shown rather than the more widely used term, "orthogonal view," with the understanding that they mean the same thing in the context of the '436 Patent and in the industry.

Figure 5B shows two oblique image views of the same house shown in Figure 3 and Figure 5A. It was discussed at the interview that these views are, in fact called, oblique views in the industry today and that the Application as filed provided these as examples of oblique views used in creating the final report that was in various claims.

The '578 Patent, which is the parent case to the '436 Patent was incorporated by reference into the '436 Patent. In the Abstract of the '578 Patent, these views were called "oblique perspective views," see '578 Abstract, line 8, and perspective views in other places, see for example, Col. 4, lines 10-11 and Col. 5, lines 55-57 as examples. This issue was discussed during the interview and the Examiner stated that it was preferred to use the terms from the specification. One suggestion during the interview was to refer to them as a view that is "other than a top plan view" if they were being claimed in the independent claims and then in a dependent claim, and to be more specific in calling them oblique perspective views or perspective views. Thus, the term perspective view of the patent is used in some places and the term "oblique perspective view" is used in other places as having generally the same meaning as an oblique view as used in the industry.

In order to clarify the support of the language in the '436 Patent itself, the Abstract is being amended to include the reference to oblique perspective views that was found in the parent '578 Patent. This does not constitute new matter since it was part of the original '578 Patent that was incorporated by reference.

During the interview, a presentation was made during which Chris Pershing and Brian Curless, along with the two attorneys attending, David Carlson and Greg Gardella, who made comments. A copy of that presentation is included herewith as Attachment 1. During the presentation, a physical model of a home in the form of a bird house was demonstrated to the Examiner and an explanation made regarding how the problem was understood, addressed and solved with regard to this model.

Slides 4 and 5 of Attachment 1 as presented at the interview explain how stereoscopic pairs of images are created. During the interview the distinction between stereoscopic pairs of images was discussed with respect to these two slides. Slide 4 is a copy of Figure 3 of Exhibit C that was filed with the supplemental Reexam. This Exhibit C is an English

language version of the document referred to in paragraph 6 of the European Patent No. EP 1 010 966 B1 as describing how stereoscopic images are acquired. According, the text of Exhibit C is one teaching regarding how these images are obtained and how they are different from a standard orthographic view and an oblique perspective view.

As stated in Exhibit C and shown in its Figure 3, the stereoscopic images are acquired as orthophotos 5. They are not obtained from two oblique images nor from one orthophoto and one oblique. As both Mr. Pershing and Dr. Curless explained in the interview, and Dr. Curless sets forth in his declaration, a stereoscopic pair of images are obtained from two orthographic images.

Dr. Curless states:

> "As explained during the interview, the '966 patent requires carefully acquired stereoscopic aerial pairs of images which need significantly more data to create than the simple image files of unrelated images. As explained in the interview, stereoscopic aerial pairs of images are obtained using two top-plan view images, not from a top plan view image and an oblique image. Concretely, the EP '966 patent states that to create stereoscopic aerial pairs "two aerial photographs are taken in stereoscopic coverage, to give sets of two-dimensional, geometric image data and parameter data that contain highly detailed information on the camera angle of the image pairs, absolute image coordinates and other image recording parameters" (column 1, paragraph 2 of the EP '966 patent). These images and associated data are completely different from a top plan view image and one or more oblique images (also called perspective views in '578) that are unrelated to each other. Reconstructing shape from calibrated stereo pairs (as in the '966 patent) is well-known in computer vision to be quite different from, and substantially easier than, reconstructing shape from photographs taken from unknown viewpoints with unknown camera parameters (as in the '578 and '436 Patents)."

Curless Declaration, pp. 14-15.

As will be explained later herein, the claims are amended to specific that one image is a top plan view and the other image is a view other than a top plan view as discussed during the interview. Some of the claims specify that this other view is an oblique perspective view. Accordingly, this will be shown to be patentably distinct from the EP '966 and the all other prior art.

A. Rejections of claims 36-40 and 42-56 under 35 U.S.C. § 101

Claims 36-40 and 42-56 of the Patent under reexamination (the "Patent") are rejected under 35 U.S.C. § 101 because the claimed invention is allegedly drawn to non-statutory subject matter

Patent Owner respectfully traverses the rejections. However, the claims have been amended herein to advance prosecution of the reexamination of the Patent. In particular, claim 36 as amended recites in relevant part (emphasis added):

36. (Amended) A non-transitory computer-readable storage medium whose contents, ***which are computer executable instructions stored on the non-transitory computer-readable storage medium, when executed by a computer processor*** of a computing system, enable [a] the computing system to generate a roof estimate report for a building having a roof, by [performing] causing, when executed by the computer processor of the computing system, the computing system to perform a method comprising:

receiving [one] two or more images of the building, wherein at least one of the two or more images provides an oblique perspective view of the roof and one of the images provides a top plan view of the roof; . . ."

As shown above, claim 36 includes tangible limitations of "computer executable instructions stored on the non-transitory computer-readable storage medium," at least by describing the "non-transitory computer-readable storage medium" and the instructions as "causing, when executed by the computer processor of the computing system, the computing system to perform" a method comprising.

Therefore, claim 36 is directed to statutory subject matter under for at least the foregoing reasons. Since dependent claims 37-56 inherit the limitations of the corresponding independent claim 36 from which they depend, claims 37-56 are also directed to statutory subject matter for at least the same reasons presented above regarding claim 36.

For at least the foregoing reasons, Patent owner respectfully requests the applicable rejections of claim 36-40 and 42-56 be withdrawn.

B. Rejections of claims 1-5, 7-42 and 46-56 under 35 U.S.C. § 103 as being unpatentable over EP 966

Claims 1-5, 7-42 and 46-56 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over European Patent No. EP 1 010 966 B1 published October 23, 2002 (EP 966). All citations to EP 966 herein are from the first English translation of EP 966 provided in Exhibit B of the Supplemental Examination Request except for one reference made herein to the second English translation of EP 966 provided in Exhibit B of the Supplemental Examination Request.

Patent Owner respectfully traverses the rejection of claims 1-5, 7-42 and 46-56 under 35 U.S.C. §103(a). However, the independent claims have been amended for clarification to expedite prosecution of the reexamination. EP 966 does not teach or suggest all the features of any of claims 1-5, 7-42 and 46-56 as amended.

For example, claim 1 recites in relevant part (emphasis added):

> 1. A computing system for generating a roof estimate report, the computing system comprising:
>
> a memory;
>
> a roof estimation module that is stored on the memory and that is configured, when executed, to:
>
> receive a first and a second aerial image of a building having a roof, each of the aerial images providing a different view of the roof of the building, ***wherein the first aerial image provides a top plan view of the roof and the second aerial image provides an oblique perspective view of the roof, and are not a stereoscopic pair***;
>
> correlate the first aerial image with the second aerial image;
>
> generate, based at least in part on the correlation between the first and second aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and
>
> generate and transmit a roof estimate report that includes one or more top plan views of the three-dimensional model ***annotated with numerical values that indicate the corresponding slope***, area, and length of edges of at least some of the plurality of planar roof sections using at least two different indicia for different types of roof properties.

EP 966 does not teach or suggest a roof estimation system "***wherein the first aerial image provides a top plan view of the roof and the second aerial image provides an oblique perspective view of the roof, and are not a stereoscopic pair***."

Instead, in the '966 Patent, the images are taken and received as a stereoscopic pair and the raw data comes already matched as a stereoscopic pair. The images in a stereoscopic pair are not taken independently of each other, as they include geometric image data and parameter data that contain highly detailed information on the camera angle of the image pairs with respect to each other (see paragraph 2 of EP 966). The claimed invention of the '436 Patent does not make use of this particular information. The fact that the '436 Patent does not make use of such stereoscopic pairs of images and associated stereoscopic parameter data is further supported by the attached Declaration of both Chris Pershing and Dr. Curless, both of which are incorporated herein by reference and not quoted in full here to save space. Chris Pershing explained this in the interview and states this in his Declaration, paragraphs 3 and 4. In contrast, the system of EP 966 requires such stereoscopic pairs of images and associated stereoscopic parameter data and other image recording parameters in order to form the three-dimensional (3D) object description in that system. This is shown in the excerpts below from EP 966 (emphasis added):

> [0001] The present invention relates to a method for generating a three-dimensional object description of a localized spatial object - especially a building - from aerial stereoscopic pairs, whereby
>
> - two-dimensional image data from the aerial pairs and ***the stereoscopic parameter data*** are digitized and stored in a data processing system as three dimensional raw data;
>
> - two-dimensional orthophoto data and three dimensional object data are calculated from the raw data;
>
> - the three-dimensional object data is coordinated with external object-specific factual data to form a three-dimensional object description.
>
> ...
>
> [0002]...In this way, stereoscopic aerial pairs of the objects, i.e. two aerial photographs ***are taken in stereoscopic coverage***, to give sets of two-dimensional, ***geometric image data and parameter data*** that ***contain highly detailed information on the camera angle of the image pairs***, absolute ***image coordinates***

> and other ***image recording parameters***. These data provide the raw data to calculate real oriented representations of the earth's surface. Scanning the individual aerial images into an electronic data processing system gives digital, two-dimensional image data. By considering ***the stereoscopic parameter data, oriented aerial photographs*** with height information are determined by aerotriangulation. In this way, three-dimensional object data is gathered from the original raw data ***to form a three-dimensional object description***.

Furthermore, the use of such stereoscopic pairs of images and associated stereoscopic parameter data are explicitly recited in claim 1 of EP 966 as that from which the 3D object data are calculated. This is further evidence that use of such stereoscopic pairs of images and associated stereoscopic parameter data are necessary and required in the system of EP 966 in order to produce the 3D model description, thereby excluding and teaching away from the use of images that are not stereoscopic pairs. In particular claim 1 of EP 966 recites, in part (emphasis added):

> 1. A method of producing a three-dimensional object description of a located spatial object - in particular a building - ***from stereoscopic pairs of aerial pictures***, in which
>
> - from the pairs of aerial pictures two-dimensional image data ***and stereoscopic parameter data are stored digitized as three-dimensional raw data*** in a data processing installation;
>
> - two-dimensional orthophoto-data and ***three dimensional object data*** are ***calculated from the raw data***...

Thus, not only does EP 966 fail to teach or suggest the claimed roof estimation system, but EP 966 also teaches away from using such images that are not stereoscopic pairs by requiring use of such stereoscopic pairs of images and associated stereoscopic parameter data. As Mr. Jones points out in his declaration:

> "For example, stereoscopy as described in the 966 Patent requires two images taken at the same camera angle with respect to the image plane. Thus, they cannot be two images, one having a top plan view and one having another view, such as an oblique view. For example, when using aerial images of roofs, the stereoscopic pair of images of the roof may be two images both showing top plan views of the roof, each taken at a known distance between the respective camera positions. Also, the general $1/30^{th}$ rule of thumb in stereoscopy requires the distance between the camera positions taking each stereoscopic image to be substantially $1/30^{th}$ of the distance from the object being photographed.

Jones Declaration, ¶¶ 18 and 19.

Nothing in the EP '966 mentions that slope or pitch are provided on a top plan view of the roof. Instead, these are provided as tables in a separate document, as demonstrated by Exhibit F, the AeroDach web site that is the commercial implementation of the EP '966 patent. Thus, EP 966 describes outputting lengths of exterior edges of roof section on the "flat two-dimensional graphics" (see paragraph 33 and Fig. 3 of EP 966) and providing area generally (see paragraph 33 of EP 966), but does not teach or suggest providing any numerical values of slope or pitch on a top plan view of the roof, even if such measurements had been previously calculated or determined.

Furthermore, the Office points to paragraph 33 of EP 966 which states:

> [0033] The resulting calculated three-dimensional object description may be output either as flat two-dimensional graphics as shown in Fig. 3, and/or as a perspective three-dimensional representation as shown in Fig. 4, and then transmitted to the client computer. At the same time, ***the factual data*** is processed and added alphanumerically to the transmitted image data. For example, the roof can be provided in m^2 to give a first impression of the scope of a necessary roof renovation.

A description and antecedent basis is explicitly provided in EP 966 for "the factual data" referred to in paragraph 33 of EP 966. This appears in various earlier sections of the specification of EP 966. In particular, paragraph 11 of EP 966 states, in part (emphasis added):

> [0011]...***Factual data***, for example, could be ***cadastral data, road and/or other building data***. In this way, for example, unique pairing of ***address data containing a street name and house number*** can be effected with a particular building. The two-dimensional orthophoto data is stored together with these ***external factual data*** in a respective orthophoto-hybrid data set referenced to the specific object.

Cadastral data is "1 : of or relating to a cadastre 2 : showing or recording property boundaries, subdivision lines, buildings, and related details" (Merriam-Webster.com). A "cadaster" is "an official register of the quantity, value, and ownership of real estate used in apportioning taxes" (Merriam-Webster.com). Thus, "the factual data" of EP 966 is building data such as building address, building number and property boundaries stored together with the two-

dimensional data, and is not roof slope or pitch and has nothing to do with roof slope or pitch. This is shown further in paragraph 14 of EP 966, which states, in part (emphasis added):

> A particular advantage of the inventive method is that no longer - as was the case before - does a building need to be identified cumbersomely in an aerial image, but only the object-specific ***factual data*** need to be entered for the selection, for example, ***a street name and house number***. This is sufficient for the selection of an object-specific orthophoto-hybrid data set.

This is also shown further in paragraph 14 of EP 966 which states, in part, "By the unique combination with the object ***factual data, such as street and house number***, a simple and unique access is guaranteed (emphasis added) and in paragraph 30 of EP 966, which states, in part "the orthophoto data is structured according to external ***factual data, such as street addresses plus house numbers***" (emphasis added). Thus, "the factual data" that "is processed and added alphanumerically to the transmitted image data" as stated in paragraph 33 of EP 966 is not slope or pitch of a roof section, but is instead cadastral data such as building address or building number as shown above.

One significant indication that the EP '966 does not teach or even suggest that the pitch values and direction of pitch was what was intended by these statements is to look at what those practicing the EP '966 actually did. First, in the EP '966, no pitch values or directions are shown on the top plan view of the roof.

Exhibit F is one example of a commercial implementation of the EP '966 by the very company which invented it. In this Exhibit F, they did not put pitch values or direction on the top plan view of the roof itself. Instead, they labeled each roof facet or section with a letter and then placed a number on the edges that separate the facets, see pages 11-17, and in particular pages 13-15 of Exhibit F of the reexamination request. After this, a table was provided in which the data was shown for each facet and edge. This is a very cumbersome approach. It is exactly the opposite of the approach taken and claimed in the '436 Patent. Thus, the EP '966 teaches away from the claims of the '436 Patent.

The Office goes on to state:

> However, in light of the teachings to determine "all relevant information, such as" "roof pitch," and the teaching that "the information necessary for renovation" [of a roof] includes "roof form, ridge lines, roof line" and "roof structures," it would

> have been obvious to a person of ordinary skill in the art modify the teachings of EP 966 to arrive at a roof estimate report that includes "numerical values that indicate the corresponding slope of at least some of the plurality of planar roof sections".

Office Action, p. 19, second full paragraph.

Determining or calculating information such as roof pitch does not teach or suggest generating "one or more top plan views of the three-dimensional model annotated with numerical values that indicate the corresponding slope." Instead, as shown above, EP 966 specifically states in paragraph 33 that "the roof can provided in m^2," while not showing or making any mention of providing roof pitch on the "flat two-dimensional graphics" of Figure 3, or any other view of the roof for that matter. If annotating a top plan view of the roof with numerical values of roof pitch were necessary or particularly relevant for the EP 966 system, then why wouldn't the "flat two-dimensional graphic" shown in Figure 3, or at least the specification of EP 966 mention including such numerical values of slope on the "flat two-dimensional graphic"? The answer is that for the purposes of the system described in EP 966, providing the roof section lengths on the "flat two-dimensional graphic" or providing roof area generally is sufficient for roof renovation and there was no suggestion or motivation of any additional benefit of including numerical values of slope on the "flat two-dimensional graphic" of EP 966.

Therefore, EP 966 does not teach or suggest "generate and transmit a roof estimate report that includes one or more top plan views of the three-dimensional model ***annotated with numerical values that indicate the corresponding slope***" (emphasis added) as recited in claim 1Since dependent claims 2-17 inherit the limitations of the corresponding independent claim 1 from which they depend, EP 966 also does not teach or suggest all the limitations of any of dependent claims 2-17 for at least the same reasons presented above regarding claim 1.

Therefore, claims 1-17 are not obvious in view of EP 966 for at least the reasons presented above.

Additionally, claim 2, which depends from claim 1, recites "...wherein the roof estimation module is further configured to correlate the first and second aerial images ***by***

receiving an indication of one or more corresponding points on the building shown in each of the first and second aerial images" (emphasis added). EP 966 does not teach or suggest this feature.

The Office points to paragraphs 11 and 24 of EP 966 as disclosing this feature. Patent Owner respectfully disagrees. Paragraph 11 describes how the "building address data containing a street name and house number" (i.e., the "external factual data" of EP 966) is stored together with the "two-dimensional orthophoto data." There is no mention of receiving any indication of particular corresponding points in the first and second aerial images, let alone "corresponding points ***on the building*** shown in each of the first and second aerial images" as recited in claim 2 (emphasis added).

Paragraph 24 of EP 966 discloses that "the desired roof surface can be marked by clicking" to request the description of the roof. There is no mention in EP 966 of indicating a particular point on the building, only the user marking the roof surface generally to identify which roof the request is for. Also, there is no mention in EP 966 of receiving any indication of particular corresponding points in any first and second aerial images. Even if the user did mark a particular a point on the building in an image in EP 966 to identify the roof for the request, there is no teaching or suggestion of receiving any indication of a point on another image specifically corresponding to that point marked by the user in EP 966.

Thus, EP 966 does not teach or suggest all the limitations of claim 2 and claim 2 is not obvious in view of EP 966 for at least these additional reasons.

Additionally, claim 3, which depends from claim 1, recites "...wherein the roof estimation module is further configured to generate the three-dimensional model ***by receiving an indication of at least one of a ridgeline of the roof, a valley of the roof, an edge of the roof, a hip of the roof, and a gable of the roof***" (emphasis added). EP 966 does not teach or suggest this feature.

The Office points to paragraph 24 of EP 966 as disclosing this feature. Patent Owner respectfully disagrees. Paragraph 24 of EP 966 discloses that "the desired roof surface can be marked by clicking" to request the description of the roof. There is no mention in EP 966 of this user indicating specifically any of "a ridgeline of the roof, a valley of the roof, an edge of

the roof, a hip of the roof, and a gable of the roof" as recited in claim 3. EP 966 just describes the user marking the roof surface generally to identify which roof the request is for (see paragraph 24 of EP 966). Nowhere in EP 966 does it describe such a marking of the roof being an ***indication*** of any particular roof feature, let alone indicating specifically a roof ridgeline, edge, valley, hip or gable.

Thus, EP 966 does not teach or suggest all the limitations of claim 3 and claim 3 is not obvious in view of EP 966 for at least these additional reasons.

Additionally, claim 8, which depends from dependent claim 7, recites "...wherein the length is located adjacent to a line representing a segment, ***the slope is located next to an arrow indicating direction of the slope*** and the area is located within a section having the area" (emphasis added). EP 966 does not teach or suggest this feature.

On page 25 of the Office Action, the Office points to paragraph 33 of EP 966 regarding the "the factual data" of EP 966 being "added alphanumerically to the transmitted image data." However, a description and antecedent basis is explicitly provided in EP 966 for "the factual data" referred to in paragraph 33 of EP 966 in various earlier sections of the specification and based on these descriptions, "the factual data" in EP 966, does not include or have anything to do with pitch or slope of the roof. In particular, paragraph 11 of EP 966 states, in part (emphasis added):

> [0011]...***Factual data***, for example, could be ***cadastral data, road and/or other building data***. In this way, for example, unique pairing of ***address data containing a street name and house number*** can be effected with a particular building. The two-dimensional orthophoto data is stored together with these ***external factual data*** in a respective orthophoto-hybrid data set referenced to the specific object.

Cadastral data is "1 : of or relating to a cadastre 2 : showing or recording property boundaries, subdivision lines, buildings, and related details" (Merriam-Webster.com). A "cadaster" is "an official register of the quantity, value, and ownership of real estate used in apportioning taxes" (Merriam-Webster.com). Thus, "the factual data" of EP 966 is building data such as building address and property boundaries and the like stored together with the two-dimensional data, and is not roof slope or pitch and has nothing to do with roof slope or pitch. This is shown further in paragraph 14 of EP 966, which states, in part (emphasis added):

> A particular advantage of the inventive method is that no longer - as was the case before - does a building need to be identified cumbersomely in an aerial image, but only the object-specific ***factual data*** need to be entered for the selection, for example, ***a street name and house number***. This is sufficient for the selection of an object-specific orthophoto-hybrid data set.

This is also shown further in paragraph 14 of EP 966 which states, in part, "By the unique combination with the object ***factual data***, ***such as street and house number***, a simple and unique access is guaranteed (emphasis added) and in paragraph 30 of EP 966, which states, in part, "the orthophoto data is structured according to external ***factual data***, ***such as street addresses plus house numbers***" (emphasis added). Thus, "the factual data" that "is processed and added alphanumerically to the transmitted image data" as stated in paragraph 33 of EP 966 is not slope or pitch of a roof section, but is instead cadastral data such as building address, building number, or building property boundaries, as shown above.

The Office goes on to state in the Office Action:

> The claim language describes a conventional written notation to indicate slope. Accordingly, in view the express instruction in EP 966 to determine "all relevant information, such as roof shape, roof surface, roof pitch" (¶ 0033) and that "factual data is processed and added alphanumerically to the transmitted image data" (¶ 0033), it would have been obvious to add slope data to the image data using a conventional written notation to indicate slope."

Office Action, p. 26, lines 1-6.

Patent Owner respectfully disagrees. As shown above, the "factual data" of EP 966 is building data such as building address and property boundaries that is stored together with the two-dimensional data, and is not roof slope or pitch and has nothing to do with roof slope or pitch. Adding building data such as building address, house number and/or property boundaries to the transmitted image data, would not suggest or motivate one to "add slope data to the image data" as the Office alleges, let alone wherein "the slope is located next to an arrow indicating direction of the slope" as recited in claim 8 of the '436 Patent.

Furthermore, determining or calculating information such as roof pitch would not suggest or motivate one to "add slope data to the image data" on the top plan view as the Office alleges, let alone wherein "the slope is located next to an arrow indicating direction of the slope" as recited in claim 8 of the '436 Patent. Instead, as shown above, EP 966 specifically states in

paragraph 33 that "the roof can provided in m^2," while not showing or making any mention of providing roof pitch or slope on the "flat two-dimensional graphics" of Figure 3, or any other view of the roof for that matter. In fact, for the purposes of the system described in EP 966, providing the roof section lengths or area on the "flat two-dimensional graphic" is sufficient to give an impression of the scope of roof renovation and there was no suggestion or motivation of any specific additional benefit of adding any indicia of slope, regardless of the particular type of slope notation that could be used to do so. Thus, even if the claim language of claim 8 did describe a "conventional written notation to indicate slope," there would be no motivation or suggestion to modify the system of EP 966 to include such notation.

Also, the Office provides no support and points to no documentary evidence of what a "conventional written notation to indicate slope" is. In fact, Exhibit F teaches the very opposite. Thus, Patent Owner respectfully submits that such factual assertions are improperly officially noticed and hereby rebuts such purported Official Notice taken by the Office. Withdrawal of this ground of rejection is requested.

The Office alleges on page 26 of the Office Action that:

> ...the differences between the claimed invention and the embodiment expressly disclosed by EP 966, Fig. 3, are merely differences in nonfunctional descriptive material. Accordingly, these differences do not patentably distinguish the claimed invention over the prior art. See MPEP § 2111.05.

Office Action, p. 26, last full paragraph.

Patent Owner respectfully disagrees. In particular, MPEP 2111.05 Section I paragraph A, states, in part (emphasis added):

> To be given patentable weight, the printed matter and associated product must be in a functional relationship. A functional relationship can be found where the ***printed matter performs some function with respect to the product to which it is associated***. See Lowry, 32 F.3d at 1584(citing Gulack, 703 F.2d at 1386). For instance, ***indicia on a measuring cup perform the function of indicating volume within that measuring cup***. See In re Miller, 418 F.2d 1392, 1396, 164 USPQ 46, 49 (CCPA 1969).

Likewise, the indicia of slope on the roof estimate report referred to in claim 8 of the '436 Patent performs the function of indicating slope of the roof shown within that roof estimate report. Thus, this functional relationship is evidence that the roof estimate report does

not merely provide support for the indicia of slope on the roof estimate report, but the indicia of slope has a functional relationship with the roof shown within that report. The fact that the specific type of functional relationship may be different than that in *In re Miller* above is not relevant as a matter of law. See *In re Gulack*, which states (emphasis added):

> A ***functional relationship of the precise type*** found by the CCPA in Miller -to size or to type of substrate, or conveying information about substrate-***is not required***. What ***is*** required is the existence of ***differences between the appealed claims and the prior art*** sufficient to establish patentability. The bare presence ***or absence*** of a specific functional relationship, without further analysis, is ***not dispositive of obviousness***. Rather, the critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.

In re Gulack, 703 F.2d 1381, 1386 (Fed. Cir. 1983)

Thus, the relevant question is whether the functional relationship of the indicia of slope with the roof shown within the roof estimate report is new and nonobvious.[1] The language of claim 8, "wherein…***the slope is located next to an arrow indicating direction of the slope***" defines this functional relationship of the indicia of slope with the roof shown within the roof estimate report. As shown above, the Office has failed to present a *prima facie* case of obviousness of this feature of claim 8 and EP 966 does not teach or suggest this element.

Furthermore, MPEP 2111.05 states:

> USPTO personnel ***must*** consider ***all*** claim limitations when determining patentability of an invention over the prior art. In re Gulack, 703 F.2d 1381, 1385, 217 USPQ, 401, 403-04 (Fed. Cir. 1983). Since a claim must be read as a whole, USPTO personnel ***may not disregard claim limitations comprised of printed matter***. See Gulack, 703 F.2d at 1384, 217 USPQ at 403; see also Diamond v. Diehr, 450 U.S. 175, 191, 209 USPQ 1, 10 (1981).

Additionally, *In re Gulack states:*

> Differences between an invention and the prior art cited against it ***cannot be ignored merely because those differences reside in the content of the printed***

[1] *In re Gulack*, 703 F.2d 1381, 1386 (Fed. Cir. 1983), states (emphasis added): A functional relationship of the precise type found by the CCPA in Miller -to size or to type of substrate, or conveying information about substrate-is not required. What is required is the existence of differences between the appealed claims and the prior art sufficient to establish patentability. The bare presence or absence of a specific functional relationship, without further analysis, is not dispositive of obviousness. Rather, the ***critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.***

> ***matter***. Under section 103, the board cannot dissect a claim, excise the printed matter from it, and declare the remaining portion of the mutilated claim to be unpatentable. The claim ***must be read as a whole***.

In re Gulack, 703 F.2d 1381, 1385 (Fed. Cir. 1983)

Therefore, since the language of claim 8 "wherein…***the slope is located next to an arrow indicating direction of the slope***" defines a functional relationship of the indicia of slope with the roof shown within the roof estimate report and EP 966 does not teach or suggest this element, it must be given patentable weight.

Therefore claim 8 is not obvious in view of EP 966 for at least the additional reasons above.

Additionally, dependent claim 10, which depends from claim 1, recites "…wherein the different types of roof properties include a ridge line and a valley line and ***the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). EP 966 does not teach or suggest this feature.

The Office agrees on page 28 of the Office Action that EP 966 does not explicitly disclose "the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley" as recited in claim 10, but alleges it would be obvious to one of ordinary skill in the art at the time the invention was made in view of EP 966 to use "at least two different indicia" that "include one color of a line associated with a ridge and a different color of a line associated with a valley" as recited in claim 10. Patent owner respectfully disagrees.

The Office points to paragraph 23 of EP 966, which states, in part (emphasis added) "In the previously proposed application, it is conceivable, for example, to mark graphically in color the outline of roof surfaces that form the object in order to highlight it. This display is extremely user friendly." However, highlighting the outline of the roof surface to be "user friendly" is not a reason for using one color for a ridge line and another color for a valley. Using one color for a ridge line and another color for a valley is not done for highlighting or for mere ornamental purposes; it is done to distinguish ridges from valleys. In the EP '966 this was

done on the computer screen and all outlines were likely same color. It was not done to provide the function of showing which lines were ridges and which were valleys.

Having colored lines perform the function of showing ridges and valleys serves an important specific function to indicate to the builder, roof renovator or other user of the report which line is a valley and which line is a ridge such that the direction of slope can be easily determined when looking at the flat top plan view of the roof in the roof estimate report. Thus, it is not merely an ornamental feature. EP 966 does not teach or suggest such a reason, or any reason at all, to specifically distinguish ridges from valleys, let alone using two different colors to do so.

Furthermore, the Office alleges on page 29 of the Office Action, that:

> ...the differences between the claimed invention and the prior art are merely differences in nonfunctional descriptive material. Accordingly, these differences do not patentably distinguish the claimed invention over the prior art. See MPEP 2111.05.

Office Action, p. 29, first full paragraph

Patent Owner respectfully disagrees for the reasons previously explained and will not repeat them here to save space.

The indicia of one color of a line associated with a ridge and a different color of a line associated with a valley on the roof estimate report referred to in claim 10 performs the function of distinguishing ridges from valleys of the roof shown within that roof estimate report for the reasons stated above. Thus, this functional relationship is evidence that the roof estimate report does not merely provide support for the indicia of different colors, but the indicia of different colors has a functional relationship with the roof shown within that report. The fact that the specific type of functional relationship may be different than that in *In re Miller* above is not relevant as a matter of law. See *In re Gulack*, which states (emphasis added):

> A ***functional relationship of the precise type*** found by the CCPA in Miller -to size or to type of substrate, or conveying information about substrate-***is not required***. What ***is*** required is the existence of ***differences between*** the appealed ***claims and the prior art*** sufficient to establish patentability. The bare presence ***or absence*** of a specific functional relationship, without further analysis, is ***not dispositive of obviousness***. Rather, the critical question is whether there exists any

> new and unobvious functional relationship between the printed matter and the substrate.

In re Gulack, 703 F.2d 1381, 1386 (Fed. Cir. 1983)

Therefore, the relevant question is whether the functional relationship of the indicia of different colors with the roof shown within the roof estimate report is new and nonobvious.[2] The language of claim 8, "...wherein the different types of roof properties include a ridge line and a valley line and ***the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" defines this functional relationship of the indicia of different colors with the roof shown within the roof estimate report. As shown above, the Office has failed to present a *prima facie* case of obviousness of this feature of claim 10 and EP 966 does not teach or suggest this element.

Furthermore, MPEP 2111.05 states:

> USPTO personnel ***must*** consider ***all*** claim limitations when determining patentability of an invention over the prior art. In re Gulack, 703 F.2d 1381, 1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983). Since a claim must be read as a whole, USPTO personnel ***may not disregard claim limitations comprised of printed matter***. See Gulack, 703 F.2d at 1384, 217 USPQ at 403; see also Diamond v. Diehr, 450 U.S. 175, 191, 209 USPQ 1, 10 (1981).

Additionally, In re Gulack states:

> Differences between an invention and the prior art cited against it ***cannot be ignored merely because those differences reside in the content of the printed matter***. Under section 103, the board cannot dissect a claim, excise the printed matter from it, and declare the remaining portion of the mutilated claim to be unpatentable. The claim ***must be read as a whole***.

In re Gulack, 703 F.2d 1381, 1385 (Fed. Cir. 1983)

Therefore, since the language of claim 10 "...wherein the different types of roof properties include a ridge line and a valley line and ***the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***"

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[2] *In re Gulack*, 703 F.2d 1381, 1386 (Fed. Cir. 1983), states (emphasis added): A functional relationship of the precise type found by the CCPA in Miller -to size or to type of substrate, or conveying information about substrate- is not required. What is required is the existence of differences between the appealed claims and the prior art sufficient to establish patentability. The bare presence or absence of a specific functional relationship, without further analysis, is not dispositive of obviousness. Rather, the ***critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.***

defines a functional relationship of the indicia of different colors with the roof shown within the roof estimate report and EP 966 does not teach or suggest this element, it must be given patentable weight.

Thus, EP 966 does not teach or suggest all the limitations of claim 10 and claim 10 is not obvious in view of EP 966 for at least these additional reasons.

Additionally, dependent claim 13, which depends from claim 1, recites "...wherein the different types of roof properties include a ridge length and a valley length and ***the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). Although the language of dependent claim 13 is not identical to that of dependent claim 10, the nonobviousness of claim 13 for reasons additional to those with respect to claim 1 will be apparent in view of the above discussion regarding dependent claim 10.

Additionally, dependent claim 17, which depends from claim 1, recites "...wherein the different types of roof properties include a slope and the at least two different ***indicia include a slope indicia, wherein the slope indicia is an arrow in a direction of the slope with a numerical value adjacent thereto***" (emphasis added). Although the language of dependent claim 17 is not identical to that of dependent claim 8, the nonobviousness of dependent claim 17 for reasons additional to those with respect to claim 1 will be apparent in view of the above discussion regarding dependent claim 8.

Therefore, the Office has failed provide a *prima facie* case of obviousness for claims 1-17 and claims 1-17 are not obvious in view of EP 966 for at least the reasons presented above.

Independent method claim 18 as amended recites (emphasis added):

> 18. A computer-implemented method for generating a roof estimate, the method comprising:
>
> receiving a first and a second aerial image of a building having a roof, each of the aerial images providing a different view of the roof of the building *wherein the first aerial image provides a top plan view of the roof and the second aerial image provides a view of the roof that is other than a top plan view and neither of the two images are part of a stereoscopic pair;*
>
> correlating the first aerial image with the second aerial image;

> generating, based at least in part on the correlation between the first and second aerial images, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding slope, area, and edges; and
>
> transmitting a roof estimate report that includes one or more top plan views of the three-dimensional model annotated with numerical indications of at least one of the slope, area, and lengths of the edges of the plurality of planar roof sections, wherein the roof estimate report includes at least two different indicia for different types of roof properties.

EP 966 does not teach or suggest the feature of "each of the aerial images providing a different view of the roof of the building **wherein the first aerial image provides a top plan view of the roof and the second aerial image provides a view of the roof that is other than a top plan view and neither of the two images are part of a stereoscopic pair**;" as recited in claim 18 as amended (emphasis added). Instead, in the system described in EP 966, the images are taken and received as a stereoscopic pair and the raw data comes already matched as a stereoscopic pair. The images in a stereoscopic pair are not taken independent of each other, let alone at different times and on different dates as recited in claim 18, as they include geometric image data and parameter data that contain highly detailed information on the camera angle of the image pairs with respect to each other (see paragraph 2 of EP 966), the benefit of which the claimed invention of the '436 Patent does not make use.

The fact that the '436 Patent does not make use of the benefit of use of such stereoscopic pairs of images and associated stereoscopic parameter data is further supported by the attached Declarations of Jones and Curless which are incorporated herein by reference, the details of which are not repeated here to save space. In contrast, the system of EP 966 requires such stereoscopic pairs of images and associated stereoscopic parameter data and other image recording parameters in order to form the three-dimensional object description in that system. This is shown in the excerpts below from paragraphs 1 and 2 in EP 966 previously quoted and not repeated here.

Furthermore, the use of such stereoscopic pairs of images and associated stereoscopic parameter data are explicitly recited in claim 1 of EP 966 as that from which the 3D object data are calculated. This is further evidence that use of such stereoscopic pairs of images and associated stereoscopic parameter data are necessary and required in the system of EP 966 in

order to produce the 3D model description of that system, thereby excluding and teaching away from the use of images taken independent of each other. In particular claim 1 of EP 966 recites, in part (emphasis added):

> 1. A method of producing a three-dimensional object description of a located spatial object - in particular a building - ***from stereoscopic pairs of aerial pictures***, in which
>
> - from the pairs of aerial pictures two-dimensional image data ***and stereoscopic parameter data are stored digitized as three-dimensional raw data*** in a data processing installation;
>
> - two-dimensional orthophoto-data and three dimensional object data are ***calculated from the raw data***...

Thus, EP 966 fails to teach or suggest the amended claim feature of "receiving a first and a second aerial image of a building having a roof, each of the aerial images providing a different view of the roof of the building "**wherein the first aerial image provides a top plan view of the roof and the second aerial image provides a view of the roof that is other than a top plan view and neither of the two images are part of a stereoscopic pair**."

Since dependent claims 19-35 inherit the limitations of the corresponding independent claim 18 from which they depend, EP 966 also does not teach or suggest all the limitations of any of dependent claims 19-35 for at least the same reasons presented above regarding claim 18.

Therefore, claims 18-35 are not obvious in view of EP 966 for at least the reasons presented above.

Additionally, dependent method claim 20, which depends from claim 18, recites "...wherein correlating the first and second aerial images ***includes receiving an indication of one or more corresponding points shown in each of the first and second aerial images***" (emphasis added). Although the language of dependent method claim 20 is not identical to that of dependent system claim 2, the nonobviousness of claim 20 for reasons additional to those with respect to independent claim 18 will be apparent in view of the above discussion regarding dependent claim 2.

Additionally, dependent method claim 22, which depends from claim 18, recites "...wherein ***generating the three-dimensional model includes receiving an indication of at least one of a ridgeline of the roof, a valley of the roof, an edge of the roof, a hip of the roof, and a gable of the roof***" (emphasis added). Although the language of dependent method claim 22 is not identical to that of dependent system claim 3, the nonobviousness of claim 22 for reasons additional to those with respect to independent claim 18 depends will be apparent in view of the above discussion regarding dependent claim 3.

Additionally, dependent method claim 26, which depends from claim 18, recites "...wherein ***the length is located adjacent to a line representing a segment, the slope is located next to an arrow indicating direction of the slope and the area is located within a section having the area***" (emphasis added). Although the language of dependent method claim 26 is not identical to that of dependent system claim 8, the nonobviousness of claim 26 for reasons additional to those with respect to independent claim 18 will be apparent in view of the above discussion regarding dependent claim 8.

Additionally, dependent method claim 28, which depends from claim 18, recites "...***wherein the different types of roof properties include a ridge line and a valley line and the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). Although the language of dependent method claim 28 is not identical to that of dependent system claim 10, the nonobviousness of claim 28 for reasons additional to those with respect to independent claim 18 will be apparent in view of the above discussion regarding dependent claim 10.

Additionally, dependent method claim 31, which depends from claim 18, recites "...wherein ***the different types of roof properties include a ridge length and a valley length and the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). Although the language of dependent method claim 31 is not identical to that of dependent system claim 10, the nonobviousness of claim 31 for reasons additional to those with respect to independent claim 18 will be apparent in view of the above discussion regarding dependent claim 10.

Additionally, dependent method claim 35, which depends from claim 18, recites "*...**wherein the different types of roof properties include a slope and the at least two different indicia include a slope indicia, wherein the slope indicia is an arrow in a direction of the slope with a numerical value adjacent thereto***" (emphasis added). Although the language of dependent method claim 35 is not identical to that of dependent system claim 8, the nonobviousness of claim 35 for reasons additional to those with respect to independent claim 18 will be apparent in view of the above discussion regarding dependent claim 8.

Therefore, allowance of amended claims 18-35 is respectfully requested.

Independent computer-readable storage medium claim 36 as amended recites (emphasis added):

> 36. (Amended) A non-transitory computer-readable storage medium whose contents, *which are computer executable instructions stored on the non-transitory computer-readable storage medium, when executed by a computer processor of a computing system,* enable the computing system to generate a roof estimate report for a building having a roof, by causing, when executed by the computer processor of the computing system, the computing system to perform a method comprising:
>
> receiving *two or more images of the building, wherein at least one of the two or more images provides an oblique perspective view of the roof and one of the images provides a top plan view of the roof;*
>
> *receiving an indication of pairs of points on the two or more images, each pair of points corresponding to substantially the same point on the roof depicted in each of the two or more images;*
>
> *generating, based on the two or more images of the building, a three-dimensional model of the roof that includes a plurality of planar roof sections that each have a corresponding area and edges, wherein the generating, based on the two or more images of the building, the model of the roof includes generating the model of the roof based on the receiving the indication of the pairs of points on the two or more images of the building*; and . . ."

EP 966 does not teach or suggest the claimed features of:

> "*two or more images of the building, wherein at least one of the two or more images provides an oblique perspective view of the roof and one of the images provides a top plan view of the roof;*

> *receiving an indication of pairs of points on the two or more images, each pair of points corresponding to substantially the same point on the roof depicted in each of the two or more images;*
>
> *generating, based on the two or more images of the building. . .*"

as recited in amended claim 36. In contrast, EP 966 discloses using stereoscopic ***pairs*** of images to perform a "three-dimensional model calculation" (paragraph 16 of EP 966), not "generating ***a two-dimensional model*** of the roof based on a ***single*** aerial image of the roof" as recited in amended claim 36.

Novak fails to cure the deficiencies of EP 966 described above with respect to this feature that EP 966 lacks. The Office alleges Novak teaches "generating a ***two-dimensional model*** of the object based on a single image" (page 48, lines 15-16 of the Office Action, emphasis added). Patent Owner respectfully submits this is incorrect. What Novak teaches is merely calculating measurements of objects and distances between objects in the image (see paragraph 65 of Novak). This is not the same as actually generating a two-dimensional ***model*** of the object. In particular, paragraph 65 of Novak shows how measurement values are merely calculated without actually building any model (emphasis added):

> In the fourth step 440 the user selects a point at the right edge of the pole and a point at the left edge of the pole at the location that the pole diameter is desired. The image processor 190 automatically ***determines the distance*** in pixel units of measure between the selected points. The ***diameter*** of the pole at reference point "A" is then ***calculated*** 450 by multiplying the image scale at point "A" With the pixel separation distance. Lastly, once the diameter is known the ***circumference*** of the pole at point "A" is ***calculated*** 460 using principles of geometry. With the diameter known and the image processor's 190 ability to ***determine the distance*** between any two substantially coplanar points on the pole, a myriad of other ***calculations*** may be performed including, for instance, the surface area ***calculation*** and the volume ***calculation***. Further, one with skill in the art can appreciate that in addition to cylindrical objects, the area and perimeter of all planar geometric shapes may be easily ***calculated*** by simply identifying the critical distances on the shape.

Thus, despite the conclusion of the Office, nowhere does Novak teach generating a ***two-dimensional model*** of the object based on a single image. The fact that Novak does not teach generating a two-dimensional model of the object based on a single image and merely

calculates measurements of objects and distances between objects in the image is further supported by the attached Declaration of Jones, he states:

> 22. The Novak reference describes calculating distances between points in a single image that are identified as being coplanar on a plane parallel to the image plane. However, points on a planar surface of the roof in an aerial image of the roof are rarely coplanar on a plane parallel to the image plane unless the planar surface of the roof is flat (i.e., has no pitch).

Jones Declaration, ¶ 22.

In addition, the Declaration of Curless states:

> I have also read the Novak patent, US 2003/0103651 A1. This patent concerns an invention for measuring the distance between points in a single, predominantly vertical plane based on a single image. It requires a substantial amount of extra equipment beyond a camera for the task, including a rangefinder to measure the distance to a point on a plane and devices to measure the orientation (at least, bearing/yaw and azimuth/pitch, perhaps assuming no roll) of the camera. Further, the camera must be calibrated with the aid of a large, planar calibration pattern roughly the size of the target plane to be measured; such a pattern can then be used to estimate camera focal length and lens distortion. This invention is substantially different from the one described in the '578 and '436 Patents. First and foremost, roofs are generally not comprised of a single, predominantly vertical plane; rather, they consist of a set of pitched facets that are not generally coplanar with each other. The Novak patent is intended for capturing vertical structures with a camera mounted on a tripod or equivalent to photograph a predominantly vertical planar structure, as opposed to the aerial imagery used to recover multi-faceted, upward-facing roofs in '578 and '436. In addition, the Novak patent requires substantial equipment and large, custom calibration patterns to estimate camera parameters before measuring distances between co-planar scene points from a single image. By contrast, the '578 and '436 Patents start just from two or more images (one of them a top-down view) without camera additional information, other than an image scale marker in one of the images.

Curless Declaration, pp. 15 and 16.

Therefore, the assertion as to what Novak teaches is incorrect.

In support of an argument that a person would have been motivated to combine the teachings of EP 966 and Novak, the Office states "In forming the combination, it would have been obvious that the 'planar geometric shapes' (Novak, ¶ 0065) of interest would be planar sections of a building roof (e.g., EP 966, ¶ 0003)." Patent Owner respectfully disagrees.

Novak states in paragraph 65 that "all planar geometric shapes may be easily calculated by simply ***identifying the critical distances on the shape***" (emphasis added). In Novak, these critical distances are determined between two substantially "***coplanar***" points in the image. This is reiterated throughout the specification of Novak. For example, the Abstract of Novak states "A photogrammetric apparatus for capturing a single image of an object, capturing a plurality of data about the image, analyzing the data, and computing relationships between substantially ***coplanar points in the image...*** The image processor includes routines for calibrating the apparatus, measuring distances between substantially coplanar points in the image, and calculating a plurality of relationships among various ***coplanar points in the image***" (emphasis added). This is also shown in the calculation of measurements in paragraph 65 of Novak, which states, in part "determine the distance between any two substantially ***coplanar*** points on the pole" (emphasis added). Paragraph 17 describes the process in which the user provides input indicating "at least ***two coplanar points in the image*** that are substantially ***coplanar on the real world target of interest***... For example, the distance between various points on a substantially ***coplanar utility*** pole may be calculated. More specifically, the point can correspond to ***cables or equipment on the pole***" (emphasis added).

The use of the term "coplanar" in Novak is "the conventional use in the context of geometric applications" (paragraph 10 of Novak), which means that "coplanar" refers to "lying in the same plane" (Collins English Dictionary – Complete and Unabridged, HarperCollins Publishers 1991, 1994, 1998, 2000, 2003). Since the "at least two coplanar points" described in Novak can be on objects with rounded surfaces such as cylindrical utility poles and cables on the pole as shown above, which do not have flat physical planar surfaces, the plane referred to in Novak on which the "at least two coplanar points" lie must be some imaginary plane in 3D space. However, any two points in 3D space are lying on some same imaginary "plane" in 3D space. Thus, for "at least two coplanar points in the image" being "coplanar" in Novak to have any significance or meaning in Novak, the imaginary plane in 3D space on which the two coplanar points lie must be with respect to some reference plane. That reference plane is the "image plane IP" of Novak (see at least paragraph 58 and Fig. 3 of Novak). This is because in Novak, the calculated real world distance between the "at least two coplanar points in the image"

is according to the distance in pixels between the points on the single image itself adjusted for scale. Thus, if the selected points in the image were ***not*** coplanar on a plane in 3D space that is substantially parallel to the reference "image plane IP" of Novak (e.g., if one point was on a utility pole in the foreground of the image and the other point was on a distant mountain in the background), the distance in pixels between the points on the image would be of no use in calculating the real world distance between the points in the image. This is evidenced in paragraph 65 of Novak, which states, "The image processor 190 automatically determines the distance ***in pixel units of measure between the selected points***. The diameter of the pole at reference point 'A' is then calculated 450 by ***multiplying the image scale*** at point 'A' with the ***pixel separation distance***" (emphasis added).

For at least the foregoing reasons, Patent owner respectfully requests the applicable rejection of claim 36 be withdrawn.

Since dependent claims from 36 inherit the limitations of the corresponding independent claim 36 from which they depend, EP 966 also does not teach or suggest all the limitations of any of dependent claims for at least the same reasons presented above regarding claim 36.

Additionally, dependent method computer-readable storage medium claim 37, which depends from claim 36, recites as amended (emphasis added):

> 37. The non-transitory computer-readable storage medium of claim 36 wherein generating the model further includes:
>
> ***correlating two of the one or more images by receiving an indication of one or more corresponding points on the building shown in each of the two images***; and
>
> generating a three-dimensional model ***based on the correlation between two of the one or more images***.

EP 966 does not teach or suggest all the limitations of claim 37 as amended. For example, EP 966 does not teach or suggest "correlating two of the one or more images by receiving an indication of one or more corresponding points on the building shown in each of the two images" as recited in claim 37 as amended. Paragraph 11 of EP 966 describes how the "building address data containing a street name and house number" (i.e., the "factual data" of EP

966) is stored together with the "two-dimensional orthophoto data" of EP 966. There is no mention of correlating any particular corresponding points in the first and second aerial images, let alone "corresponding points ***on the building*** shown in each of the first and second aerial images" as recited in claim 37 as amended (emphasis added).

Paragraph 24 of EP 966 discloses that "the desired roof surface can be marked by clicking" to request the description of the roof. There is no mention in EP 966 of indicating a particular point on the building, only the user marking the roof surface generally to identify which roof the request is for. Also, there is no mention in EP 966 of correlating any particular corresponding points in any first and second aerial images. Even if the user did mark a particular a point on the building in an image in EP 966 to identify the roof for the request, there is no teaching or suggestion of receiving any indication of a point on another image specifically corresponding to that point marked by the user in EP 966.

Therefore, EP 966 does not teach or suggest all the limitations of claim 37 as amended and claim 37 is not obvious in view of EP 966 for at least these additional reasons.

Additionally, dependent method computer-readable storage medium claim 47, which depends from claim 36, recites "...wherein ***the length is located adjacent to a line representing a segment, the slope is located next to an arrow indicating direction of the slope and the area is located within a section having the area***" (emphasis added). Although the language of dependent computer-readable storage medium claim 47 is not identical to that of dependent system claim 8, the nonobviousness of claim 47 for reasons additional to those with respect to independent claim 36 will be apparent in view of the above discussion regarding dependent claim 8.

Additionally, dependent computer-readable storage medium claim 49, which depends from claim 36, recites "...***wherein the different types of roof properties include a ridge line and a valley line and the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). Although the language of dependent computer-readable storage medium claim 49 is not identical to that of dependent system claim 10, the nonobviousness of claim 49 for reasons

additional to those with respect to independent claim 36 will be apparent in view of the above discussion regarding dependent claim 10.

Additionally, dependent computer-readable storage medium claim 52, which depends from claim 36, recites "...wherein ***the different types of roof properties include a ridge length and a valley length and the at least two different indicia include one color of a line associated with a ridge and a different color of a line associated with a valley***" (emphasis added). Although the language of dependent computer-readable storage medium claim 52 is not identical to that of dependent system claim 10, the nonobviousness of claim 52 for reasons additional to those with respect to independent claim 36 will be apparent in view of the above discussion regarding dependent claim 10.

Additionally, dependent computer-readable storage medium claim 56, which depends from claim 36, recites "...***wherein the different types of roof properties include a slope and the at least two different indicia include a slope indicia, wherein the slope indicia is an arrow in a direction of the slope with a numerical value adjacent thereto***" (emphasis added). Although the language of dependent computer-readable storage medium claim 56 is not identical to that of dependent system claim 8, the nonobviousness of claim 56 for reasons additional to those with respect to independent claim 36 will be apparent in view of the above discussion regarding dependent claim 8.

For at least the foregoing reasons, claims 1-5, 7-42 and 46-56 are not obvious in view of EP 966 and Patent owner respectfully requests the applicable rejections of claims 1-5, 7-42 and 46-56 be withdrawn.

C. Rejection of dependent claim 6 under 35 U.S.C. § 103 as being unpatentable over EP 966 in view of Aerodach Website

Claim 6 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over EP 966 in view of Aerodach Website. Patent owner respectfully traverses the rejection.

The Aerodach Website fails to cure the deficiencies of EP 966 described above with respect to claim 1 as amended and the Office does not allege the Aerodach Website teaches or suggests the features described above of claim 1 that EP 966 lacks. Since dependent claim 6

inherits all the limitations of independent claim 1 from which it depends, the combination of EP 966 and the Aerodach Website also does not teach or suggest all the limitations of dependent claim 6 for at least the same reasons presented above regarding claim 1.

Therefore, the Office has failed provide a *prima facie* case of obviousness of claim 6 over EP 966 in view of Aerodach Website and claim 6 is also not obvious over EP 966 in view of Aerodach Website for at least the reasons presented above.

For at least the foregoing reasons, Patent owner respectfully requests the applicable rejection of claim 6 be withdrawn.

D. Rejections of claims 1-5, 7-42 and 46-56 under 35 U.S.C. § 103 as being unpatentable over EP 966 in view of alleged Applicant's Admitted Prior Art

Claims 1-5, 7-42 and 46-56 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over EP 966 in view of alleged Applicant's Admitted Prior Art ("AAPA").

Patent owner respectfully traverses the rejections and the allegations of admitted prior art.

It appears the Office is alleging that several claim elements of claims 1-5, 7-42 and 46-56 are Applicant's Admitted Prior Art and also that several portions of the Detailed Description section of the specification of the Patent are Applicant's Admitted Prior Art.

MPEP 2129 Section I states (emphasis added):

> A statement by an applicant > in the specification or made < during prosecution ***identifying*** the work ***of another*** as "***prior art***" is an admission ** > which can be relied upon for both anticipation and obviousness determinations, regardless of whether the admitted prior art would otherwise qualify as prior art under the statutory categories of 35 U.S.C. 102. Riverwood Int'l Corp. v. R.A. Jones & Co., 324 F.3d 1346, 1354, 66 USPQ2d 1331, 1337 (Fed. Cir. 2003); Constant v. Advanced Micro-Devices Inc., 848 F.2d 1560, 1570, 7 USPQ2d 1057, 1063 (Fed. Cir. 1988). < However, even if labeled as "prior art," ***the work of the same inventive entity may not be considered prior art*** against the claims ***unless*** it falls under one of the statutory categories. Id.; see also Reading & Bates Construction Co. v. Baker Energy Resources Corp., 748 F.2d 645, 650, 223 USPQ 1168, 1172 (Fed. Cir. 1984) ("[W]here the inventor continues ***to improve upon his own work*** product, his foundational work product should ***not***, without a statutory basis, ***be treated as prior art*** solely because he admits knowledge of his own work. It is

> common sense that an inventor, regardless of an admission, has knowledge of his own work.").
>
> Consequently, the examiner ***must*** determine whether the subject matter identified as "prior art" is applicant's ***own work, or the work of another***. In the absence of another credible explanation, examiners should treat such subject matter as the work of another.
>
> MPEP 2129 Section II states (emphasis added):
>
> Where the specification identifies work done ***by another*** as "prior art," the subject matter so identified is treated as admitted prior art. In re Nomiya, 509 F.2d 566, 571, 184 USPQ 607, 611 (CCPA 1975) (holding applicant's labeling of two figures in the application drawings as "prior art" to be an admission that what was pictured was prior art relative to applicant's improvement).
>
> Additionally:
>
> A finding of obviousness should ***not*** be based on an ***implied admission*** erroneously creating imaginary prior art. That is ***not*** the intent of s 103.

Application of Ehrreich, 590 F.2d 902, 910 (C.C.P.A. 1979).

The Office has failed to present even a *prima facie* case that the several claim elements and the quoted portions of the Detailed Description of the Patent are admitted prior art.

First, there is no label of anything in the Patent as "prior art."

As a showing to rebut the allegation that this material is admitted prior art, the Declaration of an inventor, Chris Pershing, is attached and incorporated herein by reference. In this declaration, paragraphs 20 and 21, the inventor sets forth his statement the text asserted by the Examiner to be prior art are not, in fact prior art. Many times, the recognition of a problem is part of the inventive solution and once the problem is properly framed, again often an inventive step, the solution can be approached in a more straight forward fashion. In addition, the application of previously known math is solve a new problem and arrive at new solution is considered inventive. Mr. Pershing admits that he did not invent new math. What Mr. Pershing did was recognize a problem and then work out a solution to that problem. As he worked out a solution to that problem, he was able to use math that had been applied to different problems to reach a new solution in the creation of roof reports. As he points out in his declaration, he realizes that others might use different systems, software code and math from what he used to

achieve his claimed invention of the '436 Patent. This recognition does not render the statements in the '436 Patent as prior art.

Mr. Pershing states in his declaration as follows:

> In fact, I am an inventor of the subject matter of Column 6, lines 50-67 and Column 7, lines 1-7. I do not admit that any of this description is prior art since it is not. I defined a problem that others had not recognized and then created a solution to that problem, which I explained in the '436 patent, including in Columns 6 and 7. Of course, I did not invent the math for performing the image analysis solely from the image data files, (it is rare that someone invents math) but what I did was identify a significant problem in the roofing industry, and I also determined which math should be applied to solve that particular problem. This required a significant creative process. I did invent, create and teach in the '578 and '436 patents the steps and mechanisms by which known math could be used to solve a new problem that no one had been able to solve previously.

Pershing Declaration, ¶ 20.

Mr. Pershing explains in paragraphs 20 and 21 that these portions of the '436 Patent are not prior art and the Examiner is invited to read these two paragraphs from his Declaration in detail.

Further, the Office does not provide any reason, rationale or support for various conclusions that quoted sections of the Detailed Description of the Patent are admitted prior art. The Office merely quotes sections of the MPEP and quotes sections of the Detailed Description concluding they are admitted prior art.

While the Office has stated that the language from the claims and Detailed Description of the Patent quoted on pages 53-63 of the Office Action is specifically ***Applicant's*** Admitted Prior Art and not the work of another (although the required reasoning or rationale is not provided by the Office for this conclusion), as shown above, MPEP § 2129 Section I states "***the work of the same inventive entity may not be considered prior art*** against the claims ***unless*** it falls under one of the statutory categories" (emphasis added). However, there is no indication by the Office that the work purported by the Office to be Applicant's Admitted Prior Art falls under one of the statutory categories. Therefore, the work purported by the Office to be Applicant's Admitted Prior Art "***may not be considered prior art*** against the claims" (see MPEP

2129 Section I, *Riverwood Int'l Corp. v. R.A. Jones & Co.*, 324 F.3d 1346 (Fed. Cir. 2003) and *Constant v. Advanced Micro-Devices Inc.*, 848 F.2d 1560 (Fed. Cir. 1988)).

Fifth, since there is no label of anything in the Patent as "prior art" and the Office does not provide any reason, rationale or support for the conclusion that various quoted sections of the Detailed Description are Admitted Prior Art, it appears the Office may somehow be interpreting the particular quoted language from the claims and Detailed Description of the Patent to be ***implied*** admissions of prior art. However, "a finding of obviousness should ***not*** be based on an ***implied*** admission erroneously creating imaginary prior art. That is ***not*** the intent of s 103." *Application of Ehrreich*, 590 F.2d 902, 910 (C.C.P.A. 1979).

Thus, for at least the foregoing reasons, The Office has failed to present even a *prima facie* case that the that the language from the claims and Detailed Description of the Patent quoted on pages 53-63 of the Office Action are Applicant's Admitted Prior Art. Even if such a case has been shown, this response, together with the declaration by Mr. Pershing overcomes this showing the assertion that the material is AAPA should be withdrawn.

For at least the foregoing reasons, Patent owner respectfully requests this rejection of claims 1-5, 7-42 and 46-56 be withdrawn.

E. Rejection of claim 6 under 35 U.S.C. § 103(a) as being unpatentable over EP 966 in view of alleged Applicant's Admitted Prior Art, further in view of Aerodach Website

Claim 6 is rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over EP 966 in view of alleged Applicant's Admitted Prior Art, further in view of Aerodach Website.

Patent owner respectfully traverses the rejections and the allegations of admitted prior art for the reasons previously stated and does not repeat them here to save space.

For at least the foregoing reasons, Patent owner respectfully requests the applicable rejection of claim 6 be withdrawn.

F. New Claims 57-66

Patent owner had added 10 new claims, 57-66. The general content of some of these claims was in broad terms during the interview, notably, claims 63-66, as explained below.

New claims 58 and 60 specify the use of three different views, something which is clearly beyond what is taught in the EP '966 or any other combination of prior art. Claims 58 and 60 cover the correlation of three images, something which is not possible with stereo pairs of images, but which is clearly taught in the '436 Patent, Figures 5A and 5B. Claims 58, 60 and claims dependent thereon are believed allowable and allowance is respectfully requested.

In addition, claim 63 specifies in more clear terms that the markings of pitch values and direction, line colors and meaning are first determined and then displayed to convey certain meanings. This is believed to clearly define these markings in a manner discussed during the interview and suggested by the Examiner. The new claim 63 is therefor along the very lines of the text and language of the interview and should be allowed as discussed.

G. Secondary Considerations of Nonobviousness

The Eagle View story and its nexus with the claimed invention of the '436 and '578 Patents is best told in the Declaration of co-inventor, Chris Pershing, who is the Chief Technical Officer of Eagle View Technologies, Inc., the Patent Owner. The Pershing Declaration should be read at one time as a whole from beginning to end to appreciate the magnitude of his invention's impact on the roof estimation industry. It paints the picture and is evidence of how this foundational and groundbreaking invention revolutionized the way roof measurements were done, and in a matter of just a few years, quickly made the Patent Owner a huge success in the industry directly due to the ingenuity of and great need in the market for the claimed invention. If there is any quintessential example of Patents for which objective indicia of nonobviousness should be considered and given substantial weight, it is the '436 and '578 Patents.

1. Law of Secondary Considerations of Nonobviousness

The legal requirement of giving substantial weight to secondary considerations of nonobviousness is clear as shown below. As shown below, secondary considerations of nonobviousness must be considered and are to be considered highly probative regarding nonobviousness. Although each case below was a panel decision, Judges Rader, Moore, Linn,

Reyna, and O'Malley all agree on the elevation of secondary considerations of nonobviousness. Emphasis below was added.

a. *Apple Inc. v. International Trade Com'n*, 725 F.3d 1356 (Fed Cir 2013). August 7, 2013

This case was held before Moore, Linn, and Reyna. Apple sued Motorola in the ITC alleging that Motorola smartphones and tablets infringe the '607 patent which discloses a multitouch panel with transparent capacitive sensing medium. The ITC found for Motorola, determining that an article describing SmartSkin rendered the claims obvious, and that the Perski '455 patent anticipated the '607 claims. Apple appealed to the Federal Circuit, which reversed the ITC, finding the ITC erred when it did not consider secondary considerations, which were significant. Moore and Linn remanded to ITC for further findings. Reyna dissented and wanted to reverse the ITC, emphasizing the importance of secondary considerations.

- "[I]t is axiomatic that "[t]he establishment of a prima facie case ... is not a conclusion on the ultimate issue of obviousness." Apple Inc. v. Int'l Trade Comm'n, 725 F.3d 1356, 1365 (Fed. Cir. 2013) citing Transocean, 699 F.3d at 1348.
- The ultimate conclusion of obviousness is a legal conclusion to be reached after weighing all the evidence on both sides. Id at 1365.
- "The ITC analyzed only the disclosure of the prior art references and based solely on that evidence determined the claims would have been obvious. We conclude that the ITC's fact findings regarding what the references disclose are supported by substantial evidence. And as the ALJ and the ITC found, the Smartskin reference is very close and expressly recommends as "Conclusions and Directions for Future Work" using transparent ITO electrodes to build a "transparent SmartSkin sensor." J.A. 13603. Indeed, the reference teaches that this transparent sensor could be integrated with "most of today's flat panel displays" because those systems rely on an "active matrix and transparent electrodes." Id. The ITC erred, however, to the extent that it did not analyze the secondary consideration evidence…This error was not harmless. Id at 1365-66.
- ***Secondary considerations*** evidence can ***establish*** that ***"an invention appearing to have been obvious*** in light of the prior art ***was not"*** and may be ***"the most probative*** and ***cogent evidence in the record***." Transocean, 699 F.3d at 1349 (quoting Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d

1530, 1538 (Fed.Cir.1983)). This evidence guards against the use of hindsight because it helps "turn back the clock and place the claims in the context that led to their invention." Mintz, 679 F.3d at 1378. Id at 1366.

- "Apple presented compelling ***secondary considerations evidence*** that may have ***rebutted*** even a ***strong*** showing under the first three Graham factors, and the ITC failed to grapple with it." Id. at 1366
- Apple showed secondary considerations through: (Id. at 1366)

  Evidence of industry praise by business publications

  Evidence of copying.

  A high degree of commercial success
- Apple showed a "nexus between the undisputed commercial success of the iPhone and the patented multitouch functionality, namely evidence that Apple's competitors copied its touchscreen and those in the industry praised the iPhone's multitouch functionality. Id. at 1366.

b. *Leo Pharmaceutical Products, Ltd. v. REA* 726 F.3d 1346 (Fed Cir 2013). August 12, 2013

This case was held before Rader, O'Malley, and Reyna. Plaintiff appealed from an inter partes re-examination of the '013 patent, where the Board incorrectly found the claimed invention would have been obvious in view of the prior art and incorrectly weighed the objective indicia of nonobviousness. The '013 patent teaches simultaneous treatment with vitamin D and corticosteroids to heal psoriasis faster, however combining these two elements does not result in a storage stable combination. The Board made an obviousness rejection based on three references involving a steroid compensation within a solvent, a vitamin D analog and a corticosteroid, and a composition of the vitamin D analog and a steroid. Furthermore, Board found that objective indicia of nonobviousness did not overcome the prima facie case of obviousness. The Fed Circuit reversed.

- Obviousness is a question of law based on underlying findings of fact. An analysis of obviousness must be based on several factual inquiries: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art at the time the invention was made; and (4) objective evidence of nonobviousness, if any." Citing In re Kubin, 561 F.3d 1351, 1355 (Fed.Cir.2009); see also

Graham v. John Deere Co., 383 U.S. 1, 17–18, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966). Leo Pharm. Products, Ltd. v. Rea, 726 F.3d 1346, 1353 (Fed. Cir. 2013)

- The '013 patent, however, is not simply a combination of elements found in the prior art. The inventors of the '013 patent recognized and solved a problem with the storage stability of certain formulations—a problem that the prior art did not recognize and a problem that was not solved for over a decade. Id. at 1353

- As an initial matter, an invention can often be the recognition of a problem itself. See Cardiac Pacemakers, Inc. v. St. Jude Med., Inc., 381 F.3d 1371, 1377 (Fed.Cir.2004) ("There can of course arise situations wherein identification of the problem is itself the invention."). Id. at 1353.

- The '013 patent's claimed combination would not have been obvious to try. "[W]here the ***prior art***, at best ***gives only general guidance*** as to the ***particular form*** of the claimed invention or ***how to achieve*** it, relying on ***an obvious-to-try theory*** to support an obviousness finding is ***impermissible***." In re Cyclobenzaprine Hydrochloride Extended–Release Capsule Patent Litigation, 676 F.3d 1063, 1073 (Fed.Cir.2012) (internal citations and quotation marks omitted). Further, "KSR did not create a presumption that all experimentation in fields where there is already a background of useful knowledge is 'obvious to try,' without considering the nature of the science or technology." Abbott Labs. v. Sandoz, Inc., 544 F.3d 1341, 1352 (Fed.Cir.2008). Id. at 1356

- Objective ***indicia of nonobviousness*** play a ***critical role*** in the obviousness analysis. They are "***not just a cumulative or confirmatory*** part of the obviousness calculus but ***constitute***[ ] ***independent evidence of nonobviousness***." Ortho–McNeil Pharm., Inc. v. Mylan Labs., Inc., 520 F.3d 1358, 1365 (Fed.Cir.2008). id. at 1358.

- Objective indicia "can be the most probative evidence of nonobviousness in the record, and enables the court to avert the trap of hindsight." Crocs, Inc. v. Int'l Trade Comm'n, 598 F.3d 1294, 1310 (Fed.Cir.2010) (internal quotation marks omitted). Here, the objective indicia of nonobviousness are crucial in avoiding the trap of hindsight when reviewing, what otherwise seems like, a combination of known elements. Id. at 1358.

- Leo Pharmaceuticals provided other objective indicia of non-obviousness. For example, the commercial success of Leo Pharmaceutical's Taclonex® ointment is a testament to the improved properties of the '013 patent's claimed invention. Taclonex® is the first FDA-approved drug to combine vitamin D and corticosteroids into a single formulation for topical application. While FDA approval is not determinative of nonobviousness, it can be relevant in evaluating the objective indicia of nonobviousness.

See Knoll Pharm. Co., Inc. v. Teva. Pharm. USA, Inc., 367 F.3d 1381, 1385 (Fed.Cir.2004). Id. at 1358.

- The ***record also shows evidence of long felt but unsolved need***, i.e., the need for a single formulation to treat psoriasis. The length of the intervening time between the publication dates of the prior art and the claimed invention can also qualify as an objective indicator of nonobviousness. See Ecolochem, Inc. v. S. Cal. Edison Co., 227 F.3d 1361, 1376–77 (Fed.Cir.2000). Id. at 1359.

- Here, the ***objective indicia***—taken in sum—are the ***most "probative evidence of nonobviousness*** ... enabl[ing] the court to avert the trap of hindsight." Crocs, Inc., 598 F.3d at 1310. Viewed through the lens of the objective indicia, as opposed to the hindsight lens used by the Board, the '013 patent would not have been not obvious over Turi in combination with Dikstein or Serup. Therefore, this court reverses the Board's obviousness determination. Id. at 1359.

c. *Rambus Inc. v. REA* 2013 WL 5312505 (Fed Cir. 2013) September 24, 2013; A Case About "Nexus"

This case was held before Moore, Linn, and O'Malley. Plaintiff applicant appealed the decision of the Be PAI which sustained PTO examiners rejection of claims on re-examination of the patent for a method of controlling a synchronous memory device. The Board found that 2 references, an Intel iAPX manual and an unexamined Japanese patent "Inagaki." The references and patent in question deal with clocking schemes to transfer bits. The Fed Circuit reversed the rejection and remanded.

- ***[O]bjective evidence can establish that "an invention appearing to have been obvious in light of the prior art was not.***" Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1538 (Fed.Cir.1983). In some cases, that evidence is "***the most probative and cogent evidence*** in the record." Id. It helps "***turn back the clock and place the claims in the context that led to their invention***." Mintz v. Dietz & Watson, Inc., 679 F.3d 1372, 1378 (Fed.Cir.2012). "For objective evidence ... to be accorded ***substantial weight***, its proponent must establish a ***nexus between the evidence and the merits of the claimed invention***." In re Kao, 639 F.3d 1057, 1068 (Fed.Cir.2011) (quoting Wyers v. Master Lock Co., 616 F.3d 1231, 1246 (Fed.Cir.2010)) (emphasis omitted) (internal quotation marks omitted). Rambus Inc. v. Rea, 2012-1634, 2013 WL 5312505 (Fed. Cir. Sept. 24, 2013)

- Objective evidence of nonobviousness ***need only be "reasonably commensurate with the scope of the claims***," and we ***do not require*** a patentee to produce objective evidence of nonobviousness ***for every potential embodiment*** of the claim. Kao, 639 F.3d at 1068; In re Glatt Air Techniques, Inc., 630 F.3d 1026, 1030 (Fed.Cir.2011) ("[W]e have consistently held that a patent applicant 'need not sell every conceivable embodiment of the claims in order to rely upon evidence of commercial success.' ") (quoting In re DBC, 545 F.3d 1373, 1384 (Fed.Cir.2008)). Id. at 8.

- Board found reasons that the Nexus for Objective considerations were met: Publication said that Fujitsu, NEC and Toshiba paid "substantial license fees to participate"

Furthermore, the MPEP states:

> Objective evidence relevant to the issue of obviousness ***must*** be evaluated by Office personnel. Id. at 17-18, 148 USPQ at 467. Such evidence, sometimes referred to as "secondary considerations," may include ***evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results***.
>
> MPEP 2141 Section II (emphasis added); Graham v. John Deere Co., 383 U.S. 1 at 17-18 (1966)

Nexus between the Claimed invention on the Secondary considerations.

The Pershing Declaration provides evidence that the invention of the '436 Patent has a nexus with several secondary considerations that weight strongly in favor of the patentability. The Examiner is requested to review the Pershing Declaration in detail for these facts.

The Pershing declaration shows a nexus between the invention claimed herein and the secondary considerations. It was the inventive feature of being able to produce accurate roof reports based solely on the image files that resulted in the so many of the secondary considerations being strongly in favor of patentability. One of the inventive features is the ability to use existing top plan images of locations and oblique perspective view together to create a roof report. It was this feature that others had not been able to do until Pershing showed them how, see paragraphs 8 and 9. It was this feature that opened up an existing library of images that were ready for use by the invention of the '436 Patent but had found only limited use prior to this date. This solved a long felt need in the art of roof repair estimates, a costly and dangerous problem for many years. It was this feature that others who had had full access to

these images for many years, for example Pictometry, did not know how to solve until Pershing showed them the way with his invention disclosed in the '436 Patent Application. People in the insurance claims business, for example Xactware, had tried and failed to achieve this result and did not know how until Mr. Pershing solved the problem. This shows failure by others, despite having both the motivation and the resources. In addition to the above, the invention created by the '578 Patent resulted in the foundation of an entirely new company, started in Mr. Pershing's basement, from scratch. It went from having a few employees and low sales to having about $50 million in sales in just 5 years.

The strong nexus between the invention and the sales increase is shown by a number of factors. First, the product covered by the '436 Patent was 100% of all their sales for the first several months and then became and remains about 95% of all revenue. Rarely does a company have the evidence to show that one product covered by its patent has this specific increase in sales over many years, see paragraph 13 of the Pershing declaration. Besides the fact that the product sold is made using the claimed features, a second way the nexus is shown is that it is the features of the claim, namely the ability to produce a roof report using only image files, that makes this product even possible and also available at such a low, reasonable price.

Establishing a nexus between the secondary considerations and the claimed features is made easier in this situation because it is the claimed features that make this product possible to produce and that opens up an existing library of images that could not be used unless the roof reports could be made using only the image files themselves.

There has been significant industry praise for the product produced by this claimed invention as shown by Mr. Pershing in his declaration, paragraph 14, 15 and 16 of his declaration. It is noted that same product practices both the '436 and the '578 patents, accordingly the nexus would be common for both patents on the secondary considerations.

2. Evidence of Long-felt But Unsolved Needs

The Pershing Declaration attached hereto is evidence that shows a long-felt, but unsolved need in the construction and insurance industries for a solution to cut down on costs and increase efficiency and safety of roof estimating. Aerial images of roofs had been just sitting

available in existing commonplace imagery databases for many years, but nobody had thought to, or could figure out how to, practically utilize these available images to solve this problem of the high cost and inefficiency of climbing on roofs to do roof estimations until Chris Pershing and his co-inventor came along:

> 2. …Sometime in the second half of 2006, I had a conversation with David P. Carlson, the other listed inventor, regarding whether it would be possible to obtain specific measurements of a roof without having to climb on the roof. I speculated that a ***solution*** to that problem might be found by ***utilizing aerial and satellite imagery that had become widely available through Google, Microsoft Live (now Bing Maps), USGS, and like services***. The overhead views, also called the top plan view or orthogonal view in the image files I could obtain had a scale reference that provided a mechanism to convert a pixel distance in the image to a physical distance in feet or meters. With that scale reference, one could calculate the length of a line near-to and parallel-to the ground as well as an area of a polygon in the plane of the ground for the overhead image. However, the image files ***did not provide information to allow someone to determine the depth (e.g., distances perpendicular to the image viewpoint)***. Further the oblique images, sometimes call oblique perspective images or perspective images did not usually have scale information at all, or if they had it, it was of limited use. I wondered whether, ***without being given specific information about how the image was acquired and details about the camera position when the image was taken*** it would be possible to determine the pitch of sloped roof sections. I concluded that without a determination of the pitch of the roof sections, an accurate assessment of the surface area and the length of sloped edges and seams on the roof could not be achieved.

Pershing Declaration, ¶ 2 (emphasis added).

Note the ***nexus existing between the evidence above and the merits of the claimed inventions*** of the '578 Patents and the '436 Patent. The claimed invention of the '578 Patent is directed to determining roof measurements "based solely on the image files" and the long felt need presented was exactly for that. In other words, one long felt, but unsolved need was for a solution of how to determine roof measurements based solely on the image files of these existing imagery databases ***without having the specific information about how the image was acquired and details about the camera position when the image was taken***. Similarly, the claimed invention of the '436 Patent is directed to determining roof measurements of roofs in images that have disparate types of views of the roof such as those available at the time to the general public in the existing aerial imagery databases that, unlike stereoscopic pairs of images,

do ***not*** have the ***specific information about how the image was acquired and details about the camera position when the image was taken***. The claimed invention fulfilled this long felt need by providing a solution to remotely determine roof measurements based on image files available from image libraries that had been accumulating by these multiple image providers over many years. In particular the Pershing Declaration states in paragraph 3 (emphasis added):

> 3. ***As I studied the problem*** I also realized that if the pitch of the various roof sections could be reliably and accurately determined from an analysis of two more unrelated images, a vast and readily available library of imagery covering the United States could be successfully leveraged to provide a viable remote roof measurement solution. The ability to successfully leverage available image libraries that had been ***accumulated*** by multiple image providers ***over many years*** would be a ***significant achievement and a great advance*** in the field of roof measurements, if I were able to figure out how to do this.

As evidenced by Eagle View's aggressive growth in business volume and reaction in the marketplace once the product encompassed by the claims of the '578 and '436 Patents was released, the method solved an important and valuable overall problem in the roofing and insurance industries of the high cost and inefficiency of climbing on roofs to do roof estimations that had been present basically since roof repair had existed. This, of course, is a very long time. This aggressive growth in business volume and reaction in the marketplace is evidenced by the entire Pershing Declaration and attached Pershing Exhibits, and is shown in more detail below with respect to the discussion of the commercial success indicia, a relevant portion of which states:

> 5. The method that resulted from this prototyping and an example of the end-product is taught in the body and figures of the '578 Patent. This method was inventive. As ***evidenced by our aggressive growth in business volume***, the method ***solved an important and valuable problem in the roofing and insurance industries***. As evidenced by the ***reaction in the marketplace***, the method was unexpected and unanticipated to the industries we serve as well as providers of software packages and aerial imagery that service those same industries. As ***evidenced by our humble beginnings*** from starting a ***brand new company*** from scratch for which ***this was the only product*** and the growing business success of EagleView, the economic benefits of leveraging ***commonplace imagery*** provided a working solution to an otherwise unworkably expensive problem.

Pershing Declaration, ¶ 5 (emphasis added).

As further evidence of the ***nexus*** here between the evidence above and the merits of the claimed inventions of the '578 Patents and the '436 Patent, the product that was encompassed by the claims of the '578 Patents and the '436 Patents, was Eagle View's ***only product***, as shown above, and Eagle View was a small startup, even invoking the help of family members, obviously without a sizable marketing budget. Thus, there is no other apparent reason or excuse for the reaction in the marketplace toward Eagle View's aggressive growth in business volume and overall large commercial success, other than that the solution was fulfilling a significant long felt but unsolved need in the market for such a solution. This same nexus reasoning also applies to the other related objective indicia of non-obviousness below, especially with respect to commercial success. This is because commercial success is a likely indication or result of a long-felt need in the market being fulfilled (e.g., an untapped demand being met). Thus, if no other reason for the commercial success is apparent, commercial success may contribute as evidence of a long felt but unsolved need being fulfilled by the product encompassed by the claims.

The market reaction and aggressive growth is further evidenced in the excerpt from the Pershing Declaration below:

> 6. We officially launched the product in the last week of January 2008 with an email blast to many in the roofing business and asking them to try our service to provide them detailed roof reports of any address they provided to us in the United States. ***Within the first hour on the first day we announced our service,*** our phone began to ring, with people asking to buy the roof reports that were the product of the invention described in what became the '578 and '436 Patents. The reception in the industry was ***nothing short of amazing***. Over the weeks that followed, our wives volunteered their time answering phones, assembling more desks, and helping to find and interview the staff we needed to meet the rising tide of interest. ***Four months later, we had outgrown the size and infrastructure of our temporary office space***, and found something bigger to accommodate our growth.

Pershing Declaration, ¶ 6 (emphasis added).

3. Evidence of Failure of Others

The Pershing Declaration evidences the failure of others to independently invent the claimed inventions of the '578 and '436 Patents without having the benefit of having read the patent application or patent:

> 8. The buzz we created within the roofing contractor community soon caught the attention of insurance companies and software companies that service the insurance industry. Once such software company, Xactware, is a dominant provider of claims routing and adjusting software that services many of the nation's top insurance companies. We were invited to their headquarters just a couple of months after opening our doors. They were impressed with our product and ***stated they had previously failed at an internal effort to figure out how to use such imagery to remotely measure features in pitched roofs***. They subsequently entered into a contract with us to use roof reports we produced in large quantities. At the time of the first meeting in early 2008 I had not shown them the patent application that resulted in the '578 patent which we had previously filed but which had not yet published, so they ***were not able to read the Application that became the*** '578 Patent ***to see how we achieved this***.
>
> 9. Another company, Pictometry International, invited us out to their headquarters in the fall of 2008. We were customers in buying their oblique imagery product and they noticed we were buying more and more images from them. They saw that our product was rapidly making progress penetrating into use by the insurance industry – an industry that ***Pictometry had been struggling with finding success with over a period of years***. Even though Pictometry was the supplier of our oblique imagery, they too ***were wondering with the 'how did you do that?' question*** with regard to our ability to ***accurately determine pitch and 3D roof models using the photos they were selling to us***. When they sold their images, they intentionally removed from them nearly all the metadata collected at the time the image was taken, including all camera data and image acquisition data…

Pershing Declaration, ¶¶ 8 and 9 (emphasis added).

As shown above, Pershing was able to ingeniously overcome the problem of how to determine pitch based solely on the image files, or based on non-stereoscopic pairs of images, which have two different types of views and thus no associated camera position data. Try as they might, others could not do so without the benefit of having read the '578 or '436 Patent, or their respective patent applications. It just so happens that a main feature or merit of the claimed invention of the '578 and '436 Patents is that it determines estimated roof pitch from such images and thus the roof report with needed measurements can be provided. This shows a nexus

between the merits of the claimed invention and the evidence provided above of the failure of others.

4. Skepticism of others

The Pershing Declaration evidences the skepticism of others regarding whether the claimed inventions of the '578 and '436 Patents was even possible.

> 7. Our first and largest initial challenge in the marketplace was to prove that we were 'real'. Many of the initial contacts with contractors and companies were met with ***deep skepticism*** about our claim to be able to remotely and accurately measure the correct pitch and area of roofs from photographs obtained from commercially available image databases, such as Bing and Pictometry. In ***an attempt to debunk our claims***, many early customers followed our first conversation by sending in an address of a particularly difficult roof that they had recently measured by hand. Upon receiving and validating the reports against their own measurements and finding that our reports were accurate, the conversation changed to something to the effect of: "***that was amazing, we are surprised*** you were able to do this."
>
> ...
>
> ...The remaining metadata included only geolocation and image scale data in the orthographic images and only geolocation and approximate compass orientation of the oblique images that differentiated the East, West, North, and South looking viewpoints. This is equivalent in substance to the minimal metadata they allowed Microsoft to present to end users of the "Bird's eye" imagery in the form of visual scale markers and an indication of East, West, North, South viewpoint directions. ***Pictometry had believed that by removing nearly all metadata from the image files, a person would not be able to make use of unrelated images to recreate a 3D model of the roof***. To paraphrase, the comment from one of their executives was that we '***shouldn't have the ability to do that' with what they knew they were providing to us in the image file***s. To my knowledge, they had not, at that time, seen the '578 Patent application which was not published until October 2008 and I did not show it to them at that time.

Pershing Declaration, ¶¶ 7 and 9 (emphasis added).

As shown above, others in the industry were highly skeptical, or didn't think roof measurements from raw or disparate aerial imagery such as encompassed by the claims of the patent could even be achieved. Eagle View had to prove themselves from the very start because the industry felt Eagle View's product needed to be "debunked."

5. Unexpected results

The skepticism was eventually replaced by amazement in the industry with the success and accuracy of the process and resulting roof estimate reports encompassed by the claims of the '436 and '578 Patents. As shown in the emphasized text in the excerpts above and below from the Pershing Declaration, Eagle View's customers and the industry as a whole and even Eagle View were taken by surprise by the accuracy and reliability of the process, systems and resulting reports encompassed by the claims of the '436 and '578 Patents.

> 7. Our first and largest initial challenge in the marketplace was to prove that we were 'real'. Many of the initial contacts with contractors and companies were met with ***deep skepticism*** about our claim to be able to remotely and accurately measure the correct pitch and area of roofs from photographs obtained from commercially available image databases, such as Bing and Pictometry. In ***an attempt to debunk our claims***, many early customers followed our first conversation by sending in an address of a particularly difficult roof that they had recently measured by hand. Upon receiving and validating the reports against their own measurements and finding that our reports were accurate, the conversation changed to something to the effect of: "***that was amazing, we are surprised*** you were able to do this."
>
> ...
>
> 10. One reason they were ***very surprised*** is because we were able to achieve these ***unexpected results*** and produce the final reports ***based solely on using the image data files.*** We obtained no other information other than what we got from the ***unrelated, independently taken images*** and without an on-site visit to measure any actual roof properties.
>
> 11. Another unproven goal of the invention at the time of launch was to produce remote measurement results that were comparably accurate compared to the accepted manual roof measurement practices. To our surprise, we would soon learn that, on average, we were not only competitive with the existing manual measurement accuracy; our results were far more accurate and repeatable. In contrast to the smaller roofing contractors who were testing our product, insurance companies approached their testing with much more statistical rigor and with much larger test samples. It was not uncommon for an insurance company to conduct a test involving many hundreds of roofs across the country – sometime by ordering those roof reports anonymously under a false company name to shield us from knowing the scope or recipient of the testing. The results from several such tests from different insurance companies were consistently similar: The area reported on EagleView's measurement reports typically fell within 1% to 2% of what they determined to be the actual value obtained by a through their own on-site verification at each of the targeted buildings. In contrast, previous similar

> studies of crews performing manual roof measurements found that the manual methods resulted in an average difference of 6%– 10%. Thus, in addition to streamlining business practices, having a professional looking product, and reducing time and injury risk spent on a roof, the EagleView reports produced by this invention replaced manual roof area estimates with a significantly more accurate result.

Pershing Declaration, ¶¶ 7, 10 and 11 (emphasis added).

Note above the features of producing the final reports based solely on using the image data files and determining accurate measurements having obtained no other information other than what Eagle View got from the unrelated, independently taken images. This is without an on-site visit to measure any actual roof properties. These abilities or features are what caused the surprise and are also particular merits of the product encompassed by the claimed inventions of the 436 and '578 Patents. This provides a strong nexus between the evidence above and the merits of the claimed inventions.

6. Evidence of A High Degree of Commercial Success

As shown above, the product provided by Eagle View was fulfilling a long felt, but unsolved, need in the market as soon as it was released. This caused a great, almost immediate, commercial success for Eagle View due to the merits of the product that are particularly encompassed by the claimed inventions of the '436 and '578 Patents. Namely, such merits are, with respect to the '578 Patent, being able to determine roof measurements based solely on the image files of these existing imagery databases without having the specific information about how the image was acquired and details about the camera position when the image was taken. With respect to the '436 Patent, the merits are being able to determine roof measurements of roofs in images that have disparate types of views of the roof such as those available at the time in the commonplace aerial imagery databases that, unlike stereoscopic pairs of images, do not have the specific information about how the image was acquired and details about the camera position when the image was taken. This caused the Eagle View product to quickly become an industry standard and resulted in the aggressive growth of Eagle View, skyrocketing Eagle View to the top of the roof measurement industry as shown in the

Declaration of Chris Pershing and associated publications, testimonials and case studies which are attached as Exhibits to, and form part of, the Pershing Declaration:

> 12. As evidenced by the recognized ***growth of the volume of our business***, the ***growth of our employee head count***, and the numerous ***testimonials*** and ***articles*** attesting to the impact we have made within the industries we service, this invention has proven its uniqueness and value to the world. I will summarize these in the following paragraphs.
>
> 13. Just a few days before our January 2008 launch, the other co-inventor, David P. Carlson and myself hired and began training our first few employees. - At the time of we launched our service, the only product we sold was the product described and claimed in the '578 and '436 Patents, namely, a report that had included on it the values we have determined for the roof area, the pitch and the length of various roof edges, valleys and ridges. Thus, ***100% of the initial sales were directly for the product that is claimed in many of the claims of these two patents.*** In Fiscal Year 2008, our revenue for this product was about $1.4 million. As of December 31, 2008, our employee head count was 56. ***We thus grew from the first few employees hired in January 2008 to 56 employees at year's end. In the FY 2009, our revenue was over $5.3 million*** for this product, close to quadrupling for the prior year and our employee count at the end of the year was 69. ***In FY 2010, our revenue exceeded $12 million for this product,*** a doubling from the prior year and our employee count had grown to 105. By the end of FY 2010, many large insurance companies became convinced that our reports had data and measurements that were superior in many ways to measurements they could obtain other places and began to purchase more roof reports from us. As a result, in ***FY 2011 we had revenue of greater than $33 million from this product, almost triple from the prior year and in FY 2012 our revenue was more than $45*** million from this product, another year of significant growth. In 2011 we ended with 161 employees and this stayed about the same through 2012. In reporting the above numbers the stated revenue resulted from the sale of the claimed inventions, namely, a roof report having the determined measurements on it as specified in the '578 and '436 Patents. ***With respect to the*** '436 Patent***, these reports were made from images that included a top plan view and an oblique perspective view and also included different colors of lines for different roof properties, such as red for ridge lines and light blue for valley lines. The edges were also a different color, for example green or dark blue. The pitch was indicated on the roof reports as well with an arrow showing the direction of the pitch. The orientation of the pitch arrow is relative to the compass rose indicated on the page which may or may not have the North direction aligned with orientation of the page.***

Pershing Declaration, ¶¶ 12 and 13 (emphasis added).

As further evidence of the ***nexus*** here between the evidence above and the merits of the claimed inventions of the '578 Patents and the '436 Patent, the product that was encompassed by the claims of the '578 Patents and the '436 Patents, was Eagle View's ***only product***, as shown above, and Eagle View started as a small startup with just a few employees, obviously without a huge marketing budget. Thus, there is no other apparent reason or excuse for the reaction in the marketplace, Eagle View's aggressive growth in business volume, and overall large commercial success than "from the sale of the claimed inventions, namely, a roof report having the determined measurements on it as specified in the '578 and '436 Patents"

7. Evidence of Industry Praise

As a result of not only the commercial success, but also the merits of the product embodying the claimed inventions of the 578 and '436 Patents, there has been much industry praise for Eagle View and its product. The excerpts below evidence this, but the Examiner is invited to look at the Pershing Exhibits provided as part of the Pershing Declaration which are publications, articles and testimonials including praise for the product of Eagle View embodying the claimed inventions of the 578 and '436 Patents and its benefits:

> 14. There have been significant publications in various press sources that have touted our success. I attach hereto as ***Pershing Exhibits A and B*** some of those articles. During the Examiner's interview held on Oct. 17, 2013, we discussed the article in CNNMoney by Jennifer Alsever and a full copy is enclosed as Pershing Exhibit A for the Examiner's detailed review. We also discussed the article in Bloomberg by John Tozzi and a full copy is enclosed as Pershing Exhibit B. The Examiner can review these two articles in detail and I will quote only a few sections from each of them. In the CNNMoney publication, Kirk Belz is cited for the statements of: "***Having an Eagle View report has become an accepted industry standard.***" He also states that ***he can process 25% more claims each day using these reports, all without sending an adjustor onto the roof***, which saves the adjustor 45 min per roof and avoids the dangerous job of climbing on the roof. In the Bloomberg article, Joe Graham is cited for stating that with respect to Eagle View roof reports, "***most insurance carriers at this point treat it as gospel.***"
>
> 15. An articles authored by Chris King, titled "Bird's-Eye View illustrates the response in the industry from the early launch, having been published in August 2009, attached as ***Pershing Exhibits C***. This article is also by an author independent from EagleView and shows recognition in the industry of the

> benefits that were obtained by the claimed invention of the '578 and '436 Patents. The Examiner is inv[i]ted to review the entire article and I will only quote herein from one location near the end. Troy Mock, President of BRM roofing states: "I've been with them since the beginning, and thing really picked up since February of last year." He states that he had them shoot 100 roofs due to a recent hail storm in Houston. The article states, " '***The bottom line is that this would help every roofing contractor***,' said Mock. 'The number one reason is liability-you don't ***have to have salesmen climbing on the roof, hurting themselves or damaging the roof***.' " Another briefer article is also attached by Jeff Bond, Pershing Exhibit D that explains the benefits of the inventive reports.
>
> 16. There are a number of other articles attached as ***Pershing Exhibits E-H*** which have were authored by Eagle View employees and printed in various magazines. For example, two of the authors list are Karen Edwards and Heidi Ellsworth, both of whom were employees of Eagle View at the time they wrote the articles and thus the authors were not independent from the patent owner and company selling the inventive reports. The ***articles do contain information about the industry acceptance of the EagleView roof reports as well as comments by many in the Roofing Industry regarding their views on these reports*** and therefore have value in showing both the tremendous benefits of the invention and the acceptance in the industry. Also attached are case studies as Pershing Exhibits I-N that were prepared by Eagle View employees that were specific case studies on the benefits of using Eagle View reports that were produced by the process and system covered in the'578 and '436 Patents.

Pershing Declaration, ¶¶ 14-16 (emphasis added).

8. Evidence of Copying

The product embodying the claimed inventions of the 578 and '436 Patents was so commercially successful and had so much merit that others almost immediately began copying the invention, apparently as soon as they were able to get their hands on the published patent applications for the '578 and '436 Patents:

> 19. In fact, the industry showed that some months ***after our applications were published***, a number of ***copy-cat companies started-up*** and created ***nearly identical reports and began selling them in competition with us***. I had not given them my source code and yet by having access to our end reports, a real example of which I provided in the patent and what other information they were able to glean from the press and the '578 published patent application, they were able to imitate my results. Of course, I don't know the things the competitors studied to copy our product since they didn't contact me when they did so, but what I do know is that they ***made look-a like reports sometime after the*** '578 ***application was published***, so I believe that there was sufficient information included that

> would permit another person to make and use the invention as claimed. The companies who imitated our products, many of whom to which we have sent notice letters include ***RoofWalk***, ***GeoEstimator***, ***Skytek Imaging***, ***Aerialogics***, ***Roofs411*** and ***ConnectPoint***. This is evidence not only that they could create such reports, but also evidence that sometime after we started this business with an entire new product, others decided to imitate our product.

Thus, not only are the claims of the '436 and '578 Patents nonobvious because the Items of Information, alone or in combination, do not teach or suggest all the claimed elements, but, just as importantly, because of the secondary considerations of nonobviousness provided above as evidenced by the Pershing Declaration and attached Pershing Exhibits. Therefore, even if the one or more of the claims of the '436 and '578 Patents appear to the Office to be obvious in light of the Items of Information, they are in fact not obvious due to the substantial secondary considerations of nonobvioussness noted above and the nexus shown above between the merits of the claimed inventions of the '436 and '578 Patents and the evidence providing the secondary considerations of nonobviousness herein.

Conclusion

Patent Owner respectfully submits that the claims of the Patent are in condition for allowance. Any remarks in support of patentability of one claim should not be imputed to any other claim, even if similar terminology is used. Any remarks referring to only a portion of a claim should not be understood to base patentability on that portion; rather, patentability must rest on each claim taken as a whole. A number of clarifying amendments have also been made to the above claim set. Patent Owner does not acquiesce to each of the Examiner's rejections and to each of the Examiner's assertions regarding what the cited references show or teach, even if not expressly discussed herein. Although changes to the claims have been made, no acquiescence or estoppel is or should be implied thereby; such amendments are made only to expedite prosecution of the present reexamination and are without prejudice to the presentation or assertion, in the future, of claims relating to the same or similar subject matter.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19 1090.

All of the claims remaining in the Patent under reexamination are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

STATEMENT per 37 C.F.R. § 1.530(e)

Claim	Status (Pending or Canceled)	Support in Disclosure
1 (Amended)	Pending	Col 4, lines 9-11 and Col. 5, lines 52-57;
2	Pending	
3	Pending	
4	Pending	
5	Pending	
6	Pending	
7	Pending	
8	Pending	
9	Pending	
10	Pending	
11	Pending	
12	Pending	
13	Pending	
14	Pending	
15	Pending	
16	Pending	
17	Pending	
18 (Amended)	Pending	Col 4, lines 9-11 and Col. 5, lines 52-57;
19	Pending	
20	Pending	
21	Pending	
22	Pending	
23	Pending	
24	Pending	
25	Pending	
26	Pending	
27	Pending	
28	Pending	
29	Pending	
30	Pending	
31	Pending	
32	Pending	
33	Pending	
34	Pending	

35	Pending	
36 (Amended)	Pending	Col 3, lines 65-67; Col 4, lines 1-2; lines 9-11 and Col. 5, lines 52-57; Abstract, as amended; Col 6, lines 50-54; lines 63-67; Col 7, lines 1-11;
37 (Amended)	Pending	Col 6, lines 50-54
38	Pending	
39	Pending	
39	Pending	
40	Pending	
41 (Amended)	Pending	Col 3, line 67; Col 4, lines 1-2; lines 21-23; lines 48-52; Col 5, lines 9-12.
42	Pending	
43	Canceled	
44	Canceled	
45	Canceled	
46	Pending	
47	Pending	
48	Pending	
49	Pending	
50	Pending	
51	Pending	
52	Pending	
53	Pending	
54	Pending	
55	Pending	
56	Pending	
57 (New)	Pending	Abstract, as amended
58 (New)	Pending	Abstract, as amended; Col. 4, lines 8-11; Col. 5, lines 52-56; Col. 6, lines 12-67; Col 7, lines 12-18
59 (New)	Pending	Figure 5C; Col. 5, lines 57-61
60 (New)	Pending	Col 3, lines 65-67; Col 4, lines 1-2; lines 9-11 and Col. 5, lines 52-67; Abstract, as amended; Col 6, lines 50-54; lines 63-67; Col 7, lines 1-9
61 (New)	Pending	Col 6, lines 50-67
62 (New)	Pending	Col 6, lines 50-67; Col 7, lines 1-9
63 (New)	Pending	Col 3, lines 65-67; Col 4, lines 1-2; lines 9-11 and Col. 5, lines 52-67; Abstract, as amended; Col 6, lines 1-16; lines 50-67; lines 63-67; Col 7, lines 1-9
64 (New)	Pending	Figure 5D; Col 5, lines 61-67 and Col. 6, lines 1-6
65 (New)	Pending	Figure 5C; Figure 5D; Col 5, lines 52-67 and Col. 6, lines 1-6
66 (New)	Pending	Col. 6; lines 50-67; Col. 7, lines 1-9

Respectfully submitted,

SEED Intellectual Property Law Group PLLC

/David V. Carlson/
David V. Carlson
Registration No. 31,153

DVC:jks

Attachments:

Attachment 1:	Eagle View Presentation provided at Examiner Interview held on 10/17/13
Attachment 2:	Pershing Declaration including Pershing Exhibits A-O
Attachment 3:	Curless Declaration including Curless Exhibit A
Attachment 4:	Jones Declaration including Jones Exhibit A
Attachment 5:	Consent Decree and Dismissal – Eagle View v. Roofwalk

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ATTACHMENT 1

(96/000,004 - 290115.401C1RE)

EAGLEVIEW TECHNOLOGIES

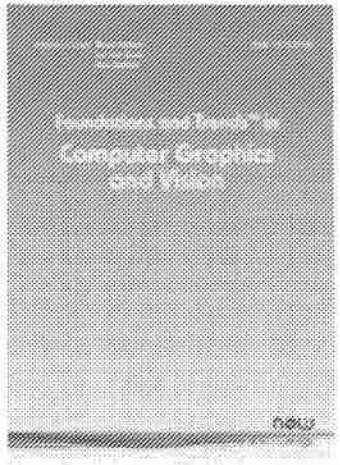
U.S. Patent No. 8,145,578

Chris Pershing

- B.S. Engineering Physics 1994, University of Arizona
- Masters in Physics 1996, University of Arizona
- Two years in a PhD program in biomedical Engineering
- Industry experience in software development including surface analysis of 3D surface microstructures and biomedical equipment
- Worked at Microsoft, Phillips Medical, among others

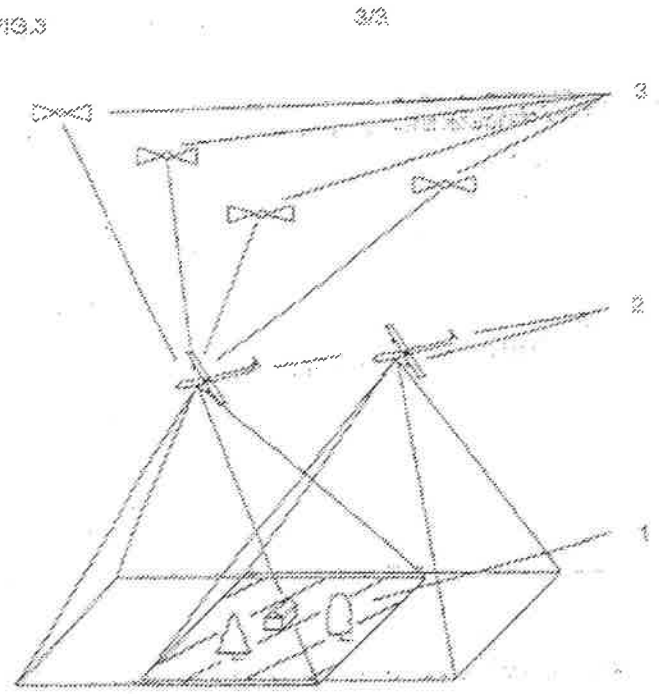
Brian Curless

- Professor, University of Washington, Department of Computer Science & Engineering
- Stanford University, Ph.D. E.E. 1997
- Stanford University, M.S.E.E. 1991
- University of Texas at Austin, B.S.E.E. 1988
- Published over 60 articles and conference papers in the field of Computer Graphics and Vision
- Co-editor-in-chief of Foundations and Trends in Computer Graphics and Vision



Background

- Stereoscopic image acquisition
- Camera locations known
- Relatively expensive
  - Special equipment
  - Dedicated flights



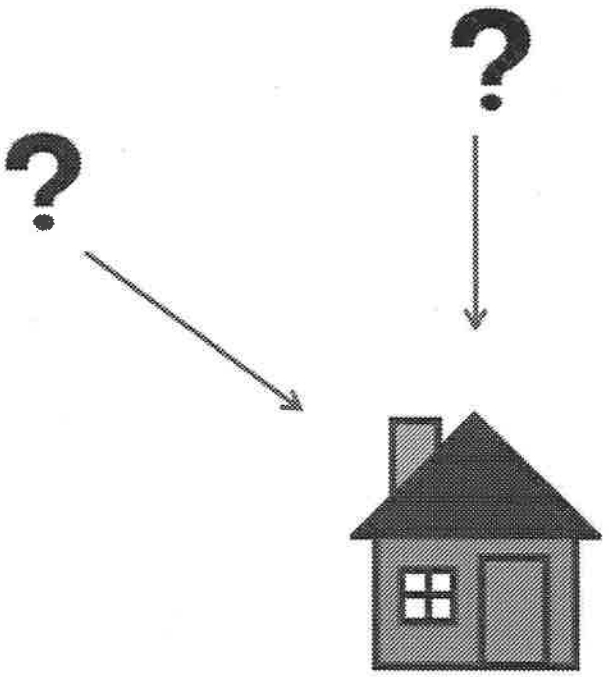
Background

(a) Left image

(b) Right image

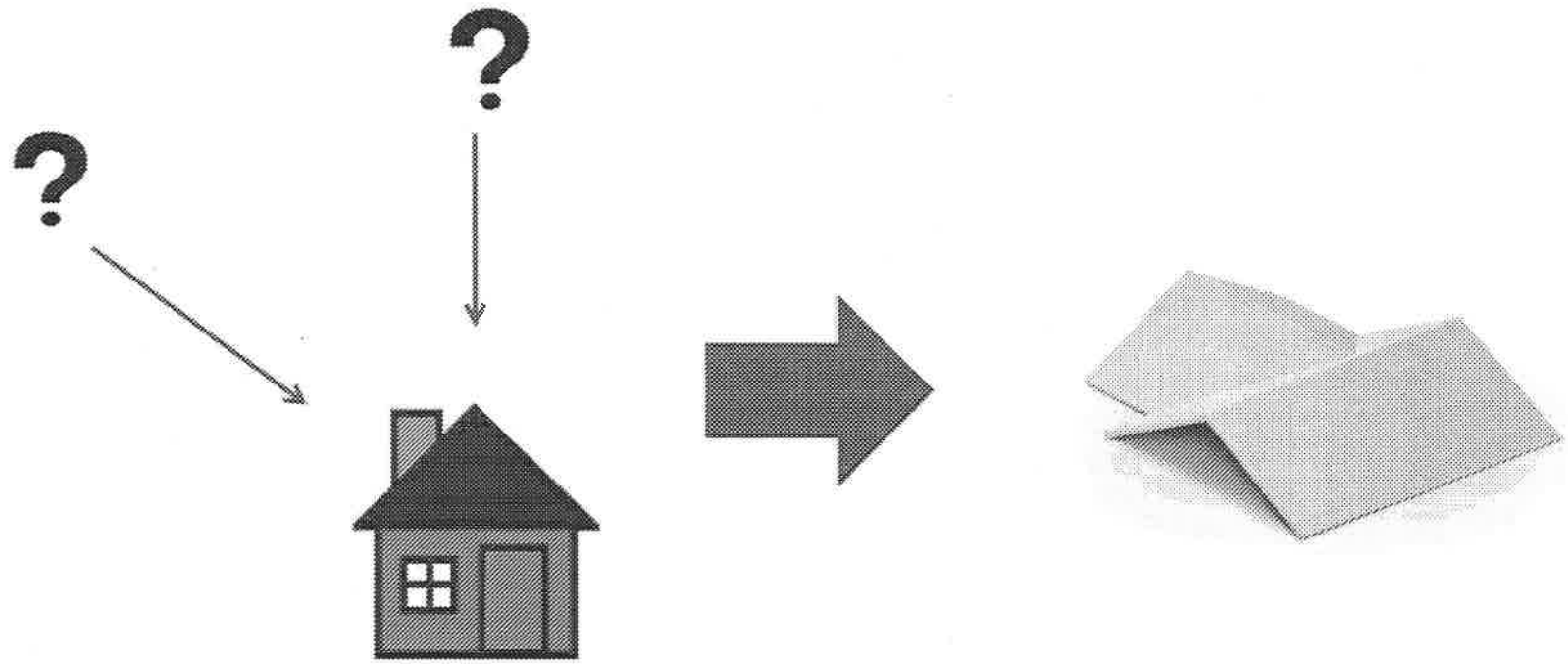
The Invention

- Two independent images
- Camera locations **unknown**
- Use publicly available pictures
- One or more oblique views
- One orthogonal / downward looking



The Challenge

Transform two (or more) aerial pictures taken from **unknown** positions into accurate 3D roof measurements?



Was it Possible?

"[That] Shouldn't be Possible"

- Inventor Chris Pershing meets with Pictometry International, then the primary supplier of oblique aerial images, in Fall of 2008

- Pictometry executive comments that "it shouldn't be possible" to derive accurate roof pitch measurements from the provided oblique images

Pictometry
Intelligent Images

- Executive from XactWare, the primary supplier of claims processing software, likewise commented that XactWare was "not able to figure out" how to do this

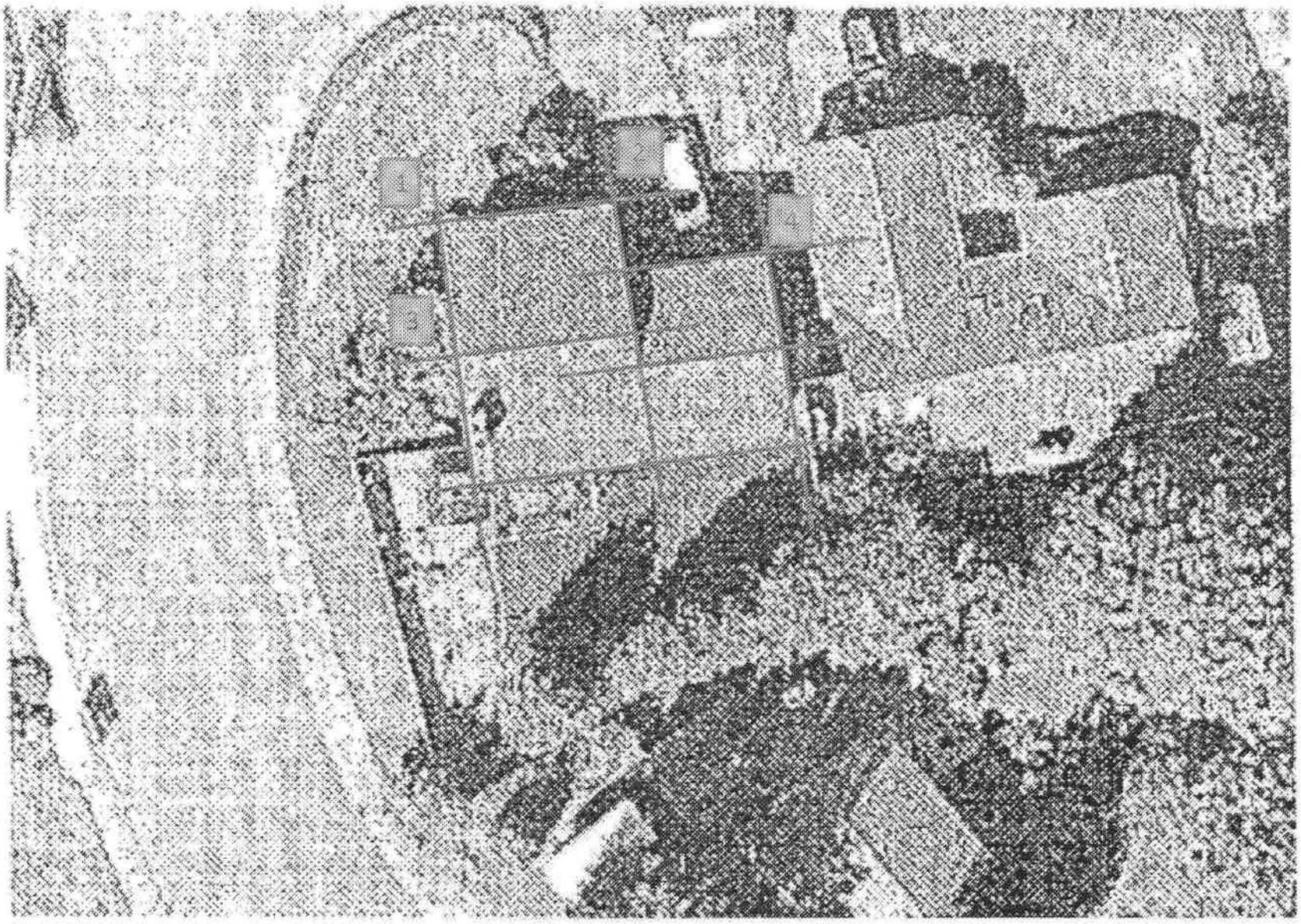
XACTWARE.

The Solution

- Identify reference points
- Coregister the images using reference points
- Reconstruct the 3D geometry
- Pershing's source code not disclosed

A set of reference points are identified in each of the images. The service's measurement software then uses these reference points and some proprietary algorithms to co-register the images and reconstruct the three dimensional geometry of the object identified by the reference points. There are a variety of photo-grammetric algorithms that can be utilized to perform this reconstruction. One such algorithm used by the service uses photographs taken from two or more view points to 'trangulate' points of interest on the object in 3D space. This triangulation can be visualized as a process of projecting a line originating from the location of the photograph's observation point that passes through a particular reference point in the image. The intersection of these projected lines from the set of observation points to a particular reference point identifies the location of that point in 3D space. Repeating the process for all such reference points allows the software to build a 3D model of the structure.

Dr. Curless's Independent Implementation



Dr. Curless's Independent Implementation

Dr. Curless's Independent Implementation of the Described Co-registration Process

Downward looking aerial view can be modeled as an orthographic projection:

Orthographic projection. Consider projection along the Z-axis. This is represented by a matrix of the form

$$P = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}. \qquad (6.22)$$

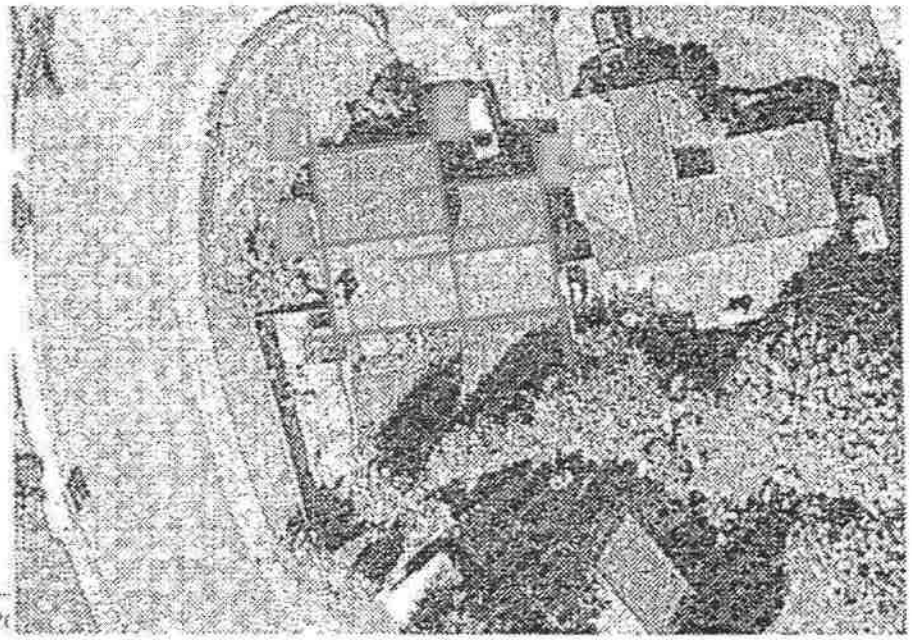
This mapping takes a point $(X, Y, Z, 1)^T$ to the image point $(X, Y, 1)^T$, dropping the Z-coordinate.

For point $X_1 \ldots X_4$, we have projection into the image:

$x_1 = P X_1$

...

$x_4 = P X_4$



EagleView Te

Dr. Curless's Independent Implementation of the Described Co-registration Process

Oblique aerial view can be modeled as scaled orthographic projection with unknown orientation:

Scaled orthographic projection. A scaled orthographic projection is an orthographic projection followed by isotropic scaling. Thus, in general, its matrix may be written in the form

$$P = \begin{bmatrix} k & & \\ & k & \\ & & 1 \end{bmatrix} \begin{bmatrix} \mathbf{r}^{1T} & t_1 \\ \mathbf{r}^{2T} & t_2 \\ \mathbf{0}^T & 1 \end{bmatrix} = \begin{bmatrix} \mathbf{r}^{1T} & t_1 \\ \mathbf{r}^{2T} & t_2 \\ \mathbf{0}^T & 1/k \end{bmatrix}. \quad (6.24)$$

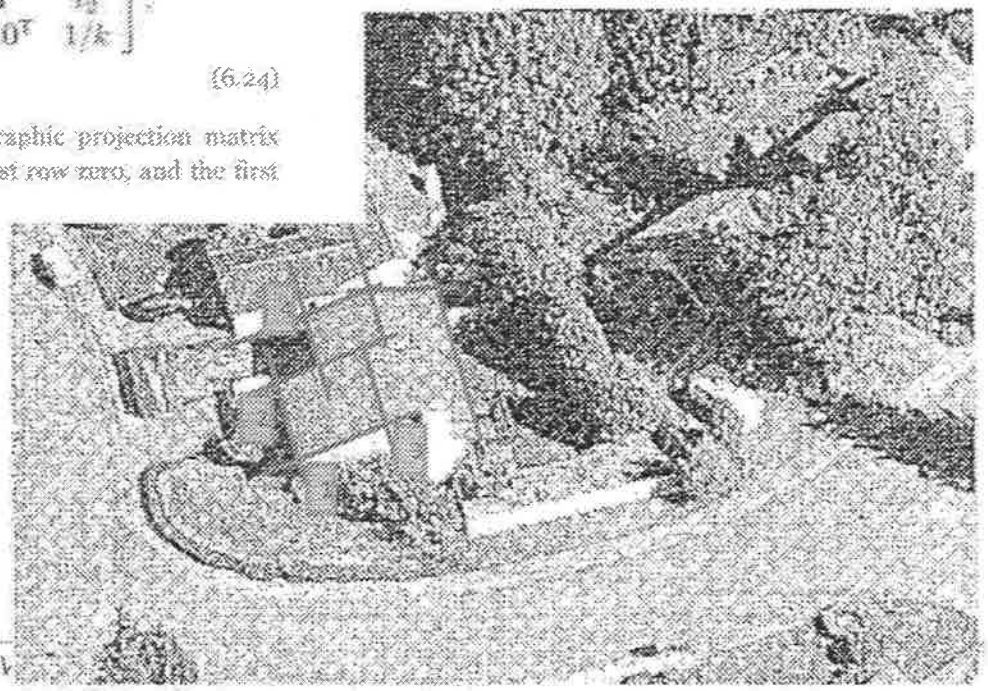
It has six degrees of freedom. A scaled orthographic projection matrix $P = [M \mid \mathbf{t}]$ is characterized by a matrix M with last row zero, and the first two rows orthogonal and of equal norm.

For point $X_1 \ldots X_4$, we again have Projection into the image:

$x_1 = P X_1$

...

$x_4 = P X_4$



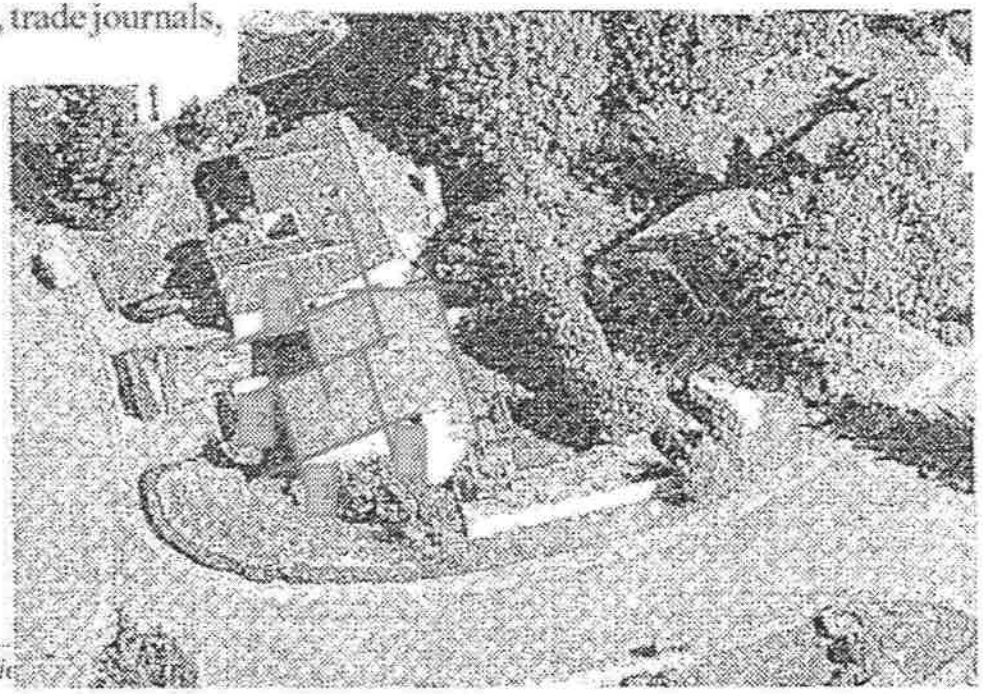
EagleV

Dr. Curless's Independent Implementation of the Described Co-registration Process

Exploit common sense knowledge of a roof.

The optimal choice of reconstruction algorithm depends on a number of factors such as the spatial relationships between the photographs, the number and locations of the reference points, and any assumptions that are made about the geometry and symmetry of the object being reconstructed. Several such algorithms are described in detail in textbooks, trade journals, and academic publications.

Can choose a level roof line.
Points 1 and 2 have same z-value.



EagleVi

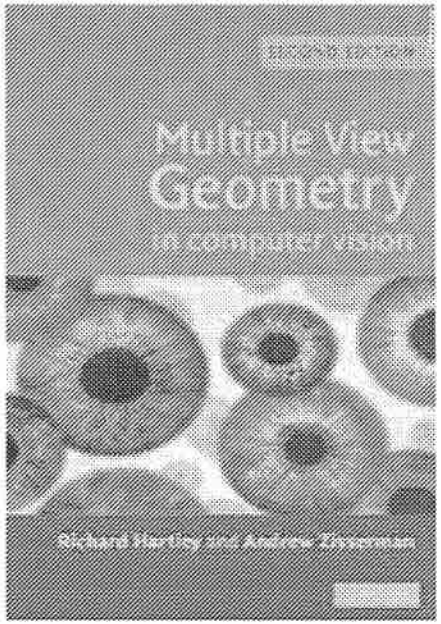
Dr. Curless's Independent Implementation of the Described Co-registration Process

Set up objective function to minimize

Bundle adjustment. If the image measurements are noisy then the equations $\mathbf{x}_j^i = P^i \mathbf{X}_j$ will not be satisfied exactly. In this case we seek the Maximum Likelihood (ML) solution assuming that the measurement noise is Gaussian: we wish to estimate projection matrices P^i and 3D points $\mathbf{X}_j$ which project exactly to image points $\hat{\mathbf{x}}_j^i$ as $\hat{\mathbf{x}}_j^i = P^i \mathbf{X}_j$, and also minimize the image distance between the reprojected point and detected (measured) image points $\mathbf{x}_j^i$ for every view in which the 3D point appears, i.e.

$$\min_{P^i, \mathbf{X}_j} \sum_{ij} d(P^i \mathbf{X}_j, \mathbf{x}_j^i)^2 \tag{18.1}$$

where $d(\mathbf{x}, \mathbf{y})$ is the geometric image distance between the homogeneous points $\mathbf{x}$ and $\mathbf{y}$. This estimation involving minimizing the reprojection error is known as *bundle adjustment* – it involves adjusting the bundle of rays between each camera centre and the set of 3D points (and equivalently between each 3D point and the set of camera centres).



Solve for camera and point unknowns using any standard non-linear least squares solver.

The Co-registration Approach is Enabled and Nonobvious

- Dr. Curless had no difficulty reproducing the result
- EP '966 merely discloses the stereoscopic pair approach

Examiner Commentary About Art Distinguished During Ex Parte Prosecution

- NFOA: "However, Patent Owner is notified that claim amendments to require a calibration module, step, or feature, would likely necessitate new prior art rejections under 35 U.S.C. §§ 102 or 103, since this amendment would eliminate a feature relied upon to distinguish over the prior art, referring to pages 17, 44, 72, 106 etc. of the Request.
- These pages in the Request refer to stereoscopic pair data that is part of the camera data when the image is acquired, not to image scale data on a final image.
- November 23, 2011 ROA explained that an image file **includes scale data.**
- Art was not distinguished based on absence of **scale data**

Interpretation of Terms in the Patent

- The '578 patent teaches that image files as purchased and delivered to the user include scale data that can be used to calibrate the image:

> on the image is converted into a physical length. This calibration information is typically presented as a scale marker on the image itself, or as additional information supplied by the image database provider along with the requested image.
>
> The image(s) and calibration information returned by the imagery database is entered or imported into the service's measurement software.

Col. 5, lines 65-67; Col. 6, lines 1-3 of the '578 Patent (emphasis added)

Amendment to Include Scale Data

- Examiner found "calibration is essential to implementing the invention" Page 12 of Office Action
- Proposed amendment: "at least one image file including information regarding image scale"

"Image Calibration" is different in meaning than a "Calibration Module"

- "Image calibration" is conversion of distance of pixels between two points on the image into a physical length:

> During calibration, the distance in pixels between two points on the image is converted into a physical length. This calibra-

Col. 5, lines 63-64 of the '578 Patent (emphasis added)

- On the other hand, "calibration ***module 56***", is also referred to as an "***image analysis and calibration module 56***":

> **92**. In one embodiment, an image analysis and calibration module **56** is linked to the software program **50** that enables

Col. 3, lines 64-65 of the '578 Patent (emphasis added)

> files **54** of the buildings. The software program **50** includes a calibration module **56** that enables the roof company **70** to

Col. 4, lines 34-35 of the '578 Patent (emphasis added)

Amendment to Address Calibration Module

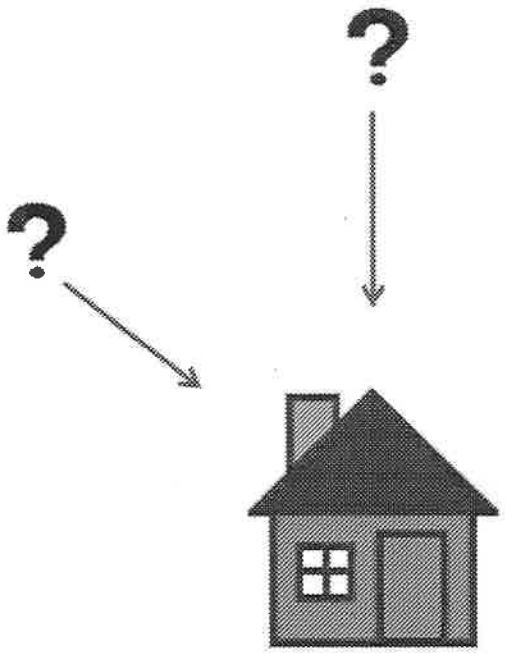
- Examiner Proctor stated: "calibration module" not enabled
- Calibration module is a subset of the roof estimate software (4:34-36)
- Proposed amendment: "~~calibration module~~ roof estimation software program"

EAGLEVIEW TECHNOLOGIES

U.S. Patent No. 8,078,436

Proposed Amendment

- Process uses two images
  - At least one generally orthographic image
  - At least one generally oblique image, said image lacking data concerning the camera orientation



AAPA

- NFOA, p. 5:

The following disclosure is interpreted as an admission of prior art:

> "Next, a set of reference points may be identified in each of the images. The service's 70 measurement software then uses these reference points and any acceptable algorithm to co-register the images and reconstruct the three-dimensional geometry of the object identified by the reference points. There are a variety of photo-grammetric algorithms that can be utilized to perform this reconstruction. One such algorithm used by the service 70 uses photographs taken from two or more view points to "triangulate" points of interest on the object in three-dimensional ("3D") space. This triangulation can be visualized as a process of projecting a line originating from the location of the photograph's observation point that passes through a particular reference point in the image. The intersection of these projected lines from the set of observation points to a particular reference point identifies the location of that point in 3D space. Repeating the process for all such reference points allows the software to build a 3D model of the structure.

- The identified subject matter is part of the inventive concept

EAGLEVIEW TECHNOLOGIES

Secondary Indicia of Nonobviousness

Industry Praise

Publications by others praising the invention

INNOVATION NATION

One small company reinvents a $30 billion market

CNNMoney

by Jennifer Reeves @CNNMoney December 9, 2011: 8:16 AM ET

EagleView founder Chris Pershing changed how the roofing industry operates with a software breakthrough.

NEW YORK (CNNMoney) -- Sometimes one bright idea -- and a whole lot of work to implement it -- can reshape an entire industry.

In 2005, roofing salesman David Carlson vented to his brother-in-law about his frustrations from climbing onto rooftops and manually measuring to give estimates on repair work. Measuring by hand is a tedious process. Plus, people fall off roofs.

Skepticism

- ""I thought, ***'There is no way,"*** says Belz, the Missouri claims adjustor. But once a few big insurers embraced the technology, ***Belz and others began to follow."***

"One small Company Reinvents a $30 billion Market," CCN Money online, December 9, 2009

Nexus

Bloomberg

EagleView's Software Measures Rooftops With Photos From the Sky

Roofers once had to spend hours with ladders and tape measures to figure out the size of a job. Now they can get the precise dimensions of roofs -- the area of each section, the pitch, the length of ridges and eaves -- without leaving their desks

In recent years, aerial and satellite photos have become abundant and detailed enough to show most U.S. buildings from several angles, and companies have emerged to turn those images into useful renderings. "It takes a lot of time to go out and measure a roof, so anything that will help with accuracy is a great idea," says James Kirby, an architect with the National Roofing Contractors Assn. EagleView Technologies was just awarded a U.S. patent on its method to derive roof measurements from aerial photos, an accomplishment that Chief Executive Officer Chris Barrow hopes will give the three-year-old Seattle company an edge over competitors such as RoofWalk, Pictometry, and Aerialogics.

EagleView patches together detailed roof renderings using aerial photos from public sources, such as county land records, or private databases. Its software matches up edges, colors, and shapes to create a three-dimensional image of the roof. EagleView's patent, previously granted abroad, will be issued Dec. 13, according to a notification from the U.S. Patent and Trademark Office. Barrow, 48, says the method is more precise and less cumbersome for roofers and insurance claims adjusters than the old-fashioned way. "It's very difficult to get an accurate measurement with a tape

Roofers once had to spend hours with ladders and tape measures to figure out the size of a job. Now they can get the precise dimensions of roofs -- the area of each section, the pitch, the length of ridges and eaves -- without leaving their desks.

Commercial Success

- Invention is source of commercial success
- Revenue grew from zero in 2007 to about $40 million in 2011
- On Inc. Magazine's 500 Fastest Growing Private Companies in America
- "EagleView's reports, priced at $20 to $80 each, are now used by around ***50,000 roofers*** and ***almost every single large insurance company***." "One small Company Reinvents a $30 billion Market," CCN Money online, December 9, 2009 (emphasis added)

The Invention is Now the Industry Standard

- "Having an ***Eagle View report*** has become an ***industry accepted standard***," says Kirk Belz, a partner at Mid-America Adjusting Services, an Ozark, Mo., company that investigates claims for national insurers.

  "One small Company Reinvents a $30 billion Market," CCN Money online, December 9, 2009

- "Now, Graham agrees that EagleView reports cut down on arguments with insurers, because '***most insurance carriers at this point treat it as gospel.***' ***In the past***, when he came up with a different number than an insurance adjuster, '***I'd have to spend hours out there teaching them how to measure a roof***,' he says.

  "EagleView's Software Measures Rooftops With Photos From the Sky" Bloomberg online Dec. 8, 2011

Copying By Others

- EagleView's product was a disruptive, new technology
- Within three years, the following companies launched "copy cat" products:
  - RoofWalk
  - GeoEstimator
  - SkyTekImaging
  - Aerialogics
  - Roofers411
  - ConnectPoint
- **<u>Evidence that others could practice the invention based on the application</u>**

Acquiescence

- *EagleView v. RoofWalk* (W.D.Wash 2012)
- RoofWalk enters consent judgment of validity and infringement
- RoofWalk closed its doors
- EagleView has decided not to license
- *EagleView v. Aerialogics* (W.D.Wash 2012) stayed pending this proceeding

EAGLEVIEW TECHNOLOGIES

Thank You

ATTACHMENT 2

(96/000,004 - 290115.401C1RE)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent	:	8,078,436 B2
Control No.	:	96/000,004
Filed	:	December 28, 2012
For	:	AERIAL ROOF ESTIMATION SYSTEMS AND METHODS

Examiner	:	Jason Scott Proctor
Art Unit	:	3992
Docket No.	:	290115.401C1RE
Date	:	October 24, 2013

Commissioner of Patents
Washington, DC 20231

DECLARATION

Commissioner for Patents:

I, Chris Pershing, declare as follows:

1. I am the Chief Technical Officer and co-founder of Eagle View Technologies, the owner of U.S. Patents 8,145,578 (the '578 patent) and 8,078,436 (the '436 patent). I am an inventor for each of these patents. I have over 15 years of experience in software development and engineering related to applied physics, and have held software related engineering positions at Philips Medical Systems, Microsoft Corporation and Veeco Instruments. I have a Masters of Science degree in Physics and a Bachelors of Science in Engineering Physics, both from the University of Arizona. I am an inventor of US Patent No. 8,078,436.

2. Following is a very brief explanation of some of the steps I carried out in making this invention. Sometime in the second half of 2006, I had a conversation with David P. Carlson, the other listed inventor, regarding whether it would be possible to obtain specific measurements of a roof without having to climb on the roof. I speculated that a solution to that problem might be found by utilizing aerial and satellite

imagery that had become widely available through Google, Microsoft Live (now Bing Maps), USGS, and like services. The overhead views, also called the top plan view or orthogonal view in the image files I could obtain had a scale reference that provided a mechanism to convert a pixel distance in the image to a physical distance in feet or meters. With that scale reference, one could calculate the length of a line near-to and parallel-to the ground as well as an area of a polygon in the plane of the ground for the overhead image. However, the image files did not provide information to allow someone to determine the depth (e.g., distances perpendicular to the image viewpoint). Further the oblique images, sometimes call oblique perspective images or perspective images did not usually have scale information at all, or if they had it, it was of limited use. I wondered whether, without being given specific information about how the image was acquired and details about the camera position when the image was taken it would be possible to determine the pitch of sloped roof sections. I concluded that without a determination of the pitch of the roof sections, an accurate assessment of the surface area and the length of sloped edges and seams on the roof could not be achieved.

3. As I studied the problem I also realized that if the pitch of the various roof sections could be reliably and accurately determined from an analysis of two more unrelated images, a vast and readily available library of imagery covering the United States could be successfully leveraged to provide a viable remote roof measurement solution. The ability to successfully leverage available image libraries that had been accumulated by multiple image providers over many years would be a significant achievement and a great advance in the field of roof measurements, if I were able to figure out how to do this.

4. As I considered how to solve the pitch problem, I realized that I would need to find a way that used only information from the image files themselves. While the various image file libraries might include two or more images of the same house, taken at different angles, these were taken independent of each other and I would not be able to obtain any data about the location of the camera for each of the images. I therefore sought a method that would rely solely on the image files themselves. More specifically, I studied the possibility of using image files containing oblique viewpoints

(such as the Microsoft's "Bird's Eye" images) in combination with images containing a top-down viewpoint (such as the near vertical viewpoints commonly found in orthographic image maps). At the start of my investigation, I did not know if this approach would be successful or even if the quality and the number of the available oblique viewpoints for a given location would be sufficient to consistently and accurately determine the pitch and overall 3D form of the targeted buildings. I used the knowledge I gained in my math, physics, and engineering background to speculate that I could derive a set of equations that would solve for the spatial relationships between the images and allow me to determine depth information (z-values) for the relevant points on the roof in the images. I used my wife's decorative bird houses as a model to help me think and work through a solution.

5. The method that resulted from this prototyping and an example of the end-product is taught in the body and figures of the '578 patent. This method was inventive. As evidenced by our aggressive growth in business volume, the method solved an important and valuable problem in the roofing and insurance industries. As evidenced by the reaction in the marketplace, the method was unexpected and unanticipated to the industries we serve as well as providers of software packages and aerial imagery that service those same industries. As evidenced by our humble beginnings from starting a brand new company from scratch for which this was the only product and the growing business success of EagleView, the economic benefits of leveraging commonplace imagery provided a working solution to an otherwise unworkably expensive problem.

6. We officially launched the product in the last week of January 2008 with an email blast to many in the roofing business and asking them to try our service to provide them detailed roof reports of any address they provided to us in the United States. Within the first hour on the first day we announced our service, our phone began to ring, with people asking to buy the roof reports that were the product of the invention described in what became the '578 and '436 patents. The reception in the industry was nothing short of amazing. Over the weeks that followed, our wives volunteered their time answering phones, assembling more desks, and helping to find and

interview the staff we needed to meet the rising tide of interest. Four months later, we had outgrown the size and infrastructure of our temporary office space, and found something bigger to accommodate our growth.

7. Our first and largest initial challenge in the marketplace was to prove that we were 'real'. Many of the initial contacts with contractors and companies were met with deep skepticism about our claim to be able to remotely and accurately measure the correct pitch and area of roofs from photographs obtained from commercially available image databases, such as Bing and Pictometry. In an attempt to debunk our claims, many early customers followed our first conversation by sending in an address of a particularly difficult roof that they had recently measured by hand. Upon receiving and validating the reports against their own measurements and finding that our reports were accurate, the conversation changed to something to the effect of: "that was amazing, we are surprised you were able to do this."

8. The buzz we created within the roofing contractor community soon caught the attention of insurance companies and software companies that service the insurance industry. Once such software company, Xactware, is a dominant provider of claims routing and adjusting software that services many of the nation's top insurance companies. We were invited to their headquarters just a couple of months after opening our doors. They were impressed with our product and stated they had previously failed at an internal effort to figure out how to use such imagery to remotely measure features in pitched roofs. They subsequently entered into a contract with us to use roof reports we produced in large quantities. At the time of the first meeting in early 2008 I had not shown them the patent application that resulted in the '578 patent which we had previously filed but which had not yet published, so they were not able to read the Application that became the '578 patent to see how we achieved this.

9. Another company, Pictometry International, invited us out to their headquarters in the fall of 2008. We were customers in buying their oblique imagery product and they noticed we were buying more and more images from them. They saw that our product was rapidly making progress penetrating into use by the insurance industry – an industry that Pictometry had been struggling with finding success with over

a period of years. Even though Pictometry was the supplier of our oblique imagery, they too were wondering with the 'how did you do that?' question with regard to our ability to accurately determine pitch and 3D roof models using the photos they were selling to us. When they sold their images, they intentionally removed from them nearly all the metadata collected at the time the image was taken, including all camera data and image acquisition data. The remaining metadata included only geolocation and image scale data in the orthographic images and only geolocation and approximate compass orientation of the oblique images that differentiated the East, West, North, and South looking viewpoints. This is equivalent in substance to the minimal metadata they allowed Microsoft to present to end users of the "Bird's eye" imagery in the form of visual scale markers and an indication of East, West, North, South viewpoint directions. Pictometry had believed that by removing nearly all metadata from the image files, a person would not be able to make use of unrelated images to recreate a 3D model of the roof. To paraphrase, the comment from one of their executives was that we 'shouldn't have the ability to do that' with what they knew they were providing to us in the image files. To my knowledge, they had not, at that time, seen the '578 patent application which was not published until October 2008 and I did not show it to them at that time.

10. One reason they were very surprised is because we were able to achieve these unexpected results and produce the final reports based solely on using the image data files. We obtained no other information other than what we got from the unrelated, independently taken images and without an on-site visit to measure any actual roof properties.

11. Another unproven goal of the invention at the time of launch was to produce remote measurement results that were comparably accurate compared to the accepted manual roof measurement practices. To our surprise, we would soon learn that, on average, we were not only competitive with the existing manual measurement accuracy; our results were far more accurate and repeatable. In contrast to the smaller roofing contractors who were testing our product, insurance companies approached their testing with much more statistical rigor and with much larger test samples. It was not uncommon for an insurance company to conduct a test involving many hundreds of roofs

across the country – sometime by ordering those roof reports anonymously under a false company name to shield us from knowing the scope or recipient of the testing. The results from several such tests from different insurance companies were consistently similar: The area reported on EagleView's measurement reports typically fell within 1% to 2% of what they determined to be the actual value obtained by a through their own on-site verification at each of the targeted buildings. In contrast, previous similar studies of crews performing manual on-site roof measurements typically found average differences of 6%– 10%. Thus, in addition to streamlining business practices, having a professional looking product, and reducing time and injury risk spent on a roof, the EagleView reports produced by this invention replaced manual roof area estimates with a significantly more accurate result.

12. As evidenced by the recognized growth of the volume of our business, the growth of our employee head count, and the numerous testimonials and articles attesting to the impact we have made within the industries we service, this invention has proven its uniqueness and value to the world. I will summarize these in the following paragraphs.

13. Just a few days before our January 2008 launch, the other co-inventor, David P. Carlson and myself hired and began training our first few employees. - At the time of we launched our service, the only product we sold was the product described and claimed in the '578 and '436 patents, namely, a report that had included on it the values we have determined for the roof area, the pitch and the length of various roof edges, valleys and ridges. Thus, 100% of the initial sales were directly for the product that is claimed in many of the claims of these two patents. In Fiscal Year 2008, our revenue for this product was about $1.4 million. As of December 31, 2008, our employee head count was 56. We thus grew from the first few employees hired in January 2008 to 56 employees at year's end. In the FY 2009, our revenue was over $5.3 million for this product, close to quadrupling for the prior year and our employee count at the end of the year was 69. In FY 2010, our revenue exceeded $12 million for this product, a doubling from the prior year and our employee count had grown to 105. By the end of FY 2010, many large insurance companies became convinced that our reports

had data and measurements that were superior in many ways to measurements they could obtain other places and began to purchase more roof reports from us. As a result, in FY 2011 we had revenue of greater than $33 million from this product, almost triple from the prior year and in FY 2012 our revenue was more than $45 million from this product, another year of significant growth. In 2011 we ended with 161 employees and this stayed about the same through 2012. In reporting the above numbers the stated revenue resulted from the sale of the claimed inventions, namely, a roof report having the determined measurements on it as specified in the '578 and '436 patents. With respect to the '436 patent, these reports were made from images that included a top plan view and an oblique perspective view and also included different colors of lines for different roof properties, such as red for ridge lines and light blue for valley lines. The edges were also a different color, for example green or dark blue. The pitch was indicated on the roof reports as well with an arrow showing the direction of the pitch. The orientation of the pitch arrow is relative to the compass rose indicated on the page which may or may not have the North direction aligned with orientation of the page.

14. There have been significant publications in various press sources that have touted our success. I attach hereto as Pershing Exhibits A and B some of those articles. During the Examiner's interview held on Oct. 17, 2013, we discussed the article in CNN Money by Jennifer Alsever and a full copy is enclosed as Pershing Exhibit A for the Examiner's detailed review. We also discussed the article in Bloomberg by John Tozzi and a full copy is enclosed as Pershing Exhibit B. The Examiner can review these two articles in detail and I will quote only a few sections from each of them. In the CNN Money publication, Kirk Belz is cited for the statements of: "Having an Eagle View report has become an accepted industry standard." He also states that he can process 25% more claims each day using these reports, all without sending an adjustor onto the roof, which saves the adjustor 45 min per roof and avoids the dangerous job of climbing on the roof. In the Bloomberg article, Joe Graham is cited for stating that with respect to Eagle View roof reports, "most insurance carriers at this point treat it as gospel."

15. An articles authored by Chris King, titled "Bird's-Eye View illustrates the response in the industry from the early launch, having been published in

August 2009, attached as Pershing Exhibits C. This article is also by an author independent from EagleView and shows recognition in the industry of the benefits that were obtained by the claimed invention of the '578 and '436 patents. The Examiner is invented to review the entire article and I will only quote herein from one location near the end. Troy Mock, President of BRM roofing states: "I've been with them since the beginning, and thing really picked up since February of last year." He states that he had them shoot 100 roofs due to a recent hail storm in Houston. The article states, " 'The bottom line is that this would help every roofing contractor,' said Mock. 'The number one reason is liability-you don't have to have salesmen climbing on the roof, hurting themselves or damaging the roof.' " Another briefer article is also attached by Jeff Bond, Pershing Exhibit D that explains the benefits of the inventive reports.

16. There are a number of other articles attached as Pershing Exhibits E-H which have were authored by Eagle View employees and printed in various magazines. For example, two of the authors list are Karen Edwards and Heidi Ellsworth, both of whom were employees of Eagle View at the time they wrote the articles and thus the authors were not independent from the patent owner and company selling the inventive reports. The articles do contain information about the industry acceptance of the EagleView roof reports as well as comments by many in the Roofing Industry regarding their views on these reports and therefore have value in showing both the tremendous benefits of the invention and the acceptance in the industry. Also attached are case studies as Pershing Exhibits I-N that were prepared by Eagle View employees that were specific case studies on the benefits of using Eagle View reports that were produced by the process and system covered in the'578 and '436 patents.

17. Over the years, Eagle View has received a number of comments and testimonials from roofers on the benefits of they obtain from using the Eagle View reports and these are attached as Pershing Exhibit O. To protect the private contact information of those sending the comments, their email address, phone numbers and other personal information has been redacted, but the no other changes have been made to the content of the messages as received from these various people who work daily in the roofing industry.

18. Let me comment briefly a particular term used in the '578 patent, which is found in Col 6, lines 5-8. I personally wrote the source code that was used to output the claimed roof reports. I considered that this source code was owned by EagleView, the company I help found and I understand the term "proprietary" to mean a term of ownership. I did not wish to disclose the specific source code used and I understood that this was not needed to obtain a patent, but I did provide sufficient detail in the '578 patent that a person working in this technology field at the time would be able to repeat the inventive results. Namely, from reading the disclosure of the '578 patent, they would be able to make and use the invention claimed in the '578 patent, even though I didn't disclose the specific source code, namely the algorithm, I had written. I gave a specific example of an actual roof report in Figures 5A-5F to be created and explained in the '578 application as filed how to create such a report, referring the reader to some specific techniques and where needed, to publicly available textbooks, trade journals and other publications. I believed this was sufficient detail to permit a person working in this field to be able to create such a report and still believe that today.

19. In fact, the industry showed that, as early as January 2009, and after our applications were published, a number of copy-cat companies started-up and created nearly identical reports and began selling them in competition with us. I had not given them my source code and yet by having access to our end reports, a real example of which I provided in the patent and what other information they were able to glean from the press and the '578 published patent application, they were able to imitate my results. Of course, I don't know the things the competitors studied to copy our product since they didn't contact me when they did so, but what I do know is that they made look-a like reports sometime after the '578 application was published, so I believe that there was sufficient information included that would permit another person to make and use the invention as claimed. The companies who imitated our products, many of whom to which we have sent notice letters include RoofWalk, GeoEstimator, Skytek Imaging, Aerialogics, Roofs411 and ConnectPoint. This is evidence not only that they could create such reports, but also evidence that sometime after we started this business with an entire new product, others decided to imitate our product.

20. In the '436 patent, this term was changed to "any accepted algorithm," see Column 6, lines 51-54. This does not mean it is admitted as prior art. This text recognizes that other could write different source code than I had written and still practice the invention. In fact, I am an inventor of the subject matter of Column 6, lines 50-67 and Column 7, lines 1-7. I do not admit that any of this description is prior art since it is not. I defined a problem that others had not recognized and then created a solution to that problem, which I explained in the '436 patent, including in Columns 6 and 7. Of course, I did not invent the math for performing the image analysis solely from the image data files, (it is rare that someone invents math) but what I did was identify a significant problem in the roofing industry, and I also determined which math should be applied to solve that particular problem. This required a significant creative process. I did invent, create and teach in the '578 and '436 patents the steps and mechanisms by which known math could be used to solve a new problem that no one had been able to solve previously. While some computer written code in the form of photo-grammetric algorithms existed as generally known in the art, they had never been applied or explained in way by which data taken solely from image files of a roof could be used to determine the pitch of roof and other measurements remotely. I was able to apply math in a new and unexpected way that resulted in the claimed invention. I was the one who recognized that the optimal choice for a reconstruction algorithm depends on a number of factors, (Col 6, lines 21 and 23 in the '578 patent and Col. 7, lines 1-3 of the '436 patent) and I determined what those factors were and explained them to the public in these patent applications. I was able to create a new product that had not existed before I came up with the inventions described in the '578 and '436 patents and find the parameters that were important to lead to that solution. Thus, my recognition that existing well known math from textbooks and journal articles could be used to solve the problems no one else had recognized and solved to create roof reports was part of the invention of the '578 and '436 patents. Thus, the Examiner's assertion that parts of Column 6 and Column 7 of the '436 patent is admitted prior art is not correct.

21. The subject matter in the '436, Column 8, lines 15-56 is not prior art. I did not admit that it was prior art in the application as filed and I do not admit that

it is prior art now. The statement that a variety of automatic and semiautomatic techniques may be employed to generate a model of the roof is not a statement of prior art, but a simple recognition that others might use different systems and code from what I used and written and achieve the claimed invention. This part of the '436 patent describes Figure 6 which is one of the systems for carrying out the claimed invention, similar to those shown in Figures 1 and 2 of the '436 and 578 applications as filed. The system shown in figure 6 and described in Col. 8 performs the inventive steps I had previously described and were claimed in the '436 patent. There is a recognition that systems using different software programs and different math than the specific one I had used could also practice the invention, but this would not avoid the invention if they made use of the claimed features. As one simple example, one algorithm may approach the solution through solving a large series of simultaneous equations; another algorithm may use a stochastic optimization method, and another may use an iterative approach, repeating that process for all reference points, in order to determine the 3-D model of the structure. It is expected that the implementation of my inventive disclosures would happen with standard programming techniques, using a range of programming languages, database systems, file systems, or other techniques for storing information. I did not invent a new programming language and instead, used existing programing languages. Furthermore, the implementation of that the inventive disclosure distributed across more than one machine using standard distributed computing techniques including messaging techniques, but this does not mean that the underlying technology I created is not inventive.

22. Prior to these inventions, the standard way roofs were measured was by sending a person to the structure's physical site, have that person get out a ladder, get up on the roof and measure the dimensions of the roof with a tape measure. This was the standard, accepted way of performing roof measurements by roofing contractors bidding for roof repair jobs, by insurance companies evaluating claims for roof damage, and others. This method was very expensive, requiring hiring people to perform the measurements, which in some cases may take up to several hours per structure. In addition, there was a very real danger to the people performing the measurements falling

or otherwise hurting themselves during the process. In many scenarios, such as a widespread disaster such as a tornado, hurricane, hailstorm or fire, this method for measuring roofs or other structure attributes for repair was not practical. Tens of thousands of structures, for example single-family homes, may have extensive roof damage requiring repair, requiring weeks or months for repair bids or insurance claims to be processed, before any actual repair can start. This previous process was grossly inefficient, resulting in inaccurate bids and estimates, high prices for owners and insurance companies, and significant delays in repair of widespread damage. This was the state of the building measurement industry in the U.S. in 2008 when I founded EagleView.

23. In addition to the expense of sending a person on-site both in terms of time spent and money spent to measure a roof, there was also a very real danger to the people measuring the roofs falling or otherwise hurting themselves during the measurement process. Nevertheless, this was the normal, accepted way roofs were measured prior to this invention.

24. As noted above, the company founded on this patent has gone from no revenues in 2007 to more than $45 million in revenues in 2012 from the sale of products that fall within the '578 and '436 patents. We have delivered over 3.5 million roof measurements to date, and this number is growing at an aggressive rate. Roof reports produced by Eagle View are used by over 50,000 roofers and by almost every single large insurance company. In 2012, Eagle View was listed by Inc. Magazine as one of the 500 fastest-growing private companies in America. Reports produced by Eagle View have become an industry accepted standard for claims investigations. By implementing these inventions, and satisfying a long-felt need in the construction and insurance industries by using aerial imagery that had been widely available from multiple sources, Eagle View was able to create an entirely new industry where none existed before, serving customers in a way they had never been served before.

25. The success from creating these reports is based on the very features that are claimed in the respective applications, namely, for the '578 the ability to create a roof report based solely on the received image files. This opened up an entire

new library of images that could be used since many such libraries contain only image file data and not camera or image acquisition data. For the '436 patent, the ability to make a roof report for two images, one a top plan view and the other a different view, in one example, an oblique perspective view, permitted the use of many libraries of images that were unrelated to each other at the time they were taken to now be correlated with each other used together to create a new report. It is therefore the claimed features that resulted in the end product the caught the industry by storm, was unexpected and resulted in the rapid growth of Eagle View technologies.

26. I hereby declare that all statements made herein are of my own knowledge are true and that all statements made on information or belief are believed to be true; and further that these statements are 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, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

10/25/2013
Date

Chris Pershing

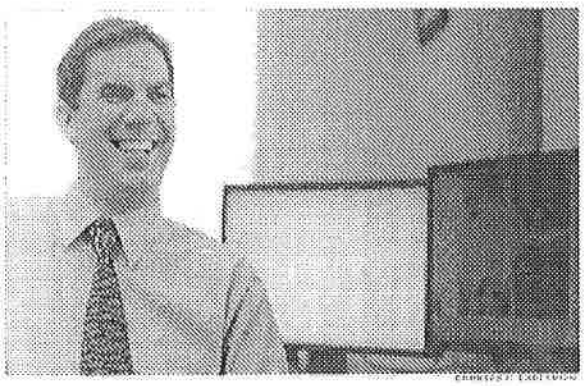
Pershing Exhibit A

(96/000,004 - 290115.401C1RE)

INNOVATION NATION

One small company reinvents a $30 billion market

By Jennifer Alsever@CNNMoneyDecember 9, 2011: 5:16 AM ET



EagleView founder Chris Pershing changed how the roofing industry operates with a software breakthrough

NEW YORK (CNNMoney) -- Sometimes one bright idea -- and a whole lot of work to implement it -- can reshape an entire industry.

In 2006, roofing salesman David Carlson vented to his brother-in-law about his frustrations from climbing onto rooftops and manually measuring to give estimates on repair work. Measuring by hand is a tedious process. Plus, people fall off roofs.

Carlson's brother-in-law, Chris Pershing, happened to be a software engineer. He did more than listen: Pershing set out to build a software program that would literally change the way the $30 billion roofing industry views America's rooftops.

Today Pershing's company, **EagleView**, uses aerial photography and 3-D modeling to produce on-demand reports for accurate measurements of almost every roof in the country. No ladder, no tape measurers and no perilous, time-consuming estimates.

"Having an Eagle View report has become an industry accepted standard," says Kirk Belz, a partner at Mid-America Adjusting Services, an Ozark, Mo., company that investigates claims for national insurers.

EagleView's reports, priced at $20 to $80 each, are now used by around 50,000 roofers and almost every single large insurance company. Sales are on track to hit $40 million this year, up from $1.4 million three years ago, and the 175-person company plans to hire another 40 to 50 sales and software people in the coming year.

Back in 2006, when Pershing first considered the idea of automating rooftop measurements, he was sure someone had already invented it. He hunted the internet for software that used photographs to generate estimates but found nothing.

So he began experimenting with sites like Microsoft's (MSFT, Fortune 500) Bing and Google (GOOG, Fortune 500) Earth, searching for satellite images. What he discovered surprised him: aerial photography, rather than satellite imagery, could provide better pictures and more accurate measurements.

"I thought there was certainly a huge opportunity out there," says Pershing, 39.

Pershing studied one of his wife's birdhouses, staring at the roof from different angles. He took snapshots in his head of those angles and then sketched various viewpoints of the roof. Over the next few months, he holed up at his computer on nights and weekends, developing software that would use algorithms to infer the size, shape, pitch and area of the roof.

He practiced his algorithms on a few addresses, including his own and his neighbors'. He even pulled up imagery of pyramids in Egypt, estimating the height of the pyramid to within a couple of bricks. He got the slope of his neighbor's homes almost exactly.

By the end of 2007, Pershing quit his job making software for ultrasound machines and started EagleView in a small rented office outside Seattle. He convinced family and friends to invest $200,000 into his new venture and set out to buy rights to aerial photographs normally used by states, counties and the U.S. Geological Survey.

When Pershing began telling contractors and insurance claims adjustors about his technology, they were skeptical. The industry had for decades measured by hand.

"I thought, 'There is no way,'" says Belz, the Missouri claims adjustor. But once a few big insurers embraced the technology, Belz and others began to follow.

Pershing hired tech veteran Chris Barrow to be CEO in 2008 and changed roles to become chief technology officer. Barrow then raised $6 million from investors.

"One of the smartest things Chris did was step away," says Roger McOmber, an angel investor in Dallas. "It's hard to do, but it's that team mentality."

Today, EagleView customers can order reports online or through a smartphone app and can get a PDF report delivered in an hour. A dozen competitors, including sites like GeoEstimator.com and Roofwalk.com, offer similar services. Despite the competition and the recession, EagleView's sales grew at a 200% clip last year.

Belz, the claims adjustor, says he can process 25% more claims each day without ever sending an adjustor onto a roof -- saving at least 45 minutes per job. "It really speeds the day up for adjustors," he says. "And going onto the roof is one of the most dangerous parts of the job."

The software also produces more precise estimates than workers with tape measurers, says James (Arry) Housch, who owns Arry's Roofing Services Inc. in Tarpon Springs, Fla. Instead of handing a customer a piece of scratch paper with some numbers and a business card, Arry's Roofing salesmen give potential customers a professional PDF report.

"It sets us apart from the competition," Housch says.

Pershing Exhibit B

(96/000,004 - 290115.401C1RE)

Bloomberg

EagleView's Software Measures Rooftops With Photos From the Sky

By John Tozzi - Dec 8, 2011

Roofers once had to spend hours with ladders and tape measures to figure out the size of a job. Now they can get the precise dimensions of roofs -- the area of each section, the pitch, the length of ridges and eaves -- without leaving their desks.

In recent years, aerial and satellite photos have become abundant and detailed enough to show most U.S. buildings from several angles, and companies have emerged to turn those images into useful renderings. "It takes a lot of time to go out and measure a roof, so anything that will help with accuracy is a great idea," says James Kirby, an architect with the National Roofing Contractors Assn. EagleView Technologies was just awarded a U.S. patent on its method to derive roof measurements from aerial photos, an accomplishment that Chief Executive Officer Chris Barrow hopes will give the three-year-old Seattle company an edge over competitors such as RoofWalk, Pictometry, and Aerialogics.

EagleView patches together detailed roof renderings using aerial photos from public sources, such as county land records, or private databases. Its software matches up edges, colors, and shapes to create a three-dimensional image of the roof. EagleView's patent, previously granted abroad, will be issued Dec. 13, according to a notification from the U.S. Patent and Trademark Office. Barrow, 48, says the method is more precise and less cumbersome for roofers and insurance claims adjusters than the old-fashioned way. "It's very difficult to get an accurate measurement with a tape measure," he says. "Five [insurance] adjusters will give five different measurements."

Barrow says EagleView, which has 200 employees, counts most of the 25 largest U.S. insurance carriers as customers, and almost 20,000 contracting businesses have used the service. That's about one-fifth of the roofing contractor market, according to an estimate by market researcher IbisWorld. Barrow says EagleView is profitable on revenue of about $40 million this year and expects to double that in 2012, as his sales team reaches more roofers and insurers.

Creating a Report

When a client puts an address into EagleView's website, the company pulls existing aerial photos of that property. The software uses them to generate a model of the roof surface, extrapolating measurements and slopes from images taken at different angles. Then a technician reviews the renderings and photos and e-mails the customer a report. The reports generally take one day and cost $45, on average, though simple homes can be done for $20 and complex roofs or commercial properties can cost $80 or more.

The idea for EagleView came to software engineer Chris Pershing when his brother-in-law, roofer Dave Carlson, described how tricky it is to measure a roof by hand. Pershing, who had worked at Microsoft (MSFT) and other software companies, began trying to write a program to create 3D models from photographs, starting with a birdhouse on his kitchen table. They started the company early in 2008 and brought on Barrow, a veteran tech executive, a few months later to be CEO. They've since raised nearly $8 million from angel investors.

The technology has helped reduce disputes between roofers, who have an incentive to high-ball roof dimensions to inflate estimates, and insurers, who have an interest in doing the opposite. "The size of the roof and the total number of squares is always a point of contention," says Corry Novosel, director of property claims at Westfield Insurance in Westfield Center, Ohio. (A "square" refers to 100 square feet of roof surface.)

Avoiding Ladders

Westfield uses EagleView mainly after big storms, tornadoes, or other catastrophic events that leave lots of roofs torn up and many insurance claims to be processed. Novosel says his adjusters can verify eight claims a day using the automated measurements, compared with five when they measure by hand. Many times, they don't even need to get on a ladder, if damage is visible from the ground. That reduces the risk that adjusters will get injured, a constant concern, Novosel notes, for people who clamber onto rooftops every day.

Joe Graham, a 28-year-old sales rep and estimator at Collis Roofing in Longwood, Fla., started using EagleView reports earlier this year for sales calls and estimates for people getting new roofs. He says he continued to measure by hand for several weeks, because he didn't trust the software. Now, Graham agrees that EagleView reports cut down on arguments with insurers, because "most insurance carriers at this point treat it as gospel." In the past, when he came up with a different number than an insurance adjuster, "I'd have to spend hours out there teaching them how to measure a roof," he says.

While he still has to climb up and inspect a roof to make an estimate, Graham says the EagleView measurements let him spend more time talking to customers and less time on top of their houses.

It also makes his job easier. "It's great in the summertime in Florida," he says, "if you can save 15 minutes on a roof."

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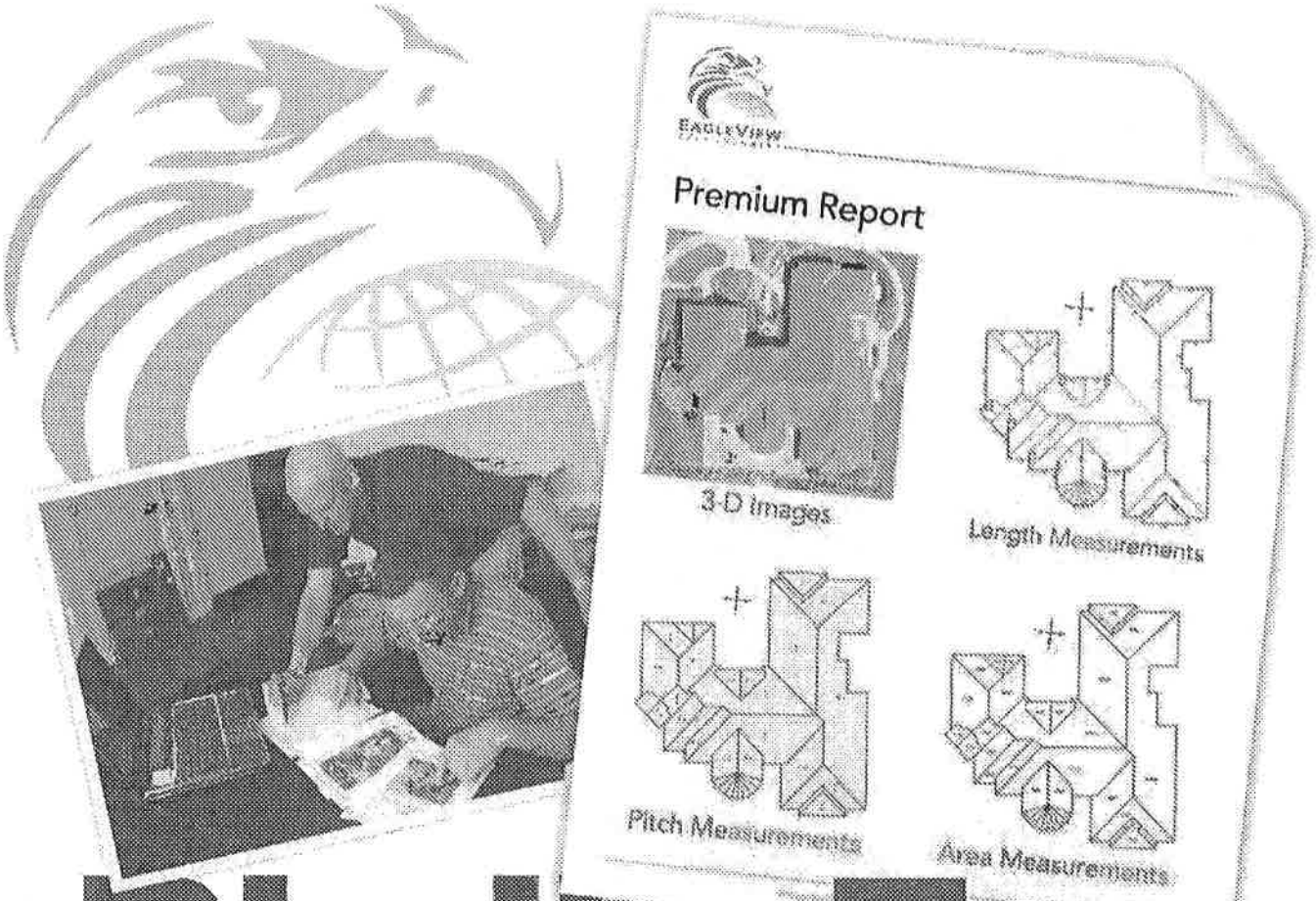
Pershing Exhibit C

(96/000,004 - 290115.401C1RE)



Bird's-Eye View

EagleView Technologies Gives Contractors Help From Above

by Chris King

The concept is fascinating: you just type in the address of a residential or commercial building and receive an aerial photo and line drawings of the roof with length, pitch and area noted for easy and accurate estimates and professional presentations. That's the concept behind EagleView Technologies, which supplies contractors with detailed reports of roof measurements based on its patented software.

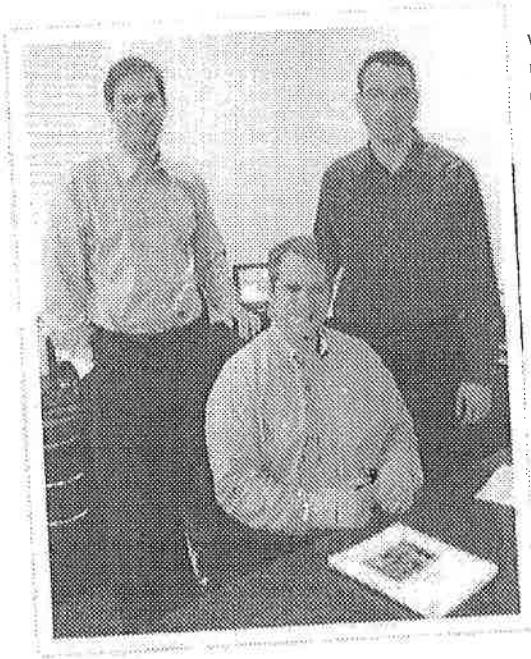
Dave Carlson founded the company as a result of the frustrations he experienced in the field as a roofing salesman, where he often found himself measuring roofs in the dark at the end of a long day.

"I thought, 'There's got to be a better way to do this,'" he recalled. "Our company was looking to hire a couple of new salesmen, and it was difficult to find people who could sell who were also comfortable on a roof — and who could properly measure it."

Carlson also realized that oftentimes even experienced salesmen were basically just making educated guesses as to the area of the roof. "I remember thinking, 'We have to take the guesstimating out of estimating,'" he said.

He called his brother-in-law, Chris Pershing, a software engineer in Seattle, and pitched his idea of an aerial measurement service. A couple of weeks later, the roofer and the software engineer had a prototype that Carlson put to the test on the job.

Carlson's company saw some immediate benefits. First of all, since his salesmen no longer had to climb on the roof, it lowered the company's workers' compensation costs. The firm found they could retain and hire gifted salesmen



Above: EagleView Technologies is run by (from left) Chris Pershing, Chris Barrow and David Carlson. **Page 31:** BRM Roofing President Troy Mock (standing) goes over an EagleView report with Roofing Consultant Michael Conway.

who weren't comfortable going up on roofs. Sales began to pick up. "Our closing rate went from 40 percent to 70 percent overnight," Carlson said.

After a year and a half of beta testing and with a half-dozen patents pending, EagleView Technologies officially took flight in February of 2007. Carlson and Pershing brought in Chris Barrow to run the startup.

"I knew they had something special here," said Barrow, the president and CEO of Eagle View. "It's one of those 'Why didn't I think of that?' ideas you fall in love with, and I came on board to help build up an experienced board and find investors. We developed a very experienced management-executive team, were very well funded, and grew by leaps and bounds."

"Business is great," said Barrow. "We've grown as fast as we can and handle requests from all over the country."

Benefits for Contractors

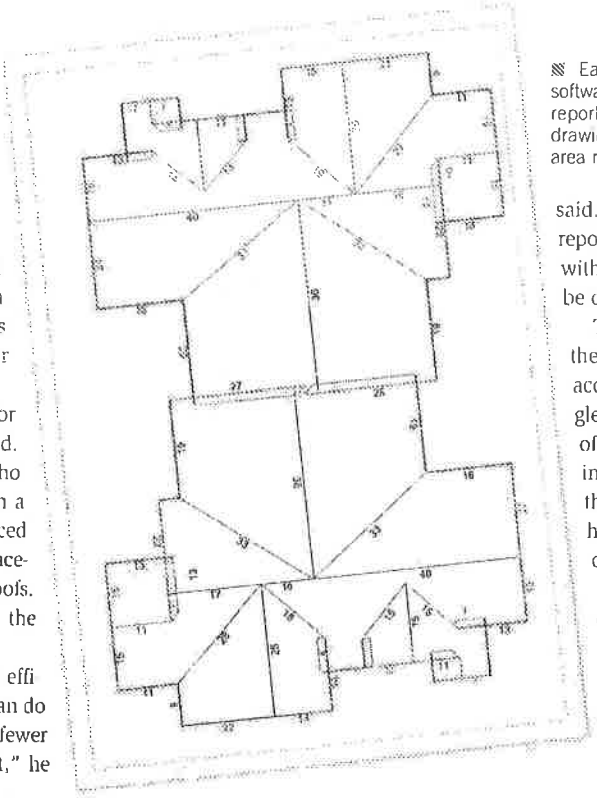
To use the service, a roofing contractor simply sends EagleView the address by e-mail, and roofing technicians, with the aid of sophisticated software, prepare a detailed report, which is e-mailed to the contractor as a PDF file or one of several proprietary formats. The report is usually ready in a couple of days, and expedited service is available. Since the company can access multiple sources of images, the reports can be generated day or night, regardless of the weather. There are two pricing plans for EagleView reports: a "pay as you go" plan that offers reports for a flat fee with no commitments and a tier-based subscription plan with volume discounts.

EagleView reports provide the contractor with several benefits, noted Barrow, including minimizing safety risks, increas-

ing efficiency, and improving the accuracy of estimates. "We reduce the number of times you climb up on a roof, which can be dangerous if it has a very steep slope, or the roof is old or damaged — if shingles are cracked, for example," he said. "To send a salesperson up on a roof is a very big safety risk. OSHA reports state the number one injury factor involves falls from ladders."

"This changes the dynamic for roofing contractors," he continued. "It changes the type of person who can sell roofs. We had a call from a company that hired an experienced salesman who had two knee replacements and couldn't climb up on roofs. They couldn't have hired him in the past, but now they can."

It also makes salespeople more efficient, noted Carlson. "Salesmen can do more estimates in one day, make fewer trips, and even close in one visit," he said. "Now you can walk in with the report, and you get more time to spend with the customer explaining what you'll be doing for them."



EagleView Technologies uses patented software to provide contractors with detailed reports of roof measurements including line drawings of the roof with length, pitch and area noted, as well an aerial photo.

The accuracy of the report makes the estimating process easier and more accurate, according to Barrow. "Rectangles are easy, but calculating the area of odd shapes with multiple angles involves complicated trigonometry that's almost impossible to do in your head or even on paper," he said. "But our software calculates it exactly."

Armed with this data, companies can better control costs, noted Carlson. "This minimizes waste if too much material is ordered and some has to be returned, and it prevents problems that come from running short of material before the job is

L.C. Nussbeck of Aspen Contracting has made EagleView reports an integral part of his business strategy.

done, resulting in people waiting at the jobsite," he said. "Now you can calculate exactly what your material costs are going to be, and determine the percentage of profit on each job."

"It also helps contractors prepare professional presentations that outshine a crude hand drawing on a piece of paper," said Barrow. "It's a polished, state-of-the-art presentation that helps close the sale."

A True Believer

L.C. Nussbeck is the owner of Aspen Contracting in Kansas City, Mo., which does residential storm repair work in Missouri, Minnesota, Nebraska, Kansas, Arkansas, Texas, Georgia and Ohio. He heard about EagleView from a friend in Texas and wondered what it was all about. "I went online and ordered a report," he said. "I thought the concept was neat, but the company was brand new, and I needed to make sure it was stable."

Over the next few months he ordered a few jobs and listened to the feedback from the employees in the field. Nussbeck was impressed. "Once I was sold on how it could help my business, I flew out to Washington to meet Dave and Chris," he recalled.

Nussbeck talked to them about his plans for the future. "I'm set up to expand and

contract quickly and work all over the country," he said. "I expand in markets where it's busy and have a traveling workforce and sales force. I had to know if they were going to be around if I was going to sell our sales force on using EagleView and how it could help grow our business."

After Hurricane Ike hit, Nussbeck preordered 5,000 reports from Eagle View. He soon found that insurance adjusters appreciated the service as much as his salesmen.

"In the storm business, we are dealing with insurance adjusters every day," he said. "Adjusters are assured the measurements are correct — not over or under. Third-party measurement has taken the arguments out of the insurance adjuster-contractor relationship. The insurance people love EagleView, and they love us."

It also makes training new salesmen easier, noted Nussbeck. "I've trained 2,000 salespeople in the industry, and I've always had to teach them how to measure a roof — and that's what takes the longest," he said. " What EagleView did was take the learning curve and just kill it."

"We went to EagleView with 65 salespeople, and now we have 210. Now we don't have to teach them how to measure a roof. We just have to teach them about the various roofing systems, Aspen Contracting, and what sets us apart," he said.

"Our closing ratio is extraordinary, to say the least," he concluded. "In 2007, we did $26 million. In 2008, we did $49 million, and we're on track to do $75 million this year."

Satisfied Contractors

Jason Alexander is general manager of Sutherlands Exteriors in Concord, N.C., a residential repair company owned by Andrew Sutherland. "Our business has grown tremendously, and it's the use of innovative developments like EagleView that's helped us grow," said Alexander. "Andrew Sutherland is a great friend and a great owner, and he's willing to take a risk and innovate to take the business to the next level."

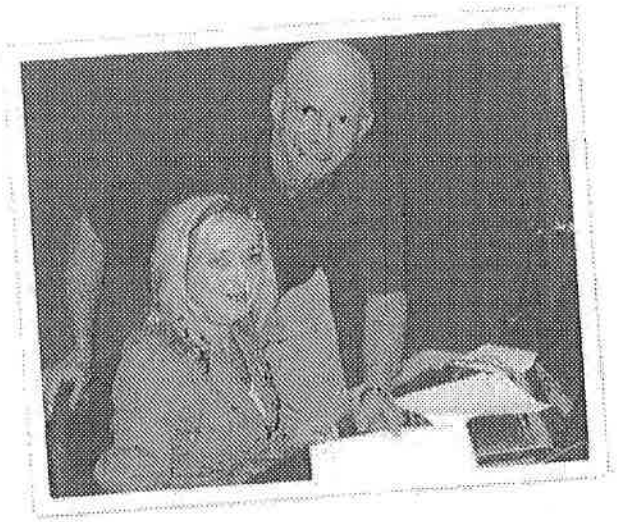
Alexander credits EagleView's Matt Guillory with helping his company implement the service and increase profitability. "EagleView totally bent over backwards to help us out," he said. "They consistently underpromise and over-deliver. After I used them once, it was a no-brainer. I believe they have revolutionized the industry."

Alexander points to increased safety as the most important benefit of the service, but he notes that's just the start. "Now we can see a property without even being there," he said. "The report shows any dangers, such as a pond in the back, or any access problems. It's accurate. We can use the report to plan deliveries and drop-off points. We develop more uses for it as we go. It's not just measurements; it helps with estimating and delivery."

"It's allowed us to do more volume of business at an efficient level," he said. "We're a real efficient operation, and a real profitable one at that. EagleView helps us out at every level."

Troy Mock, president of BRM Roofing & Construction Services in South Lake,

Bird's-Eye View



Troy Mock, President of BRM Roofing, and Angel Mock, the company's vice president, go over an EagleView report on an upcoming project.

Texas, is another satisfied customer. "I've been with them since the beginning, and things really picked up since February of last year," Mock said. "We did a lot of business when a big hailstorm went through McKinney. We had them shoot 100 roofs in Houston after that storm."

He tested EagleView's initial reports to ensure their accuracy. "I ordered a couple sky shots of some roofs, and I went out and measured them myself, and I found the reports were within 1 percent to 2 percent accuracy," he said. "After I was sure they knew what they were doing, I was right there."

"The bottom line is that this would help every roofing contractor," said Mock. "The number one reason is liability — you don't have to have salesmen climbing the roof, hurting themselves or damaging the roof. Number two is time. It's simple economics. For the fee, to get the report in a couple of days saves one to three hours of the salesman's time per roof — and that's time he can be out there selling."

Mock also loves the report, which he has found to be a great selling tool. "The report is very detailed and professional," he said. "It adds to our company and sales credibility. It's definitely increased sales."

Looking for an Edge?

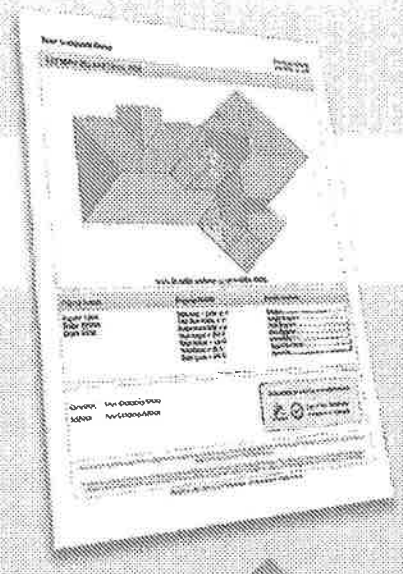
EagleView's Carlson acknowledged that the downturn in the economy has posed hardships for everyone, including contractors, but he argues that his company is perfectly positioned to help them make the most of their time and effort. "When times are tough, you have to look for every edge," he said. "We help people run leaner, meaner businesses with better presentations for customers. We realize that in a tough economy, every job counts, so we help businesses become better, faster and more efficient."

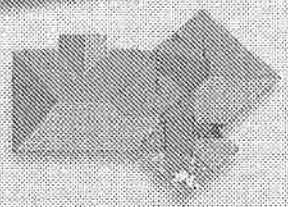
For more information about EagleView Technologies, visit www.eagleview.com.

Chris King is editor of Roofing Contractor. *He can be reached at 248-244-6497 or kingc@bnpmedia.com.*

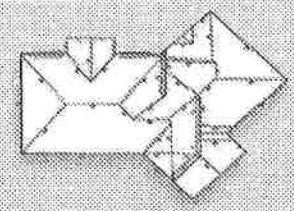
Pershing Exhibit D

(96/000,004 - 290115.401C1RE)

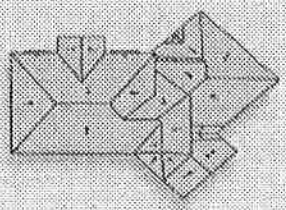




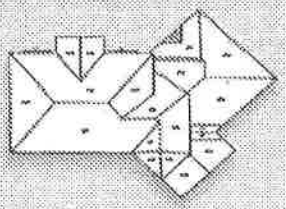
3D Diagram



Length Diagram



Pitch Diagram



Angle Diagram

Applying mathematical equations to aerial photographs of roofs, EagleView Technologies' patented system creates a three-dimensional model of a roof for a more accurate measurement.

MEASURE FOR MEASURE

NEW TECHNOLOGY OFFERS PROPERTY OWNERS A BETTER WAY TO ACCURATELY MEASURE EVEN THE MOST CHALLENGING ROOFTOPS.

BY JEFF BOND

CHRIS PERSHING thought there had to be an answer to his brother-in-law's ongoing problems.

The software engineer had listened while his relative, roofer Dave Carlson, lamented the difficulty of his work in the Los Angeles area. Carlson had to climb up on hot, dirty and dangerous roofs, and then somehow accurately measure them.

Pershing thought there must be a way to measure roofs without having to climb up on top of them and pull out the tape measure. Turns out, he was right.

After more than a year of research and development, Pershing came up with a software system that is now at the heart of EagleView Technologies, one of the top innovators in residential roofing in recent years. By applying mathematical equations to aerial photographs of roofs, Pershing was able to develop a system that accurately creates a three-dimensional model of the roof. It not only measures the square footage of the roof, but also accurately measures each roof's eccentricities, including the pitch, eaves and valleys.

Today, the Bothell, Wash.-based company uses its patented system to supply roofing contractors with a complete report on nearly any residential or commercial roof in the United States within about 24 hours. Rush jobs can be completed in one to three hours.

The company's secret is using Pershing's software program on accurate aerial photographs obtained from various sources, including county and municipal governments that use the photographs to help estimate property values.

"Essentially, all we need is a street address," says EagleView President and CEO Chris Barrow. "We will send you back a completed, professional report, complete with photographs and all measurements in usually about one day. We are convinced there is no more accurate way to measure a roof than the way we do it."

Barrow says using the EagleView system gives customers accurate measurements, and saves money and time, while also allowing for more flexibility and efficiency. The reports can accurately detail the amount of materials needed for the job, saving both the contractor and the property owner money. The cost of the report is based on the size of the roof and starts between $20 and $30 for a small roof.

Since the company's launch in 2008, residential and commercial contractors, as well as insurance carriers, have quickly become believers in EagleView's accuracy. The company began as a tool for residential contractors, but now sees about half its business coming from insurance carriers that are determining the cost of roof damage from natural disasters and storms. Barrow says a large portion of the company's business comes from the Midwest where insurance companies must assess the damage done by hailstorms and other wild weather.

Such success has helped the firm's business more than double each year. It now has more than 30,000 customers, ranging from individual roofing contractors to the nation's largest insurance carriers, and earlier this year it completed its millionth property report.

Barrow says his product is becoming so ubiquitous in the industry that it is sometimes used to settle disputes over the details of a job, with EagleView's report information being the deciding factor. It has even, on occasion, been used as a verb: to "EagleView" a roof means to measure it accurately.

As for the future, EagleView's Chief Technology Officer Chris Pershing has applied for a total of six patents and the company is working to expand into new fields, including measuring for solar energy.

"Our growth has been phenomenal," says Barrow. "We are now looking at international markets and plan to launch in Europe later this year."

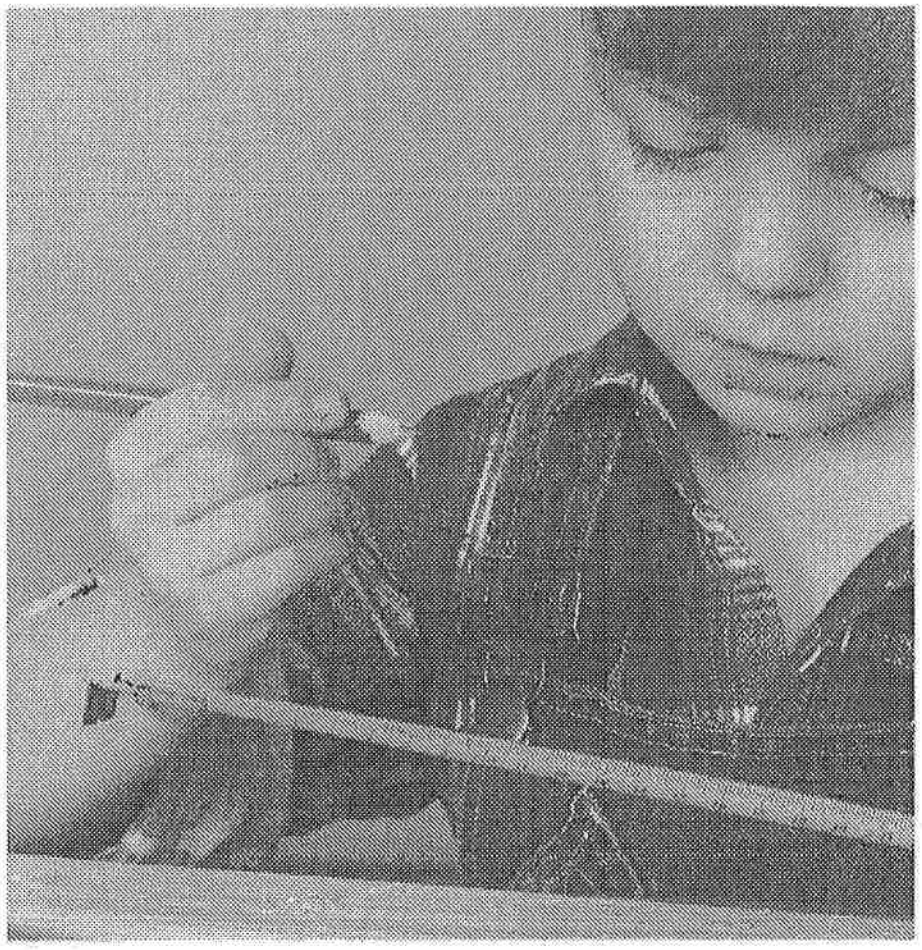
Pershing Exhibit E

(96/000,004 - 290115.401C1RE)

Karen L. Edwards

EagleView Technologies introduced a new solar roofing report that is an innovative breakthrough for solar integrators, solar installers, and the overall roofing industry. The solar industry will experience the benefits of a solar 3D-roof measurement report that additionally offers solar exposure, rafter lengths, grid layout, and an overall rooforientation in degrees.

BY KAREN L. EDWARDS



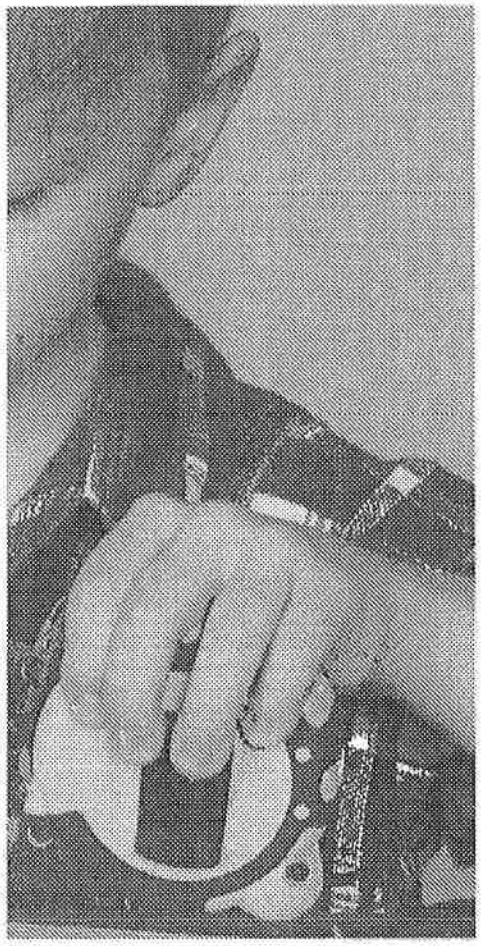
Calculate Solar Exposure

Contractors utilize new technologies to provide solar installations.

Ten years and 10 million solar systems in American homes and businesses, is it possible? The U.S. Senate Energy committee believes it is since they approved a bill by Sen. Bernie Sanders (I-Vt.) July 21, 2010 to encourage the installation of 10 million solar installations on American homes in 10 years.[1]

For those in the roofing and solar industry, this is great news and a major challenge. Many believe that more than ever they need to use every tool and technology available to meet the upcoming alternative energy demand.

For homeowners and building owners who are responding to the lure of solar grants and tax incentives, it can be somewhat confusing; they are faced with the question of where to start the solar process. Solar companies touting turnkey solutions are emerging every day. It's critical that the solar installer have a solid understanding of the roofing system that is on a building as it must protect the structure underneath for the life of the solar system. Because of the strong tie between a roof and a solar installation, more traditional roofing contractors are expanding their services and knowledge of the solar industry



to become solar and roofing installers.

Roofing Contractors Offering Solar Solutions

Tecta America Zero Company, a Cincinnati-based roofing company, has been installing roofing for the commercial, residential and industrial markets since 1929. With the increasing interest in solar installations, Zero Company understood the importance of being able to provide solar installations to its customers. Gabe Drake, general manager for Zero Company, said, "We are a forward-thinking company and recognized that energy efficiency and alternative energy solutions are growing increasingly more popular, especially with the funding and incentives offered by the government and utility companies. Even in Cincinnati we are amazed at the groundswell of interest from homeowners even before incentives enter the equation."

Drake discovered a solar 3D roof measurement report recently developed by EagleView Technologies, a Seattle-based software company. EagleView has become well known in the roofing and insurance industries for providing precise, guaranteed 3D roof measurement reports. The addition of the solar report means the contractor receives everything needed to calculate solar exposure, roof square footage and panel placement.

"What these reports have done for us, with just a 10-minute investment of time, is allow us to determine if solar is even an option for a home or building owner," explained Drake. "We can qualify them ahead of time and have a ready-to-present professional report, which in the end, saves us time and money."

New Technology Supplies Expertise to Roofing Contractors

Chris Barrow, President and CEO of EagleView Technologies, said, "We used our technology and feedback from solar installers to create a report offering important diagrams for grid layout, solar orientation and azimuth. The report provides the ability for solar installers to accurately calculate material needs and overall positioning of solar equipment."

American Solar Electric (ASE), Phoenix, AZ was instrumental in helping Barrow's company design the industry-changing solar report. Specializing in residential solar installations and designs, ASE installs solar electric systems that have everything homeowners need to generate their own electricity. This includes system design, approvals, installation, and full utility coordination. With over 2,300 Arizona homes and businesses featuring ASE work on their roofs, this company has positioned itself as a leader in the market.

"We are focused on the residential market," stated Will Herndon, Executive Vice President of Construction for ASE. "The demand for solar continues to grow in Arizona. We are focused on the market and we are using every means of technology to improve our process, sales and installations. We want to do our share of those 10 million homes."

"We see the azimuth table as one of the strongest components of this report," said Herndon. "In fact, the azimuth page is excellent. The most important part for us is that it accounts for magnetic declination. Having the accuracy of EagleView measurements is critical to the solar information since we know that performance estimates for the next twenty years are at stake."

"We used our technology and feedback from solar installers to create a report offering important diagrams for grid layout, solar orientation and azimuth."

- Chris Barrow, President of EagleVeiw

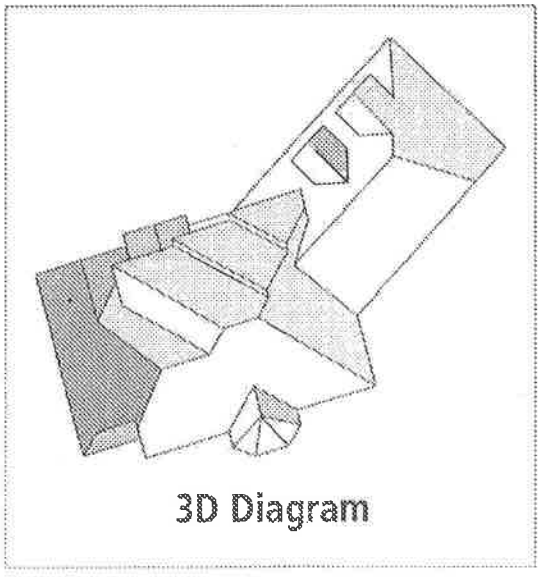
Another sounding board for the new report was CI Services. "We tested the solar reports and found them to be an incredible asset to our ability to estimate, plan and install a solar roof system," confirmed Bill Baley, President of CI Services, Mission Viejo, CA.

CI Services specializes in commercial and residential roofing installations with a strong focus on solar and green applications. "We are committed to incorporating new technologies and strong roofing practices into our solar business. It allows us to make sure the solar installations will work for the homeowner and local building codes," Baley stated.

Adding Solar to Portfolio Is a Huge Asset

The important first step in providing solar solutions is being able to plan where a solar system can be installed on an existing roof, which contractors have found easier through the use of technology such as that provided by EagleView. In addition to this first step, contractors need to be able to size the array, pick the panels, choose the size and design of the rack, plan for monitoring and interface with utility companies.

Many roofing contractors see the importance that solar will play in their future business but realize they don't necessarily have the expertise required to offer solar. With new construction starts and completions remaining down, it's more important than ever for the traditional roofing contractor to be able to provide solar solutions to their customers who may be inquiring about a new roof. This can mean that the



The 3D diagram is essential to accurate roof measurements.
(Source: EagleView Technologies)

contractor must invest resources in hiring solar experts or sending existing employees to one of many solar training schools. Many contractors are looking for efficient ways to train their employees in solar, taking advantage of every resource and new technology that will provide them with the expertise they need in the most cost-efficient manner.

Burns and Scalo Roofing, established in 1956 and headquartered in Pittsburgh, PA, recently started Scalo Solar Solutions, LLC to provide solar installations on commercial buildings. "We found that there aren't a lot of training opportunities for contractors who want to break into solar," explained Tom Peters, Executive Vice President at Scalo Solar Solutions. "We went to a lot of classes, performed our own studies and spent a lot of time picking the brains of experts at the major manufacturers and suppliers in the United States." Peters' company has gone so far as to install several different systems on their own building, not only to learn from it but to offer a demonstration area for potential customers.

Training Opportunities for Contractors

The Solar industry is growing at a rapid pace and it can be difficult to find reliable sources to provide training to contractors. The National Roofing Contractors' Association (NRCA) is one organization that understands the critical role that roofing systems play in the solar market. They also understand the need to train roofing contractors and provide them the knowledge and expertise to be able to supply solar solutions to their customers. Using technology as simple as a personal computer and the Internet, roofing contractors as well as consultants, architects and engineers can participate in NRCA's online education 'Roofing, Energy and the Environment Series.' Courses such as 'Photovoltaics' and 'Roofing' are part of the educational experience which can earn the participant a certificate and professional recognition. There is a small fee to take these courses, but doing so in an online learning environment offers benefits in time savings and travel costs.

It's more important than ever for the traditional roofing contractor to be able to provide solar solutions to their customers who may be inquiring about a new roof.

It's hard to find credible training programs with so many new companies appearing on the radar every day. Kirk Roller, Vice President of Carlisle Energy Services, a Pennsylvania-based company providing large, turnkey commercial solar solutions, explained that there are not a lot of traditional training opportunities for contractors. "Most solar panel companies are not providing a lot of training as much of their product is dictated by the mounting structure and other details," said Roller. In cases of unique photovoltaic systems, such as those using thin-film solar or tubes, contractors may find training through the manufacturer. "Many contractors end up getting trained by solar distributors," said Roller.

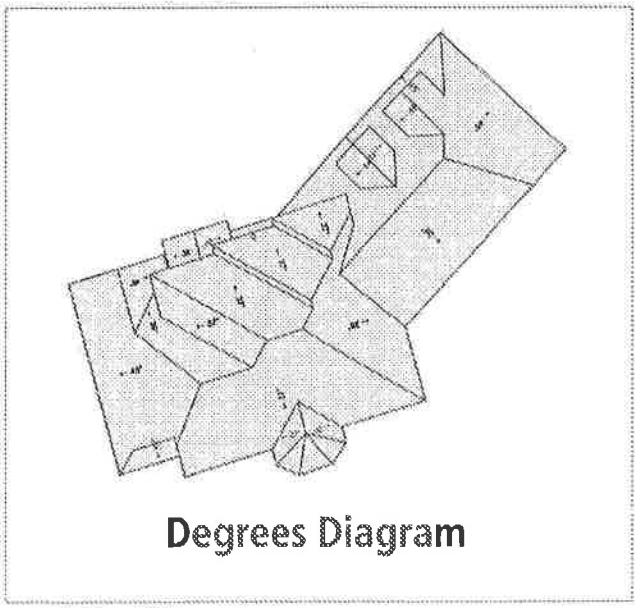
For Tecta America Zero Company, Drake says that training is a dilemma every day. "We are fortunate because Tecta America started a solar division recently and we are able to draw from their expertise," said Drake. Drake has found that many solar manufacturers and turnkey suppliers are turning to his company for assistance in the installation. "These companies know solar, but don't always understand how to properly install it on a roof without causing damage or voiding a roof warranty."

Internet Provides Information, Training and Answers

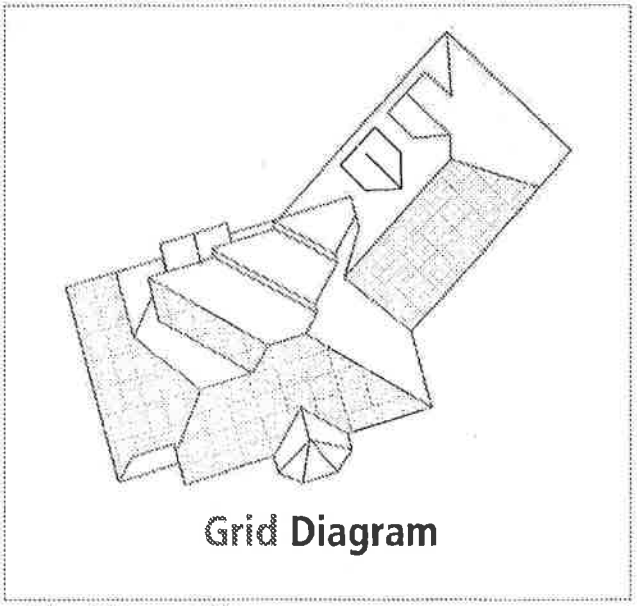
The Internet provides an enormous amount of resources to contractors or other professionals searching for solar solutions. Online training courses, manufacturers' and suppliers' websites are key sources for education and information. Another convenient resource is found online at Solar Hub (www.solarhub.com). According to their site, Solar Hub provides a free reference database of product specification data used by professionals in the solar energy market. Visitors can browse the listings or search for information on PV modules, inverters and manufacturers. The site is a good starting point that leads information seekers to the companies that can provide details, specifications and possibly even training on their products and services.

Before joining Scalo Solar Solutions, Peters worked as a consultant and says he has used online tools and software such as PVwatts and PVsyst for calculations and determining monthly electricity output. "While the tools are great to have, it still requires a lot of knowledge prior to being able to plug in your numbers," said Peters.

Drake said his company has an objective



In the degrees diagram, pitch values are shown in degrees and arrows indicate direction to help with panel placement. (Source: EagleView Technologies)



In this grid diagram, roof facets are overlaid with 1x1 foot squares, arranged in groups of 5x5, to aid in marking protrusions. (Source: EagleView Technologies)

to be a solution provider and not just a roofing company. "We appreciate the value of third-party tools because they enable us to be able to speak intelligently to homeowners, architects and building owners about the feasibility of their project."

State Incentives Scattered throughout the U.S.

While training opportunities are still being developed and discovered, another challenge for contractors is to understand the myriad of incentives, credits and rebates that are available to the homeowner or building owner who chooses to install a solar system. This is another area where the Internet and technology can save the contractor much time and money.

In the United States, many solar incentives are state specific, thus, being difficult to identify. States are offering new programs all the time and with new administrations ready to step in to many states' governments, it can be a challenge keeping up with the latest rebates and financial incentives. The most recent hot spots have been New Jersey and California with many states planning to following suit.

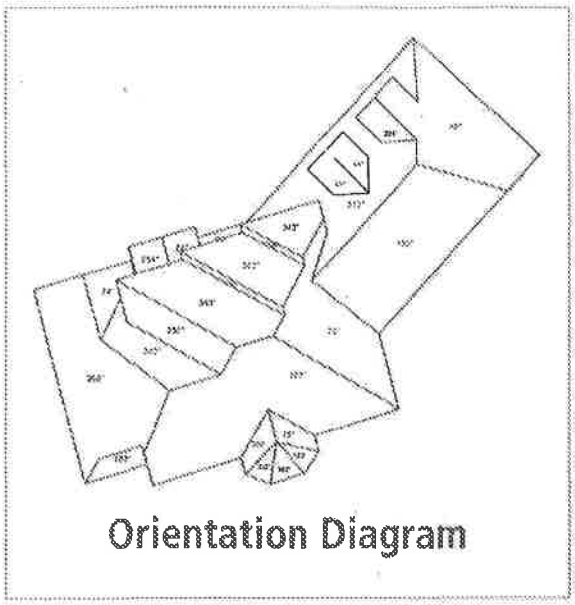
For contractors and installers who want to know what is happening in the United States, the U.S. Department of Energy has put together the Database of State Incentives for Renewables and Incentives (DSIRE). DSIRE provides comprehensive information on state, local, utility and federal incentives and policies that promote solar energy. The database can be found online at www.dsireusa.org/solar.

Relying on Third-Party Solutions Becoming a Necessity

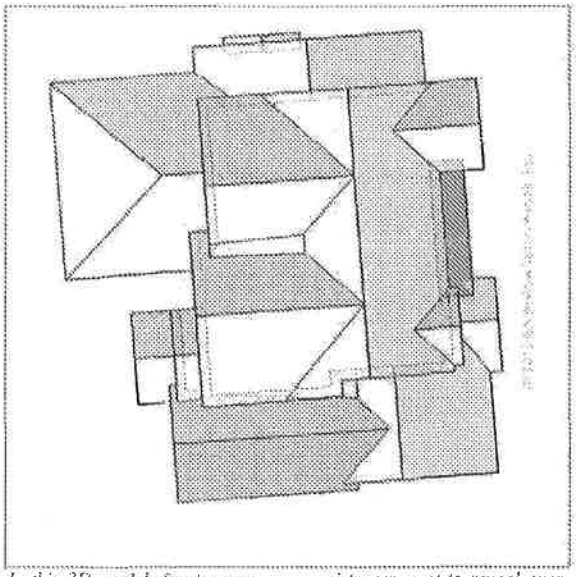
With solar experts emerging on a daily basis, it is more important than ever for contractors to rely on information provided by a reliable, respected, trustworthy source. Again the best place to start is with the U.S. Department of Energy. Their Solar Energy Technologies Program was developed to achieve high market penetration of solar energy technologies (www1.eere.energy.gov/solar). The Solar Program has several areas of focus with perhaps the Market Transformation Program being of highest interest to contractors and installers. The program's goal is to reduce market barriers to solar power through non-R&D activities, including infrastructure development, outreach and technical assistance.

The Solar Energies Industry Association® (SEIA) reports that companies and research labs are continually discovering new techniques and materials that improve the efficiency and reduce the cost of capturing solar energy. The goal is to commercialize the most promising technologies to improve delivery of solar power generation for homes, businesses and government.

A contractor or installer must be knowledgeable about the latest developments within the solar industry yet this can take an extraordinary amount of time. There is a need to find a balance between staying knowledgeable and continuing to run a profitable business. The contractor often turns to reliable, third-party resources to stay educated and remain productive in their business at the same time.



The Orientation(azimuth) diagram shows the orientation of the facets. Facet directions are labeled in degrees to assist in determining southern exposure. (Source: EagleView Technologies)



In this 3D model, facets appear as semi-transparent to reveal overhangs. (Source: EagleView Technologies)

EagleView's Barrow explains that one of the goals behind his company's reports is to help the contractor by providing a reliable source of accurate information related to their potential jobs. "We understand that this market is growing phenomenally every day. It's hard enough for the contractor to keep up with the requests for solar estimates. We are providing a service that not only saves them time but provides the critical information they need to accurately assess a project's potential solar value."

ASE's Herndon confirmed the value of using the third-party tool. "The combination of contractor feedback and strong software development has created a tool that is going to change the solar industry," said Herndon. "We see this as one of the most powerful tools to come along in a long time."

10 Million Homes A Reality?

At the rate that the U.S. solar market is growing, 10 million solar systems in American homes in 10 years may not be such a lofty goal. According to Bloomberg New Energy Finance, the United States currently generates 1.4 GW of electricity from solar, enough to power about 750,000 homes. Increasing the United States' solar production to 44 GW by 2020 (enough to power more than 20 million homes) depends on the amount of financing available, which according to Bloomberg, needs to be about US$100 million. This growth should be possible through the decreasing cost of equipment and the strong support being shown by the government.

Whether or not the actual number of homes sporting solar in 10 years actually reaches 10 million, there is no doubt that the solar industry will see explosive growth over the next decade. This means that there is also no doubt that roofing and other general contractors are sure to profit from this growth. PV

Karen L. Edwards is Marketing Director in EagleView (www.eagleview.com). She is also a freelance writer for the construction and roofing industries, with a background in marketing for several major roofing manufacturers and solar solution providers.

REFERENCE
1) http://sanders.senate.gov/newsroom/news/?id=c3fb3098-6d0c-4190-ac0c-78b162a57f65

Pershing Exhibit F

(96/000,004 - 290115.401C1RE)

Aerial Roof Measurements Technology Driving Changes to Professional Roofing Practices

By Karen Edwards, EagleView Technologies

Technology promises to maximize return for your effort, to distinguish you from the crowd and, ultimately, to increase your opportunity of *profiting through professionalism.* In order for technology to deliver on its promise, however, requires a contractor to invest time to understand it; and, to filter profitable technology from unprofitable. When a contractor "sees the light" of a particular technology, it means he can implement it into multiple facets of the business that will make day-to-day operations more efficient and profitable.

One technology that continues to prove itself and make believers out of Florida roofing contractors is aerial roof measurements. First introduced in 2008 by FRSA member EagleView Technologies, it continues to evolve and prove itself useful, sometimes in less than obvious aspects of the contracting business.

Then and Now

Gathering roof measurements has traditionally been a time consuming and labor intensive process. A contractor or employee had to drive to a prospective customer's location and manually measure and calculate roof specifications. The manual process left itself open to errors on multiple levels: in the measuring itself and then in the computation of those measurements. If additional data are required after an initial visit, it means expending more time and travel. Essentially, aerial measurement technology remotely automates this task. "When you look at the process of measuring a roof or a building's exterior, for years it was time consuming and done by hand with a tape measure," says Chris Barrow, EagleView Technologies CEO and president. "Technology has taken that tedious task and automated it."

What's in a Report

To get a glimpse of how aerial measurement technology speeds the process of roof measurement, as well as estimating, sales and other business processes, let's look at some of the information a contractor should expect to receive in a report. A contractor provides the address of a particular location and after visually confirming that the address matches

the residential or commercial building, submits the request. Some aspects to look for in a report include:

- Photographs of the property from multiple perspectives
- A three dimensional drawing of the building
- Length, pitch and area diagrams
- Report summary
- Useful information such as nearby gas stations, restaurants, medical centers, etc.

At the bottom of this page and on the following pages you will see examples, from both residential and commercial projects, of some of these items.

Apples to Oranges

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. This is enough of a difference to show up in the roof measurement report you receive. 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. 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.

Technology Creates Systems-Driven Approaches

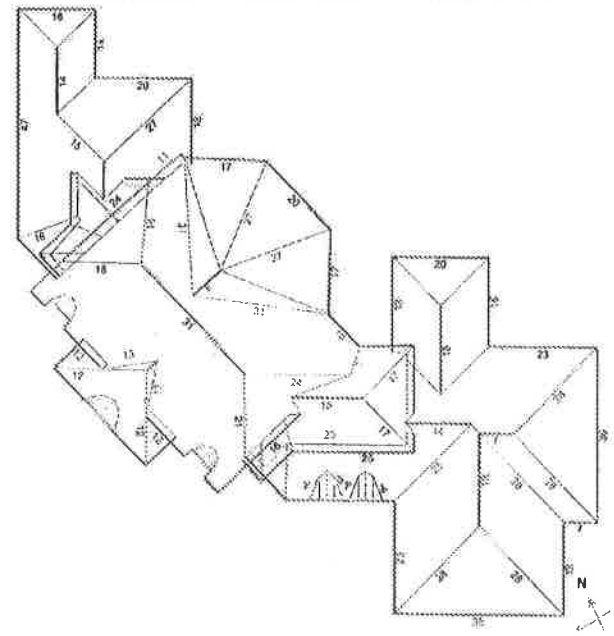
In addition to saving time and effort measuring roofs, automating the process provides additional benefits for contractors as they discover process improvements in other areas of their business, right down to the types of employees they hire. Ken Kelly, president of *Kelly Roofing* of Naples explains that the "ability to accurately measure from above has revolutionized our business process. We no longer have to worry about hiring roofers as salesmen or spending a year in training." Kelly says that his adoption of aerial roof measuring technology has given him the ability to hire sales professionals without sacrificing ability, accuracy or knowledge.

Two parts of an aerial measurement report. The length diagram (left) provides length in feet of each roof segment and the pitch diagram (right) provides the roof pitch in inches along with the pitch direction and the predominant roof pitch.

Length Diagram

Total Line Lengths

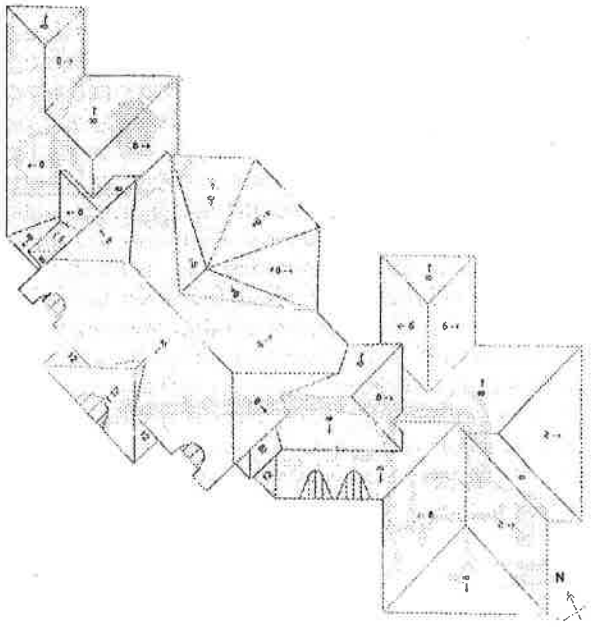
Ridges = 136 ft	Valleys = 316 ft	Flashing = 67 ft
Hips = 550 ft	Rakes = 93 ft	Step flashing = 93 ft
	Eaves = 624 ft	Parapets = 0 ft



Note: This diagram contains segment lengths (rounded to the nearest whole number) over 5 feet. In some cases, segment labels have been removed for readability. Plus signs preface some numbers to avoid confusion when rotated (e.g. +6 and +9).

Pitch Diagram

Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 8:12.



Note: This diagram contains labeled pitches for facet areas larger than 20 square feet. In some cases, pitch labels have been removed for readability. Blue shading indicates a pitch of 3:12 and greater.

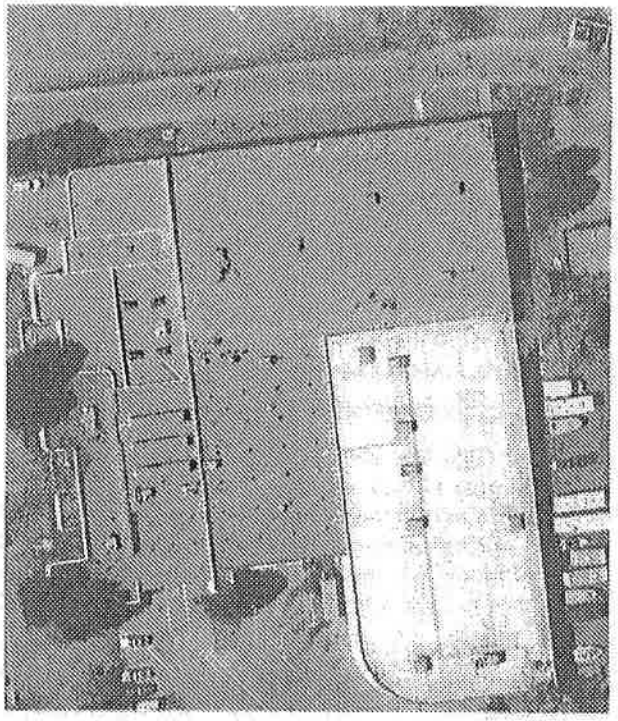
Arry Housh, president and CEO of *Arry's Roofing Services, Inc.* of Tarpon Springs, says that aerial measurement technology has allowed his company to put new systems in place for increased safety and efficiency. "We work on a lot of high-end custom homes where measuring and estimating was traditionally 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."

Incorporating the technology is paying off for Housh. "It definitely helps us better service the customer by expediting the process of preparing estimates. We also know the total bottom line number is more accurate so we stand behind that. We don't have to worry that we may have made a mistake on the measurement."

Ken Kelly cites technology as the driving force behind his company's ability to stay competitive in the tough economy. "As we integrate technology into more of our tedious and repetitive processes we discover new levels of efficiency," said Kelly. "Using technology allows our staff the time necessary to build solid relationships with our customers, suppliers and vendors without sacrificing daily duties."

Integrating technology into business has allowed for the development of a systems-driven approach to sales and operations. When a lead comes in, companies can order a roof report and assign it to a salesman. He takes that report and his laptop on the sales call, meets with the homeowners and estimates the job on site. The contract is printed right there

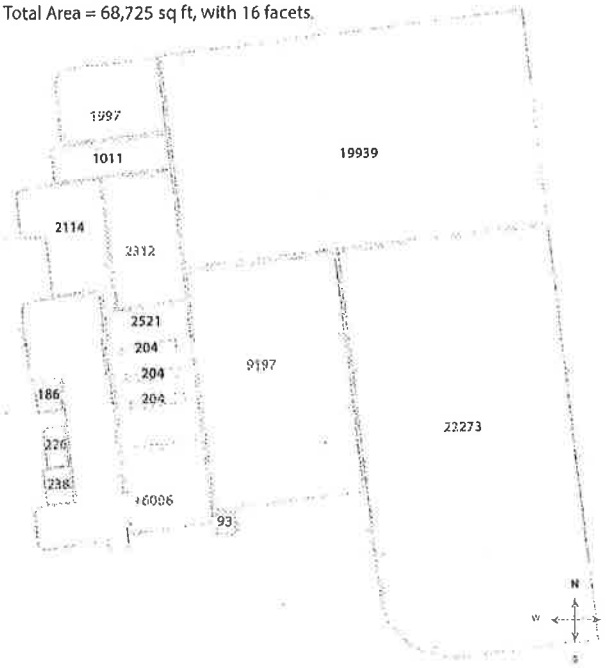
Aerial photograph of a commercial building's roof. Plane-based photography provides at least six times greater resolution and measurement accuracy than what is allowed via satellite photography.



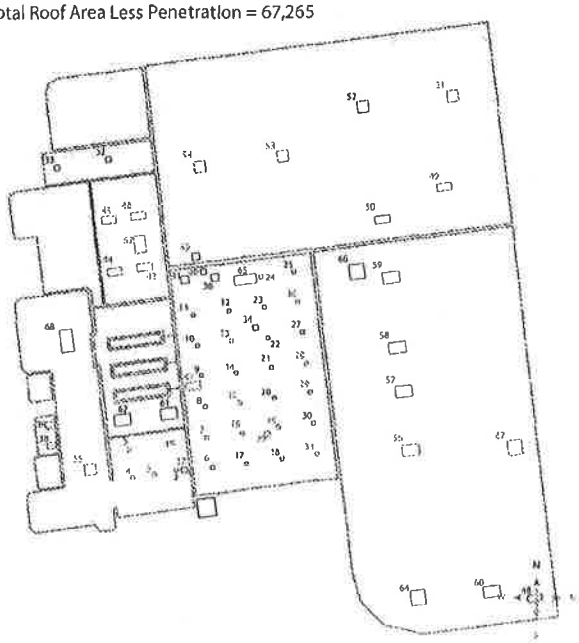
and the sale is closed in one trip. This approach pays off by helping to close more sales and, by making the process more efficient, technology allows more time to be spent with the customer.

Sitting in a customer's home, preparing an estimate and printing a contract may sound like a thing of the future but it's happening right now. Preparing estimates and bid packages is a vital part of a roofing contractor's business. It affects the sales process, the production and the profitability of a job.

Area Diagram
Total Area = 68,725 sq ft, with 16 facets.



Penetration Notes Diagram
Penetrations are labeled from smallest to largest for easy reference.
Total Penetrations = 68 Total Penetrations Area = 1,460 sq ft
Total Penetrations Perimeter = 1,120 ft
Total Roof Area Less Penetration = 67,265



The Evolution of Estimating Technology

Another once-manual process that was changed by practical technology is estimating. VisiCalc was the first spreadsheet program introduced in 1979 on the Apple II computer and was followed by Lotus 1-2-3 in the early 1980s. These spreadsheet programs proved to be extremely useful in helping contractors prepare estimates faster and in a professional format.

Estimating technology has progressed into the commercial estimating applications that are available and in use today. These software programs feature hard-coded formulas to reduce the user errors experienced with spreadsheet programs. These platforms are often very robust and provide a good solution for larger contractors with enterprise-level operations who are looking for job management, estimating and customer relationship management solutions. However, they are often cost prohibitive for mid-sized or smaller contractors.

Advancements in estimating software and platforms as well as the introduction of web-based solutions have put this tool within the reach of virtually any size roofing contractor. Not every solution will fit every business right out of the box so it's important to understand your company's needs, how the technology fits into your existing processes and what new efficiencies can be realized through the implementation of an estimating platform.

Chris Barrow said his company recently introduced a web-based estimating tool because of customer requests. "We had feedback from many of our customers that they wanted a way to take the aerial measurements they had come to rely on in their business process and see them flow into a simple estimate," explained Barrow. "This estimator is an answer to that request and is within reach financially for even the smallest contractor."

Building Your Competitive Edge

Continuing to differentiate your business through the use of technology is what's going to give your company a competitive edge in this tough economy. Building owners and homeowners respond positively to contractors who adapt to and utilize technology. Customers today are busier than ever and don't always have time for face to face meetings. They don't want to wait either. With the growing use of mobile communication, people have grown accustomed to receiving instant information.

Kelly Roofing says more than half of their business is conducted via phone, email, web or text. They see more of their customers asking for estimates to be emailed. "Without ever meeting with the decision maker we procure, complete and collect projects," said Kelly. "Imagine the amount of work contractors who haven't adapted to technology walk away from?"

Arry's Roofing Services reports that customers are very impressed by the company's use of technology. "Technology is viewed by customers as standard practice so when they see we are using it for takeoffs and roof estimation they welcome it," says Housh. He also says that it sets his company apart

from others. "Homeowners can see that we are an up-to-date contractor utilizing the latest available technologies and they want to work with us."

Implementing practical technology solutions into your business is no longer optional; it's mandatory for continued process improvement and profitability. Realizing its full benefit only happens when you make a commitment to integrate the technology throughout your existing processes.

-RFM-

Karen Edwards is the marketing director at EagleView Technologies, Inc., Bothell, WA. Prior to EagleView, she held marketing positions with Carlisle Construction Materials and HJE Marketing. She holds a bachelor's degree in Communications and Public Relations from Millersville University, Millersville, PA. ***FRSA contractors can use their member discount coupon book to receive two free EagleView roof measurement reports through September 30, 2013.***

Sealed Attics, continued from page 7

> **reduced drying potential of the system will increase substantially.** This could lead to potential long-term accumulation of moisture in the roof system resulting in costly and potentially hazardous structural deterioration as well as possible health risks.

ARMA's *Technical Bulletin (Form No. 211-RR-94)* references "Shingle Application Directly Over Insulated Decks" and states:

> This type of application is not recommended unless an adequate free-flow ventilation space is created between the top of any insulation and the underside of a nailable deck. Proper ventilation must be provided to dissipate heat and humidity build-up under the roof top. (See ARMA Bulletin 209-RR-86 entitled "Ventilation and Moisture Control for Residential Roofing.")
>
> In addition to affecting roof performance, direct applications of asphalt shingles over insulated decks without providing proper ventilation may void the shingle manufacturer's warranty. Individual manufacturers should be consulted to determine possible effects on their product warranties when such applications are utilized.

For instance, looking at the installation instructions for *Atlas Roofing Corporation's* Pinnacle 35 asphalt shingles reveals "Spray foam insulation applied directly to the bottom of the decking will void the warranty."

More Research Needed

FRSA recognizes the need for research on the effects of sealed attics in the Florida climate and may commission the *FRSA Educational and Research Foundation* to study the issue. At the committee meetings, Tim Graboski of *Tim Graboski Roofing Inc* of Delray Beach mentioned sealed attic research that is currently being conducted by the *Department of Energy's* Dr. William Miller at the *Oak Ridge National Laboratory*. For now, the real-world research being conducted on the homes of Florida citizens will continue with the installation of every sealed attic: results pending.

-RFM-

"Spray foam insulation applied directly to the bottom of the decking will void the warranty."

Atlas Roofing Corporation General Instructions for Pinnacle 35 Asphalt Shingles

Pershing Exhibit G

(96/000,004 - 290115.401C1RE)

Implementing Aerial Measurement Reports at FNOL

How To Increase Efficiency and Eliminate Supplemental Claims

INSURANCE CARRIERS EASILY recognize the value of using an independent third party to provide precise roof measurements in the event of a property claim involving roof damage. They know they can rely on EagleView® Technologies, the inventor of 3D aerial measurement technology, to provide accurate roof measurements in property claims situations. EagleView uses its patented software to provide measurements that all parties involved can easily agree on when determining repair or replacement costs.

While carriers quickly understand the value of using EagleView reports for a property damage claim, they have not been so quick to determine at what point in the claims cycle the report should be incorporated.

One insurance carrier that has relied on aerial measurements for several years turned to EagleView to conduct a study to determine the most efficient point in the claims cycle to order the report. The company's existing practice was to require its adjusters to make a visit to the site to view the damage and determine whether to order a measurement report. This resulted in extended claims cycle time with many adjuster and client touch points. It also created an environment for contractor disputes regarding the repair or replacement estimate.

"EagleView worked closely with us to look at our processes and objectively identify stages where the report could have an impact on efficiency," says the carrier's vice president of claims. "We developed a test group within our company that would order the EagleView from the first notice of loss (FNOL), and we monitored those claims throughout their lifecycles to track improvements or losses in efficiency."

> Ordering the EagleView report from the point of FNOL resulted in some positive outcomes for the carrier.

Ordering the EagleView report from the point of FNOL resulted in some positive outcomes for the carrier. The first benefit, depending on the claim damage, was the ability for the adjuster to know more about the claim, and in some cases desk adjust, closing the claim without leaving the office.

In addition to the benefit of having an accurate roof measurement on every claim, the carrier found that its adjusters were able to produce estimates faster, reduce the number of interactions with the homeowner, and effectively close the claim faster. Previously its adjusters had been closing an average of four claims each day. After the group began ordering the EagleView at FNOL, it increased the number of claims closed in a day to seven, which translated to an efficiency increase of 40 percent.

"Besides the productivity increase in the numbers of claims closed per day, we were really excited about the elimination of supplementals during this test," the carrier adds. "We averaged about two supplemental claims per week in the past. After using EagleView from FNOL, we took that number to zero."

In examining the reasons behind the supplemental claim numbers, it was determined that because the carrier had an exact roof measurement on every claim, not just the ones where the adjuster made the decision to order one, there was no dispute with the roofing or replacement contractors.

The carrier that initiated the study with EagleView received an additional, unexpected cost-saving benefit: Prior to the study it typically relegated measurements of small, up-and-over style roofs to the claims adjuster with the belief that these are simple and do not take much time to measure. The cost of the EagleView report turned out to be less than the cost of paying an adjuster to measure. The company has since changed its practice, relying on the adjuster to field verify damage and relying on EagleView to provide roof measurement reports for all properties, no matter the size.

Faster closing of claims, fewer interactions with the homeowner, shorter overall claims cycle time, accurate estimates, and payouts that are fair and agreed upon by all parties involved ultimately leads to a happier customer. Happier customers lead to increased customer satisfaction scores. ▲

Pershing Exhibit H

(96/000,004 - 290115.401C1RE)

SHEAR BULL

Palm Beach County Roofing & Sheet Metal Contractors Association

Affiliate of FRSA and NRCA | April 2011 Volume 24 - 4

April Program

Wednesday
April 27, 2011

"Engineering Issues, HVHZ Testing & Understanding Roof Calculations"

R.N. Salapan, Quest Engineering;
Katherine Cleary, Cleary Inspections

6:00PM-7:00PM - Networking
7:00PM - Dinner Meeting

Location:
Crowne Plaza
1601 Belvedere Road
@ Australian
West Palm Beach, FL 33406
Just west of the I95 Exit 69

For more info:
Ron Frano 655-5393
rfrano@pbcroofers.com

Inside

Roof Consultants Utilize Aerial Measurement Technology to Provide Expert Service

by EagleView® Technologies

Building owners rely on the expertise of roof consultants when it comes to roof repair, replacement and management of ongoing maintenance. Insurance companies often call upon a roof consultant in claims situations. As a roofing expert, the consultant must be aware of and utilize the latest technologies to provide the best service to all of their clients.

Joe Byrne of BRI Consulting, based in Florida, relies heavily on technology to ensure that he can take care of both his clients and the roofing contractors he works with. Byrne discovered EagleView® Technologies, the inventor of 3D aerial roof measurements, and has made it a part of his every day business process.

"Pictures are nice to have, but the diagrams and roof layout provided make my job easier, especially when trying to help juries understand."

EagleView invented the concept of 3D aerial roof measurements and has quickly become the industry standard in both the roofing and insurance industries. EagleView reports provide the most accurate measurements in the industry due to their ability to create 3D images and then extract the important measurements from the 3D diagram. The patent-pending software and process has been tested by major insurance carriers and roofing contractors for accuracy thousands of times with great success.

"The EagleView report allows me to make sure that everyone is bidding apples to apples," Byrne said. "It also gives everyone a fair shot. If a contractor submits a bid and has made a mistake, that bid is going to get kicked to the side." Byrne understands the roofing business, having been a contractor for 30 years before making the move to the consulting business.

"These are the kinds of tools I wish I had when I was in contracting," said Byrne. "It's tough out there and every dollar counts. Contractors can save money and present a professional report in the bid packet."

Allan Kidd of HiMark Roof Consulting, York, SC, has been using EagleView reports for the past two years and says the biggest benefit to his business and his customers has been the time savings. "I'm saving an hour or hour and a half in the field, especially if the roof is complicated," explained Kidd.

(continued on page 3)

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Vice President

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Joe Byrne (Chairman) (561) 471-8363

Message From the President

The main goal of our association is to offer our members information and services that help them operate and grow their business. With this in mind , we try to plan our yearly calendar of events with work related and useful programs. This year we are planning two events that we feel will give our members substantial value for their dues money. Since roofers are required to have a total of fourteen CE credits over a two year period, we have attempted to offer at least seven classes per year. In the past, we did this during our monthly meetings. This became a long and drawn out process. Many of our members preferred to take all of the classes at the same time. This year we are in the midst of planning to give all seven classes on the same day. We are working with Palm Beach State College to provide the classes at a reasonable and affordable price. The classes will cost $10.00 per class hour or $70.00 for all seven classes. This will give our members the opportunity to complete their required classes quickly and all at once.

The second event we are planning is directed at helping our supplier and manufacturer members. A mini-trade show is in the planning stages. The event will take place in September and will cover a four hour period. At this point in time, preliminary plans call for a charge of $50.00 per member for a 6X 30 inch table for display. Non-members will be able to have a table at $75.00. Finger foods will be served during the event. There will be no meeting involved. This is strictly an opportunity for non- contractors members to benefit from their participation in our association. It is also an opportunity for contractor members to meet in one place and at one time with the various supplier/manufacturer members to view and learn about new or existing products being offered on the market. There will be no charge for non display members to attend.

We hope our members will participate in these events. We want the association to be meaningful and of value to all of our members.

Please support your organization

Respectfully Submitted,

Walt Millet
President

...continued from front page

Roof Consultants Utilize 3D Aerial Measurement Technology to Provide Expert Service

"I'd have to spend time in the field and then come back to the office and spend more time drawing it. Using EagleView is saving my time and my clients' money." Kidd recently learned that he can receive the EagleView files in .dxf format to import it into CAD. "I'm looking forward to using that option," said Kidd.

Many times roof consultants serve as expert witnesses during depositions or trials. Byrne has found the EagleView report to be a tremendous asset in those situations. "If I'm being deposed in court, I want to have the EagleView report in front of me," explained Byrne. "Pictures are nice to have, but the diagrams and roof layout provided make my job easier, especially when trying to help juries understand." Attorneys would agree as Byrne says he has seen them enlarge the reports into poster-sized displays for jurors.

Kidd said he was in a deposition recently where the report was a critical component. "We used the report to designate the slopes we were talking about and to make sure that everyone was looking at the same part of the roof."

Competency, efficiency and knowledge are key components that a roof consultant must be able to offer to clients whether those clients are building owners, insurance companies or roofing contractors. Understanding and utilizing new technologies, such as EagleView, to improve business practices is critical to ensuring that the consultant's business continues to thrive.

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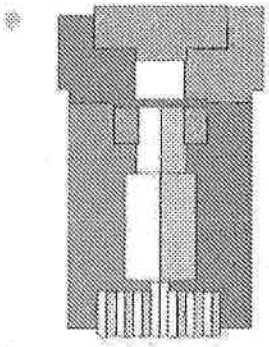
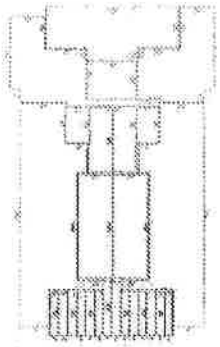
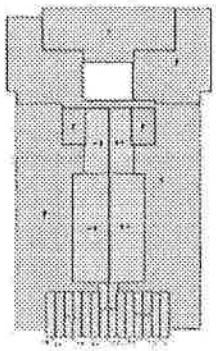
Call 1-866-659-8439 or visit www.eagleview.com to get started.



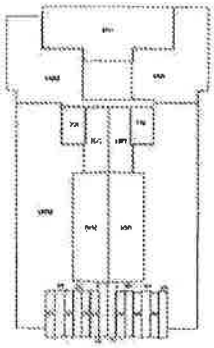
3D Diagram



Length Diagram

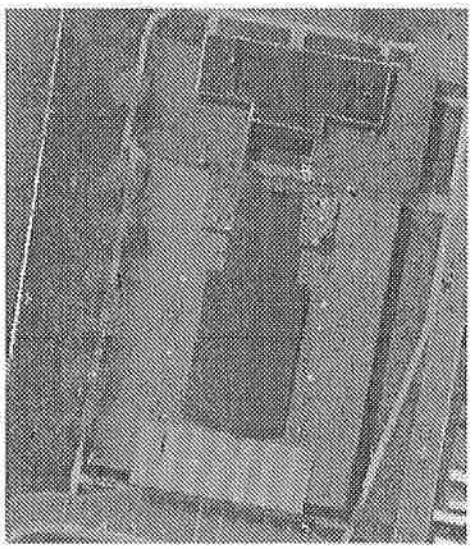


Pitch Diagram



Area Diagram

"I'm saving an hour or hour and a half in the field, especially if the roof is complicated"



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May Program

Annual Spring Golf Tournament

Wed. May 25, 2011

12:00 Noon Sign in - 1:00PM Shot Gun Start
5:00-7:00PM Dinner & Awards in Clubhouse

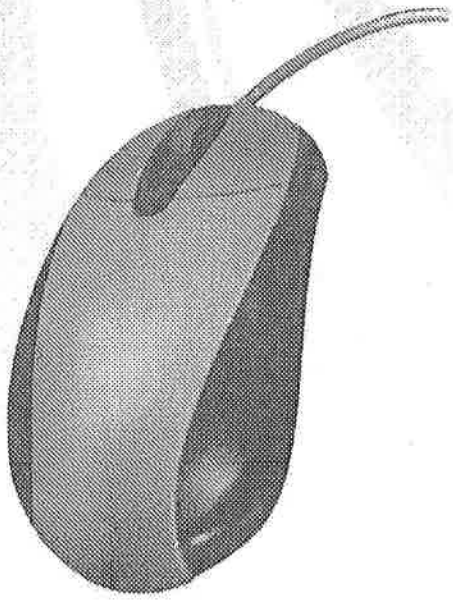
Location: 6101 Winston Trails Blvd, Lake Worth, Florida

John Pellegrino 561-719-7341
Ron Frano 655-5393
or email rfrano@pbcroofers.com

VIEW GOLF FLYER ONLINE
http://www.pbcroofers.com

Industry Websites

- ASTM - www.guidance-inc.com/~roofroof/
- American Consulting Engineers Council - acec.org
- American Institute of Architects - aia.org
- American Society of Civil Engineers - asce.org
- Building Officials Association of Palm Beach County - www.boapbc.org & www.boapbc.org/links
- Cedar Shake & Shingle Bureau - www.CEDARBUREAU.org
- Construction Industry Management Council (CIMC) - www.cimcpbc.com
- Construction Specifications Institute - http://www.csinet.org
- Copper Development Association - http://www.copper.org
- Division of Workers' Compensation - http://www.wc.les.state.fl .us./DWC/
- Florida Roofing, Sheet Metal & Air Conditioning Contractors Association - www.Floridaroof.com
- Galvalume Sheet Producers - www.steelroofing.com
- National Roofing Contractors Association (NRCA) - http://www.nrca.net
- National Society of Professional Engineers - nspe.org
- Roofing Contractors Association of South Florida (RCASF) - www.rcasf.org
- Roofing Industry Education Institute - http://members.aol.com/RIEIROOF/classes.htm
- Roof Tile Institute - www.rooftile.org
- Sheet Membrane and Component Suppliers to the Commercial Roofing Industry (SPRI) - www.SPRI.org
- Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) - http://www.smacna.org
- The Council of American Building Officials (CABO) - http://www.cabo.org



May 2011

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
			CIMC 7:45 AM			
8	9	10	11	12	13	14
15	16	17	18	19	20	21
	CILB 2:00PM		BCAB 2:00PM			
22	23	24	25	26	27	28
			Annual Golf Tournament			
29	30	31				

FRSA Future Meeting Dates

- April 28-30, 2011
  Board of Directors / Committee Meetings
  Crowne Plaza Melbourne Oceanfront, Melbourne, FL
- June 22-25, 2011
  FRSA's 89th Annual Convention & Florida Roofing & Sheet Metal Expo
  The Peabody Hotel & the Orange County Convention Center, Orlando, FL

PBCR & SMCA Office and Phones

2101 Vista Parkway, Suite 4001
West Palm Beach, FL 33411

Tel: 561.655.5393 | Fax: 561.688.8807
pbcroofers.com | rfrano@comcast.net

Ronald A. Frano, MBA
Executive Director

Pershing Exhibit I

(96/000,004 - 290115.401C1RE)

Roofing Contractor

2010 Case Study

EagleView™ Technologies Is Changing the Way Contractors Do Business

Throughout many roofing professionals' careers there has been technology that has literally changed the way they do business. Some are easy to recognize such as fax, cell phone and the Internet while others are very industry-specific such as software for estimating, accounting and production. A new technology that is again changing the course of the roofing industry has been developed and perfected over the last two years by EagleView Technologies out of Bothell, Wash. — aerial roof measurement reports.

For generations, roofing estimators have been climbing ladders and measuring roofs. "Measuring roofs takes time, money and is a huge safety concern for our company," stated Bill Gabel, an estimator for Interstate Roofing of Portland, Ore., since 1994. "It easily adds two hours to estimating for every job that I could be spending on the next estimate." When asked what he has done to change that, he was very definite: "We pull an EagleView report."

Sean Clay has been an estimator with Interstate Roofing, Portland, Ore., since 1995.

Software as a service is the new terminology for what EagleView is providing the roofing industry. "We are in our sixth generation of aerial measurement software technology and improving it every day," stated Chris Barrow, president and CEO of EagleView Technologies. "It is the next revolution in high tech. Instead of roofing contractors spending thousands installing software and maintaining crews in-house, they simply place a order on the internet for a roof measurement report and they are ready to estimate the job in hours."

Interstate Roofing, one of Portland's largest residential and commercial roofing companies, started out using the EagleView reports on just large and complicated jobs. What they have seen since then is an overall shift in how they do business utilizing the EagleView reports.

"Before I would pull up to a house and see the complexity of the roof and after talking to the homeowner, go back to the office and order an EagleView report. Now I know which neighborhoods have the large cut-up roofs and I am starting to order the reports before my appointment. Now when I show up, I am prepared and it is making a huge difference with homeowners," stated Gabel.

"What it really does is give you a sense of confidence in your estimate," agreed Sean Clay, an estimator with Interstate Roofing since 1995. "The accuracy of these reports is unbelievable. We are finding that we can take the EagleView measurements which include square footage, lineal footage and pitch, calculate the waste from the report's waste table and we are right on with our estimate. In this economy, homeowners want to know that they are getting exactly what they need, no more, no less."

"I have two jobs just recently where I estimated the roofs and then we pulled an EagleView report," confirmed Gabel. "In reviewing the results with production, EagleView was dead on. It is hard for us estimators who have been doing it for a long time to put that much faith in a report but I am consistently finding savings of at least two squares or more in my estimates. In today's competitive economy, two squares can win or lose the job."

For more information, visit www.eagleview.com.

Pershing Exhibit J

(96/000,004 - 290115.401C1RE)

Roofing Contractor

2011 Case Study

EagleView® Aerial Measurement Reports: How an Idea Changed the Industry

by Casey D. Barrow

During this time of high unemployment, economic challenges and seemingly never-ending recession, it is inspiring to see a young, new company making a difference. EagleView® Technologies is a fast-growing company that invented a new technology that is changing the roofing industry.

Like most high-tech companies, EagleView started with an idea. A roofing salesman tired of climbing and measuring roofs asked his brother-in-law, Chris Pershing, a software engineer, if he knew of any software that could measure a roof using photographs. Pershing, co-founder of EagleView, did some research but couldn't find anything similar to what his brother-in-law was looking for. This sparked his curiosity.

Chris Pershing, EagleView co-founder.

He immediately began experimenting with available overhead images and faced two key hurdles: was there enough coverage to have a nationwide product and was the resolution of the images in these existing aerial and satellite databases good enough to provide extremely accurate slope and area measurements of roofs.

The solution to both of these issues was found in existing repositories of aerial photography. Pershing found that aerial images provided a much closer view and greater resolution than satellite images, in turn leading to the ability to obtain an accurate measurement.

Pershing seized the chance to jumpstart a new company and filed the patent in spring 2007. "I always had an ambition to start a business if the opportunity came by," said Pershing, "and it finally did."

Since the spring of 2007, EagleView continues to lead the market with this new technology. With exponential growth, the term "EagleView It" now signifies how EagleView created and continues to offer the roofing industry a disruptive technology that like the fax or cell phone has changed the industry.

"We have changed our business model due to EagleView," stated Jason Berry, owner of Infinity Roofing Kansas City out of Olathe, Kan., one of EagleView's early customers. "We now hire salespeople who can focus on selling, not climbing the roof to get measurements. We still assess damage and accessibility obviously but the time saved from not having to measure the roof is time gained with the customer. We know EagleView is the industry leader for accuracy and customer service. There simply is no better option! Our proposals are ninety percent completed before we even meet with the customer. It is a game changer."

Roofing contractors like Infinity KC are incorporating the reports in their sales, marketing, and production process, utilizing the EagleView report from when the lead first comes in as part of the sales presentation and then as a key part of accurate material ordering. Finally, it is a very important addition to the final job completion and warranty package.

In just three years EagleView has grown from a simple idea to a fully developed profitable business. The future continues to look bright as EagleView spreads its wings and takes steps toward its next stage of growth. With leading market share, the company continues to innovate and offer new technologies that like aerial roof measurements will shape and change the industry for the new millennium.

For more information, visit www.eagleview.com.

Pershing Exhibit K

(96/000,004 - 290115.401C1RE)

Texas Construction Company Uses EagleView® to Increase Sales Closing Rate by 20 Percent

Charles Terry, owner of Charles Terry Construction in Midland, TX, recalled when he first learned about EagleView two years ago. "Someone from EagleView called me to tell me about what it could do for my business, and I didn't really understand how it could help," explains Terry. His curiosity won out and he decided to give it a try.

Terry was impressed by the first EagleView report he received. "The diagrams, the measurements and the color photos were very professional," he said. "I put that into my sales presentation for the homeowner and it was a slam dunk." Terry recalls that he brought his presentation to the homeowner and saw that his competitors had dropped off single-page estimates. "The EagleView report made all the difference. It positioned us as a professional company and we got the sale. That by itself made EagleView worth using on every job."

Charles Terry Construction has served the local market in the Midland – Odessa area for the past 30 years. Terry started out as a repairman in the roofing industry and built Charles Terry Construction into a million dollar plus construction business; he knows how to measure a roof. Using EagleView measurement reports is about much more than measurements for Terry.

"It gives me a huge advantage in many situations," Terry said. He told of one time he received a call from a homeowner who was 80 miles away and did not want anyone coming to her home. "I told her I could give her an estimate over the phone and I would call her back in three hours." Terry ordered an expedited EagleView report and was able to provide an accurate estimate the same day to the astonished homeowner.

Terry has seen an increase in his sales closing rate of about 20 percent that he attributes to incorporating the EagleView report into his sales process. "If people aren't taking full advantage of the report and using it in their presentation and closing, they are missing the boat," Terry said. "When you look at the cost of an EagleView compared to what it does for your business, its pennies on the dollar. You get back so much more in the end."

> *When you look at the cost of an EagleView compared to what it does for your business, its pennies on the dollar.*
>
> — Charles Terry, Charles Terry Construction

Not only has he seen his sales closing rate increase but Terry also appreciates the fact that insurance companies accept EagleView reports as the independent, third-party standard. "I no longer have discrepancies with insurance companies; there is no arguing over whether the pitch is seven or eight or who's measurements are correct. It has put us all on the same page."

EagleView's customer service department has stepped up to provide exceptional support to Terry when he needed it. The job was for a large apartment complex that had suffered storm damage. He ordered an EagleView report for the entire complex and prepared his bid from that. "The apartment complex manager had gotten another bid from two other companies that measured one building and assumed all the others were identical. He called me to tell me my bid was $90,000 under." Even though Terry was confident that the EagleView measurements were accurate, he called on EagleView customer service to double check and verify. "They took the time to review everything in my order again to provide reassurance," said Terry. "In this situation EagleView made me look like a shining star!"

In addition to ordering EagleView reports and growing his business, Terry is an avid supporter of the SPCA. He and his mascot, a Kerry Blue Terrier named Jewel, help out with many other community fundraising events, believing that it's important for a successful company to support their local community.

Pershing Exhibit L

(96/000,004 - 290115.401C1RE)

Aerial Measurement Reports: Uncovering the Hidden Costs of DIY Tools

With the increasing availability of aerial and satellite imaging tools, more insurers are turning to these resources for more efficient processing of claims. In the case of property damage claims, EagleView® Technologies, Inc. created 3D aerial roof measurement reports that approximately 96 percent of the top 25 insurance carriers rely on in their claims departments.

Many carriers are still trying to determine the best way to utilize aerial and satellite imaging in their processes. Lured by the seemingly low cost of do-it-yourself tools, there are some carriers that believe this method to be the most efficient choice. A recent study shows that the do-it-yourself technique is actually costing carriers more money than they thought.

One insurance carrier worked with EagleView to conduct a study of the cost efficiency of using do-it-yourself sketching tools versus purchasing EagleView reports on each property. The study involved 500 addresses and closely analyzed time, cost and human error to determine the efficiency of both methods.

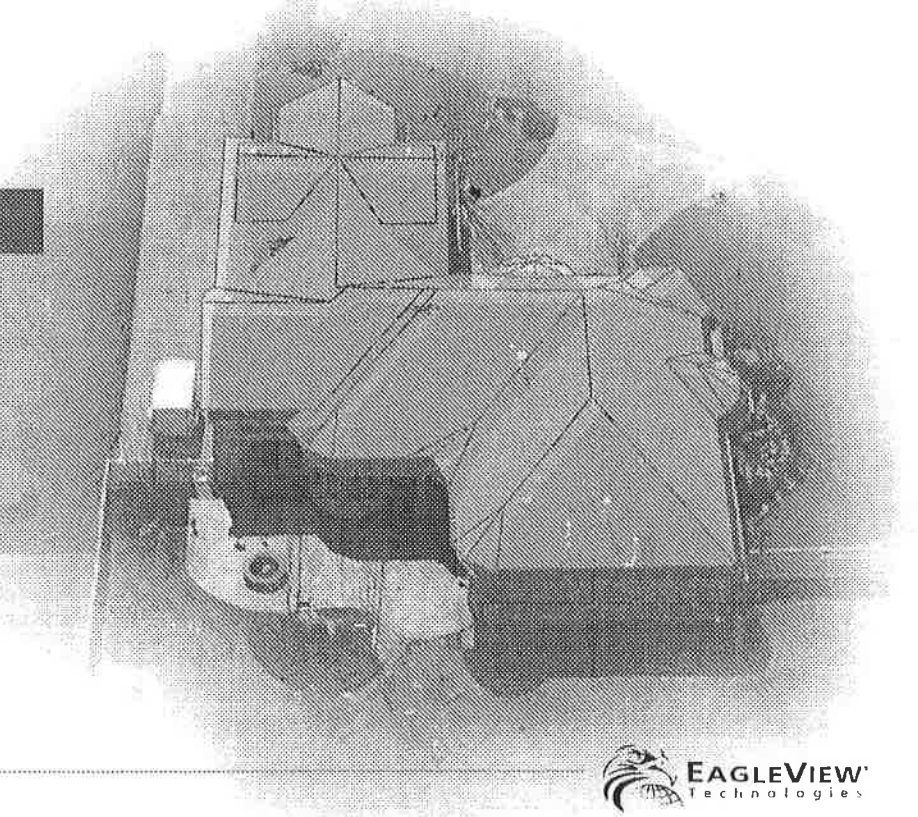
The do-it-yourself group was assigned the same 500 addresses that were also sent to EagleView for an independent report. In looking at purchase price alone, 500 addresses at five dollars each ($2,500) for the do-it-yourselfers versus 500 addresses at an average cost of $40 per report ($20,000) from EagleView, it would appear that this has an obvious answer for cost savings.

A STUDY OF 500 ADDRESSES

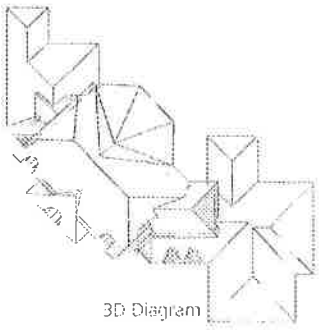
+10% = the average error rate of do-it-yourself sketchers

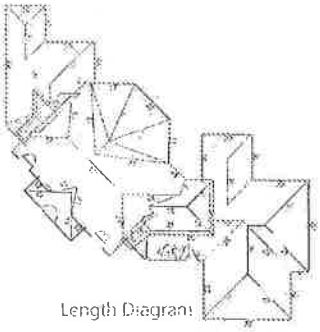
$ 637,500 = the real cost of do-it-yourself

$ 617,500 = cost savings by using EagleView



EagleView provides accurate and detailed diagrams


3D Diagram


Length Diagram


Pitch Diagram


Area Diagram

One must dig deeper and evaluate the hidden costs involved in using the do-it-yourself tool to get a true picture of the cost of each method.

The carrier's adjusters were spending an average of one hour sketching a property and completing approximately four per day. One half of their day was lost to time spent sketching a property. The group of adjusters using independent measurement reports from EagleView was able to conduct two to three more appointments with claimants per day.

Accuracy is a critical factor in the cost equation. The do-it-yourselfers in this study averaged an error rate of +10 percent on the 500 addresses that would have resulted in total overpayments of $600,000 by the carrier! The EagleView measurement reports on the properties were accurate, resulting in exact payments and a savings of $600,000.

Let's not forget about supplementals. While the average do-it-yourselfer was over by 10 percent, five percent of the homes in the study were underestimated resulting in 25 supplementals. At a conservative, average cost of $1,000 per supplemental, this would have cost the carrier an additional $25,000. The accuracy of the EagleView reports resulted in zero supplementals.

Upon final review, the do-it-yourself tool had a real cost of $637,500 ($600,000 overpayments + $10,000 time drawing + $2,500 to purchase images + $25,000 supplementals) whereas the $20,000 invested in EagleView reports produced a cost savings of $617,500! The cost and time savings ultimately led to more efficient processing and closing of claims resulting in satisfied customers and higher overall CSAT scores.

With new measurement tools emerging every day, it is important to note that these are tools, not services. A majority of these do-it-yourself tools have not been tested for accuracy; they do not eliminate adjuster bias and do not represent an independent, third party focused solely on the accuracy of the measurement.

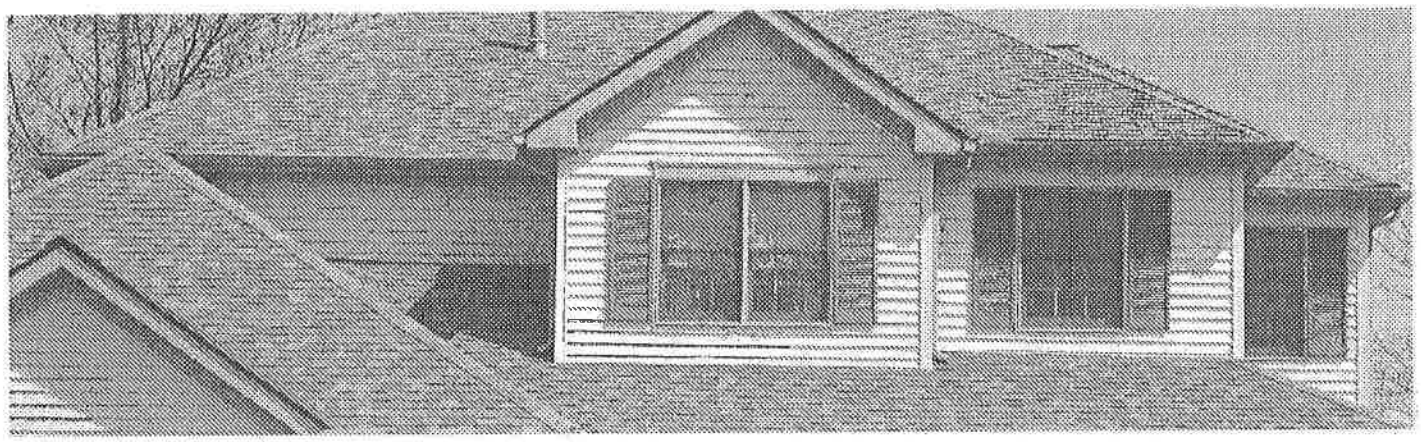
About EagleView Technologies, Inc

Headquartered in Bothell, Wash., EagleView Technologies, Inc. invented the concept of 3D aerial roof measurements. Its patented software and process provides detailed calculations and offers higher accuracy and precision than any other method. EagleView is currently in its sixth generation of aerial measurement software.

Pershing Exhibit M

(96/000,004 - 290115.401C1RE)

Counting on the Perfect Measurement Every Time



In the roofing business for more than 40 years, Dan Molnar, owner of Phoenix Roofing in Aurora, OH, quickly saw the value of using EagleView aerial roof measurements and has been doing so since 2008. "After 40 years, it doesn't get any easier to climb a ladder," Molnar said.

> *"EagleView gives us consistent, accurate measurements every time."*
> — Dan Molnar, Phoenix Roofing

When Molnar first discovered EagleView, he sent in a property address and measured that same address himself to verify. "The measurement that EagleView sent was virtually the same number that I had come up with," he explained. "I can count on the perfect measurement every time with EagleView, down to the length of the gutter."

Molnar said that Phoenix Roofing has found substantial cost savings by incorporating EagleView measurements into their business practices. They no longer have to spend the time and money to send someone out to measure each house. "We really like that we've been able to reduce the time lag between getting a measurement and preparing an estimate," Molnar said. "The time that used to be spent on measurements is now spent doing more productive tasks."

The EagleView property owner report plays a key role in Phoenix Roofing's sales process. Molnar said that he uses the full measurement report to review the details with the homeowner and then leaves the property owner report with the customer. EagleView's property owner report provides the 3D diagram, five color photographs and a labeled notes section for easy reference. "The notes diagram labels each plane of the r oof and ensures that everyone is referring to the same section when discussing the project," said Molnar.

When asked if there is one feature of the EagleView report that he appreciates the most, the answer comes easily to Molnar. "There's not just one thing; it's all encompassing for us. From the pitch to the square footage to the waste table, we use all the information that we receive. We tried out similar services but have found that they just don't compare to EagleView in terms of accuracy, the images provided and the presentation."

Pershing Exhibit N

(96/000,004 - 290115.401C1RE)

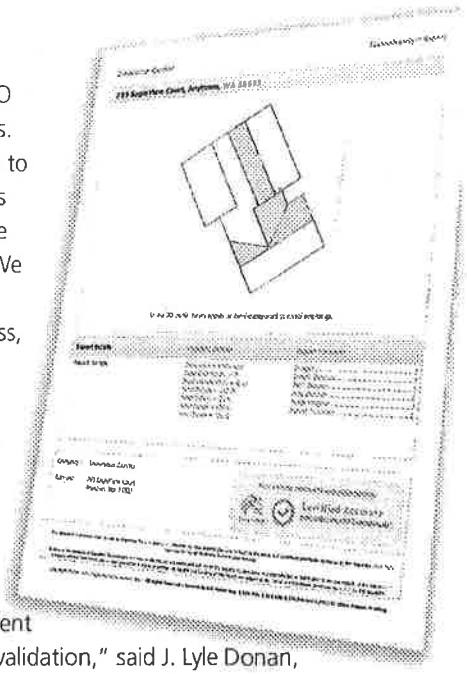
The Necessity of Third-Party Validation and Inalterable Results

Dispute resolution, accurate documentation, rapid claims processing – these are all important elements of the property and casualty claims process. In fact, each of these elements can determine the Customer Satisfaction scores (C-SAT) of consumers when processing claims. When looking at roofing claims in particular, the importance of third-party validation and the inalterability of those results have become the cornerstone to increasing and maintaining CSAT scores.

Why is third-party validation important? Particularly, it provides accurate information and historic documentation that can limit disputes and speed the processing of claims. With the increasing number of professionals involved in the claims process, having third-party validation that is set or unchangeable is critical.

An influential new technology in this area that furnishes important third-party validation for roof measurements is provided by EagleView® Technologies headquartered in Seattle, Washington. EagleView provides aerial 3D roof measurement reports that include overall square footage, lineal footage and pitch. The reports are the most accurate measurements in the industry due to their ability to create 3D images and then extract the important measurements from the 3D diagram. The patented software and process have been tested by major insurance carriers for accuracy in thousands of instances with great success. A key part of third-party validation is the assurance that measurements cannot be altered or changed after the fact. From the very beginning in early 2008 when EagleView was launched, it has had a strict policy that measurements are guaranteed and all files sent out are read-only.

"As we developed EagleView, we knew that we had to have accuracy we could stand behind in order to be a true validation of roof measurements for all parties involved in a roofing claim," said Chris Barrow, president and CEO of EagleView Technologies. "We do not allow anyone to change the measurements on the reports because we know they are accurate. We have a thorough quality control and dispute process, so for the very few instances where measurements are off we can correct and validate them for the customer."



"In our business we depend on the EagleView reports for their independent and unbiased third-party validation," said J. Lyle Donan, president and CEO of Donan Engineering Co., Inc. "In fact, in my opinion, it is nothing short of fraud to modify the measurements. That is why we look to the technology of EagleView to provide us the most accurate measurements for our roofing claims, disputes and litigation."

Having been in business for more than 60 years, Donan Engineering has had six decades to develop top-of-the-industry expertise. With their mission to provide conclusive, unbiased and accurate forensic engineering and fire investigation services along with the fastest turnaround time and the best customer service in their industry, they have come to depend on EagleView.

"Before EagleView, there was a lot of room for dispute with little accountability due to the lack of a fast and affordable third-party expert," continued Donan. "We documented

> *We have been in countless litigations, disputes and arbitrations and have found no substitute for EagleView's reports. They have become the standard.*
>
> — J. Lyle Donan, president and CEO of Donan Engineering Co., Inc.

countless instances of overpayments on the side of the carriers due to inflated material estimates. EagleView has changed how we do business by giving us fast and accurate measurements for a reasonable fee. It has not just benefitted our clients, but the industry as a whole."

This sentiment is confirmed by several sources involved with roofing claims, including Aspen Contracting, a nationally recognized company that specializes in exterior restoration after devastating storm events. Headquartered out of Lee's Summit, Missouri, Aspen has found that EagleView not only helps their business with estimating, safety and production, but has also become essential in their relationship with insurance carriers. "We depend on EagleView when working on claims and have found that by using them we have actually improved our relationships with all carriers due to the third-party validation of the roof measurement reports," said Christopher "L.C." Nussbeck, president and founder of Aspen Contracting, Inc. "Having the ability to provide a report with exact measurements that we know cannot be changed by our company, the adjuster or anyone else is key to not only resolving disputes but also to avoiding disputes in the first place," continued Nussbeck. "In the end, claims are closed faster and homeowners are happy, which is the most important goal for our company."

"In order for any report to be useful, it must be generated by an independent and unbiased organization. No one affiliated with the claim can have the opportunity to change or modify the measurements; otherwise, the report is always open to scrutiny in a dispute," concluded Donan. "We have been in countless litigations, disputes and arbitrations and have found no substitute for EagleView's reports. They have become the standard."

Pershing Exhibit O

(96/000,004 - 290115.401C1RE)

Contractor Testimonials

Scott Siegel – Maggio Roofing
At Maggio, we use the EagleView Roof Reports as part of our sales presentation. It is impressive and professional for residential and commercial roofing sales. We use the property owner report as a leave behind but we also take key segments of the report and add them into our overall proposal. We have seen impressive results.

Alex Lindus – Lindus Roofing
EagleView has helped us obtain an incredible increase in margins; 25% 2011 to 33% 2012. The accurate bids up front, generated during the sales process, have eliminated disputes between sales and production that caused lost time and revenues in the past. We have resolved that by implementing EagleView's up front and using them throughout the bidding and production process.

Joe Hoffman – Hoffman Weber
We are finding that the accuracy of EagleView's measurements is critical for determining material requirements ensuring that we meet or exceed required profit margins for the job. Our estimates are more accurate which means that our material orders are correct. The reports provide a far better method for determining waste as well. When the production manager can see a 3D model of the house it allows him to put his skills to work accurately assessing material needs and waste associated with the project.

Mike Barnes - 123 Exteriors
With insurance, the margins are tighter and the requirements are higher so we need to have a very streamlined communication with both the insurance carriers we work with for our customers to our production crews in order to streamline their process and have agreement on size and production of the job before it starts. Confusion and

Mike Ferina - State Roofing
Seeing an increase in confidence with some of the newer guys because not second guessing their #s. Biggest benefit is # are the same between sales and production, no more commission squabbles on who was off.

Excel
Time and Efficiency When weather hits can service all customers plus have accurate bids, insurance submittals and production agreements. By incorporating EagleView in our entire sales and marketing process we have been able to More Sales Call a Day

Cambridge Wilson
Streamlining processes

Karen Edwards

From: Jeff Shaffer
Sent: Tuesday, September 20, 2011 4:33 PM
To: info
Subject: Help

Categories: urgent

EagleView helps in four ways: One, with 20 roofers you get 20 numbers when it comes to size. When you use EV there is never a question.
Two, if you want to make a power point presentation, EV is the heart of that report. Three, When it comes to that roof that is easy to get lost, EV is the only answer that is consistently correct. Four, when you are submitting a bid on a large project, the EV format moves the conversation beyond size and scope.

Jeff Shaffer

Operations Manager
Alberson's Tile Roof Glaze

Karen Edwards

From: Charles Terry
Sent: Tuesday, September 20, 2011 6:10 PM
To: info
Subject: story

Categories: urgent

Eagleview oh Eagleview, how do I love thee? Let me count the ways. Insurance problems, no problem. Four story estimate, no problem. Impressing our customers with print outs and color pictures.....Nooooooo Problem! We have made more money with less overhead by using Eagleview. I never would have believed the impact an Eagleview report makes or how much influence it has on closing the sale but it proves it over and over again. I want stocks in this super company if it ever goes public.

Thank you Eagleview

Sincerely,
Charles Terry
President
Charles Terry Construction Company, Inc.

Karen Edwards

From: Phoenix Roofing
Sent: Tuesday, September 20, 2011 6:44 PM
To: info
Subject: ROOFS

Categories: urgent

After 40 years in the roofing industry, it doesn't get any easier to climb a mountain.

It is a waste to send someone else to go measure a roof, that should be out pounding nails.

With EAGLEVIEW I can count on the perfect take-off every time, not maybe, but accurate down to the length of gutters.

The customer is also happy about not seeing me go up a ladder.

THANKS.EAGLEVIEW.

D.E. MOLNAR

ProRemo Corp. recently started using EagleView and was blown away with the ease of the system. We were expecting a difficult program costing thousands of dollars. Instead, this is an affordable web based system that takes 2 minutes to send a report request. We love using it, especially for all of the steep slope roofs. We don't have to spend our valuable time climbing on dangerous roofs; we just send in a request and are ready to go. EagleView has helped us cut our steep roof and complex roof estimating time by half. It has also increased our closing rate since clients are very impressed with this technology. Eagle View also helped us to recheck the size of the roof to ensure accuracy.

Dominik Karnas
- President of ProRemo Corp.

Karen Edwards

From: werk22
Sent: Tuesday, September 20, 2011 3:25 PM
To: info
Subject: Roof Werks,Inc

Categories: urgent

As a roofing company we have used Eagleview's services many times, but in this instance we ordered an Eagleview image because we had a discrepancy with the insurance company about how many squares our customer's home had. The insurance was VERY adamant that their measurements were correct, and ours were wrong, so to settle this dispute, we ordered Eagleview, in which their measurements matched ours. So the Insurance company was off by 5 squares, and at $300/ sq.. that's a grave difference.. End result, Eagleview's precise imagery got us the amount of money we were asking from the Insurance company.

Thank You,
Roof Werks,Inc.
WWW.ROOFWERKS.US

Karen Edwards

From: Thomas L Schamens
Sent: Tuesday, September 20, 2011 6:59 PM
To: info
Subject: Be Featured in the EagleView Edge

Categories: urgent

I own a small independent adjusting company based in Wisconsin. I was referred to EagleView by a national roofing company. EagleView has become an integral business partner and an asset to my business. The speed and accuracy of the roofing reports has been outstanding. I started using EagleView for the large complex roofs that were not easily accessible and have started to rely on the EagleView report for all of my roofing claims. Just the time saving aspect alone justified the use of your services not to mention the safety aspect of not walking on and measuring some of the high and steep roofs.

Thank you for your services and I look forward to our continued partnership and success.

Thomas

TLS Insurance Services, LLC
Thomas L Schamens, AIC, AIS
Owner/Senior Adjuster
PO Box 58
Johnson Creek, WI 53038

ATTACHMENT 3

(96/000,004 - 290115.401C1RE)

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Under Reexamination	:	8,145,578 B2
Applicant(s)	:	Chris Pershing et al.
Control No.	:	96/000,005
Filed	:	December 26, 2012
For	:	AERIAL ROOF ESTIMATION SYSTEM AND METHOD
Examiner	:	Jason Scott Proctor
Art Unit	:	3992
Docket No.	:	290115.401RE

Commissioner of Patents
Washington, DC 20231

DECLARATION

Commissioner for Patents:

I, Brian L. Curless, declare as follows:

I have been retained by Seed IP Law Group PLLC to first review U.S. Patent No. 8,145,578 (the '578 Patent) with respect to the first Office Action received in the reexamination of that patent. I was also retained to review the prior art cited against U.S. Patent 8,078,436 (the '436 Patent) and comment on the whether this prior art was applicable to the '436 Patent.

I joined the Computer Science & Engineering faculty at the University of Washington in January 1998 and am currently a Professor in the Department of Computer Science & Engineering at University of Washington (UW). In particular, I am a faculty member of the Graphics and Imaging Laboratory (GRAIL) of the University of Washington's Department of Computer Science and Engineering. I am also co-founder and co-editor-in-chief of *Foundations and Trends in Computer Graphics and Vision.* The GRAIL research group focuses on computer vision, graphics, games, and

visualization. We're particularly known for research in computational photography, games for science and education, 3D reconstruction, Internet photo collections, object recognition, human shape and motion analysis, information visualization, and animation. I earned my bachelor's degree in electrical engineering, *summa cum laude,* at the University of Texas at Austin in 1988. Though I was also pre-med student as an undergraduate, I decided to stick with my more mathematical leanings, and embarked on a brief career as an electrical engineer. After a year of designing and implementing parallel-processor digital signal processing algorithms and custom printed circuit boards at SRI International, I returned to graduate school and earned my M.S. (1991) and Ph.D. (1997) degrees at Stanford University. I did my thesis research on 3D range scanning, culminating in my thesis document entitled *New Methods for Surface Reconstruction from Range Images*, which substantially advanced the state of the art in 3D scanning and high accuracy shape reconstruction and received significant publicity. My thesis work opened the door for the Digital Michelangelo Project at Stanford, a project to scan the important sculptural and architectural works of Michelangelo. After laying some of the groundwork for this project in the latter half of 1997, I spent the winter of 1999 in Florence to scan some of the great sculptures of Michelangelo. My research interests span a number of areas in computer graphics and vision, including computational photography, multi-view stereo, 3D range scanning, surface shape and appearance reconstruction and modeling, and 3D interaction. From 1998 to 2002 I was a Scientific Advisory Board Member at Paraform, Inc., Mountain View, CA, a company that develops software that enables 3D graphics professionals to extract shape and surface-texture information from 3D data sources. Other previous industry experience includes working as a software contractor at Silicon Graphics, Inc. (SGI) in 1993, where I produced a prototype that became an SGI product. Further, I have consulted for a variety of companies in various capacities, including Microsoft (2005), Adobe (2006-2007), Google (2010), and Intel (2010-2011).

As a graduate student at Stanford University, I was awarded the Stanford University Computer Science Department Arthur Samuel Thesis Award (given to the two best theses from the department each year), the Stanford University Gores Award for Teaching Excellence (given to one graduate student campus-wide each year), the

Stanford University Achievement Rewards for College Scientists (ARCS) Fellowship, and the Stanford University Solid State Industrial Affiliates Fellowship. At the University of Washington, I have been recognized with the Alfred P. Sloan Foundation Faculty Fellowship, the National Science Foundation Faculty Early Career Development (CAREER) Award, and the University of Washington Association for Computing Machinery (ACM) Teaching Award. I recently served as chair of 3D Vision 2013, which brought together researchers and industry practitioners for cutting edge presentations and demonstrations of 3D capture and reconstruction technology and algorithms.

I have presented and/or published at the following conferences:

International Conference on Computer Vision (ICCV)
Computer Vision and Pattern Recognition (CVPR)
European Conference on Computer Vision (ECCV)
3D Vision (3DV)
3D Imaging, Processing, Visualization, and Transmission (3DIMPVT)
3D Processing, Visualization, and Transmission (3DPVT)
Special Interest Group on Graphics and Interactive Techniques (SIGGRAPH)
User Interfaces and Software Technology (UIST)
International Conference on Robotics and Automation (ICRA)
Graphics Interface
International Conference on Computational Photography (ICCP)
Eurographics Symposium on Rendering (EGSR)
Eurographics Workshop on Rendering (EGWR)
Symposium for Computer Animation (SCA)

Rather than list here the specific publications at the above conferences, I have provided my CV, attached as Curless Exhibit A, which lists the presentations at the various conferences, the Journal articles, refereed conference papers, invited papers, technical reports, invited talks and other publications.

There have been a number of publications, both on the web and in the press that noted some of my work. For ease of reference, a few of these are listed with their URL address as follows:

Project to Build a 3D Fax Machine:

http://www-graphics.stanford.edu/projects/faxing/happy/

The Digital Michelangelo Project:
http://www-graphics.stanford.edu/projects/mich/

Photo Tours (as a Google product):
http://goo.gl/Pc3Fsx;

In sum, my work has been cited in various publications and in the press including CNN, the New York Times, the San Jose Mercury News, the BBC, the Discovery Channel, PBS, NPR, Gizmodo, Engadget, PC Magazine, Wired, etc..

I have been an advisor for a number of PhD students in computer science, as well as the counsel and guide for a number of students obtaining Graduate and Undergraduate degrees. I have also been an advisor for those working in Post Doctoral programs, which are listed on my CV, Curless Exhibit A, attached.

Based on the above academic and working experience, I am knowledgeable and qualified to provide an opinion regarding various aspects of U.S. Patent Application No. 12/148,439 (the Application) that was filed on April 17, 2008 and issued as the '578 patent. In particular, I am qualified to describe the state of the relevant art in the various fields at the time the application was filed, what the level of predictability of the pertinent arts were and the level of one of ordinary skill in the pertinent arts at the time U.S. Patent Application No. 12/148,439 was filed on April 17, 2008.

My experience as both a professor at the UW and in working with many students at various levels make me qualified to determine what skills one of ordinary level of skill in the arts to which the Application pertains on the date it was filed. For example, I would expect that at the time the application was filed on April 17, 2008 a typical graduate computer science student working on completing their PhD or having completed their Master's degree having taken an introductory computer vision course

would be a person of skill in the arts of this Application, keeping in mind that many such students have some level of work experience in computer programming and access to the search tools available on the internet. Further, a person with a bachelor of science in computer science with about two years of pertinent software engineering experience and hands-on computer programming with some knowledge of computer vision technology would be considered a person of skill in the art in the field of the '578 patent. It is helpful if that person has either a detailed study of math and linear algebra or exposure to issues involving image processing and computer vision that deal with this type of math. I note that many Computer Science students working on their Master's degrees or Ph.D.'s, and even many undergraduate students, have two or more years of hands on programming and computer software work experience. Computer Science is one of those technical fields in which a person in a degree program frequently is currently working on practical computer software projects, such as for a private company, in the industry, creating their own programs as a hobby, or doing computer programming work with colleagues. Thus, being a student does not exclude having some practical working experience, and, in fact for upper level students in computer science, it is very common. Thus my understanding of the level of skill in the art is based on working with students at various level of study, individuals in private companies and also students who had done both, often at the same time.

I have read and understood U.S. Patent Application No. 12/148,439, filed April 17, 2008, ("the Application") and U.S. Patent No. 8,145,578 B2 under Reexamination (the Patent) which resulted from the Application.

I have also read and understood the office action issued on July 25, 2013 by Examiner Proctor in the present Reexam application. I will cite it in various places in my declaration.

Turning to the Office Action issued on July 25, 2013, the Examiner asserts that the claimed invention includes a variety of different art fields and he lists four of them: aerial acquisition, high technology image analysis and calibration, computer software, and cost estimation and business methods; see page 7, first paragraph and page 8, last paragraph for example. I do not agree that all of these are relevant fields of art of

the claims of the application. Specifically, the field of "complicated aerial image acquisition" is not a field of art for this invention and claims. In particular, the '578 patent makes clear that the aerial image creation and acquisition is what a person of ordinary skill does not participate in nor have access to. The images are taken by a separate system, completely out of the control of the computer programmer. The image files are obtained on the internet or provided as image data files from a database in which they are stored. The computer programmer has access to the data files as stored in the image database, but did not participate in their acquisition. Further, acquisition systems and methods of acquiring the images are not covered in any claims of the application. Based on these factors, particularly that it is not claimed, I conclude that image acquisition is not a pertinent art for '578 patent.

The office action also asserts that "cost estimation and business methods" are expected to be within the skill of the art; see page 7, first paragraph and page 8, last paragraph as examples. While some of the claims, but not all of the claims relate to cost estimation, as per, for example, independent claims 5 and 9 and dependent claims 6, 7, 28, the '578 patent states that cost data can come from roofers in the business. Other claims do not have this cost estimation feature; see claims 1-4, 10, 12-17, 20 as examples. In the specification, there is an explanation that the computer software programmer is permitted to work with a roofer or building contractor to complete some of the elements of some of the claims. For example, the application states that in one embodiment, the report is sent to a roof company and the roof company uses the report to prepare a final estimate, see Col 2, lines 47-49 and Col. 4, lines 48-53. In these embodiments, the contractor, shown as reference number 70 in Figures 1 and 2, provides the information to complete the cost estimate, and the computer programmer has access to this technology and, if needed, people in this art, in preparing the software program and outputting the final product of some of the claims. I therefore find that the Application as-filed contemplates that the person writing the software code will receive input from such a person or has access to such data and thus does not need to be a person of skill in the art in the roof cost estimation or running a roofing business.

To evaluate whether '578 patent would enable one of ordinary skill in the art to reproduce the method described, I carefully read and studied the patent, referred to a standard textbook in the field, and implemented a prototype.

Based on the '578 patent, I first determined that the overall invention focused on reconstructing roof dimensions and pitches from aerial imagery without having camera parameters for those images, albeit with a scale marker provided for at least one image. Specifically, one of the images would be a downward looking image of a building, such as a home, and one or more additional images would provide substantially different views of the building.

The '578 patent explains that "a set of reference points are identified in each of the images" and that "measurement software then uses these reference points and some proprietary algorithms to co-register the images and reconstruct the three dimensional geometry of the object identified by the reference points." This is a familiar kind of problem in the computer vision community, often going by the name structure-from-motion; in structure-from-motion problems, a set of images with common 2D reference points are given, and the goal is to recover the camera parameters and 3D locations of the reference points. A standard reference for formulating and solving these problems is "Multiple View Geometry" by Hartley and Zisserman, 2004.

The '578 patent states that "Roofs containing one or more pitched sections typically require two or more photographs in order to identify and measure all relevant sections and features of the roof." Thus, I selected two of the images that appear in FIG. 5A and FIG. 5B of the '578 patent. I have reproduced these images in Figures 1(a)-(b) in this document as shown below.

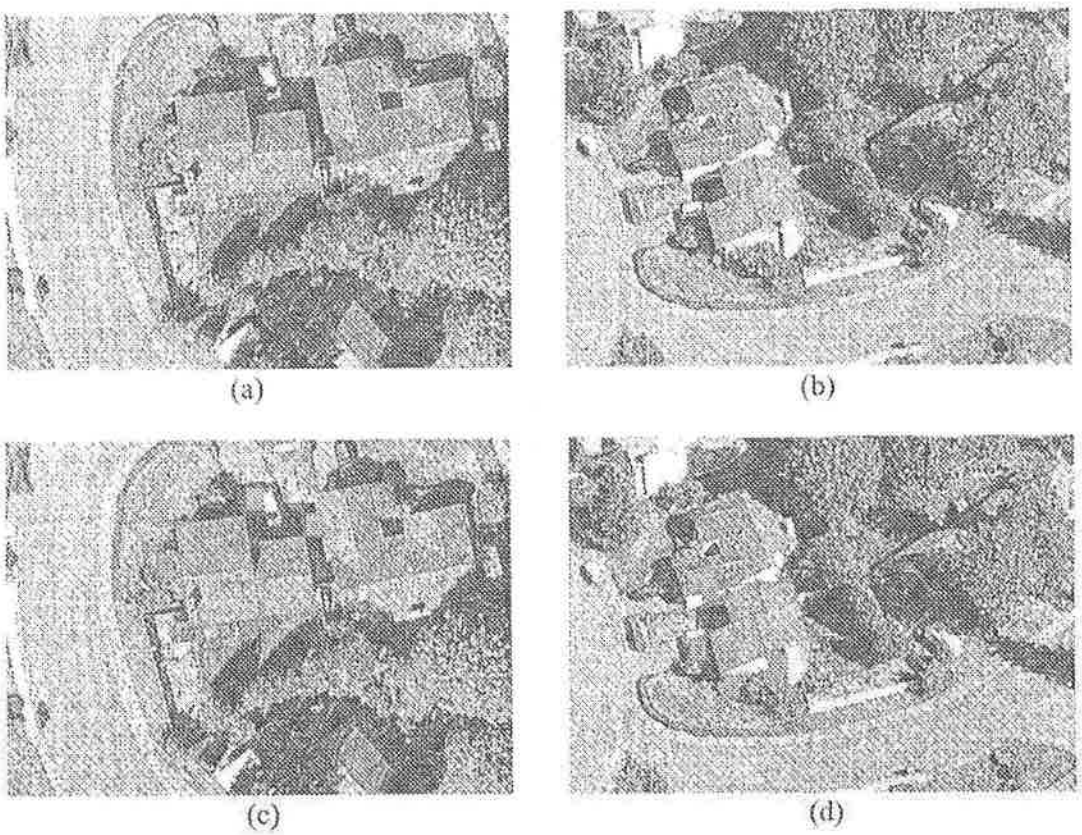


Figure 1. Aerial images and annotations. (a) Original overhead image from patent '578. (b) Original oblique image from patent. (c) Annotation of overhead image to identify four reference points. (d) Annotation of oblique image to identify the same four reference points.

Note that, as crude black-and-white scans of printed versions of color images, the images in these figures are poor reproductions of the original images, but they are exactly as I found them in the patent. I selected the overhead view (FIG 5A in the patent) as one of the images, because it was the first image and on the cover page of the roof report given in the patent, and because such overhead views are common in aerial imagery. The other image from 5B is an oblique view, as known in the industry, referred to in the '578 patent by the terms "oblique perspective view" and "perspective view." I then chose reference points in both the images by drawing straight lines on the roof segments and finding a set of intersections of those lines, corresponding to features such as corners of the roof (see Figures 1(c)-(d) above in this document). This was a

standard, straightforward way of manually identifying corner points, which I selected as my reference points.

Next, as is standard for this kind of problem, I determined reasonable camera models that explain how 3D points are projected into 2D image coordinates. In both images, after having drawn line segments on the images, I could see that parallel roof edges mapped to parallel lines in the images, because I could simply drag a drawn line segment for one roofline and overlay it on another parallel roofline in the same image and see that the overlay matched perfectly. This was not at all surprising, given that these were aerial images; a "zoomed-in" distant view of a structure from an aerial image corresponds to a very long focal length image, which would essentially eliminate perspective effects that normally cause parallel lines in 3D to project to non-parallel lines in 2D images. Thus, I determined these views to fall into the category of orthographic projection. For the overhead view, this meant using the following projection matrix (Hartley and Zisserman, p. 171):

$$P^1 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

Which can be applied to 3D points of the form $Q = [X\ Y\ Z\ 1]^T$ to give projected 2D points of the form $q = [x\ y\ 1]^T$, where, by standard convention, an extra coordinate is added and set to 1 for both the 3D and 2D points. If we apply the matrix to four 3D points Q_1, Q_2, Q_3, and Q_4 we arrive at projected 2D points q_1^1, q_2^1, q_3^1, and q_4^1:

$$q_1^1 = P^1 Q_1$$
$$q_2^1 = P^1 Q_2$$
$$q_3^1 = P^1 Q_3$$
$$q_4^1 = P^1 Q_4$$

For this overhead case, applying the matrix amounted to dropping the z-coordinate.

For the oblique view, the projection matrix had to encode unknown camera parameters, which could be written in standard form as "scaled orthographic projection" (Hartley and Zisserman, p. 171):

$$P^2 = \begin{bmatrix} k & 0 & 0 \\ 0 & k & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} r^{1\mathrm{T}} & t_1 \\ r^{2\mathrm{T}} & t_2 \\ 0^{\mathrm{T}} & 1 \end{bmatrix}$$

The $r^{1\mathrm{T}}$ and $r^{2\mathrm{T}}$ vectors represent the orientation of the oblique view (effectively, roll, pitch, and yaw for the camera), the t_1 and t_2 values represent a fixed translation in the image plane, and k encodes the scale of the image. In practice, k varies depending on how "zoomed in" the image is, e.g., how close the aircraft is to the target when taking the image. If we apply this matrix to 3D points Q_1, Q_2, Q_3, and Q_4 we arrive at projected 2D points q_1^2, q_2^2, q_3^2, and q_4^2:

$$q_1^2 = P^2 Q_1$$
$$q_2^2 = P^2 Q_2$$
$$q_3^2 = P^2 Q_3$$
$$q_4^2 = P^2 Q_4$$

As stated in the patent, the "optimal choice of reconstruction algorithm depends on…assumptions that are made about the geometry…of the object being reconstructed." To simplify the problem, I made a natural assumption about roofs: there is one segment of roofline that is parallel to the ground. For the example I implemented, this meant that Q_1 and Q_2 had the same z-value. In addition, and without any loss of generality, I assumed that point Q_1 had coordinates of (0,0,0).

At this stage of the structure-from-motion process, the standard approach is to define an objective function to minimize (after Hartley and Zisserman, p. 434):

$$\min_{P^i, Q_j} \sum_{i,j} d\left(P^i Q_j, q_j^i\right)^2$$

where $d(P^i Q_j, q_j^i)^2$ measures the squared 2D distance between the hypothetical projection of a scene point $P^i Q_j$ and the actual projection q_1^2 observed in an image, and we are solving for the projection matrices P^i and 3D points Q_j that minimize the objective. Solving this non-linear problem is called "bundle adjustment," and a variety of standard numerical methods can be employed. Note that while bundle adjustment is often used for sets of perspective images, it is suitable for orthographic projection as well. Bundle adjustment performs best with reasonable initialization of the parameters. In my case, I simply initialized all of the z-values of the 3D points to zero and initialized the roll and pitch angles of the oblique image to be 0 and 45 degrees respectively, understanding that these did not need to be precise estimates. During bundle adjustment, the non-linear solver then optimizes for the actual best values of these parameters and any other unknowns.

In my own implementation, I used a freely available software package called Maxima for specifying the projection equations and solving for the matrices and 3D points. I found this package by searching online for general mathematics software that could handle vectors and matrices and minimize non-linear functions. (Maxima has been in the public domain since 1998.) There are certainly other packages and languages that could have worked as well. It took me approximately a day to learn how to use Maxima, which I had never used before, and apply it to the problem at hand. My solution required less than 100 lines of code. The total time I spent on the project, including my study of the '578 patent to learn about the problem and how to solve it was less than week of working time, which is well within the expected range to understand a problem of this type and prepare code that can obtain the specified result.

The results I obtained for the roof pitch were within 10% of the number given in the sample roof report found in the '578 patent. This margin of error is entirely reasonable given the poor quality of the images I worked with (derived from a very crude black-and-white scan of a print of the original color image), and is a satisfactory proof of concept. I did not compare linear and area measurements to the roof report, because I did not have

the image scale factor that maps pixel units to feet or inches in the overhead image. If I were given the scale factor of physical length between two pixels for one image, for example 5A of the '578 patent, I would be able to apply straightforward math (involving nothing more than a single multiplication) to obtain the actual area and actual lengths of each of the roof segments as shown in the '578 patent.

I participated in the Examiner's interview that occurred on October 17, 2013 and as part of that interview, presented to the Examiner how a person could use the disclosure of the '578 patent to practice the inventions claimed therein. I personally create pages 10-14 of the presentation that were shown at the interview and used these to demonstrate to the Examiner how the '578 patent teaches a the person of ordinary skill in the art of computer programming and image analysis to create a roof report that contains the pitch, area and dimensions of individual roof sections based solely on image files from a standard database along with image scale provided for one of the images. Pages 10-14 of the presentation are incorporated by reference into this declaration.

The analysis I used to arrive at my result was not overly complex, in fact using the simplest set-up and reasoning based on the '578 patent: an overhead aerial image and another aerial image, a small number of reference points indicated in the two images, the simplest form of camera projection (orthographic), and a very simple assumption about the geometry (two points are at the same height). It would not be difficult for a senior undergraduate student or a masters student who has taken an introductory graduate course in computer vision (with no assumption of prior coursework in computer vision before taking that course) to perform the same analysis, based on them studying the '578 patent, to arrive at a similar result. I would estimate that such a student could obtain the result in one to two weeks. This estimation of their skill level is based on my many years of working with students and others in the field who are competent in understanding computer vision issues and writing software code based on specifications and instructions given to them. That said, I would not say that the result nor the application to problems of finding the pitch and area of roof sections of a building was obvious, but rather a study of the '578 patent was required. The textbook I referred to deals with the general topic of camera and shape reconstruction from images and the math equations used. There is no

teaching or even suggestion anywhere in that text that unrelated, independent images of the type shown in the '578 patent can be used specifically to determine actual roof measurements. It required first my detailed study of the '578 patent and the steps taught therein to be taken with respect to roof measurements. The teachings of the '578 patent provide the instructions and guidance needed to direct me on the steps to take in order to even consider the problem and then teaches how to reach this solution. I followed these teachings and combined them with a thoughtful application of the techniques of computer vision outlined in the Hartley and Zisserman textbook, but the solution was not explicitly stated in that book.

Note that all of my analysis and implementation was performed solely on the basis of patent '587 alone without ever having spoken to the inventor or anyone with technical knowledge of the company's methods. After I had carried out the above steps, I did talk to co-inventor Chris Pershing, but he did not tell me the specific algorithm he used. Also, I did not study U.S. Patent 8,078,436 before performing the above steps and achieving the above result; the '578 patent alone was all that I required. Thus, the disclosure of the Application as filed on April 17, 2008 contains sufficient information and technical details regarding systems and methods of determining roof dimensions based solely on the received image files and algorithms for construction of the geometry of the roof to enable one of ordinary skill in the pertinent arts at the time the Application was filed to make and use the invention as claimed in the '578 Patent.

In summary, if I had given any typical graduate computer science student who has taken an introductory computer vision course a copy of the Application as-filed to read and then an assignment to make and use the invention as claimed in the '578 Patent, that student would be able to do so without undue experimentation. I would expect them to be able to complete such a project in about one to two weeks of work after they had a chance to read and study the application.

Taking in to account the scope of the claims of the '578 Patent, the nature of the invention as claimed in the Patent, the state of the prior art at the time the Application was filed, the level of one of ordinary skill in the pertinent arts, and the existence of the working examples in the application, taking one to two weeks to

complete such a project would not be considered excessive or undue. I have given a number of software programming projects to students in the many years I have been a professor and some such projects have been more difficult and some have been easier than creating an operating program based on the '578 patent's technical description. Having to work one to two weeks to complete such a program would not be considered excessive or undue in the computer software field.

I also note that the images used in the '578 patent and the '436 patent are quite low quality in terms of data provided about the images, cameras used and conditions under which the images were obtained. There is no camera data provided and thus the images are distinctly different from stereoscopic aerial image pairs that rely upon significant image acquisition and also camera data. Both the '578 patent and the '436 patent provide an unexpected and significant contribution in being able to start with images taken without relationship to each other and potentially from different databases and sources and organize them in a way that is useful to the roof contractor or insurance company. In short, the '578 and '436 patents enable one to estimate roof reports from existing image databases for which camera data is not provided to end-users, which in my view is a very substantial advance over the prior art of working from carefully acquired and calibrated stereoscopic aerial pairs and certainly over the prior practice of laboriously taking measurements on-site.

It is my opinion that the '578 patent did contain sufficient disclosure for a person of ordinary skill in the art to make and use the claims therein based solely on the received image files. In addition, the "calibration module" was also fully disclosed and enabled since it refers to the computer program of the type which I have described above that is included as part of the roof estimation program 50. A person would be fully enabled by the '578 patent to create the code that would carry out the functions of the features it is claimed to perform. Further, the teaching to construct a three dimensional geometry of the roof is also fully enabled to one of skill in the relevant arts.

I have also reviewed the EP 966 patent that was used in the office action by the Examiner with respect to the '436 patent. As explained during the interview, the '966 patent requires carefully acquired stereoscopic aerial pairs of images which need

significantly more data to create than the simple image files of unrelated images. As explained in the interview, stereoscopic aerial pairs of images are obtained using two top-plan view images, not from a top plan view image and an oblique image. Concretely, the EP '966 patent states that to create stereoscopic aerial pairs "two aerial photographs are taken in stereoscopic coverage, to give sets of two-dimensional, geometric image data and parameter data that contain highly detailed information on the camera angle of the image pairs, absolute image coordinates and other image recording parameters" (column 1, paragraph 2 of the EP '966 patent). These images and associated data are completely different from a top plan view image and one or more oblique images (also called perspective views in '587) that are unrelated to each other. Reconstructing shape from calibrated stereo pairs (as in the '966 patent) is well-known in computer vision to be quite different from, and substantially easier than, reconstructing shape from photographs taken from unknown viewpoints with unknown camera parameters (as in the '587 and '436 patents).

I have also read the Novak patent, US 2003/0103651 A1. This patent concerns an invention for measuring the distance between points in a single, predominantly vertical plane based on a single image. It requires a substantial amount of extra equipment beyond a camera for the task, including a rangefinder to measure the distance to a point on a plane and devices to measure the orientation (at least, bearing/yaw and azimuth/pitch, perhaps assuming no roll) of the camera. Further, the camera must be calibrated with the aid of a large, planar calibration pattern roughly the size of the target plane to be measured; such a pattern can then be used to estimate camera focal length and lens distortion. This invention is substantially different from the one described in the '578 and '436 patents. First and foremost, roofs are generally not comprised of a single, predominantly vertical plane; rather, they consist of a set of pitched facets that are not generally coplanar with each other. The Novak patent is intended for capturing vertical structures with a camera mounted on a tripod or equivalent to photograph a predominantly vertical planar structure, as opposed to the aerial imagery used to recover multi-faceted, upward-facing roofs in '578 and '436. In addition, the Novak patent requires substantial equipment and large, custom calibration patterns to

estimate camera parameters before measuring distances between co-planar scene points from a single image. By contrast, the '578 and '436 patents start just from two or more images (one of them a top-down view) without camera additional information, other than an image scale marker in one of the images.

I hereby declare that all statements made herein are of my own knowledge true and that all statements made on information or belief are believed to be true; and further that these statements are 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, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

10/24/13
Date

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(96/000,005 - 290115.401RE)

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Educational History

Stanford University, Ph.D. in Electrical Engineering, June 1997
Thesis: *New Methods for Surface Reconstruction from Range Images*

Stanford University, M.S. in Electrical Engineering, June 1991

University of Texas at Austin, B.S. in Electrical Engineering, May 1988

Employment History

Professor, University of Washington, Department of Computer Science & Engineering (2010 – present).

Sabbatical Visitor, University of California, Berkeley, Department of Computer Science, (2011-2012).

Associate Professor, University of Washington, Department of Computer Science & Engineering (2003 – 2010).

Co-editor-in-chief, Foundations and Trends in Computer Graphics and Computer Vision (2003 – present).

Sabbatical Visitor, Columbia University, Department of Computer Science, (2004-2005).

Assistant Professor, University of Washington, Department of Computer Science & Engineering (1998 – 2003).

Visiting Scientist, Digital Michelangelo Project, Florence, Italy (Winter 1999).

Scientific Advisory Board Member, Paraform, Inc., Mountain View, CA (1998 – 2002).

Research Associate, Digital Michelangelo Project, Stanford University, with Professor Marc Levoy (1997).

Research Assistant, Stanford University, with Professor Marc Levoy (1991 - 1997).

Software Contractor, Silicon Graphics Inc., Mountain View, CA (1993).

Research Engineer, Remote Measurements Laboratory at SRI International, Menlo Park, CA (1988 - 1989).

Brian Curless
November 13, 2012

Awards and Honors

UW ACM Teaching Award, University of Washington, (2004)
Sloan Fellowship for Computer Science, University of Washington (2000)
NSF CAREER Award, University of Washington (1999)
Stanford Computer Science Department Arthur Samuel Thesis Award (1997)
Achievement Rewards for College Scientists (ARCS) fellowship (1993)
Gores Award for Teaching Excellence, Stanford (1992)
Solid State Industrial Affiliates Fellowship, Stanford (1990)
Graduated Summa cum Laude, University of Texas (1988)

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24. Pravin Bhat, Ke Colin Zheng, Noah Snavely, Aseem Agarwala, Maneesh Agrawala, Michael F. Cohen, Brian Curless. Piecewise image registration in the presence of large motions. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2006* (CVPR 2006), vol. 2, pp. 2491-2497, New York, NY, June 2006.

25. Dhruv Mahajan, Ravi Ramamoorthi and Brian Curless. A theory of spherical harmonic identities for BRDF/lighting transfer and image consistency. In *Proceedings of the European Conference on Computer Vision* (ECCV 2006), pp. 45-51, Graz, Austria, May 2006. (Oral)

26. Dan B. Goldman, Brian Curless, Aaron Hertzmann, and Steven M. Seitz. Shape and spatially-varying BRDFs from photometric stereo. In *Proceedings of Tenth IEEE International Conference on Computer Vision* (ICCV 2005), vol. 1, pp. 341-348, Beijing, China, November 2005.

27. Steve Capell, Matthew Burkhart, Brian Curless, Tom Duchamp, and Zoran Popović. Physically Based Rigging for Deformable Characters. In *Proceedings of the 2005 ACM SIGGRAPH / Eurographics Symposium on Computer Animation* (SCA '05), pp. 301-310, Los Angeles, CA, August 2005.

28. Brett Allen, Brian Curless, and Zoran Popović. Exploring the space of human body shapes: Data-driven synthesis under anthropometric control. In *Proceedings of the SAE Digital Human Modeling for Design and Engineering Conference*, pp. 245-248, Rochester, MI, June 2004.

29. Li Zhang, Brian Curless, and Steven M. Seitz. Shape and motion under varying illumination: unifying structure from motion, photometric stereo, and multi-view stereo. In *Proceedings of the Ninth IEEE International Conference on Computer Vision* (ICCV 2005), vol. 1, pp. 341-348, Nice, France, October 2003.

30. Li Zhang, Brian Curless, and Steven M. Seitz. Spacetime stereo: shape recovery for dynamic scenes. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2003* (CVPR 2003), vol. 2, pp. 367-374, Madison, WI, June 2003.

31. Daniel Azuma, Daniel Wood, Brian Curless, Tom Duchamp, David H. Salesin, and Werner Stuetzle. View-dependent refinement of multiresolution meshes with subdivision connectivity. In *Proceedings of the 2nd International Conference on Computer Graphics, Virtual Reality, Visualization, and Interaction* (Afrigraph 2003), pp. 69-78, Capetown, South Africa, February 2003.

32. Brett Allen, Brian Curless, and Zoran Popović. Articulated body deformation from range scan data. In *Proceedings of the 29th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2002), pp. 612-619, San Antonio, Texas, July 2002.

33. Steve Capell, Seth Green, Brian Curless, Tom Duchamp, Zoran Popović. Interactive skeleton-driven dynamic deformations. In *Proceedings of the 29th Annual Conference on Computer*

Graphics and Interactive Techniques (SIGGRAPH 2002), pp. 586-593, San Antonio, Texas, July 2002.

34. Yung-Yu Chuang, Aseem Agarwala, Brian Curless, David H. Salesin, and Richard Szeliski. Video matting of complex scenes. In *Proceedings of the 29th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2002), pp. 243-248, San Antonio, Texas, July 2002.

35. Steve Capell, Seth Green, Brian Curless, Tom Duchamp, and Zoran Popović. A multiresolution framework for dynamic deformations. In *Proceedings of the 2002 ACM SIGGRAPH/Eurographics Symposium on Computer Animation* (SCA '02), pp. 41-47, San Antonio, Texas, July 2002.

36. Aaron Hertzmann, Nuria Oliver, Brian Curless, and Steven M. Seitz. Curve analogies. In *Proceedings of the 13th Eurographics Workshop on Rendering* (EGWR 2002), pp. 233-245, Pisa, Italy, June 2002.

37. Li Zhang, Brian Curless, and Steven M. Seitz. Rapid shape acquisition using color structured light and multi-pass dynamic programming. In *Proceedings of the First EEE International Symposium on 3D Data Processing Visualization and Transmission* (3DPVT 2002), pp. 24-36, Padova, Italy, June 2002.

38. Yung-Yu Chuang, Brian Curless, David H. Salesin, and Richard Szeliski. A Bayesian approach to digital matting. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2001* (CVPR 2001), vol. 2, pp. 264-271, Kauai, Hawaii, December 2001.

39. Aaron Hertzmann, Charles Jacobs, Nuria Oliver, Brian Curless, and David H. Salesin. Image analogies. In *Proceedings of the 28th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2001), pp. 327-340, Los Angeles, CA, August 2001.

40. Marc Levoy, Kari Pulli, Brian Curless, Szymon Rusinkiewicz, David Koller, Lucas Pereira, Matt Ginzton, Sean Anderson, James Davis, Jeremy Ginsberg, Jonathan Shade, and Duane Fulk. The Digital Michelangelo Project: 3D scanning of large statues. In *Proceedings of the 27th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2000), pp. 131-144, New Orleans, LA, July, 2000.

41. Daniel Wood, Daniel Azuma, Wyvern Aldinger, Brian Curless, Tom Duchamp, David H. Salesin, and Werner Stuetzle. Surface light fields for 3D photography. In *Proceedings of the 27th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2000), pp. 287-296, New Orleans, LA, July, 2000.

42. Yung-Yu Chuang, Douglas Zongker, Joel Hindorff, Brian Curless, David H. Salesin, and Richard Szeliski. Extensions to environment matting: towards higher accuracy and real-time capture. In *Proceedings of the 27th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2000), pp. 121-130, New Orleans, LA, July 2000.

43. Douglas Zongker, Dawn Werner, Brian Curless, and David H. Salesin. Environment matting and compositing. In *Proceedings of the 26th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 1999), pp. 205-214, Los Angeles, CA, August 1999.

44. Brian Curless and Marc Levoy. A volumetric method for building complex models from range images. In *Proceedings of the 23rd Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 1996), pp. 303-312, New Orleans, LA, August 1996.

45. Brian Curless and Marc Levoy. Better optical triangulation through spacetime analysis. In *Proceedings of the Fifth IEEE International Conference on Computer Vision* (ICCV 1995), pp. 987-994, Boston, MA, June 1995.

46. William Weeks and Brian Curless. A real-time, multichannel system with parallel digital signal processors. In *Proceedings of IEEE International Conference on Acoustics, Speech and Signal Processing* (ICASSP 1990), vol. 3, pp. 1787-1790, Albuquerque, NM, April 1990.

Invited papers

1. S. Agarwal, Y. Furukawa, N. Snavely, I.Simon, B. Curless, S. M. Seitz and R. Szeliski. Building Rome in a Day. *Communications of the ACM*, Vol. 54, No. 10, Pages 105-112, October 2011.

2. Sameer Agarwal, Yasutaka Furukawa, Noah Snavely, Brian Curless, Steven M. Seitz, and Richard Szeliski. Reconstructing Rome. *IEEE Computer*, 43(6):40-47, June 2010.

3. Brian Curless. From range scans to 3D models. *ACM SIGGRAPH Computer Graphics*, 33(4): 38-41, 1999.

Technical reports

1. Ke Colin Zheng, Alex Colburn, Aseem Agarwala, Maneesh Agrawala, David H. Salesin, Brian Curless, and Michael F. Cohen. A Consistent Segmentation Approach to Image-based Rendering. Computer Science & Engineering Technical Report UW-CSE-09-03-02, University of Washington, Seattle, WA, March 2009.

2. Pravin Bhat, Brian Curless, Michael F. Cohen, and C. Larry Zitnick. A Perceptually-Motivated Optimization-Framework for Image and Video Processing. Computer Science & Engineering Technical Report UW-CSE-08-06-02 University of Washington, Seattle, WA, June 2008.

3. Ankit Gupta, Pravin Bhat, Mira Dontcheva, Oliver Deussen, Brian Curless, Michael F. Cohen. Enhancing and Experiencing Spacetime Resolution with Videos and Stills. Computer Science & Engineering Technical Report UW-CSE-08-04-01, University of Washington, Seattle, WA, April 2008.

4. Dan B. Goldman, Chris Gonterman, Brian Curless, David H. Salesin, and Steven M. Seitz. Interactive Video Object Annotation. Computer Science & Engineering Technical Report UW-CSE-07-04-01, University of Washington, Seattle, WA, April 2007.

5. Yung-Yu Chuang, Dan B. Goldman, Colin Zheng, Brian Curless, David H. Salesin, and Richard Szeliski. Animating Pictures with Stochastic Motion Textures. Computer Science & Engineering Technical Report UW-CSE-04-04-02, University of Washington, Seattle, WA, April 2004.

6. Steve Capell, Seth Green, Brian Curless, Tom Duchamp, and Zoran Popović. A Multiresolution Framework for Dynamic Deformations. Computer Science & Engineering Technical Report UW-CSE-02-04-02, University of Washington, Seattle, WA, April 2002.

7. Daniel Azuma, Daniel Wood, Brian Curless, Tom Duchamp, David H. Salesin, and Werner Stuetzle. View-dependent Refinement of Multiresolution Meshes with Subdivision Connectivity. Computer Science & Engineering Technical Report UW-CSE-01-10-02, University of Washington, Seattle, WA, October 2001.

8. Brian Curless, New Methods for Surface Reconstruction from Range Images. Computer Systems Laboratory Technical Report CSL-TR-97-733, Stanford University, Stanford, CA, June 1997.

9. Brian Curless and Marc Levoy. Better Optical Triangulation through Spacetime Analysis. Computer Systems Laboratory Technical Report CSL-TR-95-667, Stanford University, Stanford, CA, April 1995.

Other significant dissemination

1. Li Zhang, Brian Curless, and Steven M. Seitz, 3D face motion data (http://grail.cs.washington.edu/software-data/stfaces), 2004.

2. Brett Allen, Brian Curless, and Zoran Popović, 3D human body scan data of arm, shoulder, and torso (http://grail.cs.washington.edu/software-data/scans/), 2003.

3. Daniel Wood, Daniel Azuma, Wyvern Aldinger, Brian Curless, Tom Duchamp, David H. Salesin, and Werner Stuetzle. Surface light field datasets (http://grail.cs.washington.edu/projects/slf/data/raw/), 2001.

4. Yung-Yu Chuang, Brian Curless, and Marc Levoy. Snoop for MS Windows, software for zooming in on images (http://www.csie.ntu.edu.tw/~cyy/projects/snoop_win/index.html), 2000-present.

5. Brian Curless and Marc Levoy. VripPack: Volumetric Range Image Processing Package. Brian Curless, software system available on the web (http://grail.cs.washington.edu/software-data/vrip/), 1999-present.

6. Brian Curless and Marc Levoy (creators), Stanford 3D Scanning Repository (http://graphics.stanford.edu/data/3Dscanrep/), 1996-present.

Other Scholarly Activity

Keynote and distinguished lecturer talks

1. "Multi-view Stereo: Out of the Petri Dish and into the Wild" (Keynote), International Workshop on 3-D Digital Imaging and Modeling, ICCV, Kyoto, Japan, October 2009.

2. "Capturing Visual Experiences" (Keynote), British Machine Vision Conference, Edinburgh, Scotland, September 2006.

3. "The space of human body shapes" (Distinguished Lecture), Adobe Distinguished Lecturer Series, Adobe, San Jose, CA, October 2006.

4. "Getting more from physics, photos, and videos" (Keynote), Imagina 2006, Monte Carlo, Monaco, February 2006.

5. "The space of human body shapes" (Keynote), Indian Conference on Computer Vision, Graphics & Image Processing, Calcutta, India, December 2004.

Brian Curless
November 13, 2012

Invited talks

1. "The Space of Human Body Shapes and Photo/Video Enhancement," *Casual Connect Seattle 2009*, Seattle, WA, July 2009.
2. "Graphics research at UW," Weta Digital, Wellington, New Zealand, February 2007.
3. "Capturing Visual Experiences," University of Sydney, Sydney, Australia, February 2007.
4. "The space of human body shapes," University of Belgrade, Belgrade, Serbia, May 2006.
5. "The space of human body shapes," University of the Witwatersrand, Johannesburg, South Africa, June 2005.
6. "The space of human body shapes," University of Cape Town, Cape Town, South Africa, June 2005.
7. "The space of human body shapes," New York University, New York, NY, May 2005.
8. "The space of human body shapes," Sarnoff Corporation, Princeton, NJ, March 2005.
9. "The space of human body shapes," Hunter College, New York, NY, March 2005.
10. "Surface reconstruction: volumetric and template-based approaches," Columbia University, New York, NY, February 2005.
11. "The space of human body shapes," Princeton University, Princeton, NJ, November 2004.
12. "The space of human body shapes," Industrial Light and Magic, San Rafael, CA, July 2004.
13. "Spacetime faces: high resolution capture for modeling and animation" (with Li Zhang), *ICT Workshop: Frontiers of Facial Animation*, Marina del Rey, CA, August 2004.
14. "Image-based reflection," Tutorial on Image-based Rendering tutorial, *IEEE International Conference on Computer Vision* (ICCV 2003), Nice, France, October 2003.
15. "Generalized matting and compositing," Computer Vision Laboratory, Univsersity of Tokyo, Tokyo, Japan, October 2001.
16. "Building Complex Models from Range Images," Tutorial on Digital Geometry Processing, SIGGRAPH 2001, Los Angeles, CA, August 2001.
17. "Environment matting and compositing," Workshop *on the Convergence of Graphics, Vision, and Video*, Berkeley, CA, March 2001.
18. "Environment matting and compositing," *Special Session on Convergence of Image/Video Processing, Computer Vision, and Computer Graphics, 2000 International Conference on Image Processing*, Vancouver, Canada, September 2000.
19. "Surface light fields for 3D photography and the Digital Michelangelo Project," GMD, German Nat'l Research Center for Information Technology, Sankt Augustin, Germany, June 2000.
20. "Surface light fields for 3D photography," *Dagstuhl Seminar on Image Synthesis and Interactive 3D Graphics*, Wadern, Germany, June 2000.
21. "The Digital Michelangelo Project," *Workshop on Reality-based Modeling and Applications in Reverse Engineering, Computer Graphics, and VR, IEEE International Conference on Robotics and Automation 2000*, San Francisco, CA, April 2000.

22. "Building Complex Models from Range Images," Tutorial on Practical Generation of Models from Acquired Data, SIGGRAPH '99, Los Angeles, CA, 1999.

23. "The Digital Michelangelo Project," University of Washington Saturday Seminar, October 1998.

24. "Building Complex Models from Range Images," Boeing Corporation, Bellevue, WA, April 1998.

25. "Acquiring, Building, and Rendering Complex 3D Models," University of California, Los Angeles, CA, March 1997.

26. "Acquiring, Building, and Rendering Complex 3D Models," University of Texas, Austin, TX, March 1997.

27. "Acquiring, Building, and Rendering Complex 3D Models," Princeton University, Princeton, NJ, March 1997.

28. "Acquiring, Building, and Rendering Complex 3D Models," University of Washington, Seattle, WA, April 1997.

29. "Acquiring, Building, and Rendering Complex 3D Models," Microsoft Research, Redmond, WA, April 1997.

30. "Building Complex Models from Range Images," SIAM Conference on Geometric Design, Nashville, TN, November 1997.

31. "Building Complex Models from Range Images," Cyra Technologies, Orinda, CA, 1996.

32. "Building Complex Models from Range Images," Rockwell International, Thousand Oaks, CA, 1996.

33. "Building Complex Models from Range Images," 3D Systems, Valencia, CA, 1996.

Presentations given at conferences

1. **Steven M. Seitz, Brian Curless**, James Diebel, Daniel Scharstein, and Richard Szeliski. A comparison and evaluation of multi-view stereo reconstruction algorithms. In *Proceedings of IEEE Conference on Computer Vision and Pattern Recognition 2006* (CVPR 2006), vol. 1, pp. 519-528, New York, NY, June 2006.

2. Li Zhang, **Brian Curless**, and Steven M. Seitz. Rapid shape acquisition using color structured light and multi-pass dynamic programming. In *Proceedings of the First EEE International Symposium on 3D Data Processing Visualization and Transmission* (3DPVT 2002), pp. 24-36, Padova, Italy, June 2002.

3. **Yung-Yu Chuang, Douglas Zongker**, Joel Hindorff, **Brian Curless**, David H. Salesin, and Richard Szeliski. Extensions to environment matting: towards higher accuracy and real-time capture. In *Proceedings of the 27th Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 2000), pp. 121-130, New Orleans, LA, July 2000.

4. **Brian Curless** and Marc Levoy. A volumetric method for building complex models from range images. In *Proceedings of the 23rd Annual Conference on Computer Graphics and Interactive Techniques* (SIGGRAPH 1996), pp. 303-312, New Orleans, LA, August 1996.

Tutorials organized

1. "3D Photography," co-organized with Steve Seitz, *SIGGRAPH 2000*, New Orleans, LA, July 2000.
2. "3D Photography," co-organized with Steve Seitz, *SIGGRAPH 1999*, Los Angeles, CA, August 1999.
3. "3D Photography," co-organized with Steve Seitz, *IEEE Conference on Computer Vision and Pattern Recognition* (CVPR 1999), Fort Collins, CO, June 1999.

Professional society memberships

Association for Computing Machinery (1998-present)
IEEE Computer Society (1998-present)

Students

Undergraduate degrees:

- Ben Self, B.S. in 2011.
- Jill Edwards, B.S. in 2008.
- Chris Gonterman, B.S. in 2008, currently Ph.D. student at University of Toronto.
- Sharon Lin, B.S. in 2008, currently Ph.D. student at Stanford University.
- Matthew Burkhart, B.S. in 2005, currently at Google.
- Ethel Evans, B.S. in 2004.
- Kenneth (Wyvern) Aldinger, B.S. in 2000, currently at Microsoft Corporation.
- Jake Russel, B.S. in 1999, currently at LizardTech.

Graduate degrees:

- Dan Leventhal, M.S., 2012, with Aseem Agarwala and Dan Goldman, currently at Tableau.
- Pravin Bhat, *Gradient Shop: A Gradient-Doman Optimization Framework for Image and Video Processing*, Ph.D. 2009, co-advised with Michael Cohen, currently at Valve.
- Daniel Goldman, *A framework for video, annotation, visualization and interaction*, Ph.D. 2008, co-advised with David Salesin and Steve Seitz, currently at Adobe.
- Wilmot Li, *Interactive illustrations of complex objects*, Ph.D. 2008, co-advised with Maneesh Agarwala and David Salesin, currently at Adobe.
- Ke (Colin) Zheng, *Parallax Photography: Creating 3D Motion from Stills*, Ph.D. 2008, co-advised with Michael Cohen and David Salesin, currently at Microsoft.
- Brett Allen, *Learning Body Shape Models from Real-World Data*, Ph.D. 2005, co-advised with Zoran Popović, currently at Industrial Light and Magic
- Li Zhang, *Spacetime Stereo and Its Application*, Ph.D. 2005, co-advised with Steve Seitz, currently faculty at University of Wisconsin.
- Steve Capell, *Interactive character animation using dynamic elastic simulation*, Ph.D. 2004, co-advised with Tom Duchamp and Zoran Popović, currently at Electronic Arts.
- Yung-Yu Chuang, *New models and methods for matting and compositing*, Ph.D. 2004, co-advised with David Salesin and Rick Szeliski, currently faculty at National Taiwan University

- Daniel Wood , *Surface light fields for 3D photography*, Ph.D. 2004, co-advised with Tom Duchamp, Steve Seitz, and Werner Stuetzle, currently at Microsoft
- Daniel Azuma, M.S. 2000, co-advised with David Salesin, currently at Lariat Software
- Chris Prince, M.S. 2000, currently at Microsoft Corporation
- Dawn Werner, M.S. 1999, co-advised with David Salesin, currently at Visio

Post doctoral advisees:

- Changchang Wu, 2009-2010, with Steve Seitz, currently at Google.
- Yasutaka Furukawa, 2008-2009, with Steve Seitz, currently at Google.
- Michael Goesele, 2005-2007, with Steve Seitz, currently faculty at TU Darmstadt.
- Aaron Hertzmann, 2001-2002, with Steve Seitz and Zoran Popović, currently faculty at University of Toronto.

Current Ph.D. advisees:

- Juliet Bernstein (with Rick Szeliski)
- Alex Colburn (with Michael Cohen, Aseem Agarwala, and Aaron Hertzmann)
- Ankit Gupta (with Michael Cohen and Maneesh Agrawala)
- Shan Qi (with Steve Seitz and Yasu Furukawa)

Other past student advisees:

- Avanish Kushal, with Steve Seitz and Yasu Furukawa.
- Aseem Agrawala, with David Salesin, currently at Adobe.
- Seth Green, with Tom Duchamp and Zoran Popović.
- Joel Hindorff, with David Salesin.
- Lincoln Ritter, with Maneesh Agarwala and David Salesin.
- Suporn Pongnumkul, with Zoran Popović.
- Doug Zongker, with David Salesin, currently at Google.

CSE Ph.D. committees:

- Brett Allen
- Pravin Bhat
- Steve Capell
- Yung-Yu Chuang
- Alex Colburn
- Dan Goldman
- Ankit Gupta
- Craig Kaplan
- Ian Simon
- Jonathan Shade
- Daniel Wood
- Doug Zongker
- Li Zhang
- Colin Zheng

Graduate School Representative committees:

- Yu-Ting Chen (Music)
- Carrie Cornish (Electrical Engineering)
- Flaviano Giorgini (Genetics)
- Victor Holtcamp (Drama)
- Nathan Neihart (Electrical Engineering)

Service

***Co-founder and co-editor-in-chief*:**
Foundations and Trends in Computer Graphics and Vision (2003 – present).

Editorial board:
Computers and Graphics 1998-2003

Conference Chair
General Chair for 3DimPVT 2013 in Seattle

Program committees:
SIGGRAPH 2003, 2004, 2006, 2007, 2009, 2010, and 2013
ICCP 2009
2003 Eurographics Symposium on Geometry Processing
CVPR 2001, 2003, and 2004
3DPVT 2004

Reviewer
ACM SIGGRAPH
ACM SIGGRAPH Asia
ACM SIGGRAPH Symposium on Interactive 3D Graphics
ACM Solid Modeling
ACM Transactions on Graphics
Computers and Graphics
Eurographics
Graphics Interface
High Performance Computer Graphics, Multimedia and Visualization
IEEE Computer Graphics and Applications
IEEE Computer Vision and Pattern Recognition
IEEE Visualization

ATTACHMENT 4

(96/000,004 - 290115.401C1RE)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent	:	8,078,436 B2
Control No.	:	96/000,004
Filed	:	December 28, 2012
For	:	AERIAL ROOF ESTIMATION SYSTEMS AND METHODS

Examiner	:	Jason Scott Proctor
Art Unit	:	3992
Docket No.	:	290115.401C1RE

Commissioner of Patents
Washington, DC 20231

DECLARATION

Commissioner for Patents:

I, Kevin Jones, declare as follows:

1. I have been retained by Seed IP Law Group PLLC to first review U.S. Patent No. 8,145,578 (the '578 Patent) with respect to the first Office Action received in the reexamination of that patent and then after this to review U.S. Patent No. 8,078,436 (the '436 Patent) with respect to the first Office Action received in the reexamination of that patent. Prior to being retained by Seed IP Law Group, I had never read the '578 Patent or the '436 Patent, had never heard of Eagle View Technologies nor had I reviewed any of its products. I have not spoken with Chris Pershing or any other person at Eagle View regarding Eagle View Technologies' products, technologies or patents.

2. I have worked in various different areas of software development throughout my career as a software engineer and consultant. While I actually started my studies working towards a B.S. degree in chemical engineering, I also had an early interest in software and began taking on practical software programming and development projects in the late 1980s. As a result, I was able to obtain a solid

foundation of software programming skills after a few years of practical experience and decided to make software engineering and consulting my career. I thus did not obtain a B.S. in either computer science or chemical engineering. This foundation of software programming skills is quite common to people working in the computer programming technical field. I obtained this foundation of software programming skills over time working on many individual projects by learning and immediately applying the programming languages, data structures and theories necessary to solve the real-world problem at hand for each project. As most software engineers of ordinary skill would agree, computer science is an applied skill that is developed through practical application of spending hours of writing software code and troubleshooting the code to solve real-world problems. This is how software programmers and engineers actually learn their craft, regardless of whether they have a degree in computer science.

3. Due to my practical experience in various different areas of software development and applied mathematics without specialization in one particular area, I consider myself to be of ordinary skill in computer software and applied mathematics generally. Also, due to the many opportunities I've had throughout my career to work with various software engineers, either as a developer or consultant in different companies, I have observed and interacted with numerous software engineers, colleagues and developers having varied specialties and levels of skill. This provides me with the ability to assess what the ordinary level of skill in software and applied mathematics was around April 17, 2008, when U.S. Patent Application No. 12/148,439 (the '439 Application) for U.S. Patent No. 8,145,578 (the '578 Patent) was filed. For example, while as a software consultant for Adobe Systems in 2007, I acquired the historical source code from different developers at various global development teams and developed associated source code analysis tools. Based on work I did as part of a software programming project for Intermind, I was a co-inventor on two U.S. patents that are generally in the software field, but are unrelated to the '578 patent, listed in my attached CV. This has also given me some understanding of the concept of one of ordinary skill in the art and what that means in terms of a patent application. In 2005-2006, I developed tools to improve the performance of an Extensible Markup Language

(XML) data transformation and migration tool supporting the logical design of the aircraft for Boeing. Recently, at Z2Live, I was a software engineer that designed, developed and administered real-time server-side software for game play, voice chat and text chat. I also ported Phigs+ 3D graphics software and developed 3D visualization software to port a commercial robotics application (ca. 1993). My full CV is attached hereto as Jones Exhibit A for reference as part of this Declaration.

4. Based on the above working experience and that shown on my CV, I am knowledgeable and qualified to provide an opinion regarding various aspects of the '578 Patent as one having ordinary skill in software and applied mathematics currently and at the time the '439 Application was filed. Based on this working experience, I am also qualified to describe the state of, the predictability of, and the level of one of ordinary skill in the art of software and applied mathematics at the time the '439 Application was filed.

5. In connection with this declaration, I first read and understood the '578 Patent, using it as a guide to write the specification for the computer-implementable process described in this declaration and before coming to my conclusions regarding the '578 Patent expressed in this declaration. This was done before I ever read the '436 Patent.

6. Using only the '578 Patent as a guide, I was able to determine how to make and use the invention claimed in the '578 Patent. This was based on my reading of the '578 Patent and using the resources that would have been available to me and others of ordinary level of skill in software and applied mathematics as directed by the '578 patent at the time the '439 Application was filed. In particular, I was able to write a specification for a computer-implementable process that performs or implements the systems, methods and computer-readable mediums claimed in the '578 Patent.

7. The '578 Patent states in col. 3, lines 54-58 that "The system 10 includes an estimating software program 50 designed to receive an address for the building 92. The software program 50 is linked to an aerial image database 52 that contains aerial images 54 of various building 92 in a region."

8. The '578 Patent states in col. 5, lines 53-61 that "Next, the longitude-latitude coordinates of the property are then used to query an aerial and/or satellite imagery database in order to retrieve one or more images of the property of interest. It is important to note that flat roofs only require a single image of the property. Roofs containing one or more pitched sections typically require two or more photographs in order to identify and measure all relevant sections and features of the roof."

9. The '578 Patent states in col. 5, lines 61-67 that "Once the images of the roof section of the building are obtained, at least one of the images needs to be calibrated. During calibration, the distance in pixels between two points on the image is converted into a physical length. This calibration information is typically presented as a scale marker on the image itself, or as additional information supplied by the image database provider along with the requested image." Thus, my statements in this declaration pertain to an example scenario in which the image files referred to in the claims of the '578 Patent include image scale information for at least one of the images of the received image files.

10. Based on the above instructions and the other relevant instructions and drawings of the '578 Patent, one of ordinary level of skill in software would know how to request images from a database of such image files over the Internet. Linking to a database server for a database of image files would have been within the ability of anyone having an ordinary level of skill in software at the time the '439 Application and was filed, including myself.

11. The '578 Patent states in col. 6, lines 4-27 that "A set of reference points are identified in each of the images. The service's measurement software then uses these reference points and some proprietary algorithms to co-register the images and reconstruct the three dimensional geometry of the object identified by the reference points. There are a variety of photo-grammetric algorithms that can be utilized to perform this reconstruction. One such algorithm used by the service uses photographs taken from two or more view points to 'trangulate' [sic] points of interest on the object in 3D space. This triangulation can be visualized as a process of projecting a line originating from the location of the photograph's observation point that passes through a particular reference

point in the image. The intersection of these projected lines from the set of observation points to a particular reference point identifies the location of that point in 3D space. Repeating the process for all such reference points allows the software to build a 3D model of the structure. The optimal choice of reconstruction algorithm depends on a number of factors such as the spatial relationships between the photographs, the number and locations of the reference points, and any assumptions that are made about the geometry and symmetry of the object being reconstructed. Several such algorithms are described in detail in textbooks, trade journals, and academic publications."

12. As instructed by the '578 Patent to use basic assumptions about the geometry and symmetry of the roof, I used my general knowledge about roofs that anyone would have that has seen roofs of houses and rudimentary knowledge of geometry that anyone who took high school geometry would have to assume certain constraints indicating a maximum pitch and that roof facets are contiguous polygons connected to each other at edges defined by particular identified reference points. In particular, using the '578 Patent as a guide, I was able to write a specification for a computer-implementable process that identifies polygonal roof components by taking identified coplanar sets of reference points on a roof in a first received image. The process takes a second set of reference points identified as being the same reference points on the roof in a second received image having a different view of the roof. Based on these instructions and guidance above and other applicable language in the '578 Patent, I began researching and found basic references and software packages regarding object reconstruction that would have been available to one of ordinary skill in software at the time the '439 Application was filed. This enabled me to write a specification for a computer-implementable process that determines measurements of the roof including size, dimensions, and pitch of the plurality of distinct roof sections of the roof. This was based solely on the received image files including information regarding image scale for at least one of the image files. Some of the specification that I wrote for a computer-implementable process included pseudo-code type of text for implementation of the process in sufficient detail where applicable such that anyone of ordinary skill in software coding work would be able to write the code necessary for implementation of the entire

process at the time the '439 Application was filed. After reference points are selected and indicated as to which ones are common to both figures, the process then reconstructs a 3D model of the roof utilizing a standard software package such as PhotoModeler Pro 5 that was publicly available in 2005 to perform co-registration of the images in 3D space by using these reference points as input to form a 3D model of the roof using such constraints resulting from the assumptions I made above about the geometry and symmetry of the roof, as instructed by the '578 Patent.

13. I was able to know to look for such a 3D reconstruction software package because the '578 Patent indicated that "there are a variety of photo-grammetric algorithms that can be utilized to perform this reconstruction." I would not have otherwise thought to do so without this guidance provided by the '578 Patent and nor would others of ordinary skill in software and applied mathematics at the time the '439 Application was filed.

14. Using such constraints resulting from the assumptions I made above about the geometry and symmetry of the roof, as instructed by the '578 Patent, the process of the computer-implementable specification I wrote converts the distance between two of the reference points using the image scale information available in at least one of the received image files to calculate the estimated surface area of each polygon representing a roof facet in the reconstructed 3D model or a scale assigned manually. Using the '578 Patent as a guide, the process outputs a report including size, dimensions, and pitch of the plurality of distinct roof sections of the roof.

15. 3D reconstruction algorithms for objects were available in software packages such as PhotoModeler Pro 5 to one of ordinary skill in software and applied mathematics at the time the '439 Application was filed. Web site pages regarding PhotoModeler Pro 5 that were archived, according to Wayback Machine, before the '439 Application was filed are provided in an information disclosure statement filed in the present reexamination of the '578 Patent. However, without having the benefit of reading the '578 Patent, it would not have been obvious to me or anyone else of ordinary skill in software and applied mathematics at the time the '439 Application was filed to apply such 3D reconstruction algorithms available at the time to solve the problem of how to

get roof area and pitch measurements remotely based solely on the type of low-resolution, grainy, dirty, unrelated and disparate photographs of roofs that were currently available from the existing image databases at the time and shown in the '578 Patent. The '578 Patent contains sufficient detail and ties the relevant concepts and techniques together in a unique way to solve this problem and shows one of ordinary skill in software and applied mathematics such as myself how to make and use such a solution as claimed in the '578 Patent at the time the '439 Application was filed. Without the direction and guidance provided by the '578 Patent, it would not be apparent to one of ordinary skill in software and applied mathematics, including myself, how to get roof area and pitch measurements remotely based solely on received image files and included image scale information. I see at least one real value of the invention of the '578 Patent is that it provides the ability to take image data that is disparate, dirty, possibly obstructed by other objects in the image, and not intended for use together, and then obtain useful information from such disparate image files.

16. Thus, the '578 Patent contains sufficient information and technical details regarding systems and methods of determining roof dimensions based solely on the received image files and algorithms for construction of the geometry of the roof to enable me and any other person of ordinary skill in software and applied mathematics at the time the '439 Application was filed to make and use the invention as claimed in the '578 Patent without undue experimentation.

17. After reading the '578 Patent, I read for the first time the '436 Patent; the first Office Action issued in the reexamination of the '436 Patent; European Patent No. EP 1 010 966 B1 published October 23, 2002, and translations to English (the '966 Patent), www.archive.org Web site showing alleged archive of German AeroDach Web Site http://www.aerodach.de from June 13, 2004 (retrieved September 20, 2012), and translations to English (Aerodach Web Site); www.archive.org Web site showing alleged archive of German Aerowest Web site http://aerowest.de/ from February 6, 2006 (retrieved September 20, 2012), and translations to English (Aerowest Web Site); "AeroDach® Online Roof Evaluation Standard Delivery Format and 3D Data File" Document Version 01.00.2002 with alleged publication in 2002 (Aerodach Roof

Analysis); and U.S. Patent Application Publication No. 2003/0103651 published June 5 2003, naming inventor Kurt Novak (Novak).

18. The '966 Patent describes a system requiring use of stereoscopic images. Stereoscopy requires two clean images, has a specific set of constraints that must be met and uses associated stereoscopic data regarding camera position and angle. For example, stereoscopy as described in the 966 Patent requires two images taken at the same camera angle with respect to the image plane. Thus, they cannot be two images, one having a top plan view and one having another view, such as an oblique view. For example, when using aerial images of roofs, the stereoscopic pair of images of the roof may be two images both showing top plan views of the roof, each taken at a known distance between the respective camera positions. Also, the general 1/30th rule of thumb in stereoscopy requires the distance between the camera positions taking each stereoscopic image to be substantially 1/30th of the distance from the object being photographed.

19. The Aerodach Web Site advertises the product described by the '966 Patent that requires use of stereoscopic images and associated data.

20. The inventions described in the '578 Patent and '436 Patent do not use such stereoscopic images, do not use associated stereoscopic data, do not require such constraints regarding acquisition of stereoscopic images and may instead be based on using disparate, dirty, unrelated images without such associated stereoscopic data.

21. For the above reasons, it would not have been obvious to one of ordinary skill in software and applied mathematics, including myself, to modify the '966 Patent and/or Aerodach Web Site, or to use or combine the '966 Patent and/or Aerodach Web Site with other prior art, to arrive at the inventions described in either of the '578 Patent or '436 Patent. In particular, it would not have been obvious to one of ordinary skill in software and applied mathematics, including myself, to even consider the '966 Patent or the Aerodach Web Site as having techniques applicable to determining roof measurements based solely on received image files including image scale information. Neither would it have been obvious to one of ordinary skill in software and applied mathematics, including myself, to even consider the '966 Patent or the Aerodach Web

Site as having techniques applicable to determining roof measurements using images that have a top plan view and another different view of the roof.

22. The Novak reference describes calculating distances between points in a single image that are identified as being coplanar on a plane parallel to the image plane. However, points on a planar surface of the roof in an aerial image of the roof are rarely coplanar on a plane parallel to the image plane unless the planar surface of the roof is flat (i.e., has no pitch).

23. The inventions described in the '578 Patent and '436 Patent use images of roofs having various different pitched planar surfaces. Thus, for the reasons above, it would not have been obvious to one of ordinary skill in software and applied mathematics, including myself to modify the Novak reference, or to use or combine the Novak reference with other prior art, to arrive at the inventions described in either of the '578 Patent or '436 Patent.

24. I hereby declare that all statements made herein are of my own knowledge, are true and that all statements made on information or belief are believed to be true; and further that these statements are 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, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

25 October 2013
Date

Kevin Jones

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24. I hereby declare that all statements made herein are of my own knowledge, are true and that all statements made on information or belief are believed to be true; and further that these statements are 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, and that such willful false statements may jeopardize the validity of the captioned patent application or any patent issued therefrom.

25 October 2013
Date

Kevin Jones

Jones Exhibit A

(96/000,005 - 290115.401RE)

Kevin Jones

Summary

Mr. Jones offers experience as a consulting software engineer in roles as varied as Chief Technology Officer, Chief Architect, Principal Software Engineer, Technical Trainer and Development Lead. Mr. Jones' clients include Fortune 500 companies as well as many start-up firms.

Recent Experience

Hardware/Software Analyst, Competitive Media Intelligence, Microsoft, Monitored the competitive consumer electronics hardware and software space for the Media & Entertainment Group. Implemented catalog collection for connected device applications. Provided and presented research and analysis to Senior Management in Finance, Business Development and Strategy (2010-2011)

Consulting Senior Software Engineer, Gist (Vulcan-funded), Evaluated graph database, visualization and analysis technology for Social Network Analytics and Social CRM. Designed and developed tools (export, data cleansing, transformation and import) and prototypes using Neo4j, Neo4j.rb and MySQL for deployment into a Rails environment. Determined important queries for Social Network Analysis.

Development language(s) C, awk Lua, Ruby/JRuby. SQL (2010)

Senior Engineer, Z2Live (Madrona-funded), Designed, developed and administered real-time server-side software for game play, voice chat and text chat using TURN, XMPP and MySQL within a Rails environment. Automated deployment and monitoring in the cloud (EC2 and EngineYard) including an ejabberd cluster .

Development language(s) C, Erlang, Ruby. SQL (2009-2010)

Witness as co-inventor in the patent infringement case of Cordance v. Amazon. Provided testimony in a deposition. (2008-2009)

Consulting Sr. Engineer to KGM LLC. Design, development and implementation of a programmed trading system to support trading Foreign Exchange. Developed a system including: data feeds (including FIX 4.2), real-time tickerplant, historical database and analytics. (2007-present)

Development Language(s): k/kdb (for database and analytics) and (C/C++ for DLLs and data feed/brokerage interfaces). (2007-present)

Consulting Sr. Engineer to ITMSource (Longterm Healthcare). Consulting CTO and Advisory Board member, Provided technical oversight for the company's field service delivery and management platform (including 3rd party integration). Analyzed and reworked the field service pricing model . Interfaced with the firm's bankers and advisory team on technical matters

(including finance and marketing). Developed the methodology for taking on new lines of field service business. (January-July 2008)

Development Language(s): IIS, SQLServer, VB, XML,XSLT, javascript

Consulting Sr. Engineer to Adobe Systems. Collection and historical analysis (from the mid 90's) of the source code for Adobe's major products in support of a large corporate compliance effort (reporting to a Senior Director). Acquired of the historical source code (online and archived) from global development teams for (Acrobat, Photoshop, PageMaker, InDesign and Illustrator). Developed the source code analysis tools (including metrics) that scaled to 100 millions LOC. Produced a historical analysis of each product line. Prepared a detailed written analysis of the metrics and discussion of said metrics as related to the compliance effort (2007)
Development Language(s): C/C++, perl and bash under Mac OS X.

Consulting Sr. Engineer to The Boeing Company, 787 Functional Integration Group. Provided tools to improve the performance (30x) of an XML data transformation and migration tool supporting the logical design of the aircraft. Designed and developed data visualization tools to interactively display the design of the aircraft. Developed a high-performance database access library (C++) with python bindings (Boost.Python) for all application development. (2005-2006)

Development Language(s): C/C++/DLLs for the Versant (Windows XP & Solaris) database access and migration, Python for XML transformations and Java/yEditor/GraphML for data visualization.

Software Architect for Nimble Technologies/Actuate Corp. Design, development and optimization of a high-end XML-based data integration platform used to support enterprise information portals and business intelligence systems. Front-end language support includes SQL and XQuery. Nimble was acquired by Actuate in 2003. Retained by Actuate to plan the assimilation of the Nimble technologies into Actuate's enterprise reporting architecture. (2002-2004)

Internal Research & Development for Investt Cartier SA, offshore business and technology firm. Design & development of cross-platform XML query tools compliant with XQL and XQuery W3C specifications. Creating a commercial product stressing high performance and optimized storage of the XML content. Algorithm design for the efficient implementation of XRI/XDI standards. (2000-2005)

Consulting Software Engineer for PortalPlayer. Developed an automated software build engine for the leading developer of embedded audio/video processing software for consumer electronics devices including the Apple iPod™. Developed command line utilities that enabled PortalPlayer's Build & Configuration Management staff to maintain over 25 active software build variations. (2002)

Consulting Architect and Software Engineer for xSides Incorporated. Design & development of a cross-platform (MacOS, Windows and Linux) high-performance validating XML parser and schema processor for embedded, client and server environments. Release 1 supporting one embedded schema has a footprint (Windows/cygwin) of 32K. Implemented using flex, bison and re2c (including engineering a secure memory management for each platform). (2001-2002)

Chief Technology Officer (Contract) for HomeTownFan.Com, an Internet "e-tailer" that marketed sports clothing and memorabilia over the Internet. Responsibilities included directing the design and development of HTF's web delivery, e-Commerce and backend fulfillment systems. Mr. Jones also helped HomeTownFan to source and secure funding for the firm. (1999-2000)

Designed the architecture for an XML-based "trust agency" for LibertyBay.Com (later EssentialMarkets.Com), an Internet Services Provider and e-Commerce Application Services Provider based upon a UML use case requirements set. Prepared a recommended implementation plan with an associated risk assessment for Liberty Bay's Chairman, CEO and lead investor. (1999)

Designed a rules engine for SAFECO Insurance in support of an Internet-based insurance policy rating and approval system. The system allowed SAFECO to replace thousands of lines of compiled code with a database of scripts. (1998)

Participated as a Working Group Member in several W3C working groups responsible for XML-related specifications including RDF (Resource Description Format) and P3P (Platform for Privacy Preferences Project). (1997-1998)

Chief Architect for Intermind Corporation, developer of "Communicator", an early Internet "push" technology. Senior member of the team that designed and developed Communicator and the co-author of several patents for the communications control structure underlying "Communicator". (1995-1998)

Chemical Engineering Experience

Research Chemical Engineer, General Electric R&D, Developed a simulator for electron deposition in thin films, substrates and thin films on substrates.

Chemical Engineer, Mobil Chemical, Developed software for statistical outlier detection of sensor readings in the production of thin film plastics. Developed 2D graphics library for HP monitors/terminals.

Chemical Engineer, Exxon Chemical, Pilot plant study (including modeling and optimization) of an isobutyl alcohol process with recommendations for full-scale production. Developed a

simplified 3D graphics library for engineering presentations. Assisted in the technical due diligence phase of the acquisition of a membrane technology company. Acted as the backup computing contact for my group.

Additional experience (including personal projects):

- Designed & Architected a hybrid datastore for graph and relational data (including time series information) for very large scale storage and analysis
- Reverse-engineered a commercial database engine (incl. core algorithms/functions, compiler, VM, ipc and data-driven gui) , from 80386 machine code to C.
- Reverse-engineered a commercial compiler development tool from C to its source language
- Implemented a runtime metadata/specification driven FIX (Financial Information eXchange) protocol implementation
- Developed universal cross-platform client-server relational database access library for Interbase, Informix, Oracle and Sybase including and automated interface for the Wingz spreadsheet
- Specified and developed a cross-platform graph/object-oriented database engine and query language for use in a commercial application
- Developed a real-time 24x7 security/auditing/billing system for corporate ISP using embedded SQL and Informix Online
- Developed the system software for the best-selling "C/C++ Multimedia Cyber Classroom" from the Prentice Hall division of Simon Schuster
- Developed Universal Technical Systems, Graphics 2000 2D/3D visualization application including import/export from TkSolver
- Ported a commercial implementation of PHIGS+ from Unix to Windows (including a translation from FORTRAN to C, graphics drivers and printer drivers)
- Developed translator from PHIGS+ to graPhigs (IBM) FORTRAN API with 85% automatic translation (to port a commercial robotics application)
- Real-time TCP/IP-based derivatives trading application for the Macintosh
- Developed AutoCAD extensions and database integration for a commercial High Vacuum construction and simulation application (including Chemical Vapor Deposition)
- Reverse-engineered Powerbuilder library format, Powerscript language and Datawindow language to produce documentation tools for Powerbuilder environment
- Developed Dbase compatibility library for 4th Dimension database environment on the Macintosh
- User interface definition and analysis tools for commercial browser-based application
- Designed advanced data retrieval algorithms for high-performance name resolution and database indices

Education

Studied for Chemical Engineering B.S., Rensselaer Polytechnic Institute, Troy NY (1983-1987)

Certification in Colored Gem Stone Grading, Gemological Institute of America, Carlsbad CA (2002)

Certification in Colored Gem Stone Identification, Gemological Institute of America, Carlsbad CA (2002)

Certification in Pearl Grading, Gemological Institute of America, Carlsbad CA (2011)

Completed "The Heat Treatment of Rubies and Sapphire" course with Ted Themelis, Bangkok Thailand (2003)

Patents & Awards

Co-Inventor, "Computer-Based System and Method using Metadata Defining a Control Structure", U.S. Patent #5,862,325.

Co-Inventor, "Communications system for transferring information between memories according to processes transferred with the information", U.S. Patent #6,044,205.

American Mathematical Society award for Teaching Excellence 1992

Tools & Technologies

Platforms

Linux (RedHat, Centos, Ubuntu), SunOS, Solaris, AIX, IRIX, HPUX

MacOS X

Microsoft Windows 3.xx, Win95, NT SDK, Windows 200x, Windows XP

VMWare Fusion (Virtual Machine)

Development Languages and Tools

C and C++ (VC++, GNU C/C++)
Java (Sun JDK 1.0/1.1/1.3/1.4.2,5.0)
Ruby/JRuby
Erlang
Python
k /kdb, q
XML, XQuery
XML DTD and XML Schema
Perl, awk, prolog
Memcached, libmemcache
Lua

Networking

Ethernet, TCP/UDP/IP, multicasting including TIBCO Rendezvous
HTTP
TURN
XMPP

Database

MySQL
KDB
Neo4j
mongodb
Vertica
Versant
MS SQLServer
DB2
Interbase
Sybase ASE
Oracle
Teradata

Areas of Interest and/or Expertise (Software)

3D graphics engine development
Algorithm analysis and design
Compiler/Interpreter/Translator development
Database engine development
Distributed algorithms
Formal methods in software engineering
Identity management and metadata management
ISAM, SQL, RDBMS databases
Machine Learning
Metaprogramming
Multiparadigm programming languages
Novel programming languages
Operating System internals
Reverse-engineering of source code and data
RDF
Rules Engine development
Semi-structured databases
Software Engineering and Process
Software Performance Engineering
Systemic software reuse
User Interface analysis tools
Programmed Trading Systems

Areas of Interest and/or Expertise (Non-Software)

Gemology

- Collector of Corundum (rubies and sapphire) and Black Pearls
- Certifications (from Gemological Institute of America)
  - Colored Gem Stone Grading
  - Gem Identification
  - Pearl Grading
- Completed "The Heat Treatment of Rubies and Sapphire" course with Ted Themelis (Bangkok, Thailand)

Television

Executive Producer and Co-creator of the "Shane Coakley Show" - a celebrity interview show in Seattle with guests from Seattle as well as Los Angeles and Vancouver, BC. Filmed at Planet Hollywood (Seattle) and aired on network affiliate KONG

Non-profit

Fundraising Board of Sisters In Common, Member

Sisters in Common is dedicated to helping children and families in crisis (mostly immigrants from East Africa)

Financial markets

- Equities
- Options
- Foreign Currency Exchange
- Programmed and High-frequency trading

Music

- Rudimental Snare Drummer (from age 10)

Foreign Language

- Read, Write and Speak conversational French

ATTACHMENT 5

(96/000,004 - 290115.401C1RE)

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

Eagle View Technologies, Inc., a Washington corporation, Plaintiff, v. RoofWalk, Inc., a Minnesota corporation, Peter Wegier, an individual, and Josh Hedlund, an individual, Defendants.	Civil Action No. 2:12-cv-00544-RSL CONSENT DECREE AND DISMISSAL

Pursuant to a settlement between the parties, Plaintiff Eagle View Technologies, Inc. ("EagleView") and Defendants RoofWalk, Inc., and Peter Wegier ("Defendants") have agreed and through their respective counsel hereby stipulate to the entry of this Consent Decree.

IT IS HEREBY ORDERED, ADJUDGED AND DECREED that judgment be entered against Defendant as follows:

1. This Court has jurisdiction over the subject matter over this action and personal jurisdiction over each of the Defendants.

2. Defendants hereby acknowledge and agree that EagleView's US Patent Nos.

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701 FIFTH AVENUE, SUITE 5400
SEATTLE, WASHINGTON 98104
(206) 622-4900

8,078,436; 8,145,578; and 8,170,840 ("the EagleView Patents") are valid and enforceable.

3. Defendants hereby acknowledge and agree that the EagleView Patents are infringed by Defendant RoofWalk's creation, use, offer for sale and sale of roof reports such as that shown in Exhibit A attached hereto.

3. Defendants are hereby enjoined from making, using, selling, offering to sell, distributing or marketing roof reports such as the one shown in Exhibit A or that otherwise infringe the EagleView Patents.

6. Plaintiff and Defendants shall each bear its own costs and expenses, including attorneys' fees, arising out of this litigation.

7. This Judgment shall be effective and enforceable to the fullest extent possible under the laws of the United States of America.

8. This Court shall retain jurisdiction over the parties and this action to enforce this Consent Decree and the Settlement Agreement between EagleView and Defendants.

9. All claims in the above-entitled lawsuit between EagleView and Defendants are hereby dismissed.

SO ORDERED this 20th day of July, 2012.

Robert S. Lasnik
UNITED STATES DISTRICT JUDGE

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SEATTLE, WASHINGTON 98104
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