

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PROTECT ANIMALS WITH SATELLITES,
Petitioner,

v.

ONPOINT SYSTEMS, LLC,
Patent Owner.

IPR2021-01483
Patent 9,848,295 B1

Before LYNNE H. BROWNE, DANIEL J. GALLIGAN, and
MICHAEL T. CYGAN, *Administrative Patent Judges*.

Opinion for the Board filed PER CURIAM.

Opinion Concurring filed by *Administrative Patent Judge* GALLIGAN.

Opinion Dissenting in Part filed by *Administrative Patent Judge* CYGAN.

JUDGMENT

Determining all Challenged Claims Unpatentable
Denying Patent Owner's Motion to Amend
Denying Patent Owner's Motion to Exclude
Denying Petitioner's Motion to Exclude
35 U.S.C. § 318(a)

I. BACKGROUND

A. *Background and Summary*

On September 2, 2021, Protect Animals With Satellites, LLC (“Petitioner”) filed a Petition for *inter partes* review (“IPR”) of claims 1–18 of U.S. Patent No. 9,848,295 B1 (Ex. 1001, “the ’295 patent”). Paper 1 (“Pet.”). On December 16, 2001, OnPoint Systems, LLC (“Patent Owner”), filed a Preliminary Response. Paper 10 (“Prelim. Resp.”). We instituted an *inter partes* review as to claims 1–18 of the ’295 patent on all grounds raised in the Petition. Paper 11 (“Inst. Dec.”). Patent Owner filed a Response contesting claims 1–9, 13, and 14.¹ Paper 15 (“Resp.”). Petitioner filed a Reply (Paper 19, “Reply”), and Patent Owner filed a Sur-Reply (Paper 39, “Sur-reply”).

Patent Owner also filed a contingent Motion to Amend under the UPSTO’s Pilot Program. Paper 14. Petitioner filed an Opposition (Paper 21), and we issued Preliminary Guidance on the Motion to Amend (Paper 29, “Prelim. Guid.”). Patent Owner filed a Revised contingent Motion to Amend (Paper 38, “RMTA”), to which Petitioner filed an Opposition (Paper 48, “Opp.”). Patent Owner filed a Reply to that Opposition (Paper 54, “Opp. Reply”) and Petitioner filed a Sur-Reply to that Reply (Paper 62, “Opp. Sur-Reply”). We determine that Petitioner establishes by a preponderance of the evidence that claims 1–18 are unpatentable. We also determine that Patent Owner has not shown that the proposed substitute claims add no new matter, and we deny the Revised Motion to Amend.

¹ Patent Owner did not cancel original claims 10–12 and 15–18; thus, Petitioner still has the burden of showing these claims to be unpatentable.

B. Real Party in Interest

Petitioner identifies itself as the sole real party in interest to this IPR petition. Pet. 96. Patent Owner identifies itself as the real party in interest. Paper 8, 2.

C. Related Matters

The parties indicate that the '295 patent is involved in a patent infringement lawsuit, *OnPoint Systems, LLC v. Protect Animals With Satellites, LLC*, C.A. 4-20-cv-00657, currently pending in the Eastern District of Texas, Sherman Division. OnPoint also asserted United States Patent Numbers 9,538,329 (added to the case on April 6, 2021), 9,922,522 and 9,924,314 (the '522 and '314 patents were added on July 26, 2021) in the above case. Pet. 97; Paper 8, 2. Petitioner Protect Animals With Satellites filed *inter partes* reviews of the latter two patents, IPR2022-01141 (U.S. Patent 9,922,522), IPR2022-01139 (U.S. Patent 9,924,314),

D. The '295 Patent

The '295 patent (Ex. 1001) generally relates to tracking a subject or object, such as an animal, human, or vehicle, using satellite positioning data. Ex. 1001, 1:7–9. According to the '295 patent, wireless pet containment systems using Global Positioning System (GPS) in combination with a collar and a base were available on the market at the time the '295 patent application was filed. *Id.* at 2:16–23. However, such systems may be subject to sources of error that impact location accuracy. *Id.* at 2:57–67. The '295 patent discloses casting a ray from the position of the subject toward the containment perimeter and determining the number of line segments of the containment perimeter that are intersected by that ray. *Id.* at

3:36–41. From that number, the subject is determined to be inside or outside the perimeter. *Id.* at 41–44.

Figure 13 is reproduced below.

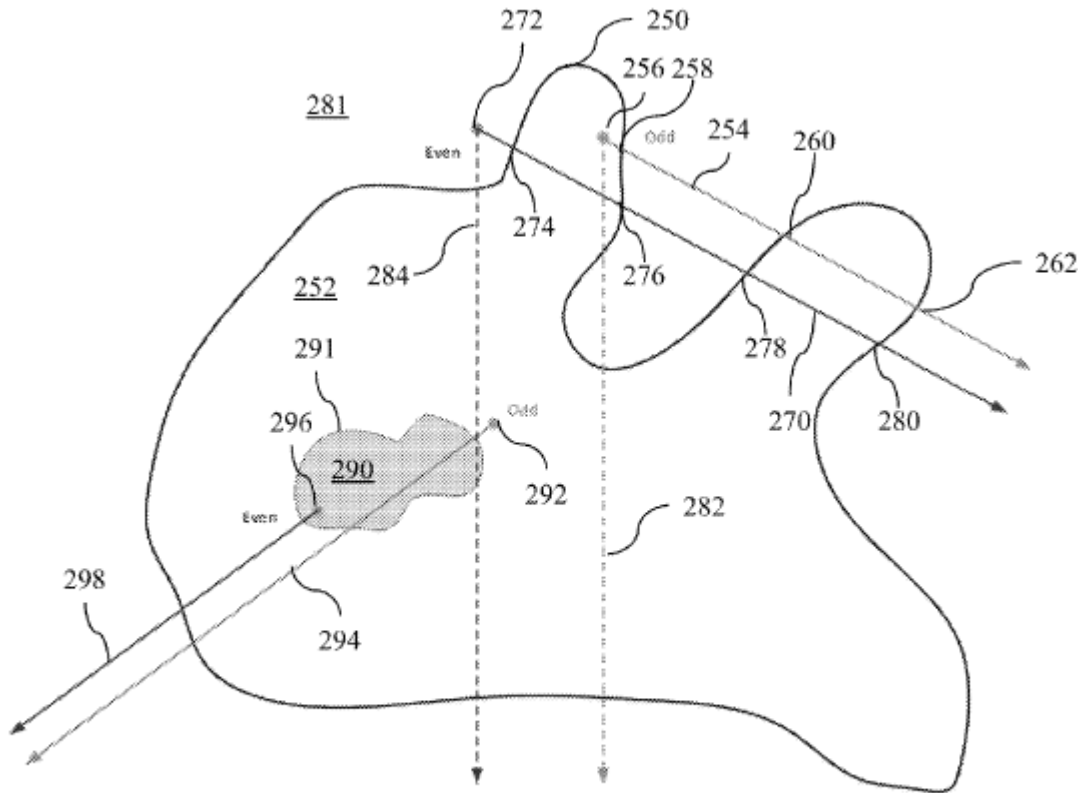


Fig. 13

Figure 13 shows a containment perimeter 250 forming a safe zone 252, and a second perimeter 291 forming an out-of-bounds zone 290 within perimeter 250, and including pets at locations 256, 272, 296, and 292. Ex. 1001, 15:38–67. Pets at locations 256 and 292 are within the safe zone, and the rays 254 and 294 cast from these locations intersect the perimeter(s) an odd number of times, indicating that the pets are within the safe zone. *Id.* Pets at locations 272 and 296 are outside of the safe zone, and the rays 270

and 298 cast from these locations intersect the perimeters an even number of times, indicating that the pets are not within the safe zone. *Id.*

E. Challenged Claims

Petitioner challenges claims 1–18 of the '295 patent. Claim 10, reproduced below (with bracketed identifying labels added), is an exemplary independent claim:

10. [10.Preamble] A method for determining whether a subject wearing a device is inside or outside of a containment zone defined by a containment perimeter, the method comprising:

[10.A] [g]enerating position data corresponding to the position of the subject; the position data including satellite positioning data;

[10.B] [r]eceiving data from a memory representing a plurality of line segments forming the containment perimeter;

[10.C] [m]athematically casting a ray from the position of the subject toward a line segment of the plurality of line segments representing the containment perimeter;

[10.D] [m]athematically determining the number of line segments of the plurality of line segments that are intersected by the ray; and

[10.G] [d]etermining, from the number of line segments of the plurality of line segments intersected by the ray, whether the subject is inside the containment zone or outside of the containment zone.

Ex. 1001, 20:22–39; Ex. 1020, 4–5. Independent claim 1 recites a system having similar limitations, and dependent claims 2–9 and 11–18 recite further limitations of their respective independent claims. Ex. 1001, 19:26–21:16; Ex. 1020 at 1–7.

F. Prior Art Relied Upon

With respect to the claims of the '295 Patent, Petitioner relies upon the prior art references listed below. Pet. 1–2.

Name	Reference	Exhibit
Franklin	“PNPOLY – Point Inclusion in Polygon Test,” W. Randolph Franklin, available at https://web.archive.org/web/20050518083531/http://www.ecse.rpi.edu/Homepages/wrf/Research/Short_Notes/pnpoly.html , May 18, 2005	1007
House	<i>Chapter 9 – Raycasting Polygonal Models</i> , Donald H. House, https://web.archive.org/web/20131228085233/http://people.cs.clemson.edu/~dhouse/courses/405/notes/raypolygon.pdf , December 28, 2013	1008
Chang	“Wireless Pet Containment System,” Jonathan Chang, et al., available online at: https://web.archive.org/web/20160619051742/https://www.ece.rutgers.edu/Capstone2016 , April 26, 2016	1010
Geeks	“How to check if a given point lies inside or outside a polygon?” Geeks for Geeks, available at https://web.archive.org/web/20130715200034/http://www.geeksforgeeks.org/how-to-check-if-a-given-point-lies-inside-a-polygon , July 11, 2013	1011
Llaria	“Geolocation and monitoring platform for extensive farming in mountain pastures,” Alvaro Llaria, et al., IEEE International Conference on Industrial Technology (ICIT), 2420-2425, June 18, 2015	1012

Schirra	“How reliable are practical point-in-polygon strategies?” S. Schirra, 16 th European Symposium on Algorithms (ESA), 744–755, 2008	1013
Berntsen	U.S. Patent No. 8,939,111 B2, issued Jan. 27, 2015	1014
Guinta	U.S. Patent No. 8,448,607 B2, issued May 28, 2013	1015
Trenkle	U.S. Patent No. 9,173,380 B2, issued Nov. 3, 2015	1016
Rich	U.S. Patent Application Number 20110298615 A1, published Dec. 8, 2011	1017
Shah	“When is a Point Inside a Polygon?”, Vivek Shah, available at: https://web.archive.org/web/20130517010213/http://cgatglance.blogspot.com/May 17, 2013	1018
Claus	“Collision Course II: Ray-Polygon-Intersection,” available at https://web.archive.org/web/20161021075420/http://phys.ik.cx/ , April 8, 2016	1019

Based on the record, we determine Petitioner has made a sufficient showing that these references are prior art patents or printed publications under 35 U.S.C. § 102. *See* Pet. iii–iv; 14–35; Ex. 1006 ¶¶ 103, 104, 107, 108, 111, 114, 117, 120, 122–123, 125; Ex. 1010, 1; Ex. 1011, 1; Ex. 1012, 1, 6; Ex. 1013, 1; Ex. 1014, codes (45), (86); Ex. 1015, codes (22), (45); Ex. 1016, codes (22), (45); Ex. 1017, (22), (43); Ex. 1018, 1; Ex. 1019, 1.

G. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–18 of the ’295 patent on the following grounds:

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
1, 2, 8–11, 17, 18	102	Chang
1, 2, 8–11, 17, 18	103	Chang, Geeks
10, 11, 17, 18	102	Llaria
10, 11, 17, 18	103	Llaria, Schirra
1–18	103	Llaria, Chang, Geeks, Rich, House, Franklin, Shah, Claus ³
1–18	103	Berntsen, Chang, Geeks, Rich, House, Franklin, Shah, Claus
1–18	103	Giunta, Chang, Geeks, Rich, House, Franklin, Shah, Claus
1–18	103	Trenkle, Chang, Geeks, Rich, House, Franklin, Shah, Claus

In the last four grounds listed in this table above, Petitioner relies on certain passages in the '295 patent that Petitioner contends are Applicant Admitted Prior Art ("AAPA"). *See* Pet. 14 (citing the following as AAPA: Ex. 1001, 1:15–18, 1:23–27, 1:53–59, 2:15–23, 2:26–27, 2:60–62), 51–96 (relying on alleged AAPA). This is a permissible use of AAPA because Petitioner relies on AAPA in combination with one or more prior art patents or printed publications. *See* June 9, 2022, Memorandum from Director

² The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284, 287–88 (2011), revised 35 U.S.C. §§ 102 and 103, effective March 16, 2013. Because the application from which the '295 patent issued was filed after this date with no claims to priority before this date, the AIA versions of §§ 102 and 103 apply.

³ Llaria is combined with either Chang and Geeks, or Rich, or House, or Franklin, or Shah, or Claus. Pet. 51. The grounds based on Berntsen, Giunta, and Trenkle are similarly presented in those alternative combinations.

Vidal titled “Updated Guidance on the Treatment of Statements of the Applicant in the Challenged Patent in Inter Partes Reviews under § 311” (available at <https://www.uspto.gov/sites/default/files/documents/20220609updatedAAPAmemo.pdf>).

II. PATENTABILITY OF THE CHALLENGED CLAIMS

A. *Legal Standards*

1. § 102

A claim is unpatentable under 35 U.S.C. § 102 “if each and every [claim] limitation is found either expressly or inherently in a single prior art reference.” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1273 (Fed. Cir. 2017) (citation omitted). “A claim limitation is inherent in the prior art if it is necessarily present in the prior art, not merely probably or possibly present.” *Akamai Techs., Inc. v. Cable & Wireless Internet Servs., Inc.*, 344 F.3d 1186, 1192 (Fed. Cir. 2003) (citing *Rosco, Inc. v. Mirror Lite, Co.*, 304 F.3d 1373, 1380 (Fed. Cir. 2002)). We analyze the asserted grounds based on anticipation with these principles in mind.

2. § 103

A claim is unpatentable under § 103 if the differences between the claimed subject matter 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 art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in

the art and (4) when in evidence, objective indicia of non-obviousness.⁴ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). We analyze the asserted grounds based on obviousness with these principles in mind.

B. Level of Skill in the Art

Petitioner offers an assessment as to the level of skill in the art as of the time the '295 patent was filed; i.e., “bachelor’s degree in Electrical or Computer Engineering, Computer Science, or a related field and . . . three or more years of experience in the field.” Pet. 10–11 (citing Ex. 1006 (Madisetti Decl.) ¶¶ 33–38). Patent Owner does not object to this assessment. Resp. 7. To the extent necessary, we accept the assessment offered by Petitioner as it is supported by the Madisetti Declaration and is consistent with the '295 patent and the majority of the asserted prior art except that we exclude “or more” to eliminate vagueness as to the amount of experience. The qualifier expands the range indefinitely without an upper bound, and thus precludes a meaningful indication of the level of ordinary skill in the art.

C. Claim Construction

We apply the same standard that is used to construe a patent claim in a civil action under 35 U.S.C. § 282(b), and construe each claim in accordance with the ordinary and customary meaning of such claim, as understood by one of ordinary skill in the art in the context of the patent, and the prosecution history pertaining to the patent, as articulated in *Phillips v. AWH*

⁴ Patent Owner does not identify any objective indicia of non-obviousness to be considered. Accordingly, we do not consider this aspect of the obviousness analysis.

Corp., 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b) (2021)). “[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). We do not expressly construe any claim terms beyond the extent necessary in our discussion of the parties’ arguments below.

Petitioner asserts that the parties have reached agreement on certain constructions. Pet. 6. The parties have agreed that the preambles are limiting. *Id.* The parties have agreed that “attitude and reference data” should be construed as “data indicating the subject’s orientation or motion relative to a known point or state.” *Id.* The parties have agreed that “plurality of satellite constellations” should be construed as “two or more systems of associated satellites, including but not limited to GPS (NAVSTAR), GALILEO or GLONASS.” *Id.* Patent Owner represents that the District Court has construed these terms in the same manner. Resp. 8 (citing Ex. 2023).

Petitioner asserts that the term “mathematically cast/casting a ray from the position of the subject toward a line segment of the plurality of line segments representing the containment perimeter” should be construed as “calculate a straight line that begins at the position of the subject and runs in the direction determined to be toward one of the line segments that make up the containment perimeter, wherein the line segments are not longitude or latitude lines.” Pet. 7–10. Patent Owner provides the District Court’s construction of that term, which is, “calculate a straight line that runs from the position of the subject toward a line segment of the plurality of line

segments representing the containment perimeter.” Resp. 8. We do not find any meaningful distinction between the proposed constructions; however, for purposes of clarity, we apply the District Court’s definition.

We further note the additional constructions provided by the District Court, as represented by Patent Owner. *Id.* The term “containment zone” is an “area defined by the containment perimeter,” and the “containment perimeter” is “a plurality of line segments arranged in the shape of a polygon.” *Id.* Because these constructions are consistent with their usage in the ’295 patent and the relevant prior art, we adopt them here.

D. Chang and Geeks

Petitioner contends that claims 1, 2, 8–11, 17, and 18 of the ’295 patent are unpatentable as anticipated under 35 U.S.C. § 102 by Chang and the material Chang incorporates from Geeks. Pet. 36. Alternatively, Petitioner contends that claims 1, 2, 8–11, 17, and 18 would have been obvious under 35 U.S.C. § 103, over the combined teachings of Chang and Geeks. *Id.* at 36 n.2. Petitioner also relies upon the Madisetti Declaration to support its positions. Ex. 1006.

Patent Owner does not challenge Petitioner’s assertions with respect to claims 10, 11, 17, and 18. Resp. 10 n.2. With respect to those claims, we are persuaded by Petitioner’s explanations and supporting evidence. With respect to claims 1, 2, 8, and 9, we are not persuaded by Petitioner’s explanations and supporting evidence. We begin our analysis with a brief overview of Chang and Geeks.

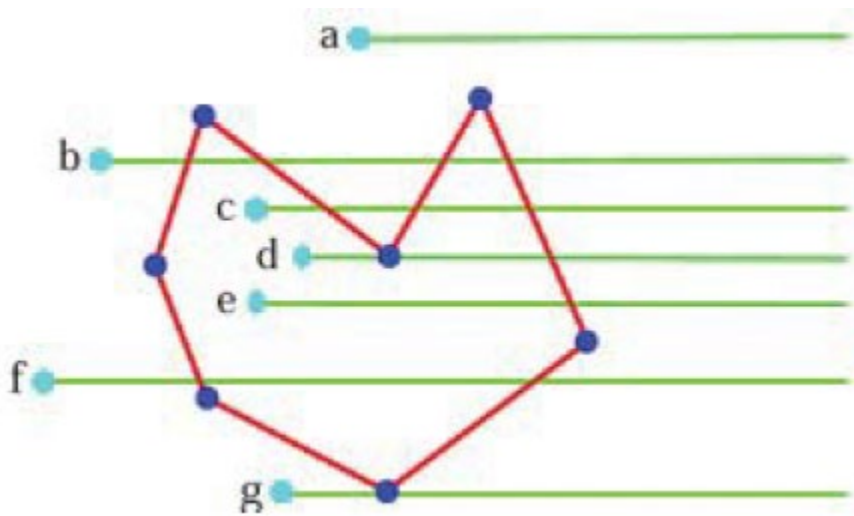
1. Overview of Chang

Chang, a presentation at a Rutgers University Capstone design project, relates to a wireless pet containment system. Ex. 1010, 1, 14.

Chang proposed to “build on [prior] wireless containment system[s] by adding an Android application component” to “not only track their pet, but also draw an imaginary fence within which they wish to contain their pet.” *Id.* The app works in conjunction with a collar having a GPS sensor and a control unit. *Id.* The control unit receives GPS coordinates from the sensor and fence parameters from the Android app and runs an algorithm to ensure the pet is within the given parameters. *Id.* One research challenge identified by Chang is “[r]equir[ing] [an] efficient algorithm to perform real-time computation of [the] pet’s location.” *Id.* at 15. Chang points to “How to check if a given point lies inside or outside a polygon”; i.e., “Geeks.” *Id.*

2. Overview of Geeks

Geeks, an article on a “computer science portal for geeks,” describes “a simple idea to check whether a point is inside or outside” a polygon constructed of line segments. Ex. 1011, 1–2. First, a horizontal line is drawn to the right of each point and extended to infinity. *Id.* Second, the number of times the line intersects the polygon is counted. *Id.* If the number is even, the point is outside the polygon; if the number is odd, the point is inside the polygon. *Id.* The Figure below illustrates this approach:



The Figure illustrates a polygon of seven blue points connected by seven red lines, with points a–g at various locations either inside or outside the polygon, and green horizontal lines extending from each point to the right edge of the Figure. *Id.* A C++ implementation is described. *Id.* at 2–5.

3. Analysis

Petitioner provides a detailed analysis supported by testimony about how the references teach the limitations in the claims. Pet. 36–43. We begin with claim 10.

a) Claim 10

[10.Preamble] A method for determining whether a subject wearing a device is inside or outside of a containment zone defined by a containment perimeter, the method comprising:

Petitioner points to Chang as describing a collar with a GPS sensor and control unit, in which an algorithm is run to ensure that the pet is within parameters based on location and virtual fence parameters. *Id.* at 36 (citing Ex. 1010, 14; Ex. 1006 ¶ 182). Petitioner further points to Chang’s image of a containment area, including a perimeter. *Id.* at 36–37 (citing Ex. 1010, 15; Ex. 1006 ¶ 183).

[10.A] generating position data corresponding to the position of the subject; the position data including satellite positioning data;

Petitioner points to Chang as describing a collar with a GPS sensor that determines and sends a pet's location to a control unit, which is a Raspberry Pi processor. *Id.* at 37 (citing Ex. 1010, 15; Ex. 1006 ¶¶ 185–188).

[10.B] receiving data from a memory representing a plurality of line segments forming the containment perimeter;

Petitioner points to Chang's reception of fence parameters from an Android app and Chang's disclosure that the "Raspberry Pi ['RPI'] transfers raw data from the GPS sensor to useful data structure." *Id.* at 38. (citing Ex. 1010, 14; Ex. 1006 ¶¶ 189–193). Meanwhile the "RPI constructs connections with Android devices using socket programming and passes the coordinates as a usable data structure for Java." *Id.* (quoting Ex. 1010, 15). Petitioner further contends that the fence parameters must inherently be stored in a memory for the algorithm to ensure that the pet is within those parameters. *Id.* (citing Ex. 1010, 14; Ex. 1006 ¶ 192).

[10.C] mathematically casting a ray from the position of the subject toward a line segment of the plurality of line segments representing the containment perimeter;

[10.D] mathematically determining the number of line segments of the plurality of line segments that are intersected by the ray; and

[10.E] determining, from the number of line segments of the plurality of line segments intersected by the ray, whether the

subject is inside the containment zone or outside of the containment zone.

Petitioner points to Chang as describing the problem as “finding an appropriate algorithm for determining whether a point lies within a given polygon and fine-tuning an acceptable order of precision for the GPS sensor on the pet collar.” *Id.* at 39–40 (citing Ex. 1010, 14). Petitioner points to Chang’s identification of Geeks as describing “[h]ow to check if a given point lies inside or outside a polygon.” *Id.* at 39 (citing Ex. 1010, 15).

Petitioner points to Geeks as describing casting horizontal lines from points near a polygon, including points that cast lines toward a line segment of a containment perimeter. *Id.* (citing Ex. 1011, 2; Ex. 1006 ¶¶ 198–200). Petitioner further points to Geeks as describing counting the number of times a line intersects the polygon, and determining therefrom whether the point is inside or outside the polygon. *Id.* at 40 (citing Ex. 1011, 2; Ex. 1006 ¶ 199).

With respect to the combination, Petitioner points to Chang’s statement of a need for an algorithm that determines whether a point lies inside or outside a polygon, and Chang’s direct reference to the Geeks article describing an algorithm having those exact properties. *Id.* at 39–40 (citing Ex. 1010, 15). Petitioner relies on its declarant’s statement that a person of ordinary skill in the art would understand Chang to incorporate the algorithm of Geeks as the algorithm for Chang’s collar. *Id.* at 39 (citing Ex. 1006 ¶¶ 195–197). Further, Petitioner’s declarant states that a person having ordinary skill in the art would understand Chang and Geeks to be treated as a single reference describing the collar. *Id.* (citing Ex. 1006 ¶¶ 195–197). We determine these facts to be sufficient to show that a person of ordinary skill

in the art would have reason to combine the references with a reasonable expectation of success.

Although Patent Owner does not contest Petitioner's assertions with respect to claim 10, the burden remains on Petitioner to demonstrate unpatentability. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Based on Petitioner's persuasive contentions and evidence, we determine that Petitioner has met that burden, and has shown by a preponderance of the evidence that claim 10 is unpatentable.

b) *Claims 11, 17, and 18*

Claim 11 further requires,

wherein the step of determining if the subject is inside the containment zone or outside of the containment zone includes determining if the number of line segments of the plurality of line segments intersected by the ray is an odd number in which case the subject is determined to be inside the containment zone and determining if the number of line segments of the plurality of line segments intersected by the ray is an even number in which case the subject is determined to be outside of the containment zone.

Ex. 1020, 5.

Petitioner points to Geeks' description that if the number of intersections of a line cast from the point is even, the point is inside the polygon, and that if the number of intersections of a line cast from a point is odd, the point is outside the polygon. Pet. 41–42 (citing Ex. 1011, 2; Ex. 1011 ¶¶ 169–171).

Claim 17 further limits the subject to one of an animal, a human, or an object. Ex. 1020, 7. Petitioner points to Chang's description of a "pet"

receiving a correction as a reminder to stay within the yard. Pet. 42 (citing Ex. 1010, 14; Ex. 1006 ¶¶ 215–218).

Claim 18 further limits the device to be in the form of a collar. Ex. 1020, 7. Petitioner points to Chang’s description of a collar that contains a GPS sensor. Pet. 42–43 (citing Ex. 1010, 15; Ex. 1006 ¶¶ 219–223).

Patent Owner does not contest Petitioner’s assertions with respect to claims 11, 17, and 18. Resp. 10 n. 2. We determine that Petitioner has shown the limitations of claims 11, 17, and 18 to be taught by the abovementioned portions of Chang and Geeks, and that a person of ordinary skill in the art would have reason to combine the references with a reasonable expectation of success. For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 11, 17, and 18 are unpatentable.

c) Claims 1, 2, 8, and 9

Claim 1 differs from claim 10 in that claim 1 recites a device comprising a positioning unit (for determining the positioning of the subject) and a processor unit in communication with the positioning unit and configured to perform steps analogous to steps 10[B-E] (i.e., receiving data and performing the mathematical determination of the subject’s position relative to the containment zone). Ex. 1020, 1–2.

(1) Parties’ Assertions and Arguments

Petitioner points to the above-identified descriptions in Chang and Geeks for the limitations common to claims 1 and 10. Pet. 40–41. Patent Owner argues that the combination of Chang and Geeks does not teach a positioning unit as part of the same device that includes the processor that performs the claimed mathematical ray casting computations. Resp. 34.

With respect to the positioning unit and processor unit being part of the device, Petitioner points to the following graphic as “depict[ing] the collar and its components”:



The graphic reproduced above portrays an equation in which two pictures of electronic components are added to a green robot icon to equal a picture of a device having a loop. *Id.* at 36–37 (citing Ex. 1010, 15; Ex. 1006 ¶ 183).

Petitioner identifies the positioning unit as being taught by Chang’s GPS that sends the pet’s location to a control unit, which Petitioner identifies as a Raspberry Pi. *Id.* at 37 (citing Ex. 1010; Ex. 1006 ¶¶ 185–188); Reply 11.

Patent Owner argues that Chang’s ray casting is performed on a device separate from the collar. Patent Owner points to Chang’s description of a “collar, which contains a GPS sensor, [that] is responsible for sending the pet’s current coordinates to the control unit.” Resp. 34 (citing Ex. 1010, 14). Patent Owner argues that this indicates that the collar is separate from the control unit. *Id.* (citing Ex. 2024 ¶ 142). Patent Owner further points to Chang’s description of the control unit as one of “multiple devices” across which data is exchanged, and in which the GPS sensor is the “remote device.” *Id.* at 35 (citing Ex. 1010, 15; Ex. 2024 ¶ 145). Patent Owner further points to Chang’s description of the control unit transferring the positioning data to the Android device, which runs a daemon that responds

to the Raspberry Pi, and performs the ray casting calculations. *Id.* at 35–36 (citing Ex. 1010, 15; Ex. 2024 ¶ 148). Patent Owner argues that Chang’s description is “poorly written” and contains some ambiguities. *Id.* at 35, 36 n.5.

Petitioner attempts to clarify its assertions in its Reply. Petitioner asserts that a person having ordinary skill in the art would recognize that Chang’s control unit performs the “in/out determination,” and is therefore the claimed processor that performs the claimed mathematical ray casting computations. Reply 11 (citing Ex. 1010, 14). Petitioner further asserts that the control unit is on the tracked pet because the Raspberry Pi contains a buzzer that “is activated to alert the pet not to cross,” which would indicate that the buzzer is located on the collar. *Id.* at 12 (citing Ex. 2025 ¶ 30). Petitioner asserts that Chang “discloses an embodiment” with all claim elements on a single device, and a second embodiment in which the Raspberry Pi instead sends the location data to a daemon on a separate device. Reply at 11–13 (citing Ex. 2025 ¶ 34).

Patent Owner argues that this “two embodiment” assertion was not raised in the original Petition. Sur-reply 2. Patent Owner argues that this results from “Dr. Madisetti mixing and matching disclosures” from the same portions of Chang, in some cases relying on different portions of the same sentence as describing different embodiments. *Id.* at 3–4. Patent Owner further argues that none of Petitioner’s citations to Chang support Petitioner’s interpretation. *Id.* at 3.

Claims 2, 8, and 9 recite limitations analogous to those in claims 11, 17, and 18, and we agree with Petitioner that those limitations are described

by Chang and Geeks as discussed for claims 11, 17, and 18, *supra*. Thus, claims 2, 8, and 9 will stand or fall with claim 1.

(2) *Determination*

Petitioner has not met its burden to show an on-collar embodiment of Chang teaches or discloses the “device to be disposed on a subject . . . the device comprising a positioning unit . . and [a] processor unit” limitations of claim 1. We agree with Patent Owner that Chang’s inconsistent descriptions do not sufficiently disclose or teach locating a processor performing mathematical boundary-crossing calculations in the same device as Chang’s GPS positioning device.

As an initial matter, Petitioner asserts that the preamble language of “device to be disposed on a subject” is limiting. Pet. 6. We agree that the preamble is limiting at least to the extent that both the positioning unit and the processor, and all of their associated functions, must be part of the same device that is recited to “comprise” both items.

In the Petition, Chang’s graphic of GPS, Raspberry Pi, and Android symbol (reproduced *supra*), in view of statements from Dr. Madisetti, is relied upon to show a Raspberry Pi control unit on the collar. Pet. 15, 37–38, 40–41 (citing Ex. 1006 ¶¶ 138–141; Ex. 1010, 15). Petitioner also relies on Chang’s description that “[t]he control unit receives the GPS coordinates from the collar and the fence parameters from the Android app, and runs an algorithm to ensure that the pet is within the given parameters.” Pet. 41 (citing Ex. 1010, 14). In its Reply, Petitioner further points to the buzzer “installed on [the Raspberry Pi] that will be activated to alert the pet not to cross” the boundary. Reply 11 (citing Ex. 1010, 15). Petitioner asserts that these descriptions locate the mathematical processing on the control unit,

describe the control unit as a Raspberry Pi, and locate the Raspberry Pi on the collar. In this manner, Petitioner asserts that the boundary-crossing calculations occur at the collar.

However, Patent Owner points to Chang's multiple descriptions of the mathematical boundary crossing calculations being located not on the collar, but on a user's device. Chang describes "the collar . . . sending the pet's current coordinates to the control unit," in which the "control unit receives the GPS coordinates from the collar . . . and runs an algorithm to ensure that the pet is within the given parameters." Resp. 34 (citing Ex. 1010, 14). Chang describes the GPS sensor and control unit as "multiple devices." *Id.* at 35 (citing Ex. 1010, 15). Chang describes the control unit transferring GPS data to an Android device, and that a "daemon" on the Android device then determines boundary crossing "according to the location data received from the [Raspberry Pi]" and "responds to [the Raspberry Pi]." *Id.* (citing Ex. 1010, 15). Other statements in Chang, such as "the daemon responds to [the Raspberry Pi]," and that the invention "[r]equire[s an] efficient algorithm to perform real-time computation of the pet's location on a cheap phone processor," further appear to locate the mathematical boundary crossing calculation on the "Android device" having a "user-friendly" interface that "enable[s] pet owners to supervise the activities of their pets." Ex. 1010, 15. Mr. Sturza, Patent Owner's declarant, testifies that Chang is "ambiguous . . . [but] does not disclose running the algorithm determining in/out status on the same device that includes the GPS sensor." Ex. 2024, 144.

Petitioner bears the burden of explaining why one having ordinary skill in the art would recognize Chang to teach or suggest an on-collar

boundary-crossing processor. Petitioner cannot point to a single statement in Chang describing a processor performing boundary-crossing calculations as being located on the collar. To the contrary, the portion of Chang cited by Petitioner as disclosing the control unit running the boundary-crossing algorithm clearly states that “[t]he control unit receives the GPS coordinates from the collar.” Pet. 41 (citing Ex. 1010, 14). Viewed as a whole, the weight of the evidence locating the boundary-crossing processor on-collar is significantly less than the weight of the evidence locating that processor on-collar.

In its Reply, Petitioner postulates that there are two separate embodiments, an on-collar embodiment and an off-collar embodiment, in Chang. Petitioner attempts to show that a certain subset of Chang’s descriptions should be taken together to indicate that the processor can be located on the collar. We do not find this explanation persuasive.

As noted by Patent Owner, Petitioner does not point to discrete sections of Chang as describing discrete embodiments. Instead, Petitioner picks and chooses statements from both the poster (Ex. 1010, 15) and the abstract of the poster (Ex. 1010, 14) to find descriptions supporting its on-collar theory. Petitioner then categorizes any contrary description as a separate off-collar embodiment. But Petitioner does not explain why Chang’s disclosure should be carved up in such a manner. Petitioner does not point to any statement in Chang indicating the presence of two distinct methods of locating the boundary-crossing processor. Tr. 17–18. Nor does Petitioner provide any satisfactory reason as to why the selected statements would have been read together, separately from the statements that indicate processing is being performed off-collar. We further consider that the

Petition makes no mention of two distinct embodiments in Chang in its assertions against claim 1. Further, even Petitioner's selected statements indicate that the processor performing the boundary-crossing calculation "receives the GPS coordinates from the collar." Pet. 41 (citing Ex. 1010, 14). Weighing the entirety of the evidence and arguments, Petitioner has not persuaded us that it is more likely than not that the contradictory or ambiguous statements in Chang represent a description of two embodiments, rather than a single embodiment that is unclearly described.

Accordingly, Petitioner has not shown, by a preponderance of the evidence, that Chang's boundary-crossing processor is taught to be on the collar along with Chang's positioning unit. Thus, Petitioner has not persuasively shown Chang to disclose or teach a single device having both position determination and mathematical boundary crossing processing as required by claim 1. Because Petitioner does not assert a separate teaching of this for dependent claims 2, 8, or 9, that defect also extends to those claims.

In view of the foregoing, we determine that Petitioner has not shown, by a preponderance of the evidence, that claims 1, 2, 8, and 9 would have been obvious over the applied combination of Chang and Geeks.

E. Llaría and Schirra

Petitioner contends that claims 10, 11, 17, and 18 of the '295 patent are unpatentable as anticipated under 35 U.S.C. § 102 by Llaría and the material Llaría incorporates from Schirra. Pet. 43–44. Alternatively, Petitioner contends that claims 10, 11, 17, and 18 would have been obvious under 35 U.S.C. § 103, over the combined teachings of Llaría and Schirra. Pet. 43 n.5. Petitioner also relies upon the Madisetti Declaration to support

its positions. Ex. 1006. Patent Owner does not challenge Petitioner's assertions. Resp. 10 n. 2. For the reasons discussed below, we are persuaded by Petitioner's explanations and supporting evidence. We begin our analysis with a brief overview of Llara and Schirra.

1. *Overview of Llara*

Llara relates to monitoring livestock. Ex. 1012, 1. Specifically, Llara aims to "implement a system capable of determin[ing] the location of animals in mountain pastures." *Id.* at 2. Llara seeks geolocation devices that can operate during seven months without needing battery replacement, assuring good coverage, and having a size and weight that does not disturb the animals. *Id.* at 3. Llara's device consists of four parts: GPS module, wireless communication module, microcontroller, and batteries. *Id.* Livestock locations and virtual fences may be seen on a user interface. *Id.*

2. *Overview of Schirra*

Schirra relates to "point-in polygon strategies." Ex. 1013, 1. Schirra tests a number of different codes representing different algorithms to compare correctness and numerical stability. *Id.* at 2–3.

3. *Analysis*

a) *Petitioner's contentions*

With respect to the preamble of claim 10, Petitioner contends that Llara describes a collar having a geolocation device (Fig. 3), containing a GPS module, a low-power microcontroller, batteries, and a wireless communication device (Fig. 2). Pet. 44–46 (citing Ex. 1012, 2422; Ex. 1006 ¶ 229). Petitioner further points to Llara's description of a user interface showing virtual fences on a map that permits users to manage zones, and to track animals in the field and monitor their movements. *Id.* at 43–47.

With respect to limitation 10.A, Petitioner points to Llara's description of Global Positioning System data to acquire positions of the collar. *Id.* at 46 (citing Ex. 1012, 2422). With respect to limitation 10.B, Petitioner points to Llara's description of functionalities for creating, editing, and deleting virtual fences over a map. *Id.* at 47 (citing Ex. 1012, Fig. 5, 2422). Petitioner relies on its declarant's statement that a memory is inherently required for such creating, editing, and deleting. *Id.* (citing Ex. 1012, 2422; Ex. 1006 ¶ 236).

With respect to limitations 10.C–10.E, Petitioner points to Llara as describing that “point-in-polygon geometric computations [32] are used to decide whether an animal position is found to be inside an area (fence) or not, thus generating an alarm on the user interface.” *Id.* at 47–48 (citing Ex. 1012, 2423, 2425). Petitioner points to reference “[32]” in Llara as Schirra, and argues that this indicates incorporation of the point-in-polygon strategies described in Schirra. *Id.* at 48 (citing Ex. 1012, 2420; Ex. 1006 ¶¶ 239–241).

Petitioner points to Schirra's description of the “crossing number algorithm” as “[p]robably the most common algorithm for point-in-polygon testing.” *Id.* (citing Ex. 1013, 2). Petitioner further points to Schirra's description, “[c]rossing number algorithms compute the parity of the **number of intersections** of an (horizontal) **ray** with the polygon boundary.” *Id.* (quoting Ex. 1013, 3). Petitioner relies on its declarant's statement that a person would understand that whenever the point is within the polygon, the line will be cast towards a line segment of the containment perimeter. *Id.* at 48–49 (citing Ex. 1006 ¶ 242).

With respect to claim 11, Petitioner further relies on its expert's statement that a person having ordinary skill in the art would recognize that an odd/even determination is inherently the basis for the crossing number algorithms. *Id.* at 49 (citing Ex. 1006 ¶ 243). With respect to claim 17, Petitioner points to Llaría as stating its ideal solution as knowing "the position of each animal." *Id.* at 50 (citing Ex. 1012, 2421). With respect to claim 18, Petitioner points to Llaría's description of a collar that includes a "GNSS module," a "wireless communication module," a "microcontroller," and an "energy unit." *Id.* (citing Ex. 1012, 2422 Figs. 2, 3).

With respect to the combination as viewed in the context of obviousness, Petitioner points to Llaría's statement of a need for an algorithm that determines whether a point lies inside or outside a polygon, and Llaría's direct reference to Schirra's article describing an algorithm having those exact properties. *Id.* at 48–49 (citing Ex. 1013, 2–3). Petitioner relies on its declarant's statement that a person of ordinary skill in the art would understand Llaría to incorporate the algorithm of Schirra as the algorithm for Llaría's collar. *Id.* at 48 (citing Ex. 1006 ¶¶ 239–241). Further, Petitioner's declarant states that a person having ordinary skill in the art would understand Llaría and Schirra to be treated as a single reference describing the collar. *Id.* at 49 (citing Ex. 1006 ¶¶ 239–241). We determine these facts to be sufficient to show that a person of ordinary skill in the art would have reason to combine the references with a reasonable expectation of success. Thus, we need not decide whether Llaría incorporates Schirra by reference for purposes of anticipation because we are persuaded that Llaría's express mention of Schirra is a teaching to use the algorithm of Schirra, and is sufficient for obviousness.

b) *Determination*

Patent Owner does not contest Petitioner's assertions with respect to claims 10, 11, 17, and 18. Resp. 10 n. 2. We determine that Petitioner has shown the limitations of claims 10, 11, 17, and 18 to be taught by the abovementioned portions of Llaría and Schirra, and that a person of ordinary skill in the art would have reason to combine the references with a reasonable expectation of success. For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 10, 11, 17, and 18 are unpatentable as obvious over the combination of Llaría and Schirra.

F. Obviousness over Llaría and other references

Petitioner asserts that claims 1–18 would have been obvious over Llaría, in view of one of Chang in view of Geeks, Rich, House, Franklin, Shah, Claus, and Appellant's Admitted Prior Art ("AAPA"). Pet. 1. Patent Owner contests only claims 1–9 and 13–14 of this ground. Resp. 9–10. With respect to claims 10–12 and 15–18, we are persuaded by Petitioner's assertions of obviousness. With respect to claims 1–9, 13, and 14, we are not persuaded by Petitioner's assertions of obviousness.

1. *Overview of Rich, House, Franklin, Shah, and Claus*

Rich is a U.S. patent application publication directed to a dog collar delivering a correction when the dog exits a defined border, in which the dog is determined to be within the border when a vector intersects an odd number of fence segments. Ex. 1017 ¶¶ 22, 135.

House is a book chapter entitled "Raycasting Polygonal Models," discussing mathematical techniques for considering intersections of rays and polygons. Ex. 1008.

Franklin is a web page discussing computational techniques for determining if a point lies within a polygon. Ex. 1007.

Shah is a web page providing a mathematical algorithm for determining when a point is inside a polygon. Ex. 1018.

Claus is a web page discussing how to determine if a planar polygon is intersected by a ray in three-dimensional space. Ex. 1019.

2. Claims 1–9

We begin with claim 1, for which the parties dispute whether Llaría teaches a device that is located on the subject and contains both positioning and boundary calculating functions. Claim 1 differs from claim 10 in that claim 1 recites a device comprising a positioning unit (for determining the positioning of the subject) and a processor unit in communication with the positioning unit and configured to perform steps analogous to steps 10[B-E] (i.e., receiving data and performing the mathematical determination of the subject’s position relative to the containment zone). Ex. 1020, 1–2.

Petitioner describes Llaría as describing a collar having a positioning unit and a user’s smartphone (or similar device) having a processor that performs “point-in-polygon geometric computations [to] decide whether an animal position is found to be inside an area (fence) or not.” Pet. 50, 52 (quoting Ex. 1012, 4). Thus, Llaría is not asserted to contain the boundary calculating function.

Petitioner asserts that it would be a design choice whether to perform the computations at a processor on the collar or at a processor on the user’s device. Pet. 52 (citing Ex. 1006 ¶¶ 290–291). Patent Owner argues that such a conclusionary statement does not satisfy Petitioner’s burden to explain why such a combination would have been obvious. Resp. 41.

Patent Owner points to Llara's discussion of minimizing energy usage, including the complexity of algorithms, on the collar device. *Id.* at 39–41 (citing Ex. 1012, 2–4). Petitioner responds by arguing that “balancing power concerns with functionality is a common design problem.” Reply 14–15. Petitioner, supported by Dr. Madisetti, asserts that data transfer between collar and user could be reduced, “potentially allowing less overall power consumption instead of more.” *Id.* at 16 (citing Ex. 1025 ¶ 43).

In its Sur-reply, Patent Owner argues that the obviousness of an alternative requires a showing that the alternative would not only be feasible, but also desirable. Sur-reply 7 (citing *In re Fulton*, 391 F.3d 1195, 1120 (Fed. Cir. 2005) (“Trade-offs often concern what is feasible, not what is, on balance, desirable. Motivation to combine requires the latter.”)). Patent Owner argues that Petitioner's conclusionary statement is insufficient. *Id.* at 8 (citing *Fanduel, Inc. v. Interactive Games LLC*, 966 F.3d 1334, 1344 (Fed. Cir. 2020) (affirming Board's finding that claim was not unpatentable as obvious because it was not sufficient for Petitioner merely to state that adding an element was “an obvious design choice”)).

We agree with Patent Owner. As in *Fanduel*, there is “a gap between the concept of [a co-located processor] being well known and the beneficial application of that concept to [Llara's collar].” *Fanduel*, 966 F.3d at 1344. Petitioner and its declarant's statement appears to acknowledge the general applicability and versatility of processors, without further evidence or explanation of why a boundary-calculating processor would have been well known to be located on a collar or other remote tracking device. Although there is no dispute that processors find ubiquitous application in devices, in many forms and combinations, that does not show that a person having

ordinary skill in the art would find any particular arrangement of processors to be obvious.

We further consider Llaría's focus on low-power collars throughout its description, as pointed out by Patent Owner, including that Llaría "criticized an even less burdensome modification" in the form of an added algorithm "that increases the complexity and computation charge of the system." Resp. 39–41 (citing Ex. 1012, 2). We also consider Dr. Madisetti's countering evidence that relies, in part, on speculative possibilities. Ex. 1025 ¶¶ 41–43 (device could be disposed "on a vehicle with plenty of surplus electrical power"; boundary crossing calculation on the collar "could" reduce data and "potentially" allow less overall power consumption). We consider the facts and evidence as a whole. *Arctic Cat, Inc. v. Bombardier Recreational Products, Inc.*, 876 F.3d 1350, 1360 ("Determining whether a claimed combination would have been obvious to a skilled artisan requires consideration of all the facts, no one of which is dispositive"). The evidence shows that Llaría's focus on power conservation on the collar device is a consideration that would weigh against arbitrarily adding features to that collar. *Id.* at 1363 ("Evidence suggesting reasons to combine cannot be viewed in a vacuum apart from evidence suggesting reasons not to combine," even if the "evidence may not rise to the level of teaching away"). We determine that Llaría's focus on minimizing the power of its remote tracking device would prompt a person having ordinary skill in the art to at least consider the advantages and disadvantages of adding further powered devices to the tracking device. Such consideration would not prevent the addition of a powered feature to the collar where a person of ordinary skill in the art would find countervailing advantages of the

combination to make such a combination obvious. However, Petitioner has failed to persuasively identify any such advantage. Consequently, we determine that Petitioner has not shown, by a preponderance of the evidence, that claim 1 would have been obvious over the teachings of Llaría.

Petitioner does not rely on any of the other applied references for this teaching. Further, we have determined that Chang does not provide this teaching. *Supra* at II(D)(3)(d). Consequently, Llaría, in view of any of the asserted references, is not shown to teach or suggest each limitation of claim 1. Such failure extends to each claim dependent on claim 1. Thus, Petitioner has not shown that claims 1–9 would have been obvious over Llaría in combination with Chang in view of Geeks, Rich, House, Franklin, Shah, or Claus, and Appellant’s Admitted Prior Art (“AAPA”).

3. *Claims 10–18*

a) *Claims 10, 11, 17, and 18*

Petitioner relies on the same teachings of Llaría as discussed *supra* at Section II(E)(3). Pet. 51–52, 59–61, 65, and 66. For the ray casting limitations of claim 10, for which Petitioner relied upon Schirra in its Llaría-Schirra combination, Petitioner instead relies upon any one of Rich, House, Franklin, Shah, or Claus, or the combined teachings of Chang and Geeks. We have already determined that the combination of Chang and Geeks teach, to one having ordinary skill in the art, to use the claimed boundary crossing technique in the context of determining whether a subject is inside or outside a containment zone defined by a containment perimeter. *Supra* at § II(D)(3)(a). Patent Owner does not contest this, or that it would have been obvious to use ray casting in combination with the teachings of Llaría to make obvious claims 10, 11, 17, and 18. Resp. 10 n. 2. For the reasons

given by Petitioner, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 10, 11, 17, and 18 would have been obvious over the combination of Llarra, Chang, and Geeks. We further determine that the ray casting teachings of Rich, House, Franklin, Shah, and Claus are of similar nature to that of Geeks, and would have been obvious to use as the mathematical inside/outside determination in combination with the teachings of Llarra for the same reasons.

b) *Claim 12*

Claim 12 depends from claim 10, and adds the limitation, “wherein the line segment of the plurality of line segments representing the containment perimeter toward which the ray is cast is line segment closest to the position of the subject.”

Petitioner asserts that the direction of the ray “is arbitrary such that the algorithm [will] work regardless of the direction.” Pet. 61. Petitioner further asserts that this limitation is taught by any one of Chang/Geeks, Rich, House, or Franklin, which teach always drawing a ray in the same specified (e.g., horizontal or vertical) direction. *Id.* Petitioner also asserts that this limitation is taught by either Shah or Claus, which determine a direction from the point toward the line segments forming the perimeter of the polygon, and then casting a ray in that direction. *Id.* Petitioner asserts that “[f]or similar reasons, it would have been obvious to a [person of ordinary skill in the art] to choose any direction for the ray including the direction of the closest line segment.” *Id.* (citing Ex. 1006 ¶¶ 361–362).

Patent Owner does not specifically contest Petitioner’s assertions as to claim 12. Resp. 52. None of the asserted references mention casting a line towards the closest line segment. However, Petitioner has shown that a

person having ordinary skill in the art would recognize the entire scope of possible line directions, and that each of these directions would obtain an identical result in the ray casting formula. In the absence of countervailing evidence, where “there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options.” *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). Consequently, we find Petitioner to have met its burden to show that claim 12 would have been obvious to one having ordinary skill in the art at the critical time.

c) *Claims 15 and 16*

Claim 15 depends from claim 10, and further recites:

issuing a stimulus to the subject when the subject is determined to be outside of the containment zone; wherein the step of issuing a stimulus includes using a static circuit for issuing the stimulus to the subject in the form of a static correction when the subject exits the containment zone, and wherein the step of issuing a stimulus further includes using an audio speaker for issuing an audible correction when the subject is within a predetermined distance of a perimeter of the containment zone.

Claim 16 depends from claim 15, and further recites “transmitting an alert to an electronic device of an operator by way of a communication network when the subject exits the containment zone.”

Petitioner asserts that the additional limitations of claim 15 are taught by Llaría’s teaching of virtual fencing systems that provide a “remote stimulation to the animal in order to induce a movement which changes their location,” and the admission in the ’295 patent that in currently on-the-market systems “[t]ypically, there is a warning zone close to the boundary and when the pet reaches this zone the collar emits an audible signal. If the

pet continues to the boundary, the collar will issue a static correction, hopefully causing the pet to retreat to the containment area.” Pet. 64.

Petitioner asserts that the additional limitations of claim 16 are taught by Llaria’s “alarm which can be transmitted by means of an SMS message to the farmer.” *Id.* at 65 (citing Ex. 1012, 5).

Patent Owner does not specifically contest Petitioner’s assertions as to claims 15 and 16. Resp. 52. We consider Llaria’s focus on battery power conservation, and its desire to avoid interactions with the animal “because of this kind of solutions are in an experimental stage due to understand the animal behavior.” Ex. 1012, 3, 5. We further consider that the ‘295 patent states that such audible warnings are typical in collars for animal containment systems, which “have been used for several decades.” Ex. 1001, 1:15–25. The admitted fact that such audible warnings are of known usefulness in such collars indicates that it would have been obvious to one having ordinary skill in the art to use them in combination with a collar having the attributes of Llaria’s collar, despite the countervailing drawbacks expressed by Llaria. Consequently, we determine that Petitioner has shown that claims 15 and 16 would have been obvious over Llaria in view of any of the other asserted references.

d) *Claims 13 and 14*

Claim 13 depends from claim 10, and further recites:

Wherein the step of generating position data includes using a global navigation satellite system receiver in communication with a plurality of satellite constellations to produce the satellite positioning data and wherein the step of generating position data further includes using an attitude and heading reference system configured to provide to the processor unit attitude and reference

data regarding the subject; wherein the position data includes the attitude and reference data.

Claim 14 depends from claim 13, and further recites, “wherein the attitude and heading reference system comprises one or more of a gyroscope, accelerometer, and a magnetometer.”

With respect to the claimed attitude and heading reference system, Petitioner argues that Llara deduces the activity of the tracked animal through analysis of the data from the device, or from other kinds of sensors, and that a person having ordinary skill in the art would recognize that an attitude and heading system is a commonly known solution to determining such activity information, and would be a mere design choice to use with the system of Llara. *Id.* at 63 (citing Ex. 1006 ¶¶ 371–386 (citing Llara 5), 496–511).

Patent Owner argues Llara’s lack of any inertial sensors, and Petitioner’s lack of any reason why such sensors would be added to Llara. Patent Owner further argues that even were such sensors added, detecting activity with such sensors would not teach including such attitude and reference data to be included in the position data. Resp. 52.

We agree with Patent Owner that Petitioner has not shown Llara to teach or suggest use of an attitude and heading reference system. At best, Llara describes “additional analysis of the data” of Llara’s current sensors, and that “in the future, other kinds of sensors” could be added to determine “information about the health and the herd behavior.” Neither description suggests adding a sensor that produces attitude and reference data, as required by claim 13. Attitude and heading systems may, as Dr. Madisetti states, be well known in the art, and we credit this unrebutted statement. Ex.

1006 ¶ 378. However, Petitioner has not sufficiently explained how an attitude and heading system would be of use in determining the health and herd behavior of the tracked animals. Petitioner has not sufficiently explained how such an attitude and heading system would improve upon Llara's GPS tracking system for such purposes, or for any other purpose, such that it would represent a meaningful tradeoff to power conservation concerns. Thus, weighing the evidence of record, including Llara's focus on power conservation at the tracking collar, Petitioner has not met its burden to show that one having ordinary skill in the art would have found it obvious to use an attitude and heading sensor in combination with the device of Llara.

For the above described reasons, Petitioner has not shown, by a preponderance of the evidence, that claims 13 and 14 would have been obvious over Llara in combination with the other asserted references of the ground.

G. Obviousness over Trenkle

Petitioner asserts that claims 1–18 would have been obvious over Trenkle in view of Chang and Geeks, or Rich, or House, or Franklin, or Shah, or Claus, in view of AAPA. Pet. 86. We agree, and determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–18 would have been obvious over Trenkle in view of either Rich or Chang and Geeks, for the reasons set forth below. Patent Owner contests only Petitioner's assertions for claims 1–9 and 13–14 of this ground. Resp. 52. We begin with an overview of Trenkle.

1. Overview of Trenkle

Trenkle describes an animal indicator apparatus tracking the location

of an animal, and providing alerts when the animal approaches a boundary. Ex. 1016, 1:14–17. The animal indicator apparatus may be worn by an animal and coupled with a portable navigation unit held by a person. *Id.* at 2:32–40. The indicator apparatus may be in the form of a collar worn about the animal’s neck, and may contain a location determining component such as a GNSS receiver configured to receive signals from a plurality of satellite constellations. *Id.* at 3:4–32. The location determining component may further contain processing elements to determine the location of the indicator apparatus. *Id.* at 3:58–62. The apparatus may further contain an audible device and one or more sensors to determine a gait or position of the animal. *Id.* at 4:16–42.

2. *Claims 1 and 10*

Petitioner points to Trenkle’s description of “an improved animal indicator apparatus that tracks the locations of an animal and alerts nearby persons when the animal approaches a boundary.” Pet. 86 (quoting Ex. 1016, Abstr.). Petitioner also points to Trenkle’s description that “the indicator apparatus is configured to be worn by a dog or other animal and generally includes a location determining component operable to determine a current geographic location of the apparatus; memory for storing cartographic data representative of at least one boundary; an indicator; and a processor.” *Id.* Further, Petitioner argues that Trenkle provides that “the processor 106 determines if the most recent geographic location of the indicator apparatus has crossed or is actually within one of the boundaries.” *Id.* (citing Ex. 1016, 13:3–6). Petitioner further cites Trenkle’s description that a user may enter boundaries into the memory, and then transfer the

information to the memory of the indicator apparatus, and that such information may also be transmitted from the navigation units. *Id.* at 89.

Petitioner admits that Trenkle does not teach a specific mathematical algorithm for such determination. *Id.* at 90 (citing Ex. 1016, 13:3–6; Ex. 1006 ¶¶ 1213–1263). However, Petitioner asserts that the teachings of Chang and Geeks provide the algorithm limitations set forth in claims 1 and 10, for the reasons expressed in the discussion of those references. *Id.*

Petitioner asserts that one having ordinary skill in the art would have been motivated to add to Trenkle the algorithm of Geeks for determining whether a point is within a polygon, in view of Chang’s description of such algorithm being incorporated into pet containment devices, in order to provide the means to determine whether or not a pet is within a containment area as desired by Trenkle. *Id.* at 95 (citing Ex. 1006 ¶¶ 1320–1324, 1098). Petitioner further asserts that a person having ordinary skill in the art would have been motivated to combine Rich with Trenkle because Trenkle seeks to determine whether a pet is within a boundary and Rich teaches a boundary crossing algorithm incorporated into pet containment devices. *Id.* at 95 (citing Ex. 1006 ¶¶ 1320–1324). Petitioner further contends that “because these algorithms are very commonly known and involve basic arithmetic functions, a POSA would have had a reasonable expectation that [the Chang/Geeks and Rich] algorithms could be successfully implemented on Trenkle’s collar. *Id.* at 95–96.⁵ Petitioner argues that Chang/Geeks and

⁵ Because we find the combination of Trenkle with either Chang/Geeks or Rich to show claims 1 and 10 obvious, we need not discuss the asserted combination with House, Franklin, Shah, or Claus.

Rich, as prior art GPS dog collar references that use ray casting to solve the boundary problem, provide a motivation to combine. Reply 5.

Patent Owner argues that Petitioner has not provided a motivation to combine Trenkle with Chang/Geeks or Rich. Resp. 10–11. Patent Owner argues that Trenkle “*already* includes some sort of algorithm – details undisclosed – capable of making an in/out determination.” *Id.* at 11–12 (citing Ex. 2024 ¶ 57). Patent Owner argues that Petitioner has not explained why a person having ordinary skill in the art would be motivated to use a different method of determination in Trenkle. *Id.* at 12. Patent Owner points to specific examples of known approaches, including ray casting to determining whether a point is inside or outside an area. *Id.* at 13–28; Sur-reply 11 (stating that Mr. Sturza pointed out that “there were several well-known techniques to determine whether a point is within a polygon.”) (citing Ex. 2024 ¶¶ 56–101). Patent Owner argues that each has its advantages and disadvantages, and that ray casting algorithms are “difficult to implement [and] they require extensive testing to ensure that the special cases are handled properly.” Resp. 28 (citing Ex. 2024 ¶ 91). Patent Owner argues that Petitioner has not explained why the advantages of ray casting would overcome its disadvantages such that a person having ordinary skill in the art would be motivated to combine ray casting with the teachings of Trenkle. *Id.* at 28–30. Further, Patent Owner faults the Petition for not establishing that there were a finite number of identified, predictable solutions to the point-in-polygon problem such that the selection of ray casting would be a mere design choice. Sur-reply 8–9.

We determine that Petitioner has sufficiently shown reason to combine the ray casting technique of either Chang/Geeks or Rich with

Trenkle. Mr. Sturza indicates that ray casting is one of a number of well-known techniques to determine whether a point is within a polygon.

Ex. 2024 ¶¶ 56–101. Geeks teaches that ray casting can determine whether a point is within a polygon, and Chang teaches that a person seeking a solution to determining whether a pet is inside a boundary would look to the ray casting of Geeks. Thus, Chang provides a reason why a person of ordinary skill reading Trenkle would look to ray casting out of the range of known possible choices for determining the location of a pet. Rich, which uses ray casting to detect whether a pet is inside a boundary, also provides a reason to use ray casting as Trenkle’s location-determining algorithm. Thus, even though there are drawbacks to ray casting, one having ordinary skill in the art would be guided by Chang and Rich to look to ray casting out of the range of known options.

We further agree with Petitioner that Trenkle’s use of some unnamed algorithm would not lead one having ordinary skill in the art away from looking to a ray casting algorithm for that purpose. Reply 4–5. Patent Owner admits that Trenkle does not disclose the details of its algorithm. Resp. 12. Thus, Trenkle does not point towards, or away from, any particular algorithm.

Further, we do not find the cases cited by Patent Owner to lead away from the above combinations. The Federal Circuit in *Henny Penny* found nonobviousness where the feature to be combined (a TPM sensor) required additional features (diverting oil through a heat dissipator) such that the combination would need those additional features or degrade faster, leading to “an unappetizing combination.” *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019). The other case cited by Patent

Owner, *Arctic Cat*, also involves a selection from among four art-recognized options in which the proposed selection raised “additional new hazards” that did not currently exist. *Arctic Cat Inc. v. Bombadier Recreational Products, Inc.*, 876 F.3d 1350, 1362–1363 (Fed. Cir. 2017). Here, Chang and Rich show that ray casting is a viable option for pet location determination, because their selection of ray casting out of the range of admittedly well-known options for use with pet location determination illustrates that it would be chosen in view of the tradeoffs between its advantages and disadvantages.

We determine that Petitioner has shown the limitations of claims 1 and 10 to be taught by the abovementioned portions of Trenkle and either Chang and Geeks or Rich, and that a person of ordinary skill in the art would have reason to combine the references with a reasonable expectation of success. For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1 and 10 would have been obvious over the combination of Trenkle in view of either Chang and Geeks or Rich.

3. *Claims 2, 3, 11, and 12*

With respect to claims 2, 3, 11, and 12, Petitioner points to its discussion of these elements being taught by either Chang/Geeks or Rich. For claims 2 and 11, Petitioner points to Geeks’ teaching of an algorithm that “‘count[s] the number of times [the] line intersects the polygon’ and determines whether or not the point is inside or outside of the polygon based on the number of intersections.” Pet. 59 (citing Ex. 1011, 2), 92. Petitioner further points to Rich’s description that “if that number is odd, then the tracking location value/current location value *is in an allowed area*. If that

number is even or zero, however, then the tracking location value/current location value is either *in an exclusion zone or outside the fence boundary*, i.e., a breach has occurred.” Pet. 59–60 (citing Ex. 1017 ¶ 135).

With respect to claims 3 and 12, Petitioner relies upon either Chang/Geeks or Rich for the additional limitations, referring back to its discussion of the obviousness of those claims over a combination with Llarra. Pet. 61–62, 92. We note that Patent Owner does not contest that Geeks teaches these limitations. Resp. 10 n. 2, 52. For the same reasons expressed *supra* at Section II(F)(3)(b) for claim 12, we find that the combined teachings of Trenkle and either Chang/Geeks or Rich would have made obvious the further limitations of claims 3 and 12.

We agree that Petitioner has shown the additional limitations of claims 2, 3, 11, and 12 to be taught by Trenkle in view of either Chang/Geeks or Rich, and that a person of ordinary skill in the art would have reason to combine the references with a reasonable expectation of success. For these reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 2, 3, 11, and 12 would have been obvious over the combination of Trenkle in view of either Chang and Geeks or Rich.

4. *Claims 4, 5, 13, and 14*

Claims 4 and 13 further limit claims 1 and 10, respectively; claim 4 recites:

wherein the positioning unit includes a global navigation satellite system receiver in communication with a plurality of satellite constellations to produce the satellite positioning data and wherein the positioning unit further includes an attitude and heading reference system configured to provide to the processor

unit attitude and reference data regarding the subject; wherein the position data includes the attitude and reference data.

Ex. 1020, 2–3. Claim 13 recites similar limitations. *Id.* at 6. Claims 5 and 14 depend from claims 4 and 13, respectively, reciting, “wherein the attitude and heading reference system comprises one or more of a gyroscope, accelerometer, and a magnetometer.” Ex. 1020, 3, 6.

Petitioner points to Trenkle’s description of a GNSS receiver receiving signals “from a plurality of satellite constellations, such as both GPS and GLONASS.” Pet. 92 (citing Ex. 1016, 3:3–33). Petitioner further points to Trenkle’s description of the indicator apparatus having sensors, such as acceleration, speed, orientation, attitude, and combinations thereof. *Id.* at 92–93 (citing Ex. 1016, 4:16–26). Petitioner further points to Trenkle’s description of sensors that “may be configured to ***determine a gait or position of the animal.*** For example, ***the processor 106 may use information provided by the one or more sensors to determine if the animal is barking, upright, running, walking, prone, treeing an animal, and the like.***” *Id.* (citing Ex. 1016, 4:16–26). Petitioner further points to Trenkle’s description that information from the sensors may be provided to the navigation unit for analysis or display. *Id.* at 93 (citing Ex. 1016, 4:16–26). Petitioner argues that Trenkle’s sensors determine whether the dog is moving or stationary, and that the sensors in the ’295 patent perform the same function. Reply 24 (citing Ex. 1025 ¶¶ 73–75). With respect to claims 5 and 14, Petitioner points to Trenkle’s sensor being an acceleration sensor. Pet. 92 (citing Ex. 1016, 4:16–26).

Patent Owner does not contest that Trenkle teaches communication with a plurality of satellite constellations (Resp. 47–48), but argues that

Trenkle does not teach attitude and reference data being provided to the processor, and that the position data includes the attitude and reference data. Resp. 43–44, 48–51. Patent Owner argues that because the claim requires the position data to include the attitude and reference data, the position/geolocation of the subject must be based upon both the satellite positioning data and the attitude and reference data. *Id.* at 43–44.

Patent Owner argues that Trenkle’s activity sensors interpret the nature of a dog’s motion rather than provide data used with satellite positioning data to determine the geolocation of the dog. Resp. 49–50. Patent Owner characterizes Trenkle’s activity sensors as “determining whether a dog is running or walking,” but that the sensor data “does not help determine the latitude/longitude of the dog.” *Id.* at 50 (citing Ex. 2024 ¶ 127); Sur-reply 24. Patent Owner further argues that Trenkle’s navigation unit is not on Trenkle’s collar, and thus, cannot teach the claimed position determination of claim 4. Sur-reply 25.

During oral argument, Patent Owner clarified the involvement of its claimed attitude and reference data. Patent Owner agreed that samples of satellite data were averaged to produce the position data, and that this averaging “is triggered by the use of attitude and reference data.” Tr. 55:1–6; 57:15–16. Patent Owner pointed to the distinction between claim 4 and “probably” the prior art as being that claim 4’s position data results in a position corresponding to the averaged satellite position, whereas the prior art only uses “raw, unadulterated GNSS data at every point.” *Id.* at 58:1–19. Patent Owner agreed that “it is correct to say that AHRS [attitude and heading reference system] data is used in step 302 to determine if the subject is moving or stopped.” Tr. 59:25–60:3.

We find Petitioner to have satisfied its burden. Petitioner points to processor 106 as receiving the activity sensor data. Pet. 92–93 (citing Ex. 1016, 4:16–26). Trenkle explicitly describes its sensor data as being “position” data. Ex. 1016, 4:16–26. Trenkle describes processor 106 as being located on the collar, and receiving data from the location determining component “to enable the processor 106 to determine the geographic location of the indicator apparatus.” Ex. 1016, 3:4–6, 3:58–66. Thus, Trenkle’s processor receives satellite position data and animal position data, and calculates the geographic location of the tracked subject. This is sufficient to teach the requirement in claim 13 that “the step of generating position data further includes an attitude and heading reference system configured to provide to the processor unit attitude and reference data regarding the subject; wherein the position data further includes the attitude and reference data,” and the similar limitation in claim 4.

Furthermore, Trenkle’s “position” data may relate to whether the dog is walking or prone, which meets Patent Owner’s description that the claimed attitude and reference data determines whether the subject is stationary or moving. Tr. 59:25–60:3. To the extent that Patent Owner points to a “triggering” of averaged satellite data as being the patentable distinction, neither claim 4 nor claim 13 requires any triggering or averaging.

Thus, we determine that Petitioner has met its burden and shown claims 4 and 13 to be unpatentable over Trenkle and either Chang and Geeks or Rich. We further agree that Trenkle describes that the activity sensor may be an accelerometer, and therefore teaches the limitation of claims 4 and 14. Consequently, we determine that Petitioner has shown, by a preponderance

of the evidence, that claims 4, 5, 13, and 14 would have been obvious over the combined teachings of Trenkle and either Chang and Geeks or Rich.

5. Claims 6–9 and 15–18

Patent Owner does not contest that Petitioner has met its burden of establishing that claims 15–18 are unpatentable. Resp. 1, 52. Claim 15 depends from claim 10, and further recites:

issuing a stimulus to the subject when the subject is determined to be outside of the containment zone; wherein the step of issuing a stimulus includes using a static circuit for issuing the stimulus to the subject in the form of a static correction when the subject exits the containment zone, and wherein the step of issuing a stimulus further includes using an audio speaker for issuing an audible correction when the subject is within a predetermined distance of a perimeter of the containment zone.

Claim 6 recites essentially the same limitations.

Petitioner asserts that the additional limitations of claim 6 and 15 are taught by Trenkle’s stimulation element 109 that “may provide stimulation to the animal A to encourage a desired result,” that the stimulation may be in the form of a “speaker” or “electrical stimulation,” and that “processor 106 may also trigger the stimulation element 109 when the animal A approaches or crosses a boundary.” Pet. 93–94 (citing Ex. 1016, 8:53–67). We agree that the identified portions of Trenkle teach the limitations of claims 6 and 15.

Claim 16 depends from claim 15, and further recites “transmitting an alert to an electronic device of an operator by way of a communication network when the subject exits the containment zone.” Claim 7 recites essentially the same limitations.

Petitioner asserts that information on the behavior of the animal, and its location, “may be transmitted to the navigation unit 200 and/or other devices to allow the user to better ascertain the behavior of the animal,” including an alert “to notify the user is approaching a boundary.” Pet. 94 (citing Ex. 1016, 14:54–61). We agree that the identified portions of Trenkle teach the limitations of claims 7 and 16.

Claim 17 further limits the subject to one of an animal, a human, or an object, and claim 18 further limits the device to be the form of a collar. Petitioner points to Trenkle’s description of the subject as an animal wearing an animal training collar around its neck. Pet. 95 (citing Ex. 1006, 3:1–3). We agree that the identified portions of Trenkle teach the limitations of claims 17 and 18.

Thus, we determine that Petitioner has met its burden and shown, by a preponderance of the evidence, that claims 6–9 and 15–18 would have been obvious over the combined teachings of Trenkle and either Chang and Geeks or Rich.

6. Determination

In view of the foregoing, Petitioner has shown, by a preponderance of the evidence, that claims 1–18 would have obvious in view of the applied combination of Trenkle and either Chang and Geeks or Rich.

Petitioner’s Berntsen- and Giunta-based grounds are similar in character. Because we have determined that all of the asserted claims are unpatentable over Trenkle in view of either Chang and Geeks or Rich, we need not further determine whether the claims are also unpatentable over the Berntsen- and Giunta-based grounds.

III. REVISED MOTION TO AMEND

Patent Owner filed a Revised Motion to Amend. Paper 38 (“Rev. Mot. Amend”). Contingent on a finding of unpatentability of claims 1–18, Patent Owner presented substitute claims 19–36. Rev. Mot. Amend 1–2. Because we conclude that Petitioner shows, by a preponderance of the evidence, that each of challenged claims 1–18 is unpatentable, we consider Patent Owner’s Revised Motion to Amend with respect to proposed substitute claims 19–36. Because Patent Owner requested, and we permitted, that we withdraw proposed substitute claims 26 and 35 (Ex. 3002), we consider only proposed substitute claims 19–25, 27–34, and 36.

“Before considering the patentability of any substitute claims, . . . the Board first must determine whether the motion to amend meets the statutory and regulatory requirements set forth in 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121.” *See Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, Paper 15 at 4 (PTAB Feb. 25, 2019) (precedential). Patent Owner bears the burden of persuasion to show, by a preponderance of the evidence, that the motion to amend complies with these requirements. 37 C.F.R. § 42.121(d)(1). Accordingly, a patent owner must provide a claim listing reproducing each proposed substitute claim, and must make an initial showing to demonstrate the following: (1) the amendment proposes a reasonable number of substitute claims; (2) the amendment responds to a ground of unpatentability involved in the trial; and (3) the amendment does not seek to enlarge the scope of the claims of the patent or introduce new subject matter. *See* 35 U.S.C. § 316(d); 37 C.F.R. § 42.121. For the reasons set forth below, we determine that Patent Owner has not met its burden of persuasion to show

that the amendments introduce no new subject matter and, therefore, deny the Revised Motion to Amend.

A. Proposed Substitute Claims

Patent Owner proposes claim 19 as a substitute for claim 1, reproduced below, and as compared to claim 1, added material is identified with underlining and deleted material is identified with strikethrough or double brackets:

19. A device to be disposed on a subject for determining whether the subject is inside or outside of a containment zone defined by a containment perimeter, the device comprising:

[[A]]a positioning unit comprising a global navigation satellite system receiver and an attitude and heading reference system, wherein the global navigation satellite system receiver is configured to ~~for~~ generate[[ing]] position data including satellite positioning data corresponding to the a position of the subject, and wherein the attitude and heading reference system is configured to generate attitude and heading reference data; the position data including satellite positioning data; and

[[A]]a processor unit, in communication with the positioning unit, configured to:

[[R]]receive data from a memory representing a plurality of line segments forming the containment perimeter;

[[O]]obtain from the positioning unit the satellite positioning data corresponding to the position of the subject;

obtain from the positioning unit the attitude and heading reference data;

generate an augmented position of the subject by determining whether the subject is in motion or is stationary, wherein when the processor determines the subject is stationary, the satellite positioning

data over a predetermined time period is aggregated to generate the augmented position, and wherein when the processor determines the subject is in motion, the position that corresponds to the satellite positioning data is augmented with the attitude and heading reference data to generate the augmented position;

[[M]]mathematically cast a ray from the augmented position of the subject toward a line segment of the plurality of line segments representing the containment perimeter;

[[M]]mathematically determine the number of line segments of the plurality of line segments that are intersected by the ray; and

[[D]]determine, from the number of line segments of the plurality of line segments intersected by the ray, whether the subject is inside the containment zone or outside of the containment zone.

Rev. Mot. Amend App. A, 1–2.

B. Requirements For Amendment

1. Claim Listing

The motion to amend includes a claim listing that clearly shows the changes, as required by 37 C.F.R. § 42.121(b). *See* Rev. Mot. Amend App. A 1–7.

2. Reasonable Number of Substitute Claims

“There is a rebuttable presumption that a reasonable number of substitute claims per challenged claim is one (1) substitute claim.” *Lectrosonics*, Paper 15 at 4–5 (citing 37 C.F.R. § 42.121(a)(3)). The Petition challenges eighteen claims, and the Revised Motion to Amend proposes eighteen substitute claims, with a one-for-one correspondence between each substitute claim and each challenged claim. Rev. Mot. Amend

2. Petitioner has not argued that there is an unreasonable number of substitute claims proposed. We determine that the number of proposed substitute claims is reasonable.

3. *Responsive to Ground of Unpatentability*

We next consider whether the proposed substitute claims respond to a ground of unpatentability involved in this trial. 37 C.F.R. § 42.121(a)(2)(i); *Lectrosonics*, Paper 15 at 5–6. Patent Owner argues the motion to amend is responsive to the instituted grounds insofar as the amendments present an “augmented position” not disclosed, suggested, or rendered obvious by the art asserted in the Petition, or in Petitioner’s prior motion to amend. Rev. Mot. Amend 12. Petitioner has not argued any issues to the contrary. We agree that the amended language addresses the references presented in the grounds of unpatentability raised in the Petition, and is responsive to a ground of unpatentability involved in this trial.

4. *Scope of Amended Claims*

“A motion to amend may not present substitute claims that enlarge the scope of the claims of the challenged patent.” 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121(a)(2)(ii); *Lectrosonics*, Paper 15 at 6–7. A “claim that is broader in any respect is considered to be broader than the original claims even though it may be narrower in other respects.” *Tillotson, Ltd. v. Walbro Corp.*, 831 F.2d 1033, 1037 n.2 (Fed. Cir. 1987); *see also* 37 C.F.R. § 1.175(b) (“A claim is broadened if the claim is broadened in any respect”). Furthermore, a “claim is enlarged if it includes within its scope any subject matter that would not have infringed the original patent.” *Hockerson-Halberstadt, Inc. v. Converse Inc.*, 183 F.3d 1369, 1374 (Fed. Cir. 1999) (quoting *In re Freeman*, 30 F.3d 1459, 1464 (Fed. Cir. 1994)).

Patent Owner argues that proposed substitute claims 19 and 28 only narrow the scope of claims 1 and 10, respectively, because the originally claimed “position” is now limited to only the “generate[d] . . . augmented position” and do not encompass any subject matter that would not have been captured by the original claims. Rev. Mot. Amend. 15 (citing Ex. 2035 ¶¶ 102–103, 105). Patent Owner argues that the original claims covered a position that included both the satellite positioning data un-augmented by other positioning data as well as satellite positioning data augmented by additional positioning data. *Id.* at 14 (citing Ex. 2035 ¶¶ 102–103). Patent Owner also calls attention to district court claim construction of the term “position of the subject,” in related patents, as meaning “the subject’s geographic location as determined by **at least** satellite positioning data.” *Id.* at 14 (citing Ex. 2023 ¶ 104).

Petitioner argues that the “position of the subject” is “the subject’s geolocation (e.g., where it is on the earth).” Opp. 3 (citing Resp. 43). As to the contrary district court construction cited by Patent Owner, Petitioner argues that it was not construed for the ’295 patent at issue. *Id.* As evidence of the scope of claim 19, Petitioner points to claims 26 and 35, which permits the “augmented position” to be “a predetermined location within the containment zone.” *Id.* Petitioner emphasizes that this predetermined location is used “***notwithstanding its actual position.***” *Id.* (citing Ex. 2022, 30:23–25). Petitioner argues that a ray cast from this “augmented position” would be captured by the revised amended claims but not the original claims. *Id.* at 4 (citing Ex. 1060 ¶ 16). Petitioner argues that the augmented satellite data position and the aggregated satellite position would be captured by the revised amended claims but not the original claims. *Id.* (citing Ex.

1060 ¶¶ 18–19).

We do not agree with Petitioner that claim 19 broadens the scope of original claim 1. Original claim 1 set forth its position limitation as a “positioning unit for generating position data corresponding to the position of the subject; the position data including satellite positioning data,” in which a processor is configured to “[o]btain from the positioning unit the position data corresponding to the position of the subject [and m]athematically cast a ray from the position of the subject toward a line segment.”

First, the language of claim 1 does not, as Petitioner argues, limit the position data to the satellite position. Claim 1 states that the position data “include[s]” satellite position data. Claim 1 also states that the position data “correspond[s]” to the position of the subject. Taken in context of the claim as a whole, the “position data” includes, but is not strictly limited to, satellite positioning data. Further, because “data” may be plural, claim 1 encompasses multiple satellite data points, whether considered individually, averaged, or aggregated.

Petitioner’s citation of the ’295 Specification, that the position data is the subject’s geolocation, is taken out of context. The full sentence being quoted states, “Specifically, the position data ‘correspond[s] to the position of the subject’ and *includes* ‘satellite positioning data.’ Ex. 1001 cl. 1; Ex. 2024 ¶ 107 (emphasis added).” Clearly, the full quote, citing to the language of claim 1, does not limit the “position” to a “geolocation” or a single satellite positioning data point.

Nor do we agree with Petitioner’s argument that proposed substitute claim 26 has an enlarged scope that causes its parent claim 19 to also have

an enlarged scope. For proposed substitute claims, there is no presumption that a dependent claim is proper under 35 U.S.C. § 112(d). Accordingly, even if claim 26 improperly enlarges the original claim scope of the patent, it is not automatically true that claim 19 also enlarges any original patent claim. Because claim 26 has been withdrawn, we need not determine whether claim 26 improperly enlarges the original scope of the patent claims or whether it is a proper dependent claim under § 112(d).

Because the language of claim 19 requires only that the position data “include[]” satellite positioning data, and “correspond[]” to the position of the subject, the position data may include other types of data and aggregations or averages of satellite positioning data. Consequently, claim 19 does not enlarge the scope of the claims of the original patent. For the same reason, claim 28 does not enlarge the scope of the claims of the original patent.

Petitioner argues that certain of the dependent claims improperly enlarge the claim scope when compared to the original claims that they substitute. Opp. 4–5. However, the proper test compares the scope of each proposed substitute claim to the scope of the claims of the original patent. We determine that each of the proposed substitute claims further limits claims 19 or 28, neither of which enlarges the scope of the original patent claims. Accordingly, none of the dependent claims enlarges the scope of the original patent claims.

Thus, we agree that Patent Owner has not presented substitute claims that enlarge the scope of the originally challenged claims of the ’562 patent.

5. New Matter

“A motion to amend may be denied where . . . [the] amendment seeks

to . . . introduce new subject matter.” 35 U.S.C. § 316(d)(3); 37 C.F.R. § 41.121(a)(2)(ii); *Lectrosonics*, Paper 15 at 6–7. Accordingly, “the Board requires that a motion to amend set forth written description support in the originally filed disclosure of the subject patent for each proposed substitute claim, and also set forth support in an earlier filed disclosure for each claim for which benefit of the filing date of the earlier filed disclosure is sought.” *Lectrosonics*, Paper 15 at 7 (citing 37 C.F.R. § 42.121(b)(1)–(2)). For this requirement, Patent Owner must cite “to the original disclosure of the application, as filed, rather than to the patent as issued.” *Id.* at 8.

A claim satisfies the written description requirement of 35 U.S.C. § 112 if the description “clearly allow[s] persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.” *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1562–63 (Fed. Cir. 1991). The Federal Circuit has further stated,

whatever the specific articulation, the test requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art. Based on that inquiry, the specification must describe an invention understandable to that skilled artisan and show that the inventor actually invented the invention claimed.

Ariad Pharms., Inc. v. Eli Lilly & Co., 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

Petitioner contends the proposed substitute claims introduce new matter. Opp. 6–10. For the reasons explained below, we agree.

- a) “*wherein when the processor determines the subject is in motion, the position that corresponds to the satellite data*

is augmented with attitude and reference data to generate the augmented position”

Petitioner argues that this claim recitation is new matter because the ’479 application describes using unaugmented satellite data when the subject is moving, referring to the operation described in Figure 14 of the ’479 application. Opp. 6–7 (citing Ex. 1060 ¶¶ 32–37; Ex. 2022, 28:19–20, Fig. 14). The proposed substitute claims recite that the ray is cast “from the augmented position,” and Petitioner argues that the ’479 application describes that, when the subject is moving, the ray is cast from the position that corresponds to the satellite data, not a position that is augmented with attitude and heading reference data. Opp. 7 (citing Ex. 2022, 28:19–20 (“In step 302 it is determined . . . if the pet. . . is in motion” and “at step 304 ***the GNSS real-time data output*** is used to accurately track the pet position using ray casting.”)). We agree with Petitioner.

There is no question that the ’479 application provides written description support for generating an augmented position using attitude and heading reference data because these data are used to determine whether the subject is stationary or in motion. For example, the ’479 application states that, “[i]n the preferred embodiment, a method is used to augment real-time GNSS data and implement hysteresis to improve overall location accuracy of the collar by using the AHRS subsystem to determine whether the pet is in motion or stationary.” Ex. 2022, 27:1–4. The ’479 application explains how to determine linear acceleration data, which “can be compared to the SoG value from the GNSS and accurately determine if the pet is in motion or stationary.” Ex. 2022, 28:9–10. The ’479 application states that, “[w]ith this critical information we can now combine augmentation and averaging

techniques to the GNSS system and achieve greater accuracy. This process is shown in flow chart 300, Fig. 14.” Ex. 2022, 28:13–15. The ’479 application describes, with reference to Figure 14, two options for determining the ray-casting position of the subject. First, “if the pet is in motion, . . . at step 304 the GNSS real-time data output is used to accurately track the pet position using ray casting.” Ex. 2022, 28:15–18. Second, “[i]f at step 302 it is determined that the pet is not in motion, then at step 306 the next n samples, one obtained each of the next n time periods t of GNSS data, are averaged and at step 308 the system freezes the pet location at the averaged position.” Ex. 2022, 28:19–22.

Thus, the ’479 application describes determining whether the subject is in motion, in which case the real-time satellite position is used as the ray-casting position, or is stationary, in which case the satellite position data are averaged to generate a ray-casting position. The proposed substitute claims, however, recite something different. In particular, proposed substitute claim 19 recites “a processor unit, in communication with the positioning unit, configured to: . . . generate an augmented position of the subject by determining whether the subject is in motion or is stationary, wherein when the processor determines the subject is stationary, the satellite positioning data over a predetermined time period is aggregated to generate the augmented position, and *wherein when the processor determines the subject is in motion, the position that corresponds to the satellite positioning data is augmented with the attitude and heading reference data to generate the augmented position.*” Proposed substitute claim 28 recites a similar limitation as a method step.

We agree with Petitioner that '479 application does not provide written description support for the proposed substitute claims as drafted. As explained above, there is no question that the '479 application provides written description support for using attitude and heading reference data to determine whether the real-time or averaged satellite data should be used as the position from which to perform ray casting (the “augmented position”). The attitude and heading reference data are used to determine whether the subject is in motion, and, if the subject is in motion, the real-time satellite data is used as the position from which the ray is cast. But this is not what the proposed substitute claims recite. Rather, the proposed substitute claims recite that, “when the processor determines the subject is in motion, the position that corresponds to the satellite positioning data is augmented with the attitude and heading reference data to generate the augmented position.” Thus, the claims do not merely recite that the attitude and heading reference data are used to make the motion determination; rather, they require that, once that determination is made, the position “is augmented with the attitude and heading reference data to generate the augmented position.”

Patent Owner responds to Petitioner’s new matter argument as follows: “As to Petitioner’s comments regarding Fig. 14 (OPP 6-7), a POSA would have understood that although the '479 Appl. describes an embodiment based on ‘GNSS real-time data,’ it also provides sufficient support for a claim scope that is not limited to the embodiment described or depicted in Fig. 14.” Opp. Reply 5 (citing Ex. 2038 ¶ 44). Patent Owner, however, does not explain what other disclosures in the '479 application show augmenting the position of the subject with attitude and heading reference data after the motion determination is made. Patent Owner’s

declarant's testimony is similarly conclusory and is as follows:

I also disagree with Petitioner's and Dr. Madisetti's comments regarding Figure 14. Petitioner's Opposition to Patent Owner's Revised Contingent Motion to Cancel and Amend Claims, Paper 48 6-7; Ex. 1060 ¶¶ 32-37. A POSITA would have understood that although the '479 Application describes an embodiment based on "GNSS real-time data," it is not limited to this embodiment described or depicted in Fig. 14. Additionally, the '479 Application provides sufficient support for a claim scope that is not limited to the embodiment described or depicted in Fig. 14.

Ex. 2038 ¶ 44.

This was not an issue when we provided Preliminary Guidance on Patent Owner's first motion to amend because the proposed substitute claims recited "when the processor determines the subject is in motion the augmented location is the real-time position that corresponds to the satellite positioning data." Paper 14, Appendix A, 1. In its Revised Motion, Patent Owner now includes an affirmative operation ("is augmented with the attitude and heading reference data"), rather than simply drafting the claims to recite "when the processor determines the subject is in motion, the position that corresponds to the satellite positioning data is the augmented position" from which to cast the ray.

The language that Patent Owner chose in its Revised Motion is clear. To interpret the claim language as allowing a non-augmented position to be the ray casting position when the subject is in motion would effectively remove the language "is augmented with the attitude and heading reference data."

Patent Owner argues that "the scope of original claims 1 and 10 include determining an un-augmented position (using the satellite

positioning data un-augmented by other positioning data), as well an augmented position (using the satellite positioning data augmented by additional positioning data),” whereas the “substitute claims now limit this ‘starting point’ to only the ‘generate[d] ... augmented position’ and do not encompass any subject matter that would not have been captured by the original claims.” Opp. Reply 14–15. To the extent that Patent Owner is arguing that any use of heading and reference data in a procedure that generates an augmented position supports the claim language, we disagree. For the reasons explained above, the ’479 application describes using attitude and heading reference data to generate an augmented position because they are used to determine whether a subject is in motion. But Patent Owner has not explained how, once that determination is made, the ’479 application describes augmenting the position with attitude and heading reference data. Rather, as discussed above, ’479 application describes using the non-augmented satellite position when the subject is in motion.

It is Patent Owner’s burden to show that that its proposed substitute claims have support in the original application, and Patent Owner has not shown that, following a motion determination based on attitude and heading reference data, a ray is cast from a “position that corresponds to the satellite positioning data [that] is augmented with the attitude and heading reference data.” Rather, as Petitioner correctly asserts, a non-augmented satellite position is used. *See* Opp. 6–7.

b) *Claims 24 and 33: “a static circuit . . . other physical stimulus”*

Petitioner argues that the originally filed disclosure of the ’295 patent describes the static circuit as issuing a static correction, but not any other

physical stimulus as set forth in proposed substitute claim 24. Opp. 9 (citing Ex. 1060 ¶ 61).

We agree with this argument. The originally-filed disclosure describes a “correction circuit configured to issue a stimulus to the subject,” and that the correction circuit “includes a static circuit for issuing the stimulus to the subject in the form of a static correction. Ex. 2022, 5:26–31; 7:8–10. We have reviewed the portions of the originally filed disclosure relied upon for support by Patent Owner. Rev. Mot. Amend. 6. None of these portions indicates that the static circuit performs any other function than to issue a static correction. Although the system would not use static correction when it is used to track people (Ex. 2022, 9:6–11), there is no indication that a different physical stimulus is to be applied by the static circuit, other portions of the correction circuit could perform that function. For these reasons, Patent Owner has not met its burden to show why this limitation is not new matter. 37 C.F.R. § 42.121(d)(1). Consequently, proposed substitute claims 24 and 33 do not meet the requirements for entry through a motion to amend. Further, because claim 25 depends from claim 24, claim 25 also contains new matter, and does not meet the requirements for entry through a motion to amend.

6. Determination

Proposed substitute claims 19–25, 27–34, and 36 impermissibly add new matter. Proposed substitute claims 26 and 35 have been withdrawn by Patent Owner. Accordingly, we determine that Patent Owner has not shown that proposed substitute claims 19–25, 27–34, and 36 satisfy the above requirements of 35 U.S.C. § 316 and 37 C.F.R. § 42.121(a).

IV. PATENT OWNER’S MOTION TO EXCLUDE

Patent Owner filed a motion to exclude certain documents. Paper 56 (“PO Mot. Excl.”). Petitioner filed an opposition to that motion. Paper 59 (“Pet. Opp. PO Mot. Excl.”). Patent Owner filed a reply to the opposition. Paper 60 (“PO Reply Mot. Excl.”). We have considered each argument in these filings, and deny Patent Owner’s motion to exclude. We note that we have not relied on any of the discussed exhibits in finding any claim not unpatentable or unpatentable, and the motion may also be dismissed as moot for that reason.

A. Legal Principles

Our determination considers that “[t]he policy considerations for excluding expert testimony, such as those implemented by the gatekeeping framework established by the Supreme Court in *Daubert* . . . are less compelling in bench proceedings such as inter partes reviews than in jury trials.” *Nestle Healthcare Nutrition, Inc. v. Steuben Foods, Inc.*, IPR2015-00249, Paper 76 at 23 (PTAB June 2, 2016); *see also Seaboard Lumber Co. v. U.S.*, 308 F.3d 1283, 1302 (Fed. Cir. 2002) (stating that the concerns underlying *Daubert* are “of lesser import in a bench trial, where no screening of the fact finder can take place”). Additionally, “we take into account the qualifications of an expert witness—and any shortcomings revealed through cross-examination—when evaluating the weight to be given that witness’s testimony. . . . the wholesale exclusion of a witness’s declarations is rarely called for in a proceeding before the Board.” *Ascend Performance Materials Operations LLC c. Samsung Sdi Co., Ltd.*, IPR2020-00349, Paper 53 at 11 (PTAB July 15, 2021). Under that framework, we consider Patent Owner’s arguments as they pertain to the *inter partes* review before us.

B. GNSS Intro and Carter

Patent Owner moves to exclude documents related to GNSS Intro (Exhibits 1028, 1074) and related portions of Exhibits 1025 and 1060 discussing GNSS Intro. PO Mot. Excl. 5–9, 11–12. Patent Owner also moves to exclude documents related to Carter (Exhibit 1065) and related portions of Exhibit 1060 discussing Carter. PO Mot. Excl. 10–11.

Patent Owner argues that GNSS Intro and Carter should be excluded because they have not been shown to be prior art, and are therefore irrelevant to any determination of obviousness and should be excluded under FRE 401–403 along with related documents and portions of Exhibits 1025 and 1060 discussing those documents. PO Mot. Excl. 5–6, 11.

Petitioner opposes this motion. Petitioner argues that any insufficiency in its showing that these documents are prior art is a legal determination to be made by the Board, and is not proper for a motion to exclude. Pet. Opp. PO Mot. Excl. 4 (citing *Chicago Mercantile Exchange Inc. v. 5th Market, Inc.*, CBM2014-00114, Paper 35, at 52 (P.T.A.B. Aug. 18, 2015) (“a motion to exclude is not the proper vehicle to challenge the sufficiency of the evidence used to demonstrate that [an item] qualifies as a prior art printed publication Whether a reference qualifies as a printed publication . . . is a legal conclusion based on underlying factual determinations” and thus “the issue of whether there is sufficient evidence in the record . . . should be presented in the patent owner response—not a motion to exclude”).

We agree with Petitioner. As the Board indicated in *Chicago Mercantile Exchange*, whether a document qualifies as a printed publication requires a legal determination based upon evidence. The primary piece of

evidence is the document itself. *Victoria's Stores*, cited by Patent Owner to illustrate the analysis required for alleged printed publication status, considered the information on the document and supporting evidence, eventually concluding that there was insufficient evidence to show that the disputed document qualified as a printed publication. *Victoria's Stores LLC v. Andra Group, LP*, IPR2020-00853, Paper 12, 23–25 (PTAB Oct. 22, 2020) (cited by Patent Owner at Opp. Reply 8). It would be improper to foreclose such analysis by deeming properly submitted evidence to be “irrelevant.” Determining the disputed documents to be inadmissible because they are irrelevant because they are not prior art, before reviewing the evidence and determining whether they are prior art, is legally erroneous.

With respect to Patent Owner's hearsay contentions, the underlying facts or data supporting an expert's opinion need not be admissible, “so long as experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion of the subject.” Fed. R. Evid. 703. Dr. Madisetti, in the disputed section, relies on a particular coverage area based on Exhibits 1026 and 1027. Ex. 1025 ¶¶ 21–24 (relying on “thousands of acres” and the surface area of the earth as representing limitless boundaries). Dr. Madisetti is not providing an opinion on whether the system in Exhibits 1026 and 1027 can perform over such regions; i.e., whether such statements are true. Rather, Dr. Madisetti opines on the memory requirements of pixel testing over such regions. The size of such regions is the kind of fact or data that Mr. Sturza also relies upon in formulating his contrary opinion of the memory requirements of pixel testing. Ex. 2024 ¶ 66. Thus, we determine that Dr. Madisetti's reliance on Exhibits 1026 and 1027 to opine on how Mr. Sturza's memory calculations would be affected by different coverage

ranges does not cause Dr. Madisetti's reliance to be improperly based on hearsay.

Patent Owner further argues that paragraph 94 of Exhibit 1060 should be excluded because it constitutes a legal opinion that GNSS Intro was publicly available by 2015. PO Mot. Excl. 8–9. However, the question of the weight given to a declarant's statement is not a matter for exclusion.

With respect to Carter, Patent Owner additionally argues that Carter should be excluded because Petitioner has not produced evidence sufficient to establish authentication under FRE 901–902. *Id.* at 10–11. Patent Owner argues that the “final certification that certifies the genuineness of the signature and official position of the signer or attester” requirement of FRE 902 for self-authenticating foreign public documents has not been met. *Id.* at 11. Patent Owner summarizes its argument as “in short, because Petitioner has failed to establish that Ex. 1065 qualifies as prior art, it should not be used in any determination of obviousness.”

Petitioner argues that Carter is a Canadian government document that is self-authenticating because the document is available on an official government web page. Pet. Opp. PO Mot. Excl. 12–13. Petitioner further points to statements within Carter as demonstrating its nature as an official Canadian document; for example, that it was “developed by a team from different agencies, Federal and Provincial.” *Id.* at 13–14. Petitioner argues that Patent Owner has been given reasonable opportunity to investigate the document's accuracy, and not provided any evidence to challenge the document's authenticity. *Id.* at 13. Patent Owner disputes this last point, asserting that it was not provided the source of the document prior to Petitioner's opposition to its motion, which it further argues is an improper

and untimely supplementation of evidence. PO Reply Mot. Excl. 4.

Authentication requires the production of evidence “sufficient to support a finding that the item is what the proponent claims it is.” Fed. R. Evid. 901(a). Authentication may be shown by the “appearance, contents, substance, internal patterns, or other distinctive characteristics of the item, taken together with all the circumstances.” Fed. R. Evid. 901(b)(4). Where an authenticated specimen is in front of the Board to establish authentication of an allegedly identical exhibit, the Board has “an obligation to make the comparison” between those documents. *Valve Corp. v. Ironburg Inventions Ltd.*, 8 F. 4th 1364, 1372–1372 (Fed. Cir. 2021). In the special case of self-authentication of foreign government documents, if all parties “have been given a reasonable opportunity to investigate the document’s authenticity and accuracy, the court may, for good cause . . . order that it be treated as presumptively authentic without final certification.” Fed. R. Evid. 902(3).

We determine that the totality of the characteristics of Carter, including the official indicia on the front page, the titles and signatures in its Foreword, and references to Canadian requirements and resources throughout the document sufficiently establish the authenticity of the document. Moreover, we have compared Carter to the allegedly identical document appearing on the Canadian government web site, and they appear to be substantially identical.

For the above described reasons, we deny Patent Owner’s motion to dismiss as to Exhibits 1028 and 1065, the supporting documents, and the references thereto in Exhibits 1025 and 1060.

C. Exhibits 1029–1030, 1036–1041, 1048, and 1050

Patent Owner also moves to exclude other documents (Exhibits 1029–

1030, 1036–1041, 1048, and 1050) as not being relied upon in Petitioner’s Reply or in connection with the Reply Declaration. PO. Mot. Excl. 7. Because none of these exhibits were used or cited with respect to the original claims, Patent Owner characterizes them as irrelevant to the Board’s consideration of the original claims, and seeks that these be excluded and not considered with respect to the original claims. *Id.*

Petitioner argues that because the original claims must be broader than the proposed substitute claims, the references are relevant to both. Pet. Opp. PO Mot. Excl. 8. Petitioner further points to Ex. 1040 in its Reply. *Id.* (citing Reply 17–18). With respect to the other identified Exhibits, Patent Owner points out that Petitioner does not contest that these were not relied upon in any of its papers regarding the original claims. PO Reply Mot. Excl. 2.

We note that Patent Owner also cites Ex. 1040 as being relied upon by Petitioner to support its obviousness contentions. PO Mot. Excl. 8. Consequently, we address Ex. 1040 in Section IV(D). With respect to the remaining exhibits, Patent Owner requests that they be excluded from consideration with respect to the original claims. However, it is undisputed that Petitioner has not asked for consideration of those reference with respect to the original claims. Nor does Patent Owner request that they be excluded from the file, because Patent Owner does not contest their use with respect to the proposed substitute claims in its Revised Motion to Amend. Because neither the Petitioner nor its expert relied upon the disputed exhibits with respect to the original claims, and none of those exhibits were relied upon in for that purpose in this Decision, Patent Owner’s motion with respect to these exhibits is dismissed as moot.

D. Exhibits 1032, 1040, 1047, and 1052–1058

Patent Owner also moves to exclude Exhibits 1032, 1040, 1047, 1052–1058) and related portions of Exhibits 1025 and 1060 discussing those documents, arguing that these documents are irrelevant because Petitioner has not established that any of them were publicly accessible before the critical date. PO Mot. Excl. 8. Petitioner argues that this is a question of sufficiency rather than exclusion. Pet. Opp. PO Mot. Excl. 10.

For the reasons detailed in Section IV(B), discussing that the question of whether a document qualifies as a printed publication requires factual and legal determinations inconsistent with the exclusion of the underlying document and supporting evidence, we deny Patent Owner's motion as to these exhibits.

E. Exhibits 1026–1027

With respect to Exhibits 1026 and 1027, Patent Owner points to Dr. Madisetti's discussion of these exhibits at paragraphs 23 and 24 of Exhibit 1025. PO Mot. Excl. 1–5. Patent Owner argues that Exhibits 1026 and 1027 discuss the capabilities of a commercial product in 2022, and have no bearing on whether the Board should confirm the claims of the '295 patent. PO Mot. Excl. 1–5; PO Reply Mot. Excl. 1. Patent Owner further argues that to the extent these exhibits are offered for the truth of the matter asserted, they constitute impermissible hearsay. *Id.* at 3.

Petitioner argues that that this challenge should go to the weight accorded to the evidence, not its exclusion. Pet. Opp. PO Mot. Excl. 2–3. Petitioner further argues that the hearsay exception does not apply to expert testimony. *Id.* at 3 (citing Fed. R. Evid. 703).

With respect to Exhibits 1026 and 1027, we disagree with Patent

Owner's blanket statement that a document must be prior art to be relevant to an obviousness determination. *See In re Wilson*, 311 F.2d 266, 268-269 (CCPA 1962) (finding a post-critical date "teaching reference" to be permissible evidence of the inherent characteristics of a product). Petitioner submits Exhibits 1026 and 1027 to rebut Mr. Sturza's characterization of the properties of a system. Such use is of similar enough character to that accepted by our reviewing court that we do not bar its entry for irrelevance. Instead, we determine this is a matter of the appropriate weight to accord Petitioner's contentions. Accordingly, we deny Patent Owner's motion with respect to Exhibits 1026 and 1027.

V. PETITIONER'S MOTION TO EXCLUDE

Petitioner moves to exclude paragraphs 37–97 of Mr. Sturza's testimony in Exhibit 2035 as being conclusory. Paper 55 ("Pet. Mot. Exclude"). Petitioner asserts that the conclusory nature of these paragraphs are not admissible under Federal Rule of Evidence 702(a). *Id.* at 2; Paper 61, 1–5 ("Pet. Reply Mot. Excl."). Petitioner presents the same arguments against paragraphs 39–44 and 64 of Exhibit 2038. Pet. Mot. Excl. 6–12.

Patent Owner opposes this motion. Paper 58 ("PO Opp. Pet. Mot. Excl.") Patent Owner argues that Mr. Sturza's testimony is not, in fact, conclusory, but that it "explains and sets forth the complete factual bases for his opinions, including the materials that he reviewed and assessed, and his application of the proper legal standards and analysis of the claim language to support his opinions." PO Opp. Pet. Mot. Excl. 2–3, 8–12.

Due to the nature of *inter partes* review proceedings, "[t]he policy considerations for excluding expert testimony . . . are less compelling . . .

than in jury trials.” *Nestle Healthcare Nutrition*, IPR2015-00249, Paper 76 at 23. Additionally, “we take into account the qualifications of an expert witness—and any shortcomings revealed through cross-examination—when evaluating the weight to be given that witness's testimony. . . . the wholesale exclusion of a witness’s declarations is rarely called for in a proceeding before the Board.” *Ascend Performance*, IPR2020-00349, Paper 53 at 11. During inter partes review proceedings, “[e]xpert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.” 37 C.F.R. § 42.65(a); *Xerox Corp v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (Aug. 4, 2022) (precedential). Because Petitioner only disputes the conclusory nature of Mr. Sturza’s testimony, and such dispute goes to the weight given to the testimony, we dismiss Petitioner’s motion to exclude the aforementioned sections of testimony.

Petitioner further asserts that paragraph 104 of Exhibit 2035 should be excluded because it is based on an incorrect statement that the Eastern District of Texas “confirmed the claim scope of the ‘295 Patent” when it construed the term “position of the subject” in other patents. Pet. Mot. Excl. 4–5; Pet. Reply Mot. Excl. 2. Patent Owner argues that Mr. Sturza was properly informed of the context of the Eastern District’s statement, as reflected in Mr. Sturza’s statements. PO Opp. Pet. Mot. Excl. 5–7.

We have reviewed paragraph 104, and found Mr. Sturza to have communicated that the Eastern District confirmed the claim scope

in the related district court litigation, which construed the term “position of the subject” in the claims of two related patents that share a specification with the ’295 Patent (U.S. Patent Nos. 9,922,522 (Ex. 2036) and 9,924,314 (Ex. 2037); *see also* Ex. 1043, 5, 56 fn.8, 68 (Petitioner stating that the ’522 and ’314

Patents share a specification with the '295 Patent) and Ex. 1044, 60 fn.5, 72 (same)) as meaning “the subject’s geographic location as determined by **at least** satellite positioning data.” Ex. 2023 at 31 (emphasis added). It is my opinion that the district court’s claim construction and interpretation of the original scope of the claims in this regard is consistent with what a POSITA would have construed the claims to mean and understood as the original scope of claims.

Ex. 2035 ¶ 104. We determine that, contrary to Petitioner’s assertion, Mr. Sturza’s statement is not based on information that the Eastern District construed “position of the subject” in the '295 patent. We agree with Patent Owner that Mr. Sturza’s statement reflects the context in which the Eastern District set forth its construction. Accordingly, we deny Petitioner’s motion to exclude paragraph 104 of Exhibit 2035.

VI. CONCLUSION

For the foregoing reasons, we determine Petitioner has established by a preponderance of the evidence the unpatentability of claims 1–18 of the '295 patent. In summary:

Claims	35 U.S.C. §	References/ Basis⁶	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 8–11, 17, 18	102 ⁷	Chang, Geeks		

⁶ Petitioner presents the latter four grounds as being in the alternative; e.g., in view of Chang and Geeks, or Rich, or House, or Franklin, or Shah, or Claus.

⁷ Petitioner’s asserted anticipation grounds based upon Chang and Geeks are not reached because they are, at best, cumulative to Petitioner’s obviousness grounds over the same references.

Claims	35 U.S.C. §	References/ Basis⁶	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 2, 8–11, 17, 18	103	Chang, Geeks	10, 11, 17, 18	1, 2, 8, 9
10, 11, 17, 18	102 ⁸	Llaria, Schirra		
10, 11, 17, 18	103	Llaria, Schirra	10, 11, 17, 18	
1–18	103	Llaria, Chang, Geeks, Rich, House, Franklin, Shah, Claus	10–12, 15–18	1–9, 13, 14
1–18	103 ⁹	Berntsen, Chang, Geeks, Rich, House, Franklin, Shah, Claus		
1–18	103 ¹⁰	Guinta, Chang, Geeks, Rich, House, Franklin, Shah, Claus		
1–18	103	Trenkle, Chang, Geeks, Rich, House, Franklin, Shah, Claus	1–18	
Overall Outcome			1–18	

⁸ Petitioner’s asserted anticipation grounds based upon Llaria and Schirra are not reached because they are, at best, cumulative to Petitioner’s obviousness grounds over the same references.

⁹ Petitioner’s asserted grounds based upon Berntsen and Guinta were not reached because they are, at best, cumulative to Petitioner’s assertions based upon Trenkle, which we found sufficient to show claims 1–18 unpatentable.

¹⁰ Petitioner’s asserted grounds based upon Berntsen and Guinta were not reached because they are, at best, cumulative to Petitioner’s assertions based upon Trenkle, which we found sufficient to show claims 1–18 unpatentable.

Patent Owner moved to substitute claims 19–36 for claims 1–18 contingent on a finding of unpatentability with respect to the originally challenged claims 1–18. Patent Owner requested, and we granted, leave to withdraw proposed amended claims 26 and 35. Ex. 3002. We deny Patent Owner’s request to amend the ’295 patent to add proposed substitute claims 19–23, 27–32, 34, and 36 because Patent Owner has not met its statutory and regulatory burdens.¹¹ A summary of our conclusions is set forth in the table reproduced below.

Revised Motion to Amend Outcome	Claims
Original Claims Cancelled by Amendment	
Substitute Claims Proposed in the Amendment	19–36
Substitute Claims: Motion to Amend Granted	
Substitute Claims: Motion to Amend Denied	19–25, 27–34, 36
Substitute Claims: Not Reached	26, 35

¹¹ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. *See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

VII. ORDER

Accordingly, it is

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–18 are unpatentable;

FURTHER ORDERED that Patent Owner’s Revised Motion to Amend is *denied*;

FURTHER ORDERED that Patent Owner’s Motion to Exclude is *denied*; and

FURTHER ORDERED that Petitioner’s Motion to Exclude is *denied*; and

FURTHER ORDERED that, because this is a Final Written Decision, parties to this proceeding seeking judicial review of our decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PROTECT ANIMALS WITH SATELLITES,
Petitioner,

v.

ONPOINT SYSTEMS, LLC,
Patent Owner.

IPR2021-01483
Patent 9,848,295 B1

Before LYNNE H. BROWNE, DANIEL J. GALLIGAN, and
MICHAEL T. CYGAN, *Administrative Patent Judges*.

GALLIGAN, *Administrative Patent Judge*, concurring.

I concur in the decision to hold claims 1–18 of U.S. Patent
9,848,295 B1 unpatentable and in the decision to deny the motion to amend.
I join all of the majority decision except for Sections II.F.2 and II.F.3.d.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PROTECT ANIMALS WITH SATELLITES,
Petitioner,

v.

ONPOINT SYSTEMS, LLC,
Patent Owner.

IPR2021-01483
Patent 9,848,295 B1

Before LYNNE H. BROWNE, DANIEL J. GALLIGAN, and
MICHAEL T. CYGAN, *Administrative Patent Judges*.

CYGAN, *Administrative Patent Judge*, dissenting-in-part.

I join in all portions of the majority's decision except those relating to the issue of new matter in claims 19 and 28, from which I respectfully dissent. Furthermore, I do not agree with Petitioner's other arguments as to new matter being introduced in those claims. Additionally, I do not find Petitioner to have met its burden to show that claims 19–23, 27–32, 34, and 36 are unpatentable. Thus, I would grant Patent Owner's Revised Motion to Amend as to claims 19–23, 27–32, 34, and 36.

1. *New Matter*

At issue is the following limitation of proposed substitute claim 19:

generate an augmented position of the subject by determining whether the subject is in motion or is stationary . . . wherein when the processor determines the subject is in motion, the position that corresponds to the satellite positioning data is augmented with the attitude and heading reference data to generate the augmented position.

Patent Owner shows support for this limitation with the following language from the originally filed disclosure:

In the preferred embodiment, a method is used to augment real-time GNSS data and implement hysteresis to improve overall location accuracy of the collar by using the AHRS subsystem to determine whether the pet is in motion or stationary.

Ex. 2022, 27:1–4; Rev. Mot. Amend. 4 (citing Ex. 2022, 26:1–29:24). The position is the real-time GNSS satellite positioning data, which is augmented by using the AHRS subsystem to determine whether the pet is in motion or stationary. This augmentation with AHRS data continues while the pet is in motion, to ensure that the satellite positioning data is representing actual movement rather than an artifact of the satellite signal interacting with the environment. Ex. 2002, 28:9–14, 29:1–24. Thus, while the pet is in motion, the satellite positioning data is continuously augmented by AHRS data to ensure that the satellite position represents the actual pet position. The claim language and its support in the original disclosure are nearly identical. One having ordinary skill in the pertinent art would immediately recognize the original disclosure to demonstrate possession of the invention of proposed substitute claim 19.

Petitioner’s sole argument is that “the ray is cast from a position based on the GNSS real-time data, not an augmented position generated using

attitude and reference data.” Opp. 7. The problem with this argument is that the original disclosure also describes that the augmented ray casting position is “based the GNSS real-time data.” What Petitioner fails to explain is why the disclosed ray casting position is not also an “augmented position generated using attitude and reference data,” despite the clear language describing it as such.

At the heart of this issue is the meaning of “augmented.” In Patent Owner’s originally-filed disclosure, the satellite position data is augmented by AHRS data in the sense that the AHRS data confirms that a moving satellite position actually corresponds to a moving pet. The ray casting position for a moving pet is from a confirmed satellite position, rather than from a satellite position that may represent environmental error. This is the type of augmentation described in the originally-filed disclosure and set forth in proposed substitute claim 19.

Petitioner appears to argue that the satellite position is not “augmented” unless it is further changed from the raw GNSS data. Sur-reply 4–5; Ex. 1060 ¶ 37. Petitioner does not explain why that is the proper construction of “augmented” or provide any contrary construction of that term. Petitioner does not, for instance, provide any supporting evidence, such as a definition of the term or expert testimony to support its construction. Even if it had been presented, such evidence would not necessarily be availing because “the inventor’s intention, as expressed in the specification, is regarded as dispositive” as to the construction of a claim term. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc). Patent Owner’s specification describes an “augmented” position as one for which AHRS data has determined the pet to be in motion.

Petitioner may not, absent sufficient evidence and explanation to the contrary, substitute its preferred construction of “augmented” for the one clearly described in the originally filed disclosure of the ’295 patent. Because the claimed “augmented position” is the same as that described in the originally filed disclosure, there is no new matter in proposed substitute claim 19.

Petitioner’s other assertions of new matter in claim 19 or claim 28 are similarly unavailing. Petitioner asserts that claim 19’s [and claim 28’s] recitation of “wherein the processor determines the subject is stationary/[in motion]” are not supported by the originally filed disclosure of the ’275 patent, because it does not teach or suggest that the processing unit makes that determination. Opp. 6. Petitioner argues that Patent Owner’s identified support in the originally filed disclosure of the ’275 patent does not use “processor” or “processing unit.” That argument is not persuasive because the test for written description or new matter is not an *ipsis verbis* test. See, e.g., *Vas-Cath v. Mahurkar*, 935 F.2d 1555, 1563 (Fed. Cir. 1991); *Martin v. Johnson*, 454 F.2d 746, 751 (CCPA 1972) (stating “the description need not be in *ipsis verbis* [i.e., ‘in the same words’] to be sufficient”).

Petitioner further argues that it is the AHRS subsystem in the positioning unit, not the processing unit, that makes the motion/stationary determination. Opp. 6 (citing Ex. 1060 ¶¶ 25–29). Specifically, Petitioner relies on its declarant’s statement that a person having ordinary skill in the art would understand this from the statement in the originally filed disclosure that “[i]n the preferred embodiment, a method is used to augment real-time GNSS data and implement hysteresis to improve overall location accuracy of the collar *by using the AHRS subsystem to determine whether*

the pet is in motion or station[a]ry.” Ex. 1060 ¶ 27 (citing Ex. 2022, 27:1-4).¹²

However, the originally filed disclosure places the determination at the processor, not at the AHRS. For example, “[t]he AHRS outputs raw acceleration,” not a motion/stationary decision. Ex. 2022, 27:18–19. Further, the determination of whether the pet is in motion or stationary results from “the filtered accelerometer output . . . in conjunction with the SoG [Speed over Ground] value output from the GNSS.” *Id.* at 27:7–9. Figure 3 of the originally filed disclosure shows data from both the AHRS and GNSS individually being sent to the processing unit, and not the AHRS and GNSS sending data to the positioning unit, which then sends data to the processing unit. Ex. 2022, 39. Consequently, the originally filed disclosure provides written description support for the limitations “wherein the processor determines the subject is stationary/[in motion].”

Petitioner also argues that “there is no teaching or suggestion of aggregating []over a predetermined time because the ’479 Application does not teach how or when n is determined, nor that it is predetermined.” Opp. 7 (citing Ex. 1060 ¶¶ 42–44). Petitioner further argues that “there is no teaching or suggestion that the average of n samples is determined by “aggregating” satellite data positions,” because “averaging n samples does

¹² Petitioner relies on its declarant, rather than its opposition, to explain why the AHRS provides this determination. However, the opposition itself must provide a “full statement of the reasons for the relief requested, including a detailed explanation of the evidence including material facts.” 37 C.F.R. § 42.22(a)(2); 37 C.F.R. § 42.23(a) (applying the content requirements of § 42.22 to oppositions).

not imply that the n samples must first be aggregated.” *Id.* (citing Ex. 1060 ¶ 46).

Petitioner’s arguments are unavailing. The originally filed disclosure explains that “ n samples, one obtained each of the next n time periods t of GNSS data, are averaged” to generate an “averaged position.” Ex. 2022, 28:10–22. The time period corresponding to n successive periods of time t provides sufficient description for the claimed predetermined time period over which data is aggregated. Petitioner and its declarant, Dr. Madiseti, appear to agree that averaging implies aggregating, describing “that averaging is a single example of aggregation.” Sur-Reply 4.¹³ Because the described averaging collects and sums information, “aggregated” is supported by the originally filed disclosure, and the limitation at issue is supported and is not new matter.

Because I would find Patent Owner to have met its burdens on its Revised Motion to Amend, I further address Petitioner’s asserted unpatentability contentions to explain why I do not find Petitioner to have met its burden to show that proposed substitute claims 19–23, 27–32, 34, and 36 are either indefinite under 35 U.S.C. § 112(b) or obvious over the combined teachings of the prior art presented in the Opposition. Opp. 10–25.

¹³¹³ In its Sur-reply, Petitioner newly argues that “aggregating” is not sufficiently described by “averaging” because the latter is a single species of “aggregating.” Sur-reply 3. However, this was not one of the “two independent reasons” argued in its Opposition, and I decline to consider the new theory pursuant to 37 C.F.R. § 42.23(b). *See also* Consolidated Trial Practice Guide at 74 (stating that a “sur-reply that raises a new issue or belatedly presents evidence may not be considered”).

2. Indefiniteness

Petitioner asserts that the phrase “containment zone defined by a containment perimeter,” set forth in both independent proposed substitute claims, is indefinite. Opp. 11. Petitioner asserts that Figure 13 depicts an out-of-bounds zone that is within a perimeter, but is not within a containment zone. *Id.* (citing Ex. 1060 ¶¶ 70–77). Petitioner asserts that Figure 13 also shows another perimeter that defines a safe area 12. *Id.* Petitioner asserts that both perimeters and both zones would meet Patent Owner’s proposed construction of a “containment zone,” and therefore, a person of ordinary skill in the art would be unable to reasonably discern the scope of this claim element. *Id.* Summarizing the alleged confusion during oral argument, Petitioner asked, “how do you determine if it’s a containment zone instead of just a zone?” Tr. 38:17–18.

Proposed substitute claims in an *inter partes* review proceeding may be challenged as indefinite. USPTO Memorandum on the Approach to Indefiniteness Under 35 U.S.C. § 112 in AIA Post-Grant Proceedings, 2 n.2 (Jan. 6, 2021); *Uniloc 2017 LLC v. Hulu, LLC*, 966 F.3d 1295, 1304 (Fed. Cir. 2020) (“The PTAB correctly concluded that it is not limited by [35 U.S.C.] § 311 in its review of proposed substitute claims in an IPR.”). The Board assesses indefiniteness under the approach set forth in *Nautilus*. *Id.* at 5 (citing *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898 (2014)). Under *Nautilus*, “a patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 572 U.S. at 901.

This limitation is definite. The claim defines the containment zone as that which is defined by a containment perimeter. No claim further requires an “out-of-bounds zone,” a “safe zone,” or other feature within the claimed perimeter that is inconsistent with a containment zone. Under the plain language of claims 19 and 28, anything within the perimeter having a line segment to which the ray is cast is within the containment zone. To the extent that the '295 patent discusses other possible zones, they are unclaimed, and do not cause the proposed substitute claims to be indefinite.

3. *Obviousness*

Petitioner asserts that the proposed substitute claims would have been obvious over the following grounds, which I present in table format for clarity:

1a	Berntsen and (Chang/Geeks or Rich or House or Franklin or Shah or Claus) and (McFarland or Carter or Mizuochi or GNSS Intro) and GNSS Intro
1b	Guinta and (Chang/Geeks or Rich or House or Franklin or Shah or Claus) and (McFarland or Carter or Mizuochi or GNSS Intro) and GNSS Intro
2	McFarland and (Carter or Mizuochi or GNSS Intro) and (Chang/Geeks or Rich or House or Franklin or Shah or Claus)
3	Shaprio and (Carter or Mizuochi or GNSS Intro) and (Chang/Geeks or Rich or House or Franklin or Shah or Claus)
4	Swanson and (Carter or Mizuochi or GNSS Intro) and (Chang/Geeks or Rich or House or Franklin or Shah or Claus)

Opp. 11–25. Petitioner bears the burden of proof to show obviousness. 37 C.F.R. § 42.121(b). I begin with Petitioner’s assertion 1a, based on Berntsen.

a) *Berntsen (assertion 1a)*

Petitioner asserts that ground 4, as presented in the Petition, discloses all elements of the original claims. Opp. 12 (citing Ex. 1060 ¶¶ 139–175).¹⁴ With respect to the newly added limitations of proposed substitute claim 19, Petitioner asserts that Berntsen discloses a GNSS receiver and an AHRS. Opp. 15 (citing Ex. 1014, 3:20, 5:23–31; Ex. 1060 ¶ 144). Petitioner asserts that Berntsen discloses using motion data to determine if the pet is in motion. *Id.* at 16 (citing Ex. 1014, 5:23–31; Ex. 1060 ¶ 144).

With respect to “aggregating satellite positioning data over a predetermining time period,” Petitioner points to descriptions of “position pinning to an aggregated position” in each of Carter (Ex. 1065), Mizuochi (Ex. 1064), or GNSS Intro (Ex. 1028), which Petitioner refers to collectively as “Aggregation References.” Opp. 12 (citing Ex. 1060 ¶¶ 85–112).¹⁵ Petitioner asserts that each of these references teach averaging and aggregation techniques for augmenting a GNSS position while stationary. *Id.* at 16 (citing Ex. 1065, 19; Ex. 1064 ¶¶ 62, 211; Ex. 1028, 57; Ex. 1060 ¶ 144). Petitioner asserts that Carter aggregates satellite data by taking repeated measurements over a “specified time period,” such as 5 seconds, to

¹⁴ I do not consider any analysis that is improperly incorporated by reference to Ex. 1060 (Madisetti Decl.) throughout the Opposition, although I consider the factual statements therein. 37 C.F.R. § 42.63; *See also Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 (August 29, 2014).

¹⁵ Petitioner further includes Tracking Animals with GPS and Hubert within the “Aggregation References,” but does not include them in its explanation of how the combination teaches claim 19. Opp. 15 (“Thus, Berntsen and Giunta, in view of Mizuochi or Carter or GNSS Intro and GNSS Intro, teach the *new limitations* in the independent claims as follows”).

“reduce the effects of individual coordinate solution variations” and thereby reduce the effects of errors on individual position determinations. *Id.* at 12–13 (citing Ex. 1060 ¶¶ 98–100). Petitioner asserts that Mizuochi teaches generating an average position, e.g., of six samples, when stationary conditions exist, as an alternative to outputting the present located position. Opp. 13 (citing Ex. 1064 ¶¶ 210, 211, 219, 249, Fig. 8; Ex. 1060 ¶¶ 107–108). Petitioner does not explain how GNSS Intro teaches aggregating over a predetermined time period while stationary; nor is such teaching found in Dr. Madiseti’s citation to GNSS Intro. Ex. 1060 ¶ 144; Ex. 1028, 57, 68–71 (discussing supplementing GNSS when GNSS conditions become poor).¹⁶ Petitioner asserts that a person having ordinary skill in the art would have combined Carter, Mizuochi, or GNSS Intro with Berntsen in order to improve its positional accuracy and avoid unwarranted correction (presumably, of the pet).

Patent Owner argues that it would not have been obvious to combine a technique that averages samples when stationary (such as Carter or Mizuochi) with Berntsen, because Berntsen teaches a power saving mode when no motion is detected. Reply 10–11 (citing Ex. 1014, 5:23–31). Petitioner argues that a person having ordinary skill in the art would find it obvious to perform the averaging before the power saving mode is entered, to provide a more accurate location when the subject is stationary. Sur-reply 12 (citing Ex. 1014, 5:23–31).

¹⁶ Because I determine that GNSS Intro, even if prior art, does not supply teachings missing from the asserted combinations of references, I need not further determine whether GNSS Intro has been shown to be prior art.

Petitioner has not met its burden to show that a person having ordinary skill in the art would have found it obvious to combine either Carter or Mizuochi with Berntsen for Petitioner's stated reasons. Petitioner relies upon Berntsen for "determining whether the subject is in motion or is stationary." Opp. 16. However, Berntsen's determination of motion results in waking up from power saving mode, and Berntsen's determination of no motion results in continued power saving mode operation. Ex. 1014, 7:61–67. Petitioner has not sufficiently explained why Berntsen's determination of no motion should instead result in performing additional position measurement steps, in light of Berntsen's emphasis on saving power when stationary. Although I credit Dr. Madisetti's statement that a person of ordinary skill in the art would seek a more accurate location of a tracked animal, neither Petitioner nor Dr. Madisetti explains why additional measurements would be desirable at a time when the animal has been determined not to have moved from its previous position; i.e., stationary. Petitioner's comparison to the reason for such measurements in the '295 patent is unpersuasive because the process of the '295 patent involves continuously taking satellite measurements that require compensation of measurement error through averaging or other aggregating to prevent an illusion of movement when the animal is stationary, whereas the process of Berntsen instead stops taking satellite measurements when stationary. Sur-reply 11–12.

Consequently, Petitioner has not shown, by a preponderance of the evidence, that it would have been obvious to combine Berntsen with either Carter or Mizuochi to teach or suggest the limitations of claim 19. Because the same assertions were applied to show the same combinations teach the

similar limitation of claim 28, and because each other asserted claim depends from either claim 19 or 28, Petitioner has not shown claims 19–25, 27–34, and 36 to be unpatentable as obvious over Berntsen combined with the other asserted references.

b) *Guinta (assertion 1b)*

Petitioner further asserts that Guinta could take the place of Berntsen, and be combined with the same references under the same arguments and evidence. Opp. 12. Patent Owner argues that Guinta, like Berntsen, stops its satellite measurements when the animal is determined to be stationary. Reply 11 (citing Ex. 1015 8:29–47 (“Once a positional fix is obtained, there is no reason to take another positional fix—and ***good reason not to***—unless the monitored animal changes its location”; “obtaining a positional fix is ***very power intensive***”) (emphasis added)).

Petitioner provides no arguments for its Guinta-based assertions separate from those advanced for its Berntsen-based assertions. Opp. 11–17. Therefore, for the reasons explained in our discussion of the Berntsen-based assertions, Petitioner has not shown, by a preponderance of the evidence, that it would have been obvious to combine Berntsen with either Carter or Mizuochi to teach or suggest the limitations of claims 19–25, 27–34, and 36.

c) *McFarland (assertion 2)*

Petitioner asserts that McFarland describes “GNSS devices for tracking subjects that include[] a ‘position pinning’ technique that uses motion sensor data to determine ‘whether the subject is in motion or is stationary’ and ‘hold[ing] constant the GNSS position’ when it is stationary.” Opp. 13 (citing Ex. 1060 ¶¶ 178–182 (citing Ex. 1034 ¶ 74)). Petitioner asserts that the position at which the GNSS is held constant is its

“actionable position,” which is an aggregated position of two data points.

Id. (citing Ex. 1060 ¶¶ 183–185).

Patent Owner argues that the claims require aggregating “when” the subject is stationary, and that McFarland’s “position pinning” instead holds the position constant when stationary, rather than making an updated position. Reply 10 (citing Ex. 1034 ¶ 74; Ex. 2038 ¶¶ 56–57). Patent Owner further argues that McFarland adds a satellite position to a non-satellite position, such as a “product of a degraded position difference and a position tracking coefficient,” that does not teach “aggregating satellite positioning data over a predetermined time period.”

Petitioner has not shown McFarland to teach the claimed determination, in which satellite positioning data over a predetermined time is aggregated when the processor determines the subject is stationary. Petitioner does not point to any indication in McFarland that GNSS measurements are to be relied upon and aggregated when the subject is stationary. McFarland instead indicates that when there is not a sufficient change in position, the GNSS position “is held constant,” or a secondary “terrestrial” (non-satellite) location source is used to determine location, or the “actionable position and speed may cease tracking the GNSS position and speed altogether,” or the mobile device may “conserve energy by ceasing GNSS navigation” and using the last acceptable location as the actionable position once motion is again detected. Ex. 1034 ¶¶ 74, 82, 84–85. Although Petitioner argues that the last acceptable location is an aggregated location, that location is simply maintained if the subject is determined to be stationary. The claim instead requires that satellite

positioning data “is aggregated” when the subject is determined to be stationary.

Petitioner further points to averaging of positions as being well-known. Opp. 17 (citing Ex. 1060 ¶¶ 110–112). Petitioner also points to averaging of positions as being taught to provide a more precise location by Carter or Mizuochi. Opp. 22 (citing Ex. 1065, 19; Ex. 1064 ¶¶ 57–58).

The general advantage of averaging multiple measurements, such as satellite measurements, to improve precision is not in dispute.¹⁷ What is in dispute is whether one having ordinary skill in the pertinent art would perform additional measurements to more precisely locate an already located, stationary animal where the pertinent art stresses the need for power conservation. In McFarland (as in Guinta and Berntsen), great care is taken to send satellite position queries only when necessary. Ex. 1034 ¶ 85. Petitioner has not sufficiently explained why the advantages of a more precise location of a stationary, already located subject would outweigh energy conservation concerns in the view of one having ordinary skill in the art.

Petitioner has not shown, by a preponderance of the evidence, that one having ordinary skill in the art would have found that the asserted combinations of the prior art teach or suggest aggregating satellite

¹⁷ Responding to Patent Owner’s arguments against the advantages of averaging in the specific technologies of individual references, Petitioner explains that the applied “aggregation references” teach that averaging is of general benefit to “any measurement technique.” Sur-reply 12 (the “aggregation references teach that averaging over a time period is not unique to satellite-based surveying”).

positioning data over a predetermined time period when the processor determines the subject is stationary. Because each of proposed substitute claims 19–25, 27–34, and 36 require that limitation, Petitioner has not shown any of claims 19–25, 27–34, and 36 to be unpatentable as obvious over the asserted combinations of prior art.

d) *Shaprio (assertion 3)*

Petitioner applies Shaprio in combination with the same references applied in its assertions based upon McFarland. Opp. 22–25. I again focus on the limitation of aggregating satellite positioning data over a predetermined time period when the processor determines the subject is stationary.

Petitioner asserts that Shaprio teaches motion sensors that determine motion and make augmented position determinations when in motion. Opp. 20 (citing Ex. 1046 ¶ 76; Ex. 1060 ¶ 218). Petitioner asserts that “*Carter and Mizu[o]chi* teach to aggregate the satellite positioning data *after* determining the subject is stationary as a technique for improving the accuracy of the determined location,” citing its discussion of these references in the context of its Berntsen-based assertions. *Id.* (citing Ex. 1060 ¶¶ 186–189). Petitioner asserts that such aggregation would advantageously “avoid applying improper stimulus to the tracked subject.” *Id.* (citing Ex. 1060 ¶¶ 122, 219–225).

Patent Owner argues that Shaprio, like McFarland, Berntsen, and Guinta, turns off its GNSS in a sleep mode that is useful to preserve its battery life. Reply 11 (citing Ex. 1046 ¶¶ 109–112).

Neither Shaprio nor Carter teach determining whether a subject is stationary. Petitioner does not assert that Shaprio teaches a determination of

whether a subject is stationary, nor that any action should occur upon such a determination. Petitioner points to Carter for that determination, referring the reader to Petitioner's discussion of its Berntsen-based assertions. However, those assertions provide no explanation or citation to support that contention. Opp. 20 (citing Opp. III(B)(1) (citing Ex. 1060 ¶¶ 98–100)). Nor do the cited paragraphs of Dr. Madisetti's declaration provide support for that contention. Ex. 1060 ¶¶ 98–100.

Petitioner also points to Mizuochi for that determination, asserting that Mizuochi calculates an average position after the position satisfies stationary conditions. Opp. 13 (citing Ex. 1064, "[0210-0211]," 23 (citing "0057 and 0058")).¹⁸ Petitioner points to its predetermined time period as the number of averaged samples "e.g., 6." Opp. 13 (citing Ex. 1064, 8, "[0249]"; Ex. 1060 ¶¶ 107–108).

I agree with Patent Owner that Mizuochi's number of averaged samples does not teach a predetermined time period. Reply 9–10. In Mizuochi, each of a number of stored positions in a buffer are tested against four "stationary conditions." Ex. 1064, 13:27–30. Only those stored data positions meeting all four stationary conditions are then averaged with the

¹⁸ Throughout the Opposition and Dr. Madisetti's Declaration (Ex. 1060), citations are made to particular paragraphs of Exhibit 1064. However, Exhibit 1064 uses a column-and-line format, not a paragraph format. Petitioner and Dr. Madisetti are apparently pin-citing to the pre-grant publication of Mizuochi, which has not been submitted as part of the record, rather than the patent of Mizuochi, which is the Exhibit 1064 of record. Although I consider Exhibit 1064 to determine whether Petitioner's contentions are supported, Petitioner bears the responsibility for clearly communicating its position.

present located position to calculate the average position P_{av} . *Id.* at 14:14–23. Thus, to the extent that the averaged positions are “predetermined,” in the sense that they are selected for averaging, they are selected not as part of a time period, but as individual data points meeting a set of defined criteria. Reply 9–10. Although, in some instances, some data points passing the criteria may happen to occur sequentially in time, Mizuochi does not teach a determination over a predetermined time period, because Mizuochi provides no criteria for how to predetermine a time period. In Mizuochi, the period of time accounted for by the samples is instead determined by one of the stationary conditions, which uses thresholding rather than averaging. Ex. 1064, 12:10–20, 13:45–46. I further credit Mr. Sturza’s statement that a person having ordinary skill in the art would not modify Mizuochi to average based solely on a time (“age”) criteria because Mizuochi’s determination of a stationary position is based on lack of movement. Ex. 2038 ¶ 55.

Consequently, neither Petitioner’s Shaprio-Carter combination nor Petitioner’s Shaprio-Mizuochi combination teaches all claimed elements. The Shaprio-Carter combination does not teach a determination of whether a subject is stationary, nor that any action should occur upon such a determination. The Shaprio-Mizuochi combination does not teach a predetermined time period over which satellite positioning data is aggregated to generate an augmented position. Each of proposed substitute claims 19–25, 27–34, and 36 require both limitations. Thus, Petitioner has not shown, by a preponderance of the evidence, any of claims 19–25, 27–34, and 36 to be unpatentable as obvious over the asserted combinations of prior art.

e) *Swanson (assertion 4)*

Petitioner applies Swanson in combination with the same references applied in its assertions based upon McFarland. Opp. 22–25. I again focus on the limitation of aggregating satellite positioning data over a predetermined time period when the processor determines the subject is stationary.

With respect to Swanson, Petitioner asserts that Swanson teaches an accelerometer that “provides an indication of no motion of said collar.” Opp. 21 (citing Ex. 1071, claim 5; Ex. 1060 ¶¶ 258–265). Petitioner asserts that Swanson further teaches aggregating GNSS data by averaging received satellite data. *Id.* (citing Ex. 1071 ¶ 38; Ex. 1060 ¶¶ 259–265). Petitioner asserts that “Carter and Mizuochi teach to aggregate the satellite positioning data after determining the subject is stationary as a technique for improving the accuracy of the determined location,” citing its discussion of these references in the context of its Berntsen-based assertions. *Id.* (citing Ex. 1060 ¶¶ 186–189). Petitioner asserts that such aggregation would advantageously “avoid applying improper stimulus to the tracked subject.” *Id.* (citing Ex. 1060 ¶¶ 122, 259–265).

Patent Owner argues that Swanson teaches that the GPS system is powered up only if the collar is in motion and that Swanson does not make a stationary position determination. Reply 11 (citing Ex. 1071 ¶¶ 59, 63, Figs. 16, 18; Ex. 2038 ¶¶ 61–62). Swanson describes that the accelerometer includes a motion detector that can turn off the GPS system when the pet is not in motion, because “no need to waste power consumption for . . . GPS tracking.” Ex. 1071 ¶ 70.

Like Berntsen, Guinta, and McFarland, Swanson ceases GPS activity when the pet is stationary. For the same reasons as expressed in the discussions of those assertions, Petitioner has not sufficiently explained why the advantages of a more precise location of a stationary, already located subject would outweigh energy conservation concerns in the view of one having ordinary skill in the art such that the asserted combinations of the prior art teach or suggest aggregating satellite positioning data over a predetermined time period when the processor determines the subject is stationary. Because each of proposed substitute claims 19–25, 27–34, and 36 require that limitation, Petitioner has not shown any of claims 19–25, 27–34, and 36 to be unpatentable as obvious over the asserted combinations of prior art.

4. Conclusion

For the above described reasons, I would grant Patent Owner's Revised Motion to Amend as to claims 19–23, 27–32, 34, and 36.

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