

Roofr Inc. v. Pictometry International Corp.

IPR2023-00435, IPR2023-00436

U.S. Patent Nos. 9,183,538, 10,648,800

Petitioner's Demonstratives

Hearing: April 23, 2024

Grounds

-00435

-00436

IPR2023-00435 – '800 Patent

Ground	Claim(s) challenged
1. Pershing-789 + Abhyanker	1-17
2. Ground 1 + Pictometry	9, 14
3. Kennedy + Abhyanker + Bailey	1-17

IPR2023-00436 – '538 Patent

Ground	Claim(s) challenged
1. Pershing-789 + Bailey	1-5, 8-13
2. Ground 1 + Abhyanker	6-7, 14-18
3. Kennedy + Bailey	1-5, 8-13
4. Ground 3 + Abhyanker	16-7, 14-18

Patent Owner's Arguments

-00435

-00436

IPR	Grounds	Patent Owner's Arguments	Claims
Both	All	The Board should give no weight to Petitioner's expert declarations	All
-00435	1, 3	Abhyanker does not disclose a "second computer input" "responsive to receiving [a] designation" that "signal[s] user-acceptance"	1, 11, 17
-00435	1, 2	Pershing-789 / Pictometry do not disclose an "outline drawing ... super-imposed on [a] nadir image"	9, 14
-00435	3	Kennedy does not disclose an "outline drawing [of a] roof"	2
-00436	1, 3	Bailey does not disclose determining a "predominant pitch of the roof" by "analyzing an image" or determining an "estimated roofing area based on the predominant pitch"	1, 13, 14
-00436	1, 3	Pershing-789 / Kennedy do not disclose determining a "footprint" of a roof	1, 13, 14
-00436	1-4	Bailey does not disclose determining a predominant pitch based on a "weighted average" / "estimated percentage of roof area"	11, 18

'800 Patent Overview

1. A process, comprising:
receiving first location data;
providing visual access to a first image corresponding to the first location data, the first image including a roof structure of a building;
providing a first computer input capable of signaling a designation from a user of a building roof structure location within the first image, wherein the building roof structure location is a geographic position of the building roof structure and is different than the first location data;
receive a designation of the building roof structure within the first image;
responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and
subsequent to receiving the user-acceptance confirming the designation of the building roof structure location, providing a report for the building roof structure.

'800 Patent Overview

-00435

1. A process, comprising:
receiving first location data;
providing visual access to a first image corresponding to the first location data, the first image including a roof structure of a building;
providing a first computer input capable of signaling a designation from a user of a building roof structure location within the first image, wherein the building roof structure location is a geographic position of the building roof structure and is different than the first location data;
receive a designation of the building roof structure within the first image;
responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and
subsequent to receiving the user-acceptance confirming the designation of the building roof structure location, providing a report for the building roof structure.

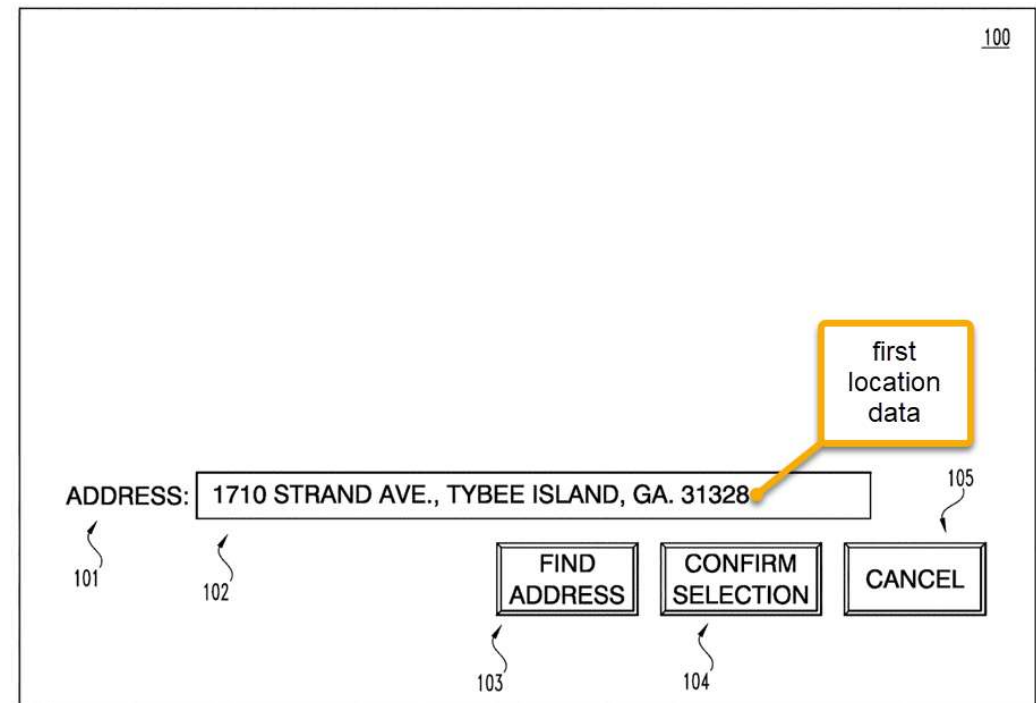
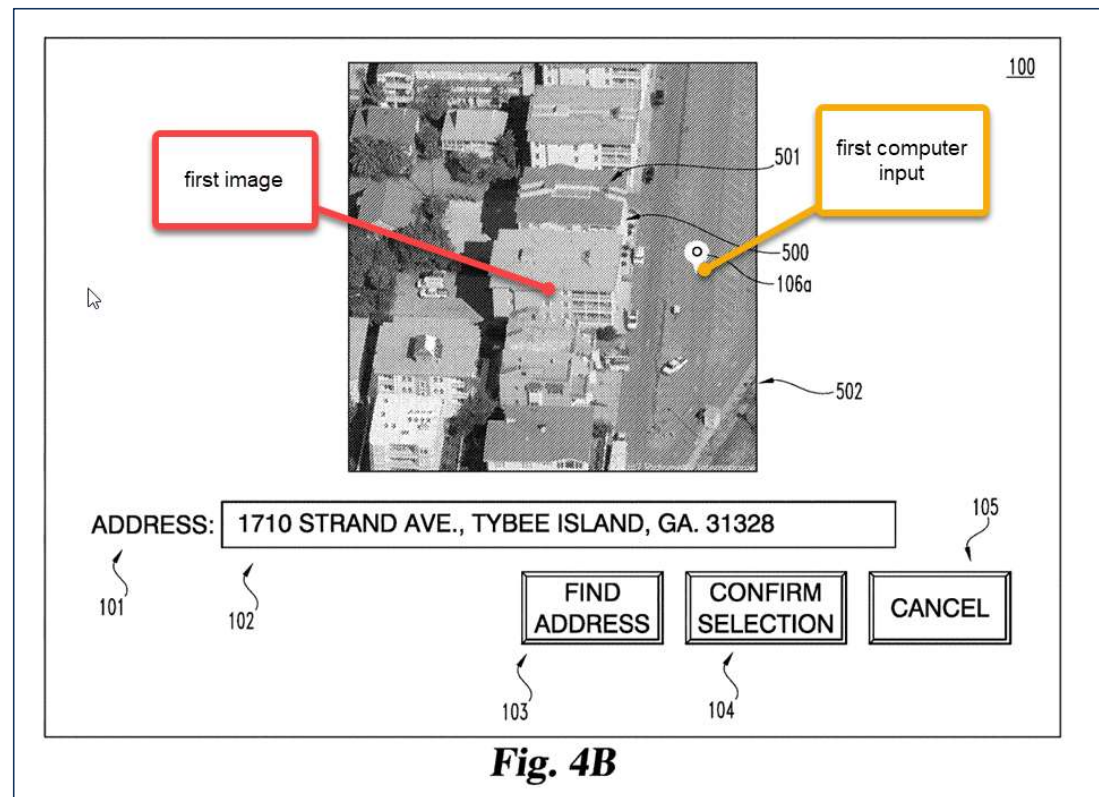


Fig. 4A

'800 Patent Overview

-00435

1. A process, comprising:
receiving first location data;
providing visual access to a first image corresponding to the first location data, the first image including a roof structure of a building;
providing a first computer input capable of signaling a designation from a user of a building roof structure location within the first image, wherein the building roof structure location is a geographic position of the building roof structure and is different than the first location data;
receive a designation of the building roof structure within the first image;
responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and
subsequent to receiving the user-acceptance confirming the designation of the building roof structure location, providing a report for the building roof structure.



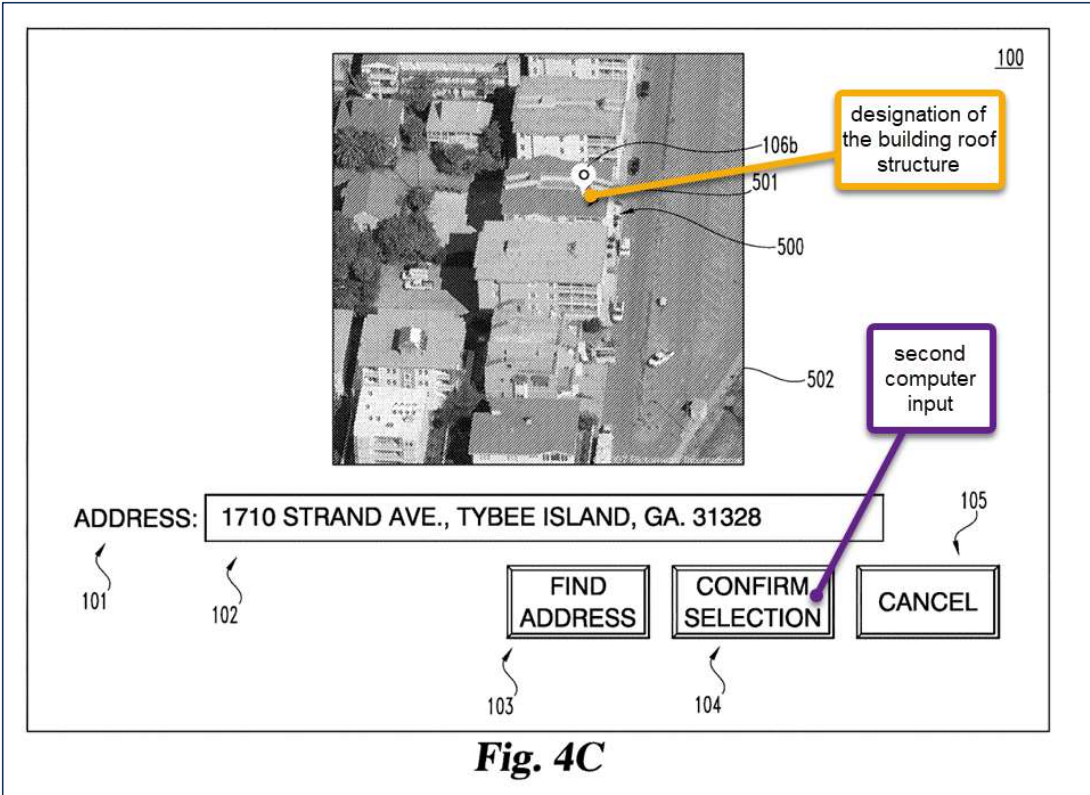
IPR2023-00435, Ex. 1001 (800 patent) at Fig. 4B

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

'800 Patent Overview

-00435

- 1. A process, comprising:
 - receiving first location data;
 - providing visual access to a first image corresponding to the first location data, the first image including a roof structure of a building;
 - providing a first computer input capable of signaling a designation from a user of a building roof structure location within the first image, wherein the building roof structure location is a geographic position of the building roof structure and is different than the first location data;
 - receive a designation of the building roof structure within the first image;
 - responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and
 - subsequent to receiving the user-acceptance confirming the designation of the building roof structure location, providing a report for the building roof structure.



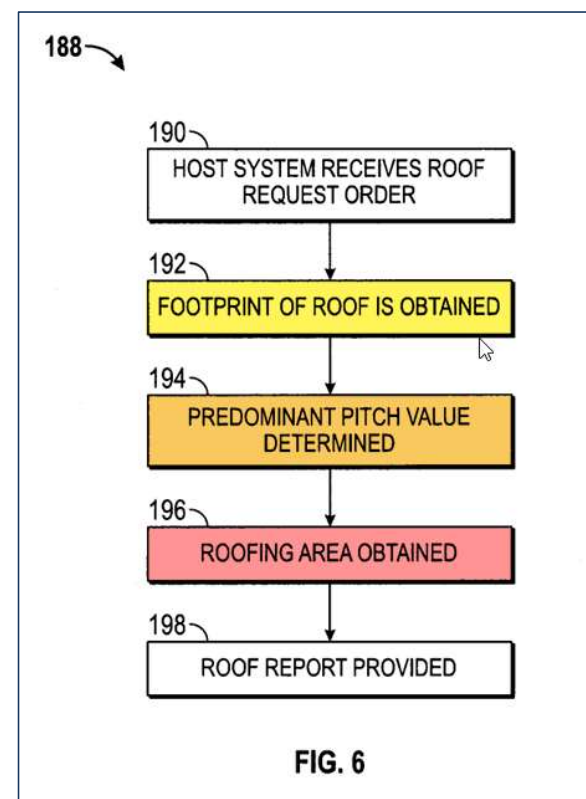
'538 Patent Overview

1. One or more non-transitory computer readable medium storing a set of computer executable instructions for running on one or more computer systems that when executed cause the one or more computer systems to: identify a geographic location of a roof; determine a footprint and predominant pitch of the roof by analyzing one or more image showing the roof; determine an estimated roofing area of the roof based on the predominant pitch and the footprint of the roof; and generate a roof report for determination of an amount of materials needed for a construction project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.

'538 Patent Overview

-00436

1. One or more non-transitory computer readable medium storing a set of computer executable instructions for running on one or more computer systems that when executed cause the one or more computer systems to: identify a geographic location of a roof; determine a footprint and predominant pitch of the roof by analyzing one or more image showing the roof; determine an estimated roofing area of the roof based on the predominant pitch and the footprint of the roof; and generate a roof report for determination of an amount of materials needed for a construction project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.



IPR2023-00436, Ex. 1001 (538 patent) at Fig. 6

'538 Patent Overview

-00436

1. One or more non-transitory computer readable medium storing a set of computer executable instructions for running on one or more computer systems that when executed cause the one or more computer systems to: identify a geographic location of a roof; determine a footprint and predominant pitch of the roof by analyzing one or more image showing the roof; determine an estimated roofing area of the roof based on the predominant pitch and the footprint of the roof; and generate a roof report for determination of an amount of materials needed for a construction project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.

The footprint may provide a two-dimensional boundary and/or outline of the roof. In a step 194, a predominant pitch value for the roof may be determined. In some embodiments, a predominant pitch value may be determined using the footprint as a boundary of the roof. The predominant pitch may be a weighted average of individual pitch factors for two or more portions of the roof. FIG. 7 illustrates an exemplary slope factor chart for determining pitch factors. For example, a first portion of the roof (e.g., 60% of the roof) may be at a 6:12 pitch. The 6:12 pitch corresponds to 1.1180 as the pitch factor). A second portion of the roof (e.g. 40% of the roof) may be at a 4:12 pitch. The 4:12 pitch corresponds to 1.0541 as the pitch factor. Thus, the weighted value of the first portion of the roof having 6:12 pitch is:

$$\text{(Pitch Factor)} \times \text{(Percentage of roof)} = \text{First Weighted Value}$$

$$1.1180 \times 0.6 = 0.6708 \qquad \text{EQ. 1}$$

The weighted value of the second portion of the roof having 4:12 pitch is:

$$\text{(Pitch Factor)} \times \text{(Percentage of roof)} = \text{Second Weighted Value}$$

$$1.0541 \times 0.4 = 0.42164 \qquad \text{EQ. 2}$$

The sum of 0.6708 and 0.42164 is 1.09244 as the total weighted pitch value. A total weighted pitch value of 1.09244 is closest to a pitch factor of 1.0833 in the table in FIG. 7. This pitch factor corresponds to a 5:12 pitch. As such, the predominant pitch in this scenario would be 5:12. Using the predominant pitch and outer dimensions provided by the footprint, an estimated area of the roof may be determined, in a step 196.

Summary of Prior Art

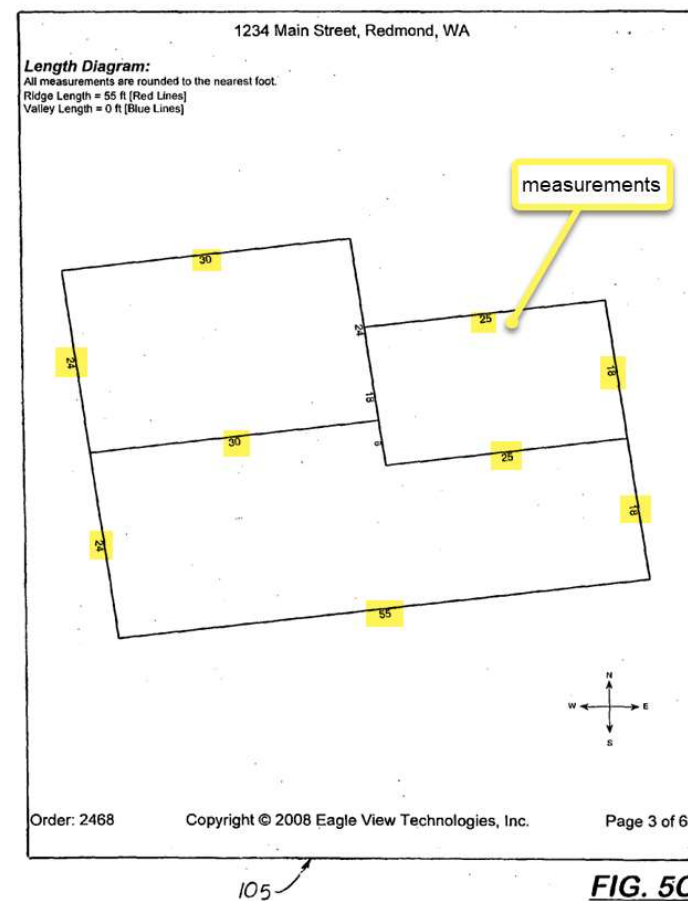
Summary of Prior Art: Pershing-789 (Ex. 1004)

-00435

-00436

A system that allows the remote measurement of the size, geometry, pitch and orientation of the roof sections of a building and then uses the information to provide an estimate to repair or replace the roof, or to install equipment thereon. The system includes an aerial image file database that shows aerial images of buildings in a designated area according to address. The slope and orientation images are typically oblique perspective views and top plan views of the buildings in the area. The system also includes an image analysis and calibration feature that enables the viewer to closely estimate the size, geometry and orientation of the building's roof sections. The information can then be used to prepare a cost estimate for the repair or replacement of the roof or installation of roof equipment. By simply inputting the potential customer's address, the company is able to determine the size, geometry, pitch and orientation of the roof sections of the building at that address, and then quickly provide an accurate estimate to the customer.

Ex. 1004, Abstract; -00435 Pet. 5-6; -00436 Pet. 6



Ex. 1004, Fig. 5C; -00435 Pet. 7; -00436 Pet. 8

Summary of Prior Art: Pershing-789 (Ex. 1004)

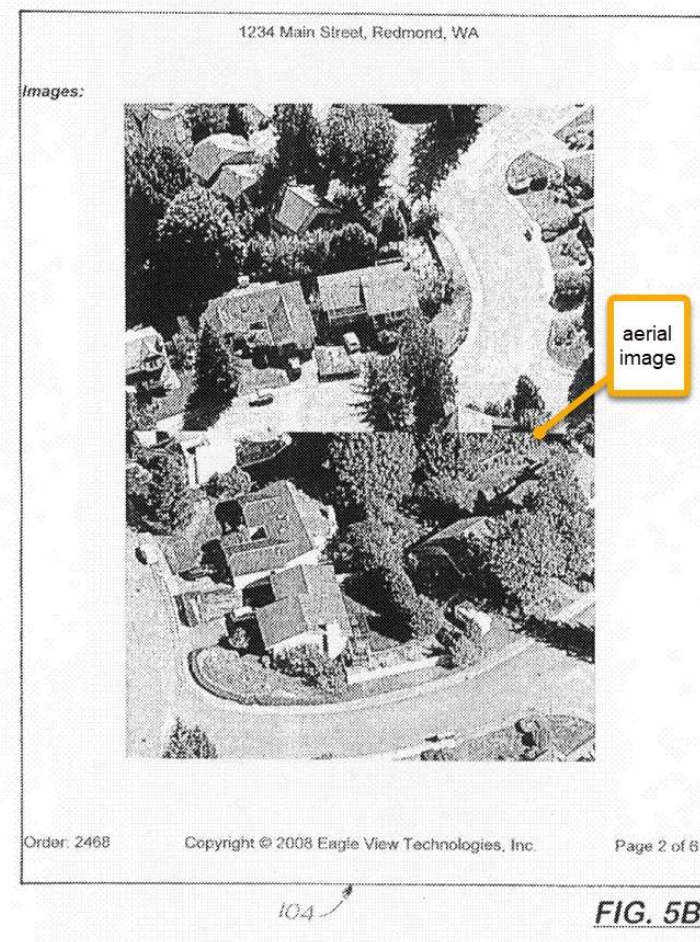
-00435

-00436

building 92 using aerial images of the building 92. 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 file database 52 that contains aerial images files 54 of various building 92 in a region. The

66. By simply inputting the customer's address into the software program 50, the roof company 70 is able view the customer's roof from the aerial image files 54 using a remote computer 72, determine the dimensions and slopes of the roof sections that make up the roof, and prepare a preliminary report 101 which is then used to prepare a final estimate 102 that is then delivered to the potential customer 90.

Ex. 1004, ¶ 22; -00435 Pet. 6; -00436 Pet. 7



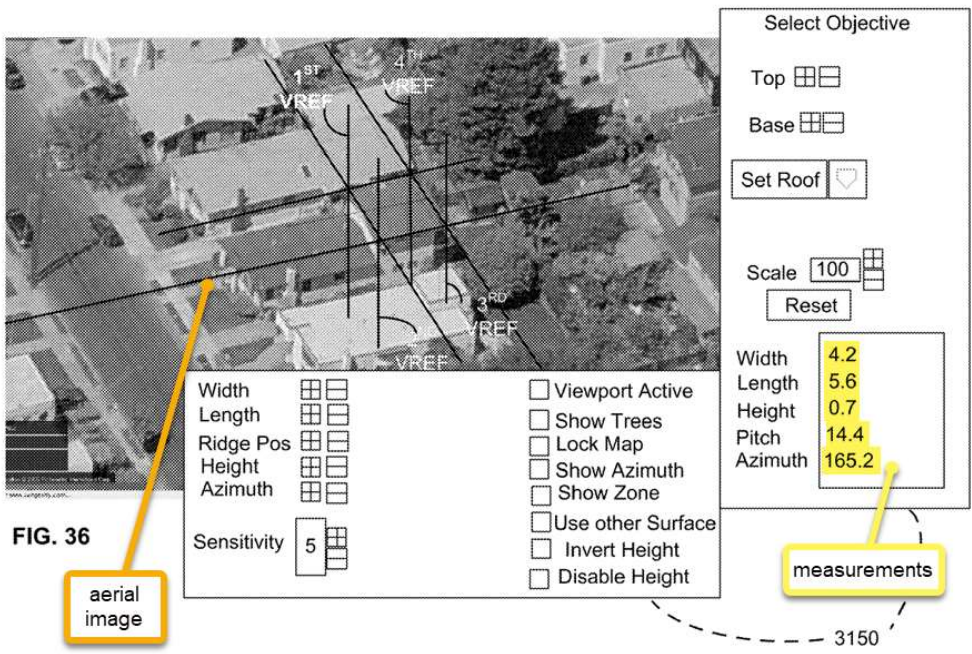
Ex. 1004, Fig. 5B; -00435 Pet. 30; -00436 Pet. 41

Summary of Prior Art: Kennedy (Ex. 1009)

-00435 -00436

The invention provides consumers, private enterprises, government agencies, contractors and third party vendors with tools and resources for gathering site specific information related to purchase and installation of energy systems. A system according to one embodiment of the invention remotely determines the measurements of a roof. An exemplary system comprises a computer including an input means, a display means and a working memory. An aerial image file database contains a plurality of aerial images of roofs of buildings in a selected region. A roof estimating software program receives location information of a building in the selected region and then presents the aerial image files showing roof sections of building located at the location information. Some embodiments of the system include a sizing tool for determining the size, geometry, and pitch of the roof sections of a building being displayed.

Ex. 1009, Abstract; -00435 Pet. 11; -00436 Pet. 15



Ex. 1009, Fig. 36; -00435 Pet. 12; -00436 Pet. 15

Summary of Prior Art: Abhyanker (Ex. 1005)

-00435

-00436

A method, apparatus, and system of **marker placement in a mapping environment are disclosed**. In one embodiment, a method includes generating a marker in a mapping environment using an algorithm based on an address data, placing the marker in the mapping environment adjacent to a physical location identified through the address data using the algorithm and automatically relocating the marker in the mapping environment to the physical location identified through the address data responsive to a user-provided marker movement. The method may also include generating a wiki marker movement request that identifies markers not claimed by any user in the mapping environment as candidates of relocation, processing **a marker locking request** when a wiki profile associated with the address data is claimed by a particular user and enabling the particular user **to control future relocations of the marker** when the user claims the wiki profile associated with the address data.

Ex. 1005, Abstract; -00435 Pet. 7-9; -00436 Pet. 8-9

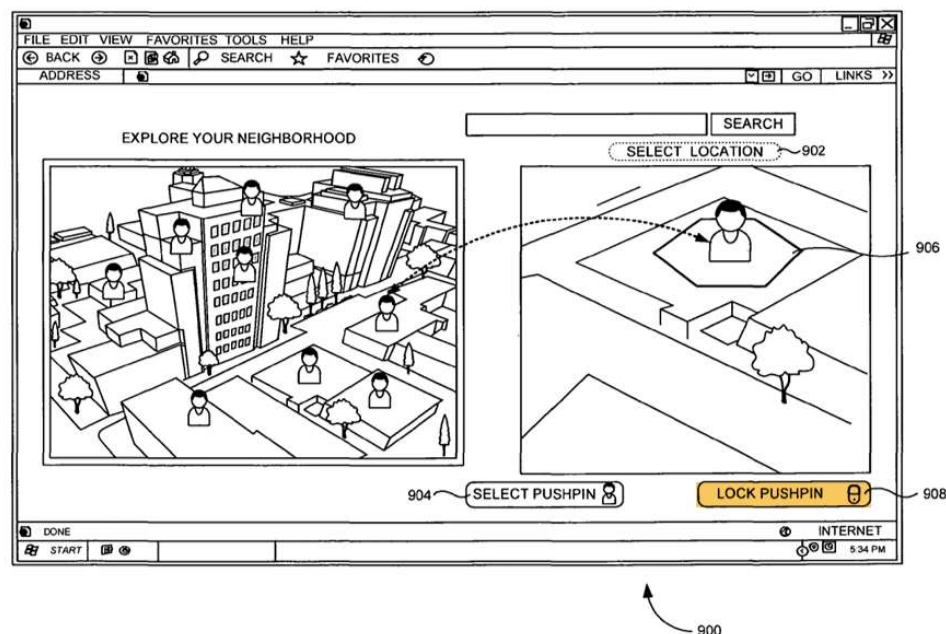


FIGURE 9

Ex. 1005, Fig. 9; -00435 Reply 17

Summary of Prior Art: Bailey (Ex. 1010)

-00435 -00436

ROOF SECTION IDENTIFICATION WORKSHEET			AGENCY/INST.: <i>Example</i>	
DATE: <i>Jan/ 1999</i>	BLDG. NO.: <i>1253</i>	SECTION ID: <i>A</i>	AREA: <i>2813</i> SF	
OCCUPANCY:	YEAR ORIG. CONST.: _____		YEAR LAST REPLACED: _____	
33 SLOPE (primary): <i>4</i> IN 12				

Ex. 1010 at 14-15; -00435 Pet. 89; -00436 Pet. 49, 69-70

Section 33 - Slope. The **predominant slope** of the roof section. The roof plan will generally indicate the slope (e.g., 4 in. in 12). If the slope is not noted on the roof plan, the section drawings may indicate the slope. If such information is not available, field measurement will be required (use the method in Appendix B).

Ex. 1010 at 17; -00435 Pet. 16; -00436 Pet. 12

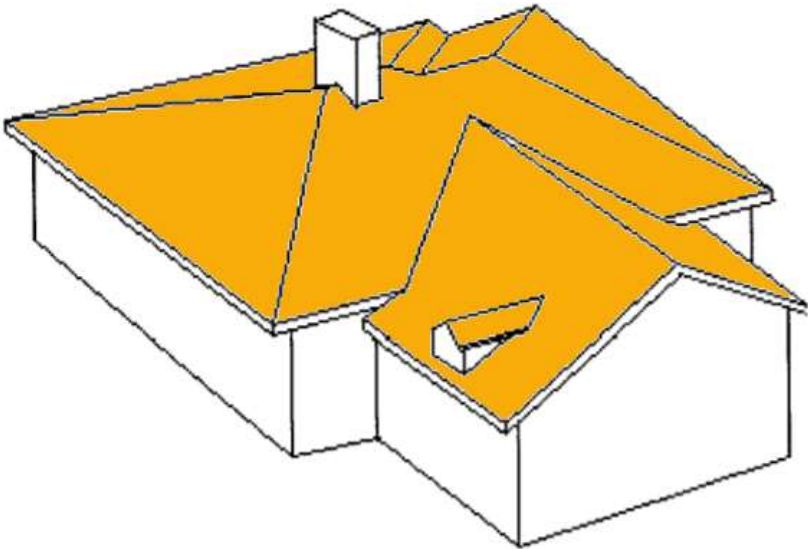


Figure 2. Example of a building roof comprising a roof section.

Ex. 1010, Fig. 2; -00435 Pet. 18; -00436 Pet. 14

Summary of Prior Art: Pictometry (Ex. 1008)

-00435

Once the user has pulled up a full-screen image, the software offers a number of tools that can be used to enhance the view. One is the distance tool, which allows the user to measure things contained within the image. For example, firefighters could measure the distance from fire hydrants in the area to the inflamed house while en route to a call to determine the length of the hoses they will need. By drawing a line around a parcel where a hostage situation is taking place, for instance, law enforcement officers could learn the square footage of the area and pre-plan how they will contain the perimeter once they arrive at the scene.

Ex. 1008 at 116; -00435 Pet. 10-11

One of the most important tools, says Kaplan, is the annotation tool. This tool enables users to attach unlimited amounts of information to an image. To track crimes, this would eliminate having a map on the wall with pushpins stuck in it. Officers could actually put a dot on the pictometry images in every place that a crime had occurred. Then when an officer clicks on a specific dot in an image, information on every crime that took place at that location would pop up.

Ex. 1008 at 116; -00435 Pet. 65

Summary of Grounds

-00435 Grounds: Pershing-789/Kennedy, Abhyanker, Pictometry, Bailey

-00435

- Pershing-789 *or* Kennedy's roof measurement system for aerial images
- Abhyanker's marker relocation and marker locking techniques
- Pershing-789 *or* Kennedy *or* Pictometry's techniques for superimposing outline drawings on aerial images
- Pershing-789 *or* Bailey's roof reports

-00436 Grounds: Pershing-789/Kennedy, Bailey, Abhyanker

-00436

- Pershing-789 *or* Kennedy's roof measurement system for aerial images
- Bailey's predominant pitch
- Abhyanker's marker relocation and marker locking techniques
- Pershing-789 *or* Bailey's roof reports

Challenges to Petitioner's Expert Declarations

Disputes over Petitioner's Expert: Summary of Arguments

-00435

-00436

IPR	Patent Owner's Arguments
Both	Petitioner's expert declaration is conclusory/repeats the petition
-00435	Petitioner's expert does not meet the Board's definition of a POSITA
-00436	Petitioner's expert has less experience than PO's expert

- **PO's arguments misstate the applicable law and the Board's adopted level of skill in the art**
- **Ignores evidence and arguments**

Weight of Expert Declaration: Summary of Dispute

-00435 -00436

Patent Owner's Arguments
Mr. Cummings' declaration repeats the Petition
Mr. Cummings' opinions are conclusory
Mr. Cummings did not write his own declaration

Petitioner's Responses
The Board already determined that it is not "problematic" that the Petition repeats Mr. Cummings' testimony
PO's expert also repeats portions of PO's papers
Mr. Cummings' opinions are supported by evidence and technical reasoning
Mr. Cummings testified that his declaration was a collaborative effort, and that all of the opinions are his own

The Board Rejected Already PO's Argument that Petitioner's Expert Declaration is Conclusory

-00435

-00436

as a skilled artisan. In addition, we do not find it problematic that the Petition repeats certain portions of Mr. Cummings's testimony. Though portions of the Petition may be the same as Mr. Cummings's testimony, that does not undermine the testimony's persuasiveness or its status as evidence, nor does it mean Petitioner's arguments are conclusory, as Patent Owner suggests. *See* Prelim. Resp. 42–43.

-00435 Institution Decision (Paper 16) at 8

In addition, we do not find it problematic that the Petition repeats Mr. Cummings's testimony as that does not undermine the testimony's persuasiveness or its status as evidence, nor does it mean Petitioner's arguments are conclusory, as Patent Owner suggests. *See* Prelim. Resp. 34–35.

-00436 Institution Decision (Paper 14) at 7

Petitioner's Authority Only Holds that Expert Opinions Unsupported by Evidence or Technical Reasoning Are Conclusory

-00435

-00436

“We have reviewed this excerpt from Dr. Jones’ declaration and note that it merely repeats, verbatim, the conclusory assertion for which it is offered to support. See Ex. 1003 ¶ 54 (Dr. Jones declaring that “[a] POSITA would understand that such a blocking would require recording the blocking in a data record associated with that user’s account.”). Dr. Jones does not cite to any additional supporting evidence or provide any technical reasoning to support his statement. Thus, the cited declaration testimony is conclusory and unsupported, adds little to the conclusory assertion for which it is offered to support, and is entitled to little weight.

Xerox Corp. v. Bytemark, Inc., IPR2022-00624, Paper 9, 15-16 (P.T.A.B. Aug. 24, 2022)

-00435 Reply 7-8; -00436 Reply 25-26

Petitioner's Expert Relies on Evidence and Technical Reasoning

-00435

44. There are a variety of reasons a POSITA would be motivated to apply these teachings from Abhyanker to Pershing-789. For example, allowing a user to designate a geographic position of a roof and to subsequently confirm that the roof location is correct would promote the accuracy of the system. Abhyanker's teachings expressly address this motivation. Abhyanker discloses that automated systems used to pinpoint geographic locations (like Pershing-789's) are not always 100% accurate, and mistakes will result in user disappointment. Ex. 1005 at [0004]-[0005]. That is especially true here: if Pershing-789's system inadvertently marked a neighboring roof (or a roof with the same address in a different state or town), the resulting materials estimate would be incorrect. This would cost both the user and the service provider time and money (and would potentially cost the software provider business). Thus, it would have been obvious to include Abhyanker's teachings of allowing a user to place a "marker" on the roof in question and to affirmatively "confirm" the right selection was made. This accuracy check would save money, save time and avoid customer losses.

-00435 Ex. 1003, ¶ 44; -00435 Reply 9

62. Abhyanker teaches this limitation. First, Abhyanker teaches "responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image." As discussed above, Abhyanker teaches that a user may "drag and drop" a marker to choose a location:

Furthermore, the method may include applying a *drag and drop* algorithm that enables the user to sequentially and/or concurrently relocate markers in the mapping environment, iteratively performing additional verifications when any particular marker has been previously moved[.]

63. Ex. 1005 at [0011] (emphasis added). Thus, a user has freedom to relocate a marker anywhere desired within the aerial image, including a location that is different from the original address entered by a user.

-00435 Ex. 1003, ¶¶ 62-63; -00435 Reply 9

Petitioner's Expert Relies on Evidence and Technical Reasoning

-00436

44. As discussed with respect to claim 1, below, Bailey expressly teaches finding the “predominant slope [*i.e.*, pitch]”—which is a weighted average of roof pitches. Bailey teaches calculating the predominant slope of a “roof section,” *i.e.*, any roof area 10,000 square feet or less, which may include an entire residential roof. A POSITA would have been motivated to incorporate Bailey’s predominant pitch estimation into Pershing-789 for a variety of reasons. For example, Bailey is a guide from the U.S. Army Corps of Engineers that teaches calculating the predominant pitch of a roof for, *e.g.*, repair assessment. Ex. 1010 at 1, 15, 17. As discussed below, Bailey’s roof report collects the same types of attributes as Pershing-789’s report (area, pitch, length). Ex. 1010 at 11-22. A POSITA considering Pershing-789’s system for collecting roof data and generating a corresponding report would have been motivated by Bailey’s teaching to include predominant pitch as part of its estimation techniques. Including Bailey’s predominant pitch would allow Pershing-789’s system to estimate roof area accurately with simplified calculations, as discussed above.

-00436 Ex. 1003, ¶ 44; -00436 Reply 26

97. Moreover, as confirmed by my experience in the industry, such weighted average calculations are extremely common in construction, including roofing, and were in widespread use many years before the ’538 patent. Indeed, the RSMeans Illustrated Construction Dictionary—frequently referred to by those of ordinary skill in the art as a “complete source of construction terms and concepts,” including myself—defines a weighted average in the construction context “[a]n average in which certain entries, usually at the extremes of the range of values, are manipulated so a number is obtained that is believed to be more representative of the true mean than that obtained by straight averaging.” Ex. 1013 at 1, 605. Thus, as a POSITA would understand, *by definition* a weighted average can be used to give a “more representative” number in the face of a range of values than a straight average. This is precisely the situation called for when estimating a predominant pitch as taught by Bailey. For example, if 90% of Bailey’s 10,000 square foot roof section has a pitch of 4:12 and 10% of the roof section has a pitch of 7:12, a POSITA would be motivated to weight the pitches according to their surface areas because doing so would most accurately result in the true “predominant” or “primary” pitch of the roof. If each section were weighted equally, it could not be understood as a “predominant” pitch—indeed, there would be nothing “predominant” about it.

-00436 Ex. 1003, ¶ 97; -00436 Reply 27

PO's Expert Also Offers Opinions that Repeats PO's Papers

-00435

Second, Abhyanker does not teach that the marker-locking feature is “capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location.” EX2031, ¶80. Instead, Abhyanker teaches that the marker-locking feature is used to claim the “wiki profile” associated with the address at which the marker is located. EX1005, ¶¶64 (“The locking module 220 may process a marker locking request *when the particular user claims the wiki profile associated with the address data.*”) (emphasis added), 66 (“In addition, a marker locking request may be processed *when the wiki profile associated with the address data is claimed by the particular user.*”) (emphasis added), 99 (“The Operation 1110, a marker locking request may be processed *when a wiki profile associated with the address data is claimed by a particular user.*”) (emphasis added). Claiming such a wiki profile, Abhyanker explains, allows the user to control the information that is included in the profile and to prevent other users from relocating the marker to a different location. See EX1005, ¶¶58, 63-64, 66; EX2031, ¶80. But claiming a wiki profile in Abhyanker has nothing to do with confirming the location of a building roof structure. EX2031, ¶80.

-00435 POR 25-26; -00435 Reply 9

80. Second, Abhyanker does not teach that the marker-locking feature is “capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location.” Instead, Abhyanker teaches that the marker-locking feature is used to claim the “wiki profile” associated with the address at which the marker is located. EX1005, Abhyanker, ¶¶64 (“The locking module 220 may process a marker locking request *when the particular user claims the wiki profile associated with the address data.*”) (emphasis added), 66 (“In addition, a marker locking request may be processed *when the wiki profile associated with the address data is claimed by the particular user.*”), 99 (“The Operation 1110, a marker locking request may be processed *when a wiki profile associated with the address data is claimed by a particular user.*”) (emphasis added). Claiming such a wiki profile, Abhyanker explains, allows the user to control the information that is included in the profile and to prevent other users from relocating the marker to a different location. See EX1005, Abhyanker, ¶¶58, 63-64, 66. But claiming a wiki profile in Abhyanker has nothing to do with confirming the location of a building roof structure.

-00435 Ex. 2031, ¶ 80; -00435 Reply 9

Mr. Cummings Confirmed His Declarations Contain His Opinions

-00435

1 Q What was your process for preparing the
2 declaration?

3 A The -- I gave the attorneys information
4 on estimating procedures, processes that have been
5 used within the industry. We had back-and-forth
6 discussions about that throughout the entire
7 process, so I was bringing some practical
8 experience and my education in using -- in
9 estimating and other things to the table.

10 Q Did you write the declaration?

11 A Not by myself, no.

12 Q Did you write portions of the
13 declaration?

14 A This was a collaborative effort. As we
15 would talk, things would be put down. We would
16 discuss them. They would be modified. So there's
17 nothing in here that I've written specifically,
18 but it's been a collaboration of my input and the
19 attorney.

20 Q And all of the opinions in your
21 declaration are your own, though, correct?

22 A That is correct.

-00435 Ex. 2032, 13:1-22; -00435 Reply 9

Mr. Cummings Confirmed His Declarations Contain His Opinions

-00436

10 Q Did you write your declaration?

11 A Yep.

12 MR. HAGIZ: Objection to form.

13 A It was a collaboration between the
14 attorneys and myself.

15 Q Roughly, how much time did you spend
16 collaborating with the attorneys to prepare your
17 declaration?

18 A It was probably in the order of
19 three weeks, maybe.

20 Q So --

21 A Sometime around the first of December
22 of last year. And I think it was due by the first
1 of the year. So, like, the first week of
2 December. So about three weeks.

-00436 Ex. 2032, 9:10-10:7; -00436 Reply 27-28

Mr. Cummings' Status as a POSITA: Summary of Dispute

-00435

Patent Owner's Arguments

Mr. Cummings is not a POSITA under the Board's level of skill in the art

The Board may not consider any of Mr. Cummings' opinions if he is not a POSITA

Mr. Cummings applied the wrong level of skill in the art for obviousness

Petitioner's Responses

Mr. Cummings qualifies as a POSITA under the Board's standard

PO's arguments apply a level of skill higher than that adopted by the Board

The Board may consider Mr. Cummings' opinions on issues within his expertise even if he is not a POSITA

Mr. Cummings expressly testified that his opinions on obviousness and motivation to combine are the same under the Board's proposed level of skill in the art

PO does not dispute the substance of any of Mr. Cummings' opinions on obviousness

The Level of Ordinary Skill in the Art Adopted by the Board

-00435

Petitioner’s Proposal	Patent Owner’s Proposal
“[a] bachelor’s degree in architecture or an equivalent with at least five years of experience performing roof estimation, ... more experience would compensate for less formal education, and vice versa.”	“[a] Bachelor’s Degree in an academic area emphasizing the design of electrical, computer, or software technologies, or a similar discipline, and at least two years of experience related to computerized image analysis and three-dimensional modeling.”

We agree with Patent Owner that one skilled in the art would have computer-related experience, as that is more consistent with the prior art and patent specification before us. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (prior art itself may reflect an appropriate level of skill). While Patent Owner’s proposed definition better reflects this requisite experience, we agree with Petitioner’s definition to the extent it recognizes that experience may compensate for formal education, and vice versa. *See* Pet. 2. Thus, at this stage, we adopt Patent Owner’s definition, but add Petitioner’s education-versus-experience caveat.

Mr. Cummings' Lack of Formal Computer Education Does Not Disqualify Him

-00435

- PO incorrectly argues that Mr. Cummings cannot be a POSITA because he lacks formal education in computerized image analysis or 3D modeling.
- The Board already rejected that argument in its Institution Decision.

Given this definition, on the present record we disagree with Patent Owner that Mr. Cummings does not qualify as a person of skill in the art. Although Mr. Cummings may lack formal computer-related education, he “ha[s] extensive experience using software related to construction” including “decades working with software related to construction modeling and estimation.” Ex. 1003 ¶ 6. Mr. Cummings further “ha[s] experience collaborating with software developers to create new software in my field.” *Id.* At this stage, we find Mr. Cummings’s experience sufficient to qualify as a skilled artisan. In addition, we do not find it problematic that the

-00435 Institution Decision (Paper 16) at 8; -00435 Reply 3-4

PO Does Not Dispute that Mr. Cummings Has Experience with Software Packages

-00435

At bottom, Mr. Cummings is an architect who has experience with software packages that are commonly used in the field of architecture, such as CAD packages and software for reviewing building codes. This general experience does make him a POSITA of the '800 patent, which describes and claims computer-implemented technologies for analyzing aerial imagery. Because Mr. Cummings is not a POSITA, the Board should not credit his opinions.

-00435 POR 37; -00435 Reply 4

- Even PO's expert does not claim Mr. Cummings is not qualified as a POSITA.

8 Q Doctor, my question more specifically was:

9 Is it your opinion that Mr. Cummings does not have
10 the qualifications or experience to be a person of
11 ordinary skill in the art under your definition?

12 A I haven't, you know, formulated an opinion
13 about all of Mr. Cummings', you know, background
14 as far as relevant to his testimony.

-00435 Ex. 1014, 13:8-14; -00435 Reply 4

Mr. Cummings Has Relevant Experience with Software Development

-00435

6. While I am not a computer programmer, I have extensive experience using software related to construction. Indeed, I have spent decades working with software related to construction modeling and estimation. For example, I have relied on Computer-aided Design Packages (CAD), programs that have automated the building code review process, Critical Path Method scheduling packages (CPM), and construction estimating software. I have been using this software for decades. I also have experience collaborating with software developers to create new software in my field. For example, in approximately 2010 I partnered with a computer programmer to develop a photo-documentation and document control software to assist in my Owner's Representative assignments.

-00435 Ex. 1003, ¶ 6

Mr. Cummings Has Relevant Experience with Software Development

-00435

- PO tries to downplay this experience by characterizing it as a project with Mr. Cummings' nephew.
- But Mr. Cummings' nephew is a professional computer programmer, and the developed software was used and provided to customers.

1 Q Can you explain that experience?
2 A Approximately 2009 or 2010, I had a
3 request from a client to come up with a system
4 that would allow us to catalog real-time
5 photographic documentation we were doing on
6 projects. And so, I met with a program --
7 programmer and gave them my parameters, and I
8 worked with them for probably three or four years,
9 we still work together, but developing -- I would
10 give him the concept of what we needed to do, how
11 it was supposed to work, what we wanted the
12 outcome to be, and then he would provide the
13 computer programming aspect of it.

-00435 Ex. 2032, 18:1-13

1 Q So is this software that you use
2 yourself, personally?
3 A It is.
4 Q Does anybody else use this software?
5 A We'll allow the clients to use it. If
6 they want to use it, they can have -- they'll need
7 access to it.

-00435 Ex. 2032, 19:1-7

5 Q And how did you come to engage Chris
6 Kuhn to develop the software?
7 A Actually, Chris happens to be my
8 nephew, but he's been programming for about
9 30-something years.
10 Q And is Chris a computer -- a
11 professional computer programmer?
12 A Yes, he is.

-00435 Ex. 2032, 20:5-12

-00435 Reply 4-5

A POSITA Does Not Need Computer Programming Experience

-00435

- The Board's level of skill in the art does not specify computer programming experience
- The '800 Patent relates to roofing applications using standard software interfaces – computer programming experience is not necessary.

As can be appreciated in three-dimensional geometry, given the shape of plane D (516) the value of the pitch ordinarily will affect the overall area of such roofing (see e.g. FIG. 5F, area value 516b).

Mathematical equations demonstrating-area relationship for a sloped, rectangular roof plane are known, an example of which is set forth below:

$$\text{Area} = W \times Z$$

$$Z = \text{square root of: } (X^2 + Y^2)$$

Where:

W=width

X=horizontal run

Y=vertical rise

Z=hypotenuse of X-Y-Z right triangle.

Other, geometries may be calculated using known math, coefficients and/or tables. See for example: Miller, Mark; *Miller's Guide to Roofing* (2005) ISBN 0-07-145144-7. Thus, in combination with the perimeter measurements supplied with the report based on the creation of roof plane D from the imagery, the addition of the roof pitch value may lead to the calculation such as in the example 357.93 sq. ft. shown at 516b. Likewise, for plane O, the value of "6" may

-00435 Ex. 1001, 7:65-8:16

that address. In response, computer screen 100 may appear like FIG. 4B. As such, it may depict imagery 502 of a region, the region including building 500 with its roof structure 501. Ordinarily, this includes not only the building structure 500, but also depicts adjacent buildings, trees, streets, and/or other features. Such imagery may come from a variety of places. One example could be Google® Earth imagery database which is web based and provides address location information. Such imagery covers much of the world, although it may or may not be comparatively low resolution imagery. In FIG. 4B, marker 106a is shown in the region 502, corresponding to the street address in field 102. Note further that while marker 106a is close to roof structure 501, it does not directly or perfectly correspond to roof structure 501. As such, the customer or other user may be allowed to move the marker (by click and dragging via computer mouse, arrows, or otherwise) to a final location 106b as depicted in FIG. 4C. Such final location is on top of the building 500 and such movement more precisely identifies the location of the building roof structure 501 to be measured. Optionally, in FIG. 4C when said marker has been moved to final location 106b, the user may activate a selection confirmation, such as confirm selection button 104, enter, checkbox or otherwise. Optionally, to potentially start

-00435 Ex. 1001, 10:5-28

-00435 Reply 5-6

A POSITA Does Not Need Computer Programming Experience

-00435

- PO's expert agreed that the claimed functionality of the '800 Patent is described in algorithms, and can be understood without source code or programming.

22 Is there any source code or computer code
1 that's provided in the patent specification or
2 claims for the '800 patent?
3 MR. BEMBEN: Objection. Form.
4 BY THE WITNESS:
5 A A person of ordinary skill in the art
6 would not necessarily need to look at source code
7 when an algorithm is defined in the detail that is
8 given. It's very well understood by a person of
9 ordinary skill in the art as to what is the
10 intended functionality, what are the sequence of
11 steps that are detailed.
12 Source code is the final, you know,
13 codification of those instructions so it's not
14 necessary so the '800 patent – to understand the
15 patent, you don't need to look at the source code.

-00435 Ex. 1014, 16:22-17:15; -00435 Reply 6

A POSITA Does Not Need Computer Programming Experience

-00435

- Mr. Cummings similarly testified that there was nothing in the '800 Patent or the prior art that he could not understand without formal computer or computer programming experience.

16 Q Is there anything in the '800 patent
17 that you believe you couldn't understand because
18 you don't have a computer science or computer
19 engineering, or similar degree?

20 A I don't believe so.

21 Q Is there anything in any of the prior
22 art that you discussed in your declaration that
1 you believe you couldn't understand because you
2 don't have a computer science, computer
3 engineering, or similar degree?

4 A I don't believe so.

-00435 Ex. 2032, 89:16-90:4; -00435 Reply 6

The Board May Consider Mr. Cummings' Opinions Regardless of Whether He Is a POSITA

-00435

- The Board cannot rely on his testimony to establish the understanding of a POSITA, but may consider his opinions on any issues where he is qualified to offer testimony.

“In reviewing Dr. Stone’s testimony, we still may consider his opinions on the issues for which he is qualified to offer testimony, compare his opinions to the disclosures of the prior art references and the challenged patent, and the entirety of the evidence of record to weigh each part of his relative opinion testimony separately. ... Although we do not give any weight to Dr. Stone’s testimony from the perspective of a skilled artisan, we find him qualified ... to opine about the technology itself that is the subject matter of the ’545 patent and the asserted prior art. In other words, we may consider Dr. Stone’s opinions about the structures and operations included in the disclosed systems, but we cannot give any weight to his opinions regarding what a skilled artisan would have understood and/or derived from the disclosed technology because the latter is necessarily from the perspective of a skilled artisan.

Avail Medsystems, Inc. v. Teladoc Health, Inc., IPR2022-00444, Paper 10, 26 (P.T.A.B., July 21, 2022)

-00435 Reply 6-7

The Board May Consider Mr. Cummings' Opinions Regardless of Whether He Is a POSITA

-00435

- Mr. Cummings' opinions are based on his experience and expertise with construction modeling and estimation, including as a user of software packages for construction and measurement

45. In addition, applying Abhyanker's teachings to Pershing-789's system would also *add convenience* to a user. For example, if a user inadvertently input a neighbor's address it would be convenient to allow the user to apply a drag-and-drop feature, like that taught by Abhyanker, to correct this error by simply sliding the marker to the correct location. This would also add to the convenience for users who may have difficulties typing or reading smaller print in the form fields in a screen—dragging a colored “marker” would assist such users in marking the right roof.

-00435 Ex. 1003, ¶ 45

124. A POSITA would have also been motivated to use Pictometry's annotation tool in Pershing-789's system because doing so would allow roofers and customers to see the house being analyzed. This would *promote accuracy*, since users could confirm that the correct house was being measured.

125. Likewise, a POSITA would be motivated to use Pictometry's annotation tool because it would provide roofers and customers *greater flexibility* related to which aspects of the home to measure. Showing annotations on a nadir image would also *improve precision* because users could ensure that the measurements were properly aligned with the building.

-00435 Ex. 1003, ¶¶ 124-125

-00435 Reply 7, 11-12

The Board May Consider Mr. Cummings' Opinions Regardless of Whether He Is a POSITA

-00435

- PO also incorrectly argues that Mr. Cummings' obviousness opinions should be given no weight because he applied the wrong level of skill in the art.
- Mr. Cummings' testimony directly rebuts this point.
- PO also does not challenge the substance of Mr. Cummings' opinions.

6 Do you remember, earlier today, you
7 were asked about the level of skill in the art
8 that the board adopted in its institution
9 decision?

10 A Yes.

11 Q Under the board's definition of the
12 level of skill in the art, does that change any of
13 the opinions that you offered on obviousness in
14 your declaration?

15 A No.

-00435 Ex. 2032, 89:6-15; -00435 Reply 10-11

Weighing Competing Expert Testimony: Summary of Dispute

-00436

Patent Owner's Arguments

PO's expert should be given more weight because he has more relevant experience

Petitioner's Responses

PO's arguments are based on an incorrect level of skill in the art that the Board did not adopt

Mr. Cummings' experience is relevant to the '538 Patent

PO ignores much of Mr. Cummings' relevant experience

A POSITA Does Not Need Specific Experience Estimating Measurements from Aerial Images

-00436

- The Board adopted the same level of skill in the art as it did in the '00435 IPR.
- That definition does not require specific experience measuring roofs using aerial images.

On this record, we disagree with Petitioner's definition because it does not reflect that one skilled in the art would also have computer-related experience, even though the challenged patent and the asserted prior art deal extensively with computer modeling. Instead, we find that one skilled in the art would have a Bachelor's Degree in an academic area emphasizing the design of electrical, computer, or software technologies, or a similar discipline, and at least two years of experience related to computerized image analysis and three-dimensional modeling. In addition, experience may compensate for formal education, and vice versa.⁶

-00436 Institution Decision (Paper 14) at 7

-00436 Reply 28-29

A POSITA Does Not Need Specific Experience Estimating Measurements from Aerial Images

-00436

- PO gives no credible reason why Mr. Cummings' experience determining measurements from blueprints is less relevant
- PO's expert admitted his experience is in performing on-site measurements and using third-party measurements already provided with the aerial images.

4 In Paragraphs 7 to 9 of your declaration,
5 you also mention work you've done where you used
6 diagrams or images of roofs provided by third
7 parties.

8 A Yes.

9 Q And in those roof diagrams and images,
10 those were provided to you including the
11 dimensions of the roofs already?

12 A There were different -- yes and no. Some
13 of them had products including but not limited to
14 EagleView, and then sometimes we would use aerial
15 imagery and then supplement that with measurements
16 in the field.

13 Have you ever used an image -- an image of a roof
14 without dimensions provided and without software
15 tools to independently determine the measurements
16 of the roof?

17 A I don't think so. Because I think the
18 other times I've done it would have been like for
19 large -- really large buildings, like maybe using
20 Google Earth but they also have a measuring tool
21 built in.

22 So other than that other instance I said,

14
1 it's been, you know, field measurements. Or many
2 times we've taken an aerial image of the roof off
3 of Google Earth or something like that and then
4 measured it in the field, so kind of combining the
5 two.

-00436 Ex. 1015, 11:4-16, 13:13-14:5; 00436 Reply 29-30

PO Ignores Much of Mr. Cummings' Relevant Experience

-00436

- PO ignores roughly a decade of Mr. Cummings' experience with estimation.

5. My experience with estimating construction projects began during my architectural internship period assembling preliminary cost estimates for clients on projects that the architectural firms were designing. The vast majority of these projects were new construction which required cost related to new roofing on both commercial and residential. Between 1980 and 1983 I began as an estimator and later became head of estimating for a firm in Colorado specializing in Department of Defense construction projects (primarily housing rehabilitation). In total, we bid and completed approximately 2,000 housing units across the United States ranging from minor interior renovation to whole house/building repairs. Between 1987 to 1989, I was hired to become head of estimating and overhaul the existing estimating component of the firm which also specialized in Department of Defense construction projects. While at this firm, I became the quality control officer on a 135-unit housing development overseeing the total renovation of abandoned base housing in Newport, Rhode Island. Since 1990, I have provided forensic analysis of numerous roofs and performed estimates which have included estimating the cost to repair for litigation purposes on a variety of project types.

-00436 Ex. 1003, ¶ 5; 00436 Reply 30-31

Obviousness of the '800 Patent

'800 Patent: Summary of Arguments

-00435

Grounds	Patent Owner's Arguments	Claims
1, 3	Abhyanker does not disclose a "second computer input" that "signal[s] user-acceptance"	1, 11, 17
1,3	Abhyanker's "second computer input" is not "responsive to receiving [a] designation"	1, 11
1	Pershing-789 does not disclose an "outline drawing ... super-imposed on [a] nadir image"	9, 14
2	Pictometry does not disclose an "outline drawing ... super-imposed on [a] nadir image"	9, 14
3	Kennedy does not disclose an "outline drawing [of a] roof"	2

- **PO's arguments are not responsive to the theories in the Petition**
- **PO ignores key disclosures in the prior art and the '800 Patent**
- **PO's arguments rely on incorrect claim construction arguments**

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Summary of Dispute

-00435

Petitioner’s Arguments

Obvious to incorporate Abhyanker’s “marker-locking” feature into Pershing-789/Kennedy
Abhyanker’s “marker-locking” feature signals “user-acceptance” of a location on a map

Patent Owner’s Arguments

Abhyanker’s “marker-locking” feature is different from Abhyanker’s “additional verifications”
Abhyanker’s marker-locking feature is used to claim a “wiki-profile” and not to signal user-acceptance of a location

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Claim Language

-00435

responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and

Ex. 1001 ('800 Patent), cl. 1

responsive to receiving the designation of the building roof structure location, provide a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and

Ex. 1001 ('800 Patent), cl. 11

signaling, by the user, user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and

Ex. 1001 ('800 Patent), cl. 17

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Petitioner’s Arguments

-00435

- Abhyanker teaches a marker that can be “dragged and dropped” to a new location

Abhyanker teaches this limitation. Ex. 1003 at ¶¶ 62-66. First, Abhyander teaches “responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image.” As discussed above, Abhyanker teaches that a user may “drag and drop” a marker to choose a location:

Furthermore, the method may include applying a *drag and drop* algorithm that enables the user to sequentially and/or concurrently relocate markers in the mapping environment, iteratively performing additional verifications when any particular marker has been previously moved[.]

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Petitioner’s Arguments

-00435

- A “marker locking request” may prevent future relocation of the marker (i.e., accept its location)
- Although the Petition describes Abhyanker’s marker locking request as a type of “additional verification,” the Petition relies on the marker-locking feature, not the additional verifications.

For example, Abhyanker teaches a user may “lock” the location of a marker, preventing unauthorized future relocation:

The locking module 220 may process a marker *locking request* when the particular user claims the wiki profile associated with the address data. In addition, the locking module 220 may enable the user(s) to control the future relocation of the marker in the mapping environment.

Id. at [0064] (emphasis added). Abhyanker’s additional verifications, such as locking the marker position, are the claimed “second computer input capable of signaling user-acceptance of the building roof structure location” within the image required by the challenged claims.

Pet. 34; Reply 13-15

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Petitioner’s Arguments

-00435

- In the proposed combinations, Abhyanker’s teachings of markers and marker locking are applied to Pershing-789’s and Kennedy’s roof measurement and aerial image system.

Pershing-789 expressly teaches the bulk of the claim elements recited in the ’800 patent, including a software system for locating a customer’s roof at a specific geographic location, analyzing roof dimensions to estimate the materials needed to repair or replace the customer’s roof and generating a report for a customer. A POSITA would have been motivated by the teachings of Abhyanker to allow users of Pershing-789’s roofing system the option to specifically designate the geographic position of a roof to be analyzed using a marker, and to include a subsequent user confirmation option to ensure the correct roof is being analyzed. Ex. 1003 at ¶ 43.

As discussed below, the combination of Kennedy and Abhyanker renders obvious the challenged claims. Kennedy expressly teaches the bulk of the claim elements recited in the ’800 patent, including a software system for locating a customer’s roof at a specific geographic location and analyzing roof dimensions. A POSITA would have been motivated by the teachings of Abhyanker to allow users of Kennedy’s roofing system the option to specifically designate the geographic position of a roof to be analyzed using a marker, and to include a subsequent user confirmation option to ensure the correct roof is being analyzed. Ex. 1003 at ¶ 127.

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Abhyanker Teaches Accepting the Location of a Marker

-00435

- Abhyanker’s marker locking feature is expressly described as enabling users to secure (*i.e.*, accept) the location of a marker and prevent future relocation.

[0064] The location module 218 may capture (e.g., in the map) a graphical representation of locations physically present in the neighborhood through the set of markers indicating the profile (e.g., claimed profile, unclaimed profile) associated with the address data. The locking module 220 may process a marker locking request when the particular user claims the wiki profile associated with the address data. In addition, the locking module 220 may enable the user(s) to control the future relocation of the marker in the mapping environment. The selection module 222 may enable to select the physical location in the geospatial environment for physically relocating the pushpins to the desired location.

[0095] The select location option 902 may enable the user to capture the graphical representation of the desired physical location associated with the address data in the geospatial environment. The select pushpin option 904 may enable the user to physically select and relocate a set of pushpins indicating the profile associated with the address data. The rooftop polygon 906 may enable the user to visualize the relocated pushpin in any perspective view of the mapping environment. The lock pushpin option 908 may enable the user to secure the pushpins from future relocations in the geo-spatial environment.

Ex. 1005 (Abhyanker), ¶¶ 64, 95; Pet. 34; Reply 14-15

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Abhyanker’s Marker-Locking Feature Does Not Claim a “Wiki Profile”

-00435

- PO is incorrect that Abhyanker’s “marker-locking” feature is used to claim a “wiki profile.”
- Claiming a “wiki profile” is a condition that ***may trigger*** a marker locking request.
- The marker locking request prevents relocation of the marker.

[0064] The location module 218 may capture (e.g., in the map) a graphical representation of locations physically present in the neighborhood through the set of markers indicating the profile (e.g., claimed profile, unclaimed profile) associated with the address data. The locking module 220 may process a marker locking request when the particular user claims the wiki profile associated with the address data. In addition, the locking module 220 may enable the user(s) to control the future relocation of the marker in the mapping environment. The selection module 222 may enable to select the physical location in the geospatial environment for physically relocating the push-pins to the desired location.

Ex. 1005 (Abhyanker), ¶ 64; Reply 15-16

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”): Abhyanker’s Marker-Locking Feature Does Not Claim a “Wiki Profile”

-00435

- In at least one embodiment, the marker-locking feature is a button that the user activates to “lock” the position of a marker.
- This embodiment does not even refer to claiming a “wiki profile.”

[0095] The select location option 902 may enable the user to capture the graphical representation of the desired physical location associated with the address data in the geo-spatial environment. The select pushpin option 904 may enable the user to physically select and relocate a set of pushpins indicating the profile associated with the address data. The rooftop polygon 906 may enable the user to visualize the relocated pushpin in any perspective view of the mapping environment. The lock pushpin option 908 may enable the user to secure the pushpins from future relocations in the geo-spatial environment.

[0096] The example embodiment illustrated in FIG. 9, the user interface view may enable the user to locate the pushpin on the rooftop polygon 906 in the mapping environment through enabling the select location option 902 and/or may enable the user to lock pushpins from movement in the map (e.g., using the lock pushpin option 908).

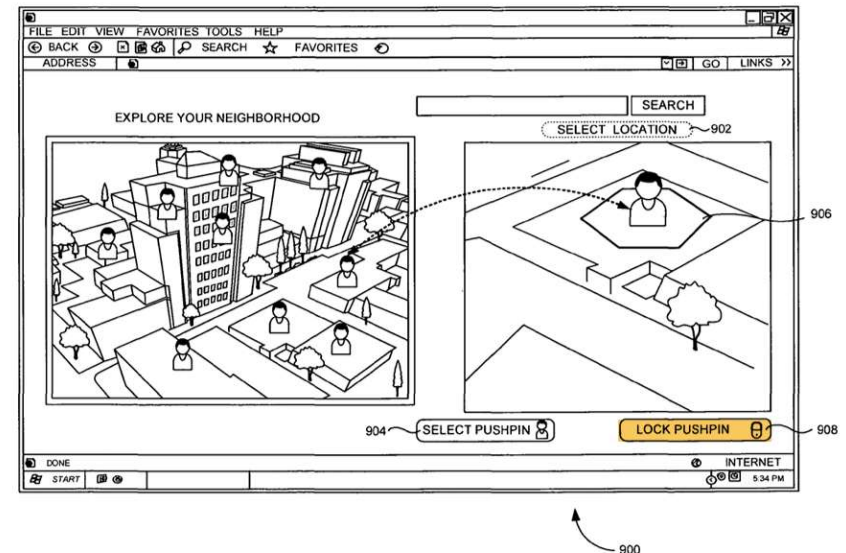


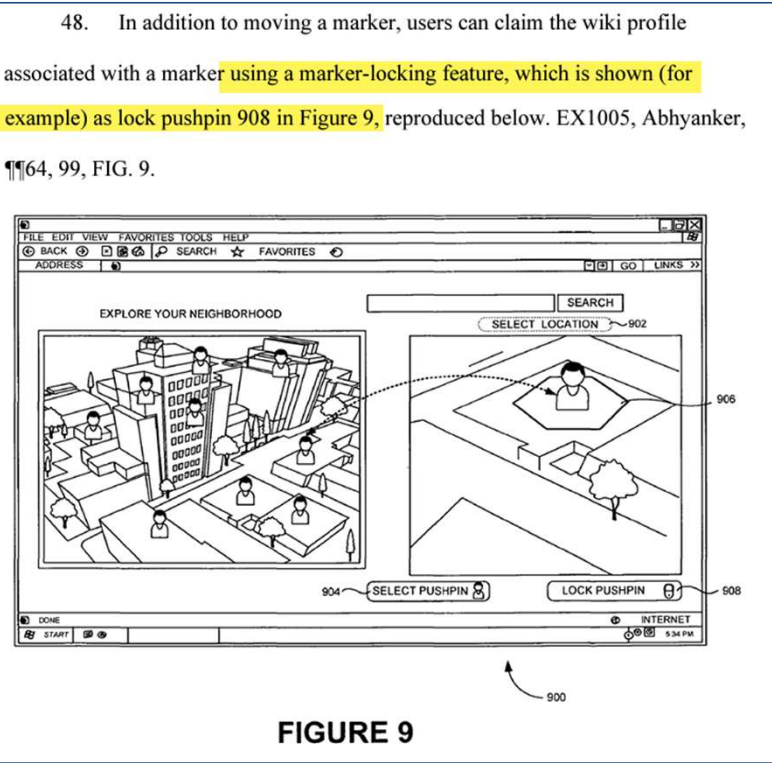
FIGURE 9

Ex. 1005 (Abhyanker), ¶¶ 95-96, Fig. 9; Reply 16-18

Grounds 1, 3, Cls. 1, 11, 17 (“user-acceptance”):
 Abhyanker’s Marker-Locking Feature Does Not Claim a “Wiki Profile”

-00435

- PO’s expert agrees that the embodiment in Fig. 9 is an example of Abhyanker’s marker-locking feature.



Ex. 2031, ¶ 48; Reply 16

Grounds 1, 3, Cls. 1, 11 (“responsive to”): Summary of Dispute

-00435

Petitioner’s Arguments

Abhyanker’s “marker-locking” feature is responsive to a designation of a location on a map

Patent Owner’s Arguments

Abhyanker’s “marker-locking” feature is not “responsive to” a designation because the “lock pushpin” button is provided before a marker has been moved

Grounds 1, 3, Cls. 1, 11 (“responsive to”): Claim Language

-00435

responsive to receiving the designation of the building roof structure location, providing a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and

Ex. 1001 ('800 Patent), cl. 1

responsive to receiving the designation of the building roof structure location, provide a second computer input capable of signaling user-acceptance of the building roof structure location within the first image, wherein user-acceptance is one or more affirmative steps undertaken by the user to confirm the designation of the building roof structure location; and

Ex. 1001 ('800 Patent), cl. 11

Grounds 1, 3, Cls. 1, 11 (“responsive to”): PO Applies an Incorrect Claim Construction

- PO’s argument is premised on a construction of “responsive to” that requires the claimed “second computer input” to only be displayed after the user makes a designation of a roof structure.
- PO’s expert disagrees with PO that “responsive to” imposes a temporal limitation on the appearance of the second computer input.

15 Your understanding is that the limitation
16 1-F requires the system to provide the second
17 computer input after it receives the designation
18 of the building roof structure location, correct?
19 **A No. The providing of a computer input**
20 **could be already on the interface but that input**
21 **must be capable of signaling user acceptance of**
22 **the building roof structure, but that has to –**

48

1 that user acceptance and that signaling by the
2 user acceptance has to occur after it receives the
3 designation, and in response to its receiving the
4 designation, it's signaling to confirm the
5 designation of the building roof structure.

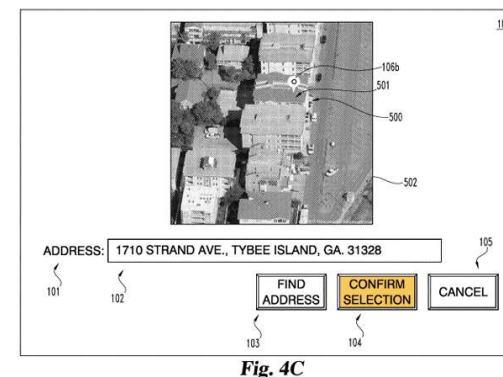
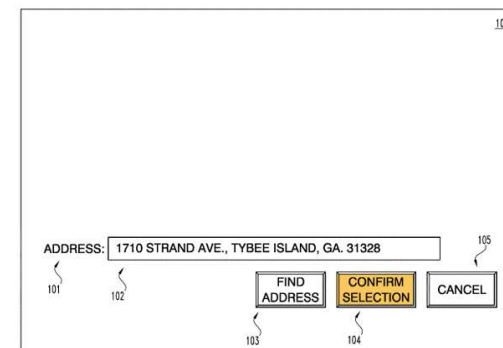
Ex. 1014, 47:15-48:5; Reply 22-23

Grounds 1, 3, Cls. 1, 11 (“responsive to”): PO Applies an Incorrect Claim Construction

- PO’s construction is contradicted by the ’800 Patent.
- The ’800 Patent shows that the “second computer input” is displayed before any designation .

Another optional feature is to provide for user acceptance of the final location of a roof structure. One optional way to do this is to provide an internet based interface for the customer/user. One example of such is shown in FIGS. 4A-4D. For example, in FIG. 4A, computer screen 100 provides a place to enter an address, such as field 102 for address entry (denoted by label 101). In the illustrated

501. As such, the customer or other user may be allowed to move the marker (by click and dragging via computer mouse, arrows, or otherwise) to a final location 106b as depicted in FIG. 4C. Such final location is on top of the building 500 and such movement more precisely identifies the location of the building roof structure 501 to be measured. Optionally, in FIG. 4C when said marker has been moved to final location 106b, the user may activate a selection confirmation, such as confirm selection button 104, enter, checkbox or otherwise. Optionally, to potentially start over the user may be afforded the option of hitting the cancel button 105 or merely logging off. However, if confirmed selection button 104 or other such user acceptance is activated, another screen (and/or report) optionally may be provided, such as screen 100 as depicted in FIG. 4D. While



Ex. 1001 ('800 Patent), 9:62-10:33, Figs. 4A, 4C; Reply 19-22

Grounds 1, 3, Cls. 1, 11 (“responsive to”): PO Applies an Incorrect Claim Construction

- The '800 Patent **does not** describe the “checkbox” in Fig. 4D as signaling “user acceptance.”

button 105 or merely logging off. However, if confirmed selection button 104 or other such user acceptance is activated, another screen (and/or report) optionally may be provided, such as screen 100 as depicted in FIG. 4D. While this may be a wide variety in the formats, in the one example provided, some or all of the regional image 502a may be depicted showing the marker in its final location 106b. Also, a checkbox may be providing a further reconfirmation that the users reviewed the image is correct. In this way, the end user/customer will be sure that when placing an order, the vendor is measuring the correct roof structure as opposed to, for example, measuring the nearby roof structure due to mistake/miscommunication. Optionally, as shown in FIG.

ADDRESS TO BE MEASURED:

1710 STRAND AVE.

CITY:

TYBEE ISLAND

STATE:

GA.

ZIP CODE

31328

NUMBER OF PLANES

RUSH PROCESSING

OPTIONAL:

REFERENCE NUMBER:

CLAIM NUMBER:

ADD TO CART

100

106b

502a

☒
 I have reviewed the image and confirm my selection is correct.

LATITUDE REFERENCE:

38.7492

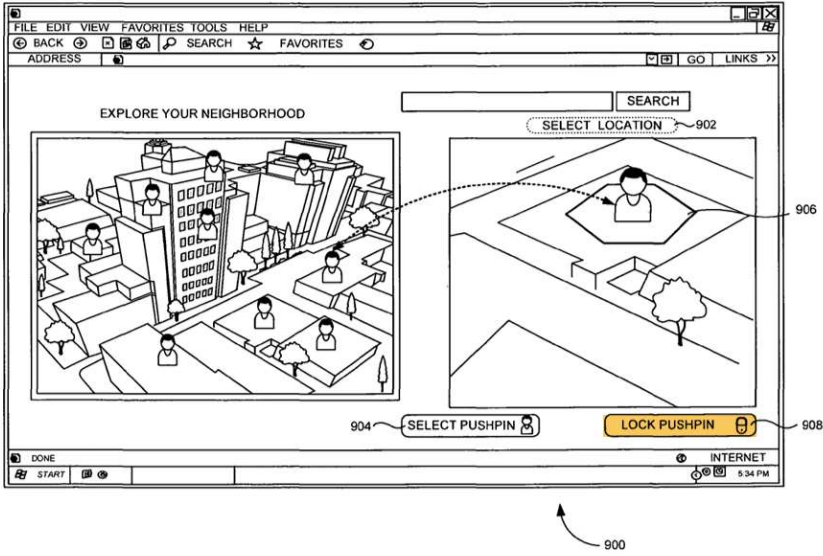
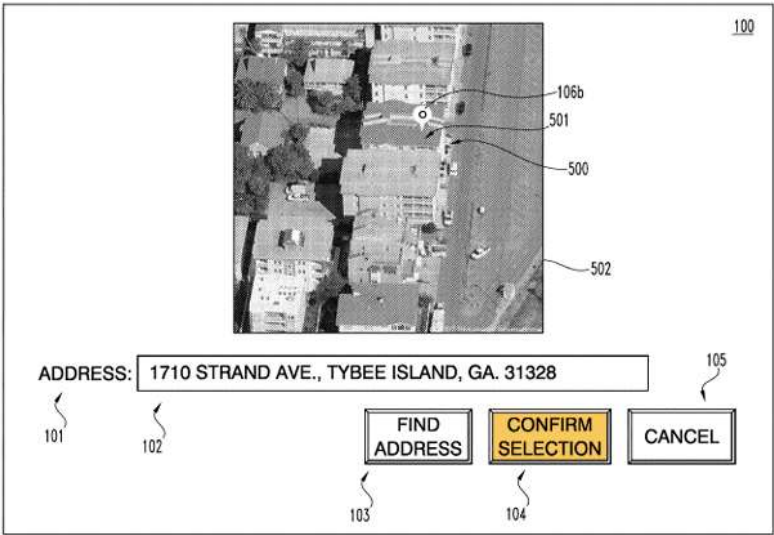
LONGITUDE REFERENCE:

-85.2748

Fig. 4D

Ex. 1001 ('800 Patent), 10:30-42, Fig. 4D; Reply 22

Grounds 1, 3, Cls. 1, 11 (“responsive to”): The ’800 Embodiment Mirrors Abhyanker’s Disclosure



Ex. 1001 (’800 Patent), Fig. 4C; Ex. 1005 (Abhyanker), Fig. 9; Reply 24-25

Grounds 1, 3, Cls. 1, 11 (“responsive to”): Abhyanker’s Fig. 11 Does Not Support PO’s Argument

- Petitioner does not rely on the embodiment shown in Fig. 11.
- Fig. 11 does not show that marker locking necessarily occurs before a marker has been moved.
- The ability to relocate a marker is available before the marker locking feature is activated.

[0095] The select location option 902 may enable the user to capture the graphical representation of the desired physical location associated with the address data in the geo-spatial environment. The select pushpin option 904 may enable the user to physically select and relocate a set of pushpins indicating the profile associated with the address data. The rooftop polygon 906 may enable the user to visualize the relocated pushpin in any perspective view of the mapping environment. The lock pushpin option 908 may enable the user to secure the pushpins from future relocations in the geo-spatial environment.

Ground 1, Cls. 9, 14 (“outline drawing ... super-imposed”): Summary of Dispute

-00435

Petitioner’s Arguments

Pershing-789 discloses outline drawings showing measurements of a roof

Pershing-789 also discloses a “scale marker” that is super-imposed over an aerial image

Obvious to super-impose Pershing-789’s outline drawings over an aerial image of the roof

Patent Owner’s Arguments

Pershing-789’s “scale marker” only indicates physical length, and is not an outline drawing

Ground 1, Cls. 9, 14 (“outline drawing ... super-imposed”): Claim Language

-00435

2. The process of claim 1, further comprising providing visual access to one or more outline drawing corresponding to the roof structure of the building.

Ex. 1001 ('800 Patent), cl. 2

9. The process of claim 2, further comprising, providing visual access to a nadir image from an imagery database corresponding to location coordinates of the building roof structure location, and wherein the outline drawing is super-imposed on the nadir image.

Ex. 1001 ('800 Patent), cl. 9

Ground 1, Cls. 9, 14 (“outline drawing ... super-imposed”): Petitioner’s Argument

-00435

- Pershing-789 teaches generating outline drawings of a roof showing measurements.
- PO does not dispute this.

challenged claims. Ex. 1003 at ¶¶ 70-71. For example, Pershing-789 discloses a drawing of a roof structure *outline* as part of its report in Figure 5C:

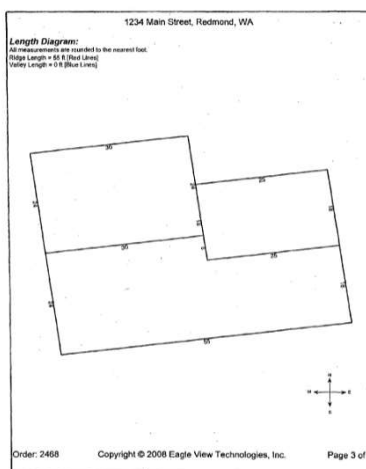


FIG. 5C

Ex. 1004 at Fig. 5C. Pershing-789 discloses: “FIG. 5C is the third page 105 of the report which *shows a line drawing* of the building showing ridge and valley lines, dimensions and a compass indicator.” Ex. 1004 at [0038] (emphasis added).

Ex. 1004, Fig. 5C; Pet. 37

Ground 1, Cls. 9, 14 (“outline drawing ... super-imposed”): Petitioner’s Argument

-00435

- Pershing-789 teaches a “scale marker” that displays measurement information super-imposed on an aerial image.
- This is also undisputed.

Pershing-789 teaches that, for example, the calibration module may calculate the physical length of features *in an aerial photo* using “distance in pixels between two points” that is “converted into physical length”:

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.

Id. at [0032]. This “scale marker” depicting “physical length” between pixels constitutes an outline drawing that is super-imposed on the nadir image.

Ex. 1004, ¶ 32; Pet. 57

Ground 1, Cls. 9, 14 (“outline drawing ... super-imposed”): PO Does Not Address The Proposed Combination

-00435

- Pershing-789’s outline drawings could be super-imposed on the aerial image of a roof in light of Pershing-789’s disclosure of a super-imposed scale marker for measurement.
- PO’s argument that the scale marker is not independently an outline drawing does not address the petition’s proposed application of Pershing-789’s teachings.

As discussed above, Pershing-789 also teaches generating outline drawings. Pershing-789 further teaches that such dimensional outline drawings may be generated *on the nadir image itself* using Pershing-789’s calibration module:

Like the software program **50** loaded into the roof contractor's computer **72** in the previous embodiment the software program **50'** is also able to *retrieve aerial images of houses* from a database **52'** containing aerial images files **54'** of houses located in the region served by the roof company **70**. An optional *calibration module 56' may be provided which enables the entity 105 to determine the angles and linear dimensions of various roof sections on the house***92**.

Ex. 1004 at [0025].

Ex. 1004, ¶ 25; Pet. 56; Reply 27-28

Ground 2, Cls. 9, 14 (“outline drawing ... super-imposed”): Summary of Dispute

-00435

Petitioner’s Arguments

Obvious to incorporate Pictometry’s annotation and distance tools into Pershing-789

Pictometry’s distance and annotation tools can be used to draw lines super-imposed on an aerial image

Pictometry expressly discloses drawing an outline around a roof structure

Patent Owner’s Arguments

Pictometry’s measuring tools do not disclose superimposing an outline drawing on a roof structure

Ground 2, Cls. 9, 14 (“outline drawing ... super-imposed”): Petitioner’s Argument

-00435

- The Petition relies on Pictometry’s “annotation tool” and “distance tool”

To the extent Patent Owner argues that Pershing-789 does not disclose an “outline drawing is superimposed on the nadir image,” as required by claims 9 and 14, Pictometry teaches this limitation. Pictometry discloses a program that allows users to **annotate aerial photographs**. *See, generally* Ex. 1008. Pictometry teaches that a variety of aerial photographs can be taken, and that users can “zoom, measur[e]...and annotate[e]” these images. *Id.* at 115. Pictometry teaches a “distance tool” which allows a user to measure various attributes contained within an image. *Id.* at 116. Pictometry specifically teaches drawing lines around a “parcel” to learn the square footage and area of a region. *Id.* Pictometry’s tool can also be used for “measuring angles.” *Id.* at 116. Thus, Pictometry expressly teaches superimposing drawings on a nadir image, and specifically teaches drawing the same types of measurements taught by Pershing-789 (length, pitch, area). Accordingly, a POSITA would have been motivated to use an “outline drawing is superimposed on the nadir image” in Pershing-789’s system based on the teachings of Bailey. Ex. 1003 at ¶ 121.

Pet. 63-64

Ground 2, Cls. 9, 14 (“outline drawing ... super-imposed”): Pictometry’s Tools Use Outline Drawings Super-Imposed on Aerial Images

-00435

- Pictometry teaches that these tools can be used to add information to an aerial image.
- Pictometry expressly teaches an example of drawing an outline of a “parcel” to determine its area.
- PO fails to address this express teaching.

Once the user has pulled up a full-screen image, the software offers a number of tools that can be used to enhance the view. One is the distance tool, which allows the user to measure things contained within the image. For example, firefighters could measure the distance from fire hydrants in the area to the inflamed house while en route to a call to determine the length of the hoses they will need. By drawing a line around a parcel where a hostage situation is taking place, for instance, law enforcement officers could learn the square footage of the area and pre-plan how they will contain the perimeter once they arrive at the scene.

Ex. 1008 at 116

One of the most important tools, says Kaplan, is the annotation tool. This tool enables users to attach unlimited amounts of information to an image. To track crimes, this would eliminate having a map on the wall with pushpins stuck in it. Officers could actually put a dot on the pictometry images in every place that a crime had occurred. Then when an officer clicks on a specific dot in an image, information on every crime that took place at that location would pop up.

Ex. 1008 at 116

'800 Patent: Summary of Arguments

-00435

Grounds	Patent Owner's Arguments	Claims
1, 3	Abhyanker does not disclose a "second computer input" that "signal[s] user-acceptance"	1, 11, 17
1,3	Abhyanker's "second computer input" is not "responsive to receiving [a] designation"	1, 11
1	Pershing-789 does not disclose an "outline drawing ... super-imposed on [a] nadir image"	9, 14
2	Pictometry does not disclose an "outline drawing ... super-imposed on [a] nadir image"	9, 14
3	Kennedy does not disclose an "outline drawing [of a] roof"	2

- **PO's arguments are not responsive to the theories in the Petition**
- **PO ignores key disclosures in the prior art and the '800 Patent**
- **PO's arguments rely on incorrect claim construction arguments**

Ground 3, Cl. 2 (“outline drawing”): Summary of Dispute

-00435

Petitioner’s Arguments

Kennedy’s “sizing tool” is displayed as outline drawing that may correspond to a roof structure

Patent Owner’s Arguments

Kennedy’s sizing tool merely enables a user to make measurements

Ground 3, Cl. 2 (“outline drawing”): Petitioner’s Argument

-00435

- The Petition relies on Kennedy’s “sizing tool” as an outline drawing.
- Kennedy expressly teaches super-imposing the sizing tool over a roof structure in an image.

Kennedy expressly discloses a “sizing tool” that is superimposed on an aerial image to determine “surface dimensions” of a roof:

In one embodiment of the invention, a graphical user interface (best illustrated in FIGS. 8-9) cooperates with sizing subsystem 500 of system 100 to implement a sizing tool enabling user 107 to determine surface dimensions and pitch of a surface, for example a roof 191 of a house appearing in the retrieved image 153. Thus there is no need to physically visit the installation site to make measurements and perform sizing calculations.

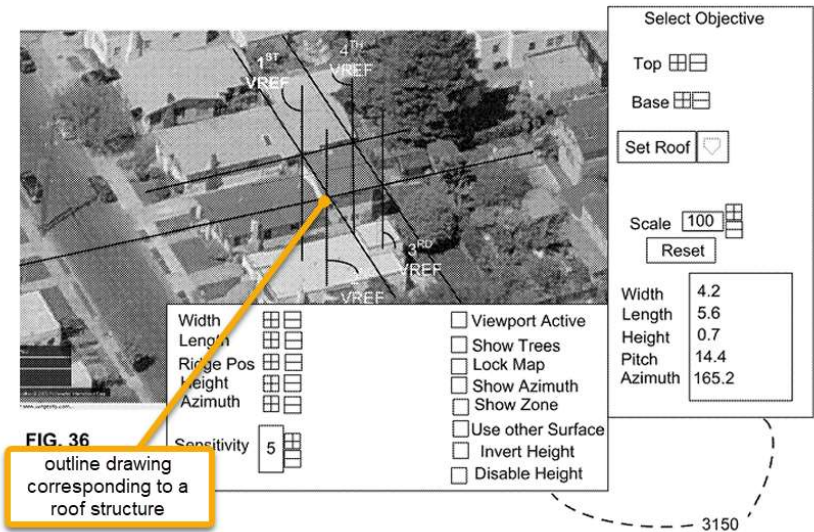
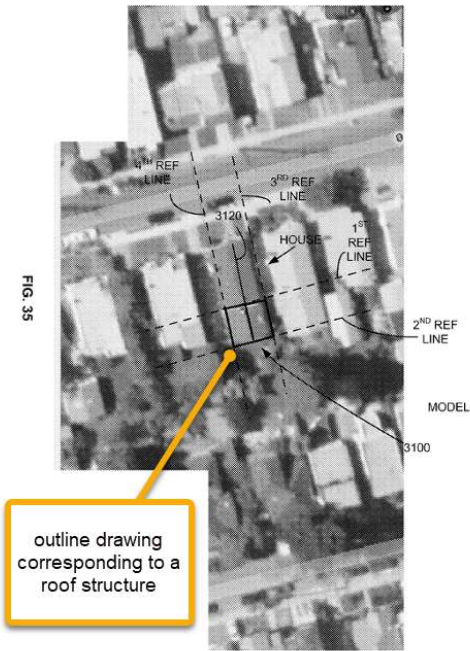
Id. at [0058]; see also *id.* at [0110] (“**To size surface 1215 user 507 superimposes sizing tool**, in this example tool 1117 (illustrated in Fig. 11) of at least a portion of image 1215...in some embodiments, information defining an orientation of shape 1215 with respect to a reference axis 1211 is generated by comparing orientation of adjusted tool 1107 to reference axis 1211.”) (emphasis added). Kennedy discloses “**generating length and width measurements** for a generally rectangular planar installation surface such as a side of a roof.” *Id.* at [0082] (emphasis added); see also [0109], Fig. 12.

Ex. 1009, ¶¶ 82, 110; Pet. 75

Ground 3, Cl. 2 (“outline drawing”):
Kennedy’s Sizing Tool is Displayed as an Outline Drawing

-00435

- PO is wrong that Kennedy’s sizing tool only provides measurements
- Kennedy provides express examples where its sizing tool is displayed as an outline of a roof structure



Ex. 1009, Figs. 35, 36; Reply 30

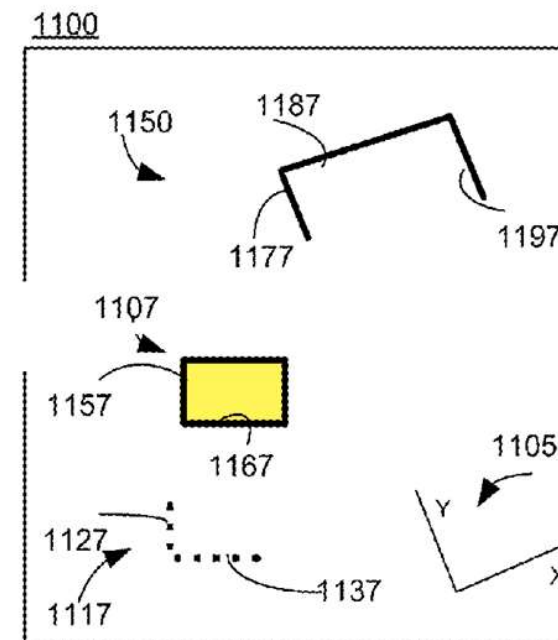
Ground 3, Cl. 2 (“outline drawing”): Kennedy’s Sizing Tool is Displayed as an Outline Drawing

-00435

- In at least one embodiment, the sizing tool is an outline that can be sized to include all the outer edges of a roof.

[0121] A simple implementation of installation surface measuring tool 1107 comprises a 2D rectangle with predetermined height and width (equivalent to a 3D box with height=0) overlaid over the image of an object with known magnification/scale/resolution (resolution) and rotation (e.g. 1 pixel=1 foot top-down image). The dimensions (height & width) of the first model can be adjusted to match the dimensions of the object. Since the resolution of the image is known, the real-world dimensions of the object can be calculated. (e.g. A length of 10 pixels on the image could represent 10 feet on the ground).

FIG. 11



Ex. 1009, ¶ 121, Fig. 11; Reply 30-31

Obviousness of the '538 Patent

'538 Patent: Summary of Arguments

-00436

Grounds	Patent Owner's Arguments	Claims
1, 3	Bailey does not disclose determining an "estimated roofing area" based on "predominant pitch"	1, 13, 14
1, 3	Bailey does not disclose determining a "predominant pitch" by "analyzing one or more images showing the roof"	1, 13, 14
1-4	Bailey does not disclose determining the predominant pitch as a "weighted average"	11, 18
1	Pershing-789 does not disclose a "footprint" of a roof	1, 13, 14
3	Kennedy does not disclose a "footprint" of a roof	1, 13, 14

- **PO's arguments are not responsive to the theories in the Petition**
- **PO ignores key disclosures in the prior art**
- **PO's arguments rely on incorrect claim construction arguments**

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Summary of Dispute

-00436

Petitioner’s Arguments
Bailey discloses a “predominant pitch”
Obvious to use Bailey’s “predominant pitch” to estimate the area of a roof

Patent Owner’s Arguments
Bailey teaches away from using “predominant pitch” to estimate the area of a roof

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Claim Language

-00436

1. One or more non-transitory computer readable medium storing a set of computer executable instructions for running on one or more computer systems that when executed cause the one or more computer systems to: identify a geographic location of a roof; determine a footprint and predominant pitch of the roof by analyzing one or more image showing the roof; determine an estimated roofing area of the roof based on the predominant pitch and the footprint of the roof; and generate a roof report for determination of an amount of materials needed for a construction project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.

Ex. 1001 ('538 Patent), cl. 1

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Petitioner’s Argument

-00436

- Bailey expressly discloses a predominant pitch.
- No dispute that Bailey’s “slope” is the same as a “pitch.”

Section 33 - Slope. The predominant slope of the roof section. The roof plan will generally indicate the slope (e.g., 4 in. in 12). If the slope is not noted on the roof plan, the section drawings may indicate the slope. If such information is not available, field measurement will be required (use the method in Appendix B).

Ex. 1010 at 17; Pet. 12, 31

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Petitioner’s Argument

-00436

- Bailey also teaches that a roofing area can be calculated using the area and pitch/slope of a roof.
- Obvious that Bailey’s “predominant slope” can be applied using the same formula to estimate area.

B Conversion to Actual Area

Now that the total projected horizontal areas for each roof slope have been calculated, the results can be converted to actual areas with the aid of Table 3. (To calculate the Actual Area, multiply the Horizontal Area by the Area/Rake Factor.)

① For the 9" slope roof:
 $1,302 \text{ ft.}^2 \times 1.250 = 1,627.5 \text{ ft.}^2$

② For the 6" slope roof:
 $643 \text{ ft.}^2 \times 1.118 = 718.8 \text{ ft.}^2$

After the horizontal areas have been converted to actual areas, the results can be added to obtain the total area of roof to be covered:

$$1,628 \text{ ft.}^2 + 719 \text{ ft.}^2 = 2,347 \text{ ft.}^2$$

**Table 3:
Area/Rake Conversion ***

Slope (inches per foot)	Area/Rake Factor
4	1.054
5	1.083
6	1.118
7	1.157
8	1.202
9	1.250
10	1.302
11	1.356
12	1.414

*To use the table, simply multiply the projected horizontal area by the conversion factor for the appropriate roof slope. The result is the actual area of the roof.

Ex. 1010 at 137; Pet. 12, 34

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey’s “Predominant Slope” Is for an Entire Roof

-00436

- PO argues that Bailey’s “predominant slope” is only for a roof “section.”
- But Bailey teaches that a roof “section” may comprise the entire roof.

Roof Sections

Building roofs are managed by units called “roof sections” for which all repair and replacement decisions can be made. To achieve this, each roof section is inspected and evaluated independently of other roof sections. As a rule, a building having a steep roofing system of approximately 10,000 SF or less should be managed as one section. Roofing on dormers and similar projections should be included with the main roof section. As an example, all exposed roof areas on the building shown in Figure 2 would comprise one roof section.

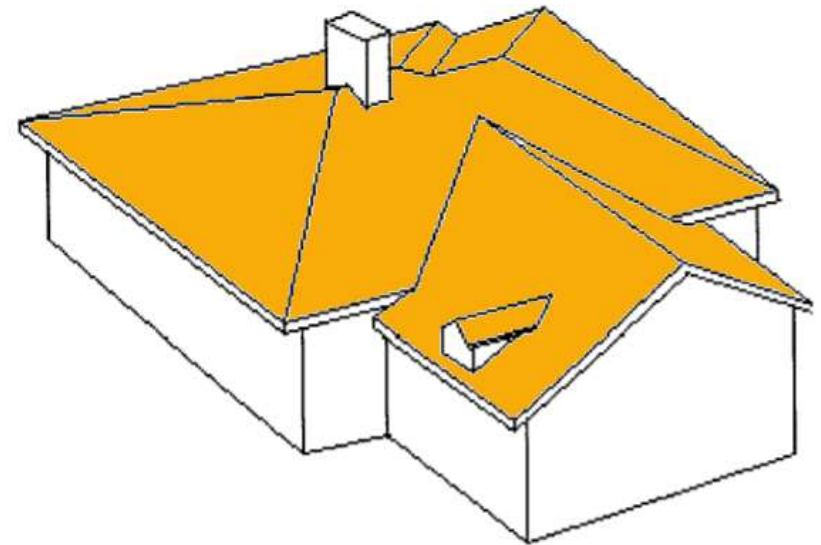


Figure 2. Example of a building roof comprising a roof section.

Ex. 1010 at 10, Fig. 2; Reply 3

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”):
Bailey’s “Predominant Slope” Is for an Entire Roof

-00436

- Bailey provides an express example where a “predominant pitch” is determined for a roof comprising only one section.

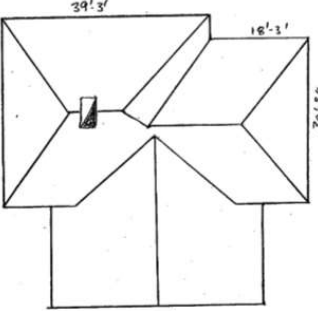
BUILDING IDENTIFICATION SHEET		AGENCY / INST. NO.: X X X X X X	
DATE: 7/2/89		AGENCY / INST.: Example	
BUILDING NAME: Residence - 1201 Vine			
BUILDING NUMBER: 1253		DESIGN CATEGORY CODE: 17111111	
TYPE CONST.: 1P		FACILITY NUMBER: 11121513	
LOCATION: 1201 Vine Street		YEAR BUILT: 1991	
USE: Family Housing			
ROOF SECTIONS:			
A 2813 SF F _____ SF K _____ SF P _____ SF			
B _____ SF G _____ SF L _____ SF Q _____ SF			
C _____ SF H _____ SF M _____ SF R _____ SF			
D _____ SF I _____ SF N _____ SF S _____ SF			
E _____ SF J _____ SF O _____ SF T _____ SF			
REMARKS:			
			
BUILDING ROOF PLAN SCALE:			

Figure 3. Completed Building Identification Sheet.

32 ATTACHMENT SURFACE (if applicable):		
☐ WOOD FIBER	☐ WOOD BOARDS	☐ METAL PURLINS
☐ PLYWOOD	☐ WOOD BATTENS	☐ OTHER
☐ UNKNOWN		
33 SLOPE (primary): 4 IN 12		
34 DRAINAGE (check all):		
☐ INTERIOR DRAINS	☐ SCUPPERS	☐ OVERFLOW SCUPPERS
☐ INTERIOR GUTTERS	☐ ADJACENT ROOF SECTIONS	☐ ROOF EDGE
☒ GUTTERS & DOWNSPOUTS	☐ SCUPPERS W/LEADER & DOWNSPOUTS	☐ OTHER
40 UNDERLAYMENT		
41 TYPE (check all):		
☐ FULLY-ADHERED ICE & WATER MAT	☒ ASPHALT SATURATED SHEET	☐ UNKNOWN
☐ OTHER		☐ NONE
50 ROOF COVERING		
51 TYPE (check one):		
☒ ASPHALT SHINGLE	☐ SYNTHETIC ROOFING	☐ METAL PANEL
☐ Three-Tab	☐ Plastic	☐ CONCRETE TILE
☐ Multi-Tab	☐ Wood Fiber	☐ Pan and Cover
☐ Strip (no cutout)	☐ Metal Shingles	☐ S-Shaped
☐ Laminated	☐ Fiber Cement	☐ Flat
☐ Lock-Down	☐ WOOD SHAKES	☐ CLAY TILE
☐ Foil-Faced	☐ WOOD SHINGLES	☐ Pan and Cover
☐ ASPHALT ROLLED	☐ SLATE	☐ S-Shaped
		☐ Flat
		☐ OTHER
52 SHINGLE REINFORCEMENT (for Asphalt Shingle only) (check one):		
☐ ORGANIC	☒ FIBROUS GLASS	☐ OTHER
		☐ UNKNOWN

Figure 4 (continued). Completed Roof Section Identification Worksheet.

Ex. 1010 at 13, 15; Reply 3-4

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey’s “Predominant Slope” Is for an Entire Roof

-00436

- PO’s expert agrees that Bailey’s predominant pitch is for the entire roof in this example.

10 Q And so for the -- for the -- so for the
11 building identification sheet, the example that's
12 provided on Page 13 of Bailey, that's a worksheet
13 for a roof that just has one roof section,
14 correct?

15 A Correct.

16 Q Okay. And so in that example, the entire
17 roof is that single roof section?

18 A Yes.

19 Q And now on Page 14 for the roof section
20 identification worksheet, this worksheet would
21 correspond to one roof section, correct?

22 A Correct. It's referring back to the same

1 one on the prior page in the example.

2 Q Okay. So in this example, the roof
3 section identification worksheet is a worksheet
4 for that entire roof of the building on Page 13?

5 A It is.

6 Q And on Page 15, you see there's a -- a
7 field number 33 labeled "Slope (Primary)."

8 A Yes.

Ex. 1015, 18:10-19:8; Reply 4

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey Does Not Teach Away from Estimating a Roof Area Using Predominant Pitch

-00436

- PO does not address the proposed combination in the Petition
- In the proposed combination, Bailey’s teaching of predominant pitch is applied to Pershing-789/Kennedy’s area estimation methods.

At a minimum, including “predominant pitch” in Pershing-789’s estimation process would have been nothing more than a mere design choice. See, e.g., *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1340 (Fed. Cir. 2020) (in choosing between “terminal-side plotting” or “server-side plotting,” “[a] person of ordinary skill would therefore have two predictable choices for when to perform plotting, providing them with a simple design choice... Because a [POSITA] has ‘good reasons to pursue the known options within his or her technical grasp,’ § 103 bars the patentability of such an obviousness combination.”); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010) (holding that a motivation to combine and a reasonable expectation of success exist when “it is simply a matter of common sense” to combine known elements of the prior art to solve a known problem). Indeed, there are only a finite number of ways to calculate pitch for a roof, including using pitch values for every facet or a single “predominant pitch” value, and, thus, it would have been a simple design choice that a POSITA “ha[d] good reason to pursue” given “a finite number of identified, predictable solutions” to a design need. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007).

Ex. 1010 at 17; Pet. 20-25, 61-62; Reply 4-5

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey Does Not Teach Away from Estimating a Roof Area Using Predominant Pitch

-00436

- PO incorrectly argues that Bailey “teaches away” from the proposed combination because Bailey describes how to calculate a roof area using individual pitch values.
- Those techniques are in an Appendix describing field measurements.
- Bailey expressly teaches to use those techniques if “predominant slope” information is “not available.”

Section 33 - Slope. The predominant slope of the roof section. The roof plan will generally indicate the slope (e.g., 4 in. in 12). If the slope is not noted on the roof plan, the section drawings may indicate the slope. If such information is not available, field measurement will be required (use the method in Appendix B).

Ex. 1010 at 17; Reply 6-8

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey Does Not Teach Away from Estimating a Roof Area Using Predominant Pitch

-00436



We conclude that the Board erred in determining that Intex failed to prove claims 1, 7, and 11–14 obvious. The Board misapplied the obviousness standard, and misapprehended Intex's argument, when it fixated on whether the prior art literally disclosed Intex's theory of modifying Parienti only slightly by taking the pump attached to the outside of the mattress and recessing it partially within the mattress.

Intex Recreation Corp. v. Team Worldwide Corp., 860 Fed. Appx. 717, 723 (Fed. Cir. 2021)

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey Does Not Teach Away from Estimating a Roof Area Using Predominant Pitch

-00436



We agree with Presens that Maryland's teaching away arguments do not demonstrate Board error. Like its argument based on the positioning of Weigl's sensors, Maryland's teaching away arguments narrowly focus on Weigl's physical arrangement. But “mere disclosure of alternative designs does not teach away.” *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004). Rather, teaching away requires “clear discouragement” from implementing a technical feature. *In re Ethicon, Inc.*, 844 F.3d 1344, 1351 1351 (Fed. Cir. 2017). *Univ. of Maryland Biotechnology v. Presens Precision Sensing GmbH*, 711 Fed. Appx. 1007, 1011 (Fed. Cir. 2017)

Reply 6-7

Grounds 1, 3, Cls. 1, 13, 14 (“predominant pitch”): Bailey’s Predominant Slope Is Used for Measurements

-00436

- PO incorrectly argues that Bailey’s predominant slope is not used for “measurement”
- Bailey’s system is part of a software program that performs measurements and reporting
- Bailey expressly teaches how to use this information to estimate roofing area.

Mode of Technology Transfer

This report serves as the ROOFER inspection manual for asphalt shingle roofs. The capabilities for storing collected information and performing automated calculations, data analyses, and reporting have been incorporated into the Micro-ROOFER software program. CERL and Corps of Engineers Districts can provide assistance to Army installations in implementing the ROOFER program.

Calculating Roof Section Area

The roof section area used in the condition rating procedure is the actual exposed area — not the projected horizontal area. The latter area can be determined from a roof section plan having horizontal dimensions and then can be converted to the actual area by adjusting for roof slope (see Appendix B).

Ex. 1010 at 8, 22; Reply 8-9

Grounds 1, 3, Cls. 1, 13, 14 (“analyzing an image”): Summary of Dispute

-00436

Petitioner’s Arguments
Pershing-789/Kennedy disclose determining pitch values by analyzing an image of a roof
Bailey teaches a “predominant pitch” for a roof with individual pitches
Obvious to apply Bailey’s teachings to Pershing-789/Kennedy’s pitch values determined by analyzing an image of a roof

Patent Owner’s Arguments
Bailey does not disclose that “predominant pitch” is determined by analyzing an image of a roof

Grounds 1, 3, Cls. 1, 13, 14 (“analyzing an image”): Petitioner’s Argument

-00436

- Petitioner relies on Pershing-789 and Kennedy for the teaching of determining pitch values by analyzing an image of a roof.
- No dispute that Pershing-789 and Kennedy disclose this.

Pershing-789 broadly discloses a calculation of pitch: “It should be understood, that the system and method described herein may be used to any individual or company that would find the calculation of the size, geometry, *pitch* and orientation of the roof of a building from aerial images of the building useful.” Ex. 1004 at [0016] (emphasis added).

Pet. 30-31; Ex. 1004, ¶ 16

Id. at [0058]; see also *id.* at [0110] (“*To size surface 1215 user 507 superimposes sizing tool*, in this example tool 1117 (illustrated in Fig. 11) of at least a portion of image 1215...in some embodiments, information defining an orientation of shape 1215 with respect to a reference axis 1211 is generated by comparing orientation of adjusted tool 1107 to reference axis 1211.”) (emphasis added). Kennedy discloses “*generating length and width measurements* for a generally rectangular planar installation surface such as a side of a roof.” *Id.* at [0082] (emphasis added); see also [0109], Fig. 12.

Kennedy discloses that *the measuring tool can be used to determine the pitch of a roof*. *Id.* at [0116] (“...measuring tool 1107 [can be] used to measure displacement of a ridge of roof 650 from base 635. The displacement information is used by modeling unit 591 (Fig. 5) to determine *pitch* of roof 600.”) (emphasis added). Kennedy expressly teaches including the “pitch” dimension on its outline drawing, *e.g.*, in Fig. 36:

Pet. 64-66; Ex. 1009, ¶¶ 110, 116

Grounds 1, 3, Cls. 1, 13, 14 (“analyzing an image”): Petitioner’s Argument Ignores the Proposed Combination

-00436

- PO argues that Bailey does not disclose determining the predominant pitch by analyzing an image
- In the proposed combination, Bailey’s “predominant pitch” is calculated using the individual pitch values determined from an image of a roof by Pershing-789/Kennedy
- This is precisely how the ’538 Patent describes determining a predominant pitch.

The footprint may provide a two-dimensional boundary and/or outline of the roof. In a step **194**, a predominant pitch value for the roof may be determined. In some embodiments, a predominant pitch value may be determined using the footprint as a boundary of the roof. **The predominant pitch may be a weighted average of individual pitch factors for two or more portions of the roof.** FIG. 7 illustrates an exemplary slope factor chart for determining pitch factors. For example, a first portion of the roof (e.g., 60% of the roof) may be at a 6:12 pitch. The 6:12 pitch corresponds to 1.1180 as the pitch factor). A second portion of the roof (e.g. 40% of the roof) may be at a 4:12 pitch. The 4:12 pitch corresponds to 1.0541 as the pitch factor. Thus, the weighted value of the first portion of the roof having 6:12 pitch is:

Ex. 1001 (538 Patent), 12:8-21; Reply 10-12

Grounds 1-4, Cls. 11, 18 (“weighted average”): Summary of Dispute

-00436

Petitioner’s Arguments
Bailey discloses a “predominant pitch”
A “weighted average” is a well-known way to determine a representative value in roofing and construction
Obvious to compute Bailey’s “predominant pitch” as a weighted average of individual pitch values

Patent Owner’s Arguments
Bailey does not disclose how a “predominant pitch” is calculated
POSITA would not calculate a “predominant pitch” using a weighted average

Grounds 1-4, Cls. 11, 18 (“weighted average”): Claim Language

-00436

11. The one or more non-transitory computer readable medium of claim 10, wherein each pitch value is associated with an estimated percentage of roof area to provide an average pitch value.

Ex. 1001 ('538 Patent), cl. 11

18. The roofing estimate method of claim 14, wherein the predominant pitch is based on a weighted average of individual pitch factors for two or more portions of the roof.

Ex. 1001 ('538 Patent), cl. 18

Grounds 1-4, Cls. 11, 18 (“weighted average”): Obvious to POSITA to Use a Weighted Average

-00436

- Bailey does not teach a specific way to compute predominant pitch.
- Using a weighted average is common in construction and roofing,
- It would be obvious to POSITA to use a weighted average to compute predominant pitch.

weighted average An average in which certain entries, usually at the extremes of the range of values, are manipulated so a number is obtained that is believed to be more representative of the true mean than that obtained by straight averaging.

- PO relies on its expert’s identification of a different way to compute predominant pitch.
- PO and its expert do not address the advantages of using a weighted average described by Mr. Cummings.

Ex. 1003, ¶ 97; Ex. 1013 (RSMMeans Illustrated Construction Dictionary), 605; Pet. 51-52

Ground 1, Cls. 1, 13, 14 (“footprint”): Summary of Dispute

-00436

Petitioner’s Arguments

Pershing-789 discloses a “footprint” as an outline drawing of a roof

Patent Owner’s Arguments

Pershing-789’s outline drawing is not a “footprint” because it includes surface area measurements

Ground 1, Cls. 1, 13, 14 (“footprint”): Claim Language

-00436

1. One or more non-transitory computer readable medium storing a set of computer executable instructions for running on one or more computer systems that when executed cause the one or more computer systems to: identify a geographic location of a roof; **determine a footprint** and predominant pitch **of the roof** by analyzing one or more image showing the roof; determine an estimated roofing area of the roof based on the predominant pitch and the footprint of the roof; and generate a roof report for determination of an amount of materials needed for a construction project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.

Ex. 1001 ('538 Patent), cl. 1

Ground 1, Cls. 1, 13, 14 (“footprint”): Petitioner’s Argument

-00436

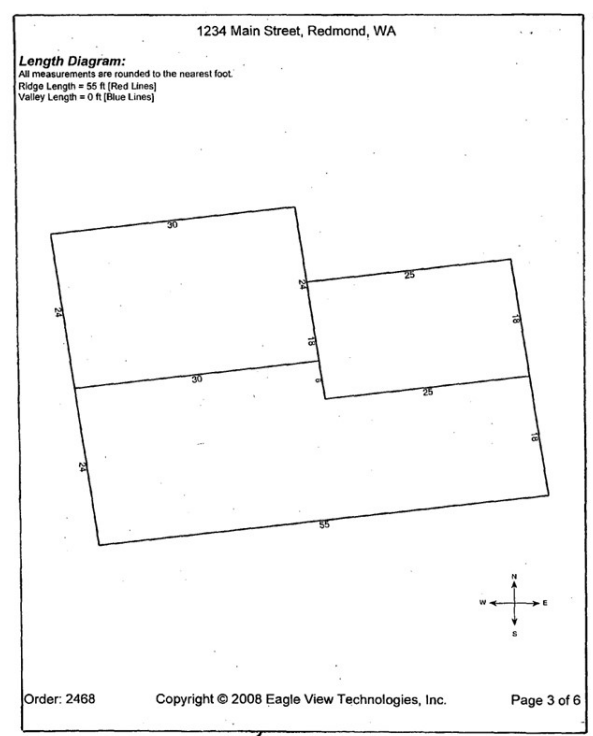
- The Petition relied on the definition of a “footprint” in the specification of the ’538 Patent

Pershing-789 teaches “determine[ing] a footprint” of the roof. The ’538 patent teaches that the “footprint may provide a two-dimensional boundary and/or outline of the roof.” Ex. 1001 at 12:8-9. Thus, the “footprint” of the roof includes at least its area. Pershing-789 teaches determining the claimed “*footprint*” of the roof by drawing two-dimensional boundaries/outlines of roof sections, *e.g.*, to compute area. This is shown, for example, in Figure 5E:

Ground 1, Cls. 1, 13, 14 (“footprint”): Petitioner’s Argument

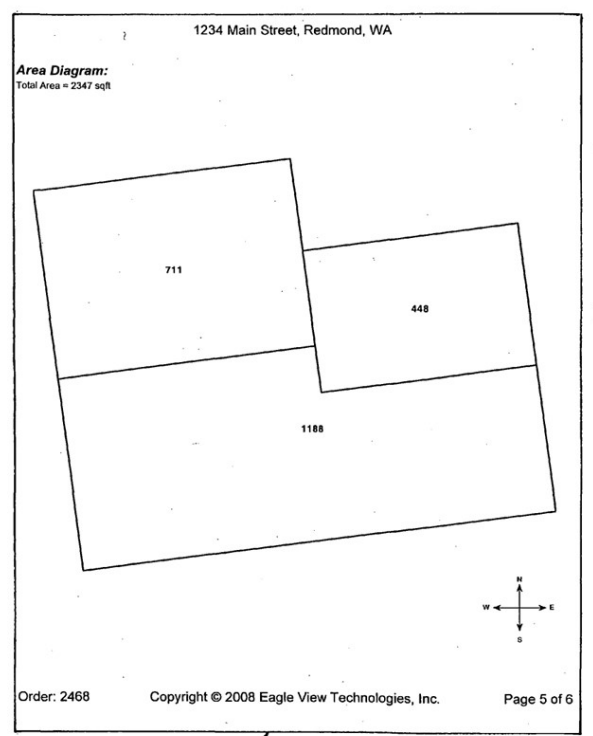
-00436

- Pershing-789 determines two-dimensional boundaries/outlines of roof sections



105

FIG. 5C



107

FIG. 5E

Ex. 1004, Figs. 5C, 5E; Pet. 8, 29-30; Reply 18-19

Ground 1, Cls. 1, 13, 14 (“footprint”): A Footprint Does Not Need to Show the 2-D Area

-00436

- PO’s entire argument is premised on the assumption that a footprint must provide the 2-D area of the roof.
- The argument contradicts the description of a “footprint” in the specification.
- The Board rejected the same argument in its Institution Decision.

The footprint may provide a two-dimensional boundary and/or outline of the roof. In a step 194, a predominant pitch

Ex. 1001 ('538 Patent), 12:8-9

On this record, we agree with Petitioner that Pershing-789’s Figure 5E teaches the claimed footprint. As Petitioner notes, “the ’538 patent teaches that the ‘footprint may provide a two-dimensional boundary and/or outline of the roof.’” Pet. 28 (quoting Ex. 1001, 12:8–9). Figure 5E shows just that—a two-dimensional boundary and/or outline of the roof. Although we agree with Patent Owner that the roof’s surface area and its footprint are distinct, that does not mean that Figure 5E is not a footprint simply because it includes corresponding surface area values. On this record, we agree with Petitioner that Pershing-789’s Figure 5E teaches the claimed footprint. See Pet. 28–30.

Institution Decision (Paper 14) at 11

Reply 19-20

Ground 1, Cls. 1, 13, 14 (“footprint”): A Footprint Does Not Need to Show the 2-D Area

-00436

- PO offers no basis to deviate from the definition in the '538 Patent.
- Mr. Cummings' testimony was consistent with the definition in the patent.

8 Q Okay. So you're not saying the
9 footprint is bigger than the area, it's more,
10 just, there's other things that can characterize
11 the footprint?
12 A Yes.
13 Q Okay.
14 A The footprint is, based on this
15 drawing, is the outer boundary lines. And all
16 this is saying is that it has got the square
17 footage of each of the individual areas.

Ex. 2032, 70:8-17

Ground 3, Cls. 1, 13, 14 (“footprint”): Summary of Dispute

-00436

Petitioner’s Arguments

Kennedy’s sizing tool determines a “footprint” of a roof

Patent Owner’s Arguments

Kennedy’s outline drawing is not a “footprint” because it may be used to determine surface area measurements

Ground 3, Cls. 1, 13, 14 (“footprint”): Petitioner’s Argument

-00436

- Kennedy’s “sizing tool” provides an outline drawing that can be super-imposed on a roof structure to make measurements.

Kennedy expressly discloses a “sizing tool” that is superimposed on an aerial image to determine “surface dimensions” of a roof:

In one embodiment of the invention, a graphical user interface (best illustrated in FIGS. 8-9) cooperates with sizing subsystem 500 of system 100 to implement a sizing tool enabling user 107 to determine surface dimensions and pitch of a surface, for example a roof 191 of a house appearing in the retrieved image 153. Thus there is no need to physically visit the installation site to make measurements and perform sizing calculations.

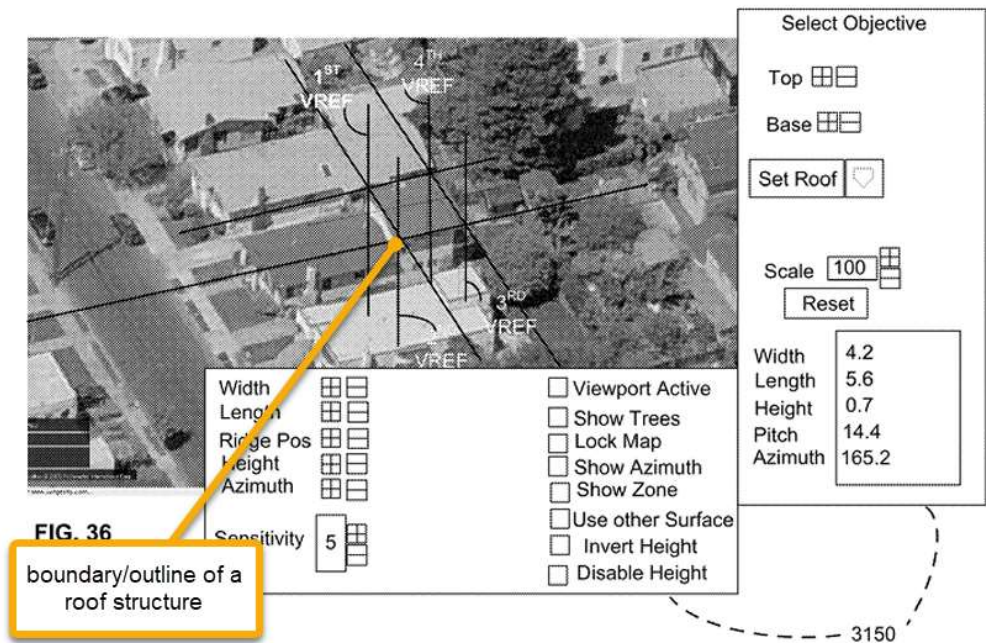
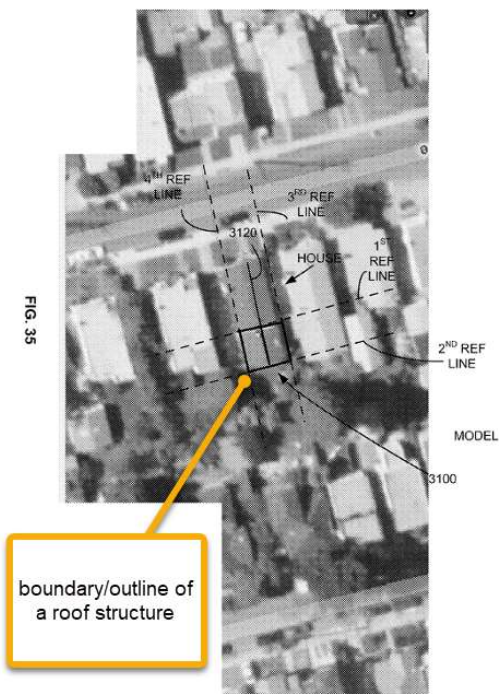
Id. at [0058]; see also *id.* at [0110] (“**To size surface 1215 user 507 superimposes sizing tool**, in this example tool 1117 (illustrated in Fig. 11) of at least a portion of image 1215...in some embodiments, information defining an orientation of shape 1215 with respect to a reference axis 1211 is generated by comparing orientation of adjusted tool 1107 to reference axis 1211.”) (emphasis added). Kennedy discloses “**generating length and width measurements** for a generally rectangular planar installation surface such as a side of a roof.” *Id.* at [0082] (emphasis added); see also [0109], Fig. 12.

Ex. 1009, ¶¶ 82, 110; Pet. 76

Ground 3, Cls. 1, 13, 14 (“footprint”):
Kennedy’s Sizing Tool Determines the Outline/Boundary of a Roof Structure

-00436

- PO does not dispute that Kennedy’s sizing tool can be used to determine the outline or outer boundaries of a roof structure
- Petitioner relies on the same incorrect argument that a “footprint” must include area information



Ex. 1009, Figs. 35, 36; Reply 23-24