

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

PICTOMETRY INTERNATIONAL CORPORATION,
Appellant

v.

ROOFR INC.,
Appellee

2024-2321

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. IPR2023-
00436.

Decided: May 22, 2026

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Before TARANTO, HUGHES, and CUNNINGHAM, *Circuit Judges*.

TARANTO, *Circuit Judge*.

Pictometry International Corp. owns U.S. Patent No. 9,183,538, which claims, in various forms, a method for measuring roofs using aerial imagery. The method helps contractors estimate roof area, and hence the cost of a roofing project, without the need to measure the roof onsite. The patented method involves estimating roof area based on the roof's "predominant pitch" and "footprint."

In 2023, Roofr Inc. successfully petitioned for an inter partes review (IPR) of all claims of the '538 patent under 35 U.S.C. §§ 311–19, and the Patent Trial and Appeal Board held all claims unpatentable for obviousness over Roofr's proposed prior-art combinations. *See Roofr Inc. v. Pictometry International Corp.*, No. IPR2023-00436, 2024 WL 3379549 (P.T.A.B. July 11, 2024) (*Decision*). Pictometry appeals, challenging the Board's understanding of "predominant pitch." We affirm.

I

A

The '538 patent describes a procedure for estimating the area of a roof using the roof's "footprint" and "pitch." '538 patent, col. 12, lines 37–39. The patent does not expressly define either term. But the specification implies that a "footprint" is the roof's two-dimensional boundary or outline (seen from above). *See id.*, col. 12, lines 8–10. That term is not in dispute on appeal. The specification makes clear that a "pitch" and "pitch factor" designate the roof's degree of inclination: the "pitch" is its rise (vertical measure) divided by its run (horizontal measure); the "pitch factor" is easily derived from "pitch"—starting from the right triangle formed by the rise and run, it is the length of the

hypotenuse, divided by the run. *See id.*, Fig. 7; col. 12, lines 12–20; Pictometry Opening Br. at 8. The area of a roof section can be calculated using the footprint and the pitch factor. *See* Pictometry Opening Br. at 9; J.A. 1940–41, at 7:21–9:4 (Pictometry’s expert).

Roofs often have multiple sections with varying pitches, in which case there would be multiple pitch factors. The patent proposes using, in the area calculation, a “predominant pitch value.” ’538 patent, col. 12, lines 9–10; Fig. 6. It also describes one way to calculate the predominant pitch factor by identifying pitch factors for portions of a roof and appropriately weighting them (by the percent of the overall roof having that pitch) and summing them to arrive at a “total weighted pitch value,” converting the result to a predominant pitch factor. *Id.*, col. 12, lines 14–39.

The patent has related claims in method form, in system form, and in the form of a computer readable medium with code to execute the method. They call for using information from images of roofs. Claim 1 is representative for this appeal:

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

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project, wherein the roof report includes at least one image showing the roof and the estimated roofing area of the roof.

'538 patent, col. 15, lines 21–32 (emphases added).

Claims 11 and 18 are also at issue. Claim 11 depends on claim 10 (which refers to the “predominant pitch” of claim 1) and states that “each pitch value is associated with an estimated percentage of roof area to provide an **average** pitch value.” *Id.*, col. 16, lines 20–23 (emphasis added).¹ Claim 18 describes the “roofing estimate method” of an earlier claim, “wherein the predominant pitch is based on a **weighted average** of individual pitch factors for two or more portions of the roof.” *Id.*, col. 17, lines 16–18 (emphasis added). The “predominant pitch” of claim 18 is relevantly similar to that of claim 1.

B

In February 2023, Roofr petitioned for an IPR, challenging all claims of the '538 patent for obviousness over several prior-art references. *See* J.A. 59. To demonstrate obviousness for claims 1 and 11, Roofr relied on a 1999 article published by the United States Army Corps of Engineers (Bailey) and U.S. Patent Application Publication No. 2008/0262789 (Pershing). *See* J.A. 88. Roofr relied on those same references, as well as one other, to show obviousness for claim 18. *See Decision*, at *1. Relevant to this appeal, Roofr argued that Bailey, in speaking of a

¹ Although claim 11 does not expressly require a “weighted average,” instead requiring only an “average” pitch (referring to claim 10’s “predominant pitch” value, *see* '538 patent, col. 16, lines 15–23), the Board understood claim 11 to “require using a weighted average to determine predominant pitch.” *Decision*, at *4. Pictometry does not dispute the Board’s interpretation of claim 11 as requiring a *weighted* average. *See* Pictometry Opening Br. at 47.

“predominant slope,” discloses claim 1’s “predominant pitch” and that a relevant artisan would have been motivated to combine Bailey’s teaching with Pershing’s teaching of roof area calculations to estimate roofing area. J.A. 88, 101–02. Roofr also argued that a relevant artisan would understand that a predominant pitch can be calculated using a weighted average of pitch values. J.A. 118–20. Pictometry opposed institution. J.A. 179, 214–15.

The Board instituted the requested review, and in so doing, the Board responded to a pre-institution argument from Pictometry by stating that “[n]othing in the claims’ plain language *limits* predominant pitch to a weighted average.” *Roofr, Inc. v. Pictometry International Corp.*, No. IPR2023-00436, 2023 WL 5153636, at *4 (P.T.A.B. July 21, 2023) (*Institution Decision*) (emphasis added). After institution, Pictometry did not argue in its papers for a claim construction for the term “predominant pitch.” See J.A. 330–39. Instead, Pictometry argued only that Bailey did not disclose using a predominant pitch in a roof area calculation. See *id.* (patent owner’s response); J.A. 428–30 (sur-reply). At oral argument before the Board, however, Pictometry asserted that there is an issue of claim construction because “Bailey doesn’t tell you what predominant slope even means.” J.A. 543–44.²

In July 2024, the Board issued its final written decision, holding all claims unpatentable for obviousness. *Decision*, at *1. As now relevant, the Board found that Bailey’s teaching of a “predominant slope” disclosed the claimed “predominant pitch.” *Id.* at *3–4. For dependent claims 11 and 18, which the Board understood to “require using a weighted average to determine predominant pitch,” the Board, relying on expert testimony and a dictionary

² The parties agree, for the purpose of this appeal, that “pitch” and “slope” are synonymous. See Pictometry Opening Br. at 8 n.1; J.A. 99 (petition).

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cited by Roofr in its petition, concluded that a relevant artisan employing the patented method would know that a weighted average is one way to calculate a predominant pitch. *Id.* at *4–5.

Pictometry timely appealed the Board’s final written decision. We have jurisdiction under 35 U.S.C. §§ 141(c), 319 and 28 U.S.C. § 1295(a)(4)(A).

II

“We review the Board’s legal determinations de novo and the Board’s factual findings for substantial-evidence support.” *Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1363 (Fed. Cir. 2023). The ultimate question of obviousness is a question of law, and the Board’s resolution is subject to a de novo standard of review, but the answer depends on underlying facts, for which the Board’s findings are reviewed only for substantial-evidence support, *id.*, which is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion,” *Consolidated Edison Co. of New York v. National Labor Relations Board*, 305 U.S. 197, 229 (1938).

A

Pictometry argues that the Board erred in its interpretation of claim 1’s “predominant pitch” limitation. In its decision, the Board did not expressly adopt a construction of “predominant” or “predominant pitch,” but the Board concluded that Bailey teaches a “predominant slope,” which the Board understood as equivalent to a “predominant pitch.” *See Decision*, at *2 (citing J.A. 1678 § 33)). On appeal, Pictometry now contends that a “predominant pitch” value must be construed to require accounting for the pitch of *every roof section* across the entire roof. *See* Pictometry Opening Br. at 31–32, 35, 37–38 (citing J.A. 1540 ¶ 94 (Roofr’s expert declaration stating that a relevant artisan would have “account[ed] for all of the pitches of a roof” when calculating “a single ‘predominant slope’”)).

But even putting aside whether Pictometry adequately preserved the point as a claim-construction contention, despite not having squarely presented such a claim-construction position after institution (as required by *Institution Decision*, at *6), we see no reversible error by the Board.

With no express construction proposed, the Board could begin with the “ordinary and customary meaning” of “predominant pitch.” *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). The word “predominant” is not on its face limited to a weighted average or to an analysis of pitches of all portions of a roof; it could, for example, refer to the pitch for the lion’s share of the roof, and in a context where a roof measurement (from photographs) may be valuable for the patent’s goals even if not precise, that might be good enough and helpfully simplify the analysis. Regardless, the Board impliedly understood from the petition that Bailey’s “predominant slope” could be interpreted by a relevant artisan to cover several possibilities, *including* a weighted average of all the roof’s pitches, an understanding supported by substantial evidence. *See Decision*, at *3–5 (citing J.A. 89–90, 99–102 (petition)); *see infra* pp. 8–9. Because a weighted average of all pitches falls within the scope of the ordinary meaning of “predominant pitch,” and Bailey is reasonably read to teach such a predominant pitch, we see no reversible error even if a full-roof weighted-average understanding is required.

The Board, adopting Roofr’s motivation to combine Bailey with Pershing, relied on Bailey’s predominant slope, combined with Pershing’s use of measurements determined from aerial images in an area calculation, to conclude that claim 1 would have been obvious. *Decision*, at *4; *see* J.A. 88. That conclusion is reasonable and supported by substantial evidence.

B

Relatedly, Pictometry argues that the Board erred in holding dependent claims 11 and 18 unpatentable for obviousness because the cited prior art does not expressly disclose the “weighted average” limitation. The Board, however, concluded that it would have been obvious to a relevant artisan measuring a roof’s area to calculate the predominant pitch using a weighted average. *See Decision*, at *4. In its decision, the Board relied in part on testimony from Roofr’s expert that a skilled artisan would be motivated to use weighted averages, a known technique, to calculate a predominant pitch, *see* J.A. 1541–42 ¶ 97, and in part on a construction dictionary, *see* J.A. 1933, to conclude that weighted averages were commonly known and used in the roofing construction context. *See Decision*, at *4; J.A. 119–20 (Roofr’s petition citing construction dictionary and expert).

We see no reversible error in the Board’s obviousness holding for claims 11 and 18. Although Bailey does not expressly disclose using a weighted average to determine predominant pitch, the understanding of a piece of prior art is a factual matter, depending on how a relevant artisan would understand it. *See Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1383–84 (Fed. Cir. 2019); *In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1332 (Fed. Cir. 2016). In any event, the Board can “take account of the inferences and creative steps” that a relevant artisan “would employ.” *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Substantial evidence supports the Board’s conclusion that using a weighted average to calculate predominant pitch would have “been nothing more than the application of a known technique to yield a predictable result.” *Decision*, at *4 (quoting J.A. 408). Moreover, Pictometry does not argue that the Board abused its discretion in interpreting the petition’s asserted combination as involving such background knowledge. *Cf. Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1376–78 (Fed. Cir. 2023).

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Finally, contrary to Pictometry’s argument, the Board’s consideration of Bailey’s “slope-factor chart” in its analysis of claim 18 was not erroneous. Roofr relied on Bailey’s “slope-factor chart” to show that a relevant artisan would know that slope can be represented as a pitch factor, and, with some conversion, pitch factor can be used in a roof area calculation. *See* J.A. 408–09; J.A. 1551–52 ¶ 127; J.A. 1798 Table 3. The Board understood that Roofr relied on more than just the Bailey reference for determining pitch. *See Decision*, at *4. Because the Board relied on a combination of references for its claim 18 obviousness determination, we see no error in its passing citation to Bailey’s slope-factor chart.

III

We have considered Pictometry’s remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm the decision of the Board.

AFFIRMED