

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

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**ELBIT SYSTEMS OF AMERICA, LLC,**  
*Appellant*

v.

**THALES VISIONIX, INC.,**  
*Appellee*

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2017-1355

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Appeal from the United States Patent and Trademark  
Office, Patent Trial and Appeal Board in No. IPR2015-  
01095.

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Decided: February 6, 2018

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RANGANATH SUDARSHAN, Covington & Burling LLP,  
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Before MOORE, WALLACH, and STOLL, *Circuit Judges*.

WALLACH, *Circuit Judge*.

Appellant Elbit Systems of America, LLC (“Elbit”) sought inter partes review of various claims of Appellee Thales Visionix, Inc.’s (“Thales”) U.S. Patent No. 6,474,159 (“the ’159 patent”). The U.S. Patent and Trademark Office’s Patent Trial and Appeal Board (“PTAB”) issued a final written decision, *see Elbit Sys. of Am., LLC v. Thales Visionix, Inc.*, No. IPR2015-01095 (P.T.A.B. Oct. 14, 2016) (J.A. 1–25), finding that, inter alia, Elbit failed to demonstrate by a preponderance of the evidence that claims 3–5, 13, 24–28, 31, and 34 (“the Asserted Claims”) of the ’159 patent would have been obvious over U.S. Patent No. 4,722,601 (“McFarlane”) in combination with two other prior art references, *see* J.A. 2, 4–5.

Elbit appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (2012). We affirm.

#### BACKGROUND

Entitled “Motion-Tracking,” the ’159 patent generally relates to “tracking motion relative to a moving platform, such as motion-base simulators, virtual environment trainers deployed on board ships, and live vehicular applications including helmet-mounted cueing systems and enhanced vision or situational awareness displays.” ’159 patent, Abstract. The claimed invention purportedly “enables the use of inertial head-tracking systems on-board moving platforms by computing the motion of a ‘tracking’ Inertial Measurement Unit (IMU) mounted on [a head mounted display] relative to a ‘reference’ IMU rigidly attached to the moving platform.” *Id.* This eliminates the need to calculate an object’s position relative to the ground, *id.* col. 1 ll. 23–25, col. 6 l. 67–col. 7 l. 12, col. 8 ll. 37–41, which improves functionality when “tracking on moving vehicles, where millimeter-level vehicle position data is generally not available,” *id.* col. 6 ll. 65–67; *see id.* col. 7 l. 40–col. 8 l. 17 (explaining the method of

calculating the object's orientation without requiring additional calculation of its orientation relative to earth).

Dependent claim 3 is effectively representative<sup>1</sup> and depends from dependent claim 2, which in turn depends from independent claim 1. Claims 1–3 are reproduced below:

1. A system for tracking the motion of an object relative to a moving reference frame, comprising:

a first inertial sensor mounted on the tracked object;

a second inertial sensor mounted on the moving reference frame; and

an element adapted to receive signals from said first and second inertial sensors and configured to determine an orientation of the object relative to the moving reference frame based on the signals received from the first and second inertial sensors.

2. The system of claim 1[,] in which the first and second inertial sensors each comprises three angular inertial sensors selected from the set of an-

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<sup>1</sup> Although the PTAB appears to have treated claims 1–3 as illustrative, *see* J.A. 4, the parties do not designate a claim as representative, *see generally* Appellant's Br.; Appellee's Br. However, Elbit limits its substantive arguments to claim 3, *see* Appellant's Br. 29–47, and argues that “claims 4[–]5, 13, 24–28, 31, and 34 are unpatentable for the same reasons as claim 3,” *id.* at 47 (capitalization omitted). Therefore, the Asserted Claims “stand or fall” with claim 3. *In re Affinity Labs of Tex., LLC*, 856 F.3d 883, 894 n.6 (Fed. Cir. 2017) (internal quotation marks and citation omitted).

gular accelerometers, angular rate sensors, and angular position gyroscopes.

3. The system of claim 2, in which the angular inertial sensors comprise angular rate sensors, and the orientation of the object relative to the moving reference frame is determined by *integrating a relative angular rate signal determined from the angular rate signals measured by the first and second inertial sensors*.

*Id.* col. 11 l. 50–col. 12 l. 2 (emphasis added).

## DISCUSSION

### I. Standard of Review and Legal Standard

“We review the PTAB’s factual findings for substantial evidence and its legal conclusions de novo.” *Redline Detection, LLC v. Star Envirotech, Inc.*, 811 F.3d 435, 449 (Fed. Cir. 2015) (citation omitted). “Substantial evidence is something less than the weight of the evidence but more than a mere scintilla of evidence,” meaning that “[i]t is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *In re NuVasive, Inc.*, 842 F.3d 1376, 1379–80 (Fed. Cir. 2016) (internal quotation marks and citations omitted). If two “inconsistent conclusions may reasonably be drawn from the evidence in record, [the PTAB]’s decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence.” *In re Cree, Inc.*, 818 F.3d 694, 701 (Fed. Cir. 2016) (internal quotation marks and citation omitted).

A patent claim is invalid “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the [relevant] art

[(‘PHOSITA’)].” 35 U.S.C. § 103(a) (2006).<sup>2</sup> Obviousness is a question of law based on underlying findings of fact. *See In re Gartside*, 203 F.3d 1305, 1316 (Fed. Cir. 2000). Those underlying findings of fact include (1) “the scope and content of the prior art,” (2) “differences between the prior art and the claims at issue,” (3) “the level of ordinary skill in the pertinent art,” and (4) the presence of objective indicia of nonobviousness such “as commercial success, long felt but unsolved needs, failure of others,” and unexpected results. *Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17 (1966); *see United States v. Adams*, 383 U.S. 49, 50–52 (1966). In assessing the prior art, the PTAB also “consider[s] whether a PHOSITA would have been motivated to combine the prior art to achieve the claimed invention.” *In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1333 (Fed. Cir. 2016) (internal quotation marks, brackets, and citation omitted).

## II. Substantial Evidence Supports the PTAB’s Determination that the Asserted Claims Would Not Have Been Obvious

This appeal concerns whether, in light of *McFarlane*, the method of integrating the “relative angular rate signal”<sup>3</sup> taught in claim 3 of the ’159 patent would have

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<sup>2</sup> Congress amended § 103 when it enacted the Leahy-Smith America Invents Act (“AIA”). Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287 (2011). However, because the application that led to the ’159 patent has never contained (1) a claim having an effective filing date on or after March 16, 2013, or (2) a reference under 35 U.S.C. §§ 120, 121, or 365(c) to any patent or application that ever contained such a claim, the pre-AIA § 103 applies. *See id.* § 3(n)(1), 125 Stat. at 293.

<sup>3</sup> Although Elbit now appears to contest the PTAB’s lack of explicit construction of “relative angular rate signal” in Elbit’s favor, *see Appellant’s Br.* 45–47, neither

been obvious to a PHOSITA. Oral Arg. at 2:02–31, 13:37–51. After determining that Elbit “ha[d] not directed [the PTAB] to prior art of record that allegedly teaches the ‘relative angular rate signal,’” J.A. 16–17, and that there were many “deficiencies” in the testimony of Elbit’s expert, the PTAB concluded that Elbit had not “met its burden of proving [the Asserted Claims] unpatentable by a preponderance of the evidence,” J.A. 18. We agree.

Substantial evidence supports the PTAB’s conclusion of nonobviousness. It is undisputed that the method of calculating the “relative angular rate signal” taught in the ’159 patent “is not explicitly disclosed” in the prior art because the prior art and the Asserted Claims employ different steps to calculate the orientation or position of a moving object relative to a moving reference frame. J.A. 468; *see* Oral Arg. at 1:19–2:01, 12:00–13:34. The PTAB credited the testimony of Thales’s expert, *see* J.A. 14–15, who explained the prior art calculates an object’s relative orientation using a three-step method:

First, the orientation of a moving object . . . is calculated with respect to an inertial reference frame . . . using inertial sensors mounted to a moving object (e.g., angular rate sensors . . .). Next, the orientation of a moving reference frame . . . is calculated with respect to the inertial reference frame using inertial sensors mounted to

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party proffered a construction of this limitation to the PTAB, Oral Arg. at 1:09–13, <http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2017-1355.mp3> (conceding, by Elbit’s attorney, that “the parties never asked for constructions”), 11:35–45 (same by Thales’s attorney). Therefore, this argument is waived. *See Conoco, Inc. v. Energy & Envtl. Int’l, L.C.*, 460 F.3d 1349, 1358 (Fed. Cir. 2006) (“[A] party may not introduce new claim construction arguments on appeal . . . .” (citation omitted)).

the moving reference frame . . . . Finally, the relative orientation of the moving object with respect to the moving platform . . . is calculated by resolving the two orientation calculations.

J.A. 2109–10. For example, McFarlane calculates directional angles to detect the orientation of the moving object and then “appl[ies] . . . inputs from the [moving reference frame’s] own inertial platform so that movements of the reference frame may be off set against movements indicated by the [moving object],” indicating that McFarlane twice calculates orientation and then resolves those two calculations to determine relative orientation. McFarlane col. 4 ll. 14–21; *see id.* col. 2 ll. 37–54; *see also* J.A. 2138–39 (explaining, by Thales’s expert, that a PHOSITA would have understood McFarlane to disclose this three-step method).

In contrast, Thales’s expert explained that the Asserted Claims employ a two-step method: “the raw signal data from the inertial sensors . . . is used to determine the relative angular rate signal”; and “[t]hat relative angular rate signal . . . is then used to calculate the relative orientation.” J.A. 2112. This testimony is supported by the specification of the ’159 patent, which explains that “this system operates independently without any inputs from the motion-base controller or the vehicle attitude<sup>[4]</sup> reference system, and without the need to ever know or measure or calculate the orientation or position of the moving platform.” ’159 patent col. 8 ll. 37–41; *see, e.g., id.* col. 1 ll. 36–40 (explaining that, prior to the ’159 patent, “[t]he inertial sensors would measure head motion relative to the ground, while the drift-correcting range sensors would measure head pose relative to the vehicle platform in which the reference receivers are mounted”).

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<sup>4</sup> “Attitude” is another term for orientation. J.A. 810 (Elbit’s Expert Decl.).

Moreover, Thales's expert explained that the two-step method employed by the Asserted Claims "reduces both the number of calculations required to determine relative orientation . . . and the propagation of errors that inevitably occur when using inertial sensors to track motion." J.A. 2112; *see* J.A. 2108 ("Contrary to the . . . prior art, . . . without performing all computations related to the Earth as a fixed reference frame, transformation errors are minimized."); *see also* '159 patent col. 1 ll. 40–42 (explaining that, prior to the '159 patent, "[w]hile the vehicle is turning or accelerating, the . . . filter would attempt to fuse inconsistent data and produce unpredictable results"). This constitutes substantial evidence showing that the prior art does not teach the Asserted Claims' "relative angular rate signal."

Elbit's expert attempts to undermine this testimony by arguing that the two- and three-step methods are "mathematically equivalent" and that "there is no practical difference" between them. J.A. 2034. However, the PTAB determined that Elbit's expert's testimony was "unsupported" and entitled to "little weight" because he did not address or account for the recited relative angular rate signal limitation "anywhere in his opinion." J.A. 17–18. "The PTAB [i]s entitled to weigh the credibility of the witnesses," *Trs. of Columbia Univ. v. Illumina, Inc.*, 620 F. App'x 916, 922 (Fed. Cir. 2015); *see Inwood Labs., Inc. v. Ives Labs., Inc.*, 456 U.S. 844, 856 (1982) ("Determining the weight and credibility of the evidence is the special province of the trier of fact."), and, thus, we decline to disturb these credibility determinations here.

Elbit's counterarguments are unpersuasive. First, Elbit argues that the method employed by the Asserted Claims merely reorders the steps employed by the prior art and that "[c]hanging the order of steps does not produce a new or unexpected result." Appellant's Br. 32; *see id.* at 31–34. However, Thales's expert explained the differences between the three-step method employed by



the prior art and the two-step method employed by the Asserted Claims, *compare* J.A. 2109–10, *with* J.A. 2112, as well as the benefits of the two-step method, J.A. 2112, and Elbit conceded that it failed to argue that substantial evidence does not support the PTAB’s decision to credit Thales’s explanation of the nonobviousness of the two-step method, *see* Oral Arg. at 27:30–32 (acknowledging that they “did not make . . . a legal argument” that the PTAB’s decision is unsupported by substantial evidence), which constitutes waiver, *see Nan Ya Plastics Corp. v. United States*, 810 F.3d 1333, 1347 (Fed. Cir. 2016) (holding that failure to present arguments under the operative legal framework “typically warrants a finding of waiver”).

Second, Elbit argues that the PTAB applied the incorrect legal standard because it “fail[ed] to credit the knowledge of a [PHOSITA],” who would allegedly understand that the sum of integrals principle<sup>5</sup> extends to navigation equations, and, “[i]nstead, . . . required Elbit to produce a prior art reference expressly teaching that the sum of integrals principle applies ‘in the context of navigation equations.’” Appellant’s Br. 35 (quoting J.A. 17); *see id.* at 34–37. However, Elbit improperly attempts to create legal error by selectively quoting from a portion of one of the PTAB’s multiple findings analyzing why it

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<sup>5</sup> Pursuant to this principle, “as a matter of calculus, the sum of integrals is equal to the integral of sums.” J.A. 2144. According to Elbit, this principle dictates that the same result will be reached whether data is “first integrated, *then* subtracted” or “first subtracted, *then* integrated,” such that “the order in which these steps are performed does not matter.” Appellant’s Br. 3. As applied to the ’159 patent, Elbit contends that the sum of integrals principle renders the ’159 patent “no more than a predictable variation of the prior art” and, thus, unpatentable. *Id.* at 5 (citation omitted).

found Elbit’s expert unpersuasive, and “[w]e will not find legal error based upon an isolated statement stripped from its context.” *Waymo LLC v. Uber Techs., Inc.*, 870 F.3d 1350, 1361 (Fed. Cir. 2017) (internal quotation marks and citation omitted). As for whether a PHOSITA “would understand that the sum of integrals principle applies to all equations, including navigation equations,” Appellant’s Br. 37 (capitalization omitted); *see id.* at 37–41, Elbit fails to present any evidence supporting this contention beyond attorney argument, *see id.* at 37–41, and “[a]ttorney argument is not evidence” and cannot rebut other admitted evidence, *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017). In contrast, Thales’s expert testified that a PHOSITA could have determined that it would be “mathematically inappropriate or invalid” to apply the principle to the navigation equations disclosed in the ’159 patent. J.A. 2143. In sum, substantial evidence supports the PTAB’s determination that the Asserted Claims would not have been obvious to a PHOSITA.

#### CONCLUSION

We have considered Elbit’s remaining arguments and find them unpersuasive. Thales’s request for attorney fees is denied. Accordingly, the Final Written Decision of the U.S. Patent and Trademark Office’s Patent Trial and Appeal Board is

#### **AFFIRMED**

#### COSTS

Costs to Thales.