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Filed on behalf of **Brain Corporation**

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AVIDBOTS CORP. and AVIDBOTS USA CORP.,
Petitioners,

v.

BRAIN CORPORATION.,
Patent Owner

Case No. IPR2025-01601
US Patent No. 10,379,539

PATENT OWNER'S PRELIMINARY RESPONSE

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LIST OF EXHIBITS

Exhibit	Description
2001	Proposed Protective Order
2002	Redlined Protective Order
2003	Complaint for Patent Infringement, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569, Dkt. 1 (N.D. Ill. Dec. 6, 2024)
2004	Declaration of Daniel P. Hughes
2005	Northern District of Illinois Local Patent Rules
2006	Joint Initial Status Report & Notification of Docket Entry, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569, Dkts. 40 & 42 (N.D. Ill.)
2007	Report of the Parties' Planning Meeting, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569, Dkt. 34 (N.D. Ill.)
2008	Defendant Avidbots's Second Supplemental Non-Infringement and Invalidity Contentions, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2009	Certificate of Service of Complaint in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569, Dkt. 8 (N.D. Ill.)
2010	HIGHLY CONFIDENTIAL – ATTORNEYS' EYES ONLY - Exhibit 97 to December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2011	HIGHLY CONFIDENTIAL – ATTORNEYS' EYES ONLY - Exhibit 99 to December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2012	HIGHLY CONFIDENTIAL – ATTORNEYS' EYES ONLY - Excerpts of December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)

2013	HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY - Exhibit 102 to December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2014	HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY - Exhibit 104 to December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2015	HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY - Excerpt of Exhibit 103 to December 11, 2025 Cabrerra Deposition in <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2016	Printout of November 16, 2019 Wayback Machine archive of https://www.braincorp.com/patents (captured on January 7, 2026)
2017	RESERVED
2018	HIGHLY CONFIDENTIAL – ATTORNEYS’ EYES ONLY – Document produced by Avidbots bearing production nos. AVID0576615–AVID0576616
2019	RESERVED
2020	RESERVED
2021	Redacted Excerpt of Defendant Avidbots’s Final Invalidity Contentions, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2022	RESERVED
2023	Order Denying Motion to Stay, <i>Brain Corp. v. Avidbots Corp. et al.</i> , Case No. 1:24-cv-12569 (N.D. Ill.)
2024	March 4, 2026 Email from Avidbots to Brain re Representations in Avidbots’ Brief Opposing Discretionary Denial
2025-2049	RESERVED
2050	Declaration of Marilyn C. Wolf, Ph.D.
2051	Marilyn C. Wolf Curriculum Vitae

2052	Diane Souvaine, Michael Horn, Julie Weber, “Voronoi Diagrams,” Tufts University (2005)
2053	David Miller, “A Spatial Representation System for Mobile Robots,” Yale University (1985)

Patent Owner Brain Corporation (“Brain”) submits this Preliminary Response to the Petition filed by Avidbots Corp. and Avidbots USA Corp. (collectively, “Petitioner”) regarding U.S. Patent No. 10,379,539 (the “’539 Patent”).

I. INTRODUCTION

To the extent the Director does not deny the Petition based on discretionary denial factors, the Board should deny the Petition on the merits. The Petition fails to demonstrate that the cited references disclose or render obvious multiple claim limitations in each independent claim, improperly incorporates arguments by reference to a declaration, and fails to prove its cited references qualify as prior art.

First, the independent claims recite a route on a map for the robot to travel, where the route includes poses of a robot, wherein a “respective pose of the robot includ[es] a plurality of points disposed therein.” However, the Petition fails to demonstrate that any of the cited references disclose that a respective pose of a robot includes a plurality of points disposed therein. The claims then require computing repulsive forces onto those plurality of points within a respective pose. But again, the Petition fails to demonstrate that repulsive forces are computed on more than a single point in any of its asserted combinations.

Second, the Petition relies extensively on non-patent literature in each asserted ground, but fails to argue that those references qualify as prior art. Instead of presenting those arguments in the Petition, Petitioner improperly incorporates those

arguments by reference to an expert declaration of Mary Bolin. Even if considered, that declaration does nothing more than accept the dates listed on documents and websites at face value. Such dates are inadmissible hearsay for proving public accessibility, even if presented through the guise of a declaration. In fact, the Bolin declaration exemplifies why such dates are unreliable hearsay. Based on those dates, Bolin testifies that a reference was somehow published on IEEE Xplore *several months before* IEEE Xplore was even put online. At the very least, this contradiction raises the sort of factual issues best decided by the district court, not the Board.

Thus, the Board should deny institution on the merits if institution is not denied for other discretionary denial factors.

II. BACKGROUND

A. Brain Corporation

Founded in 2009, Brain is an autonomous technology company that pioneered the commercial robotics domain by developing innovative solutions in robotics and artificial intelligence. In 2014, after significant investment in research and development, Brain launched its Brain Operating System (BrainOS[®]), which provided a breakthrough in robot programming. This breakthrough was inspired by Brain's commitment to understanding how biological brains perceive their environment via inputs and learn from demonstration. BrainOS[®] is the leading

artificial intelligence platform for powering robots in commercial public spaces worldwide.

Soon after developing BrainOS[®], Brain recognized that the commercial floor cleaning industry was experiencing a labor shortage. Brain then partnered with major floor equipment manufacturers to integrate BrainOS[®] into manual cleaning equipment. By 2018, Brain began collaborating with major global retailers to provide autonomous floor scrubbers in several of their stores. Brain's technology solved problems unique to autonomous floor cleaning, including how to navigate dynamic environments while cleaning as much of the desired area as possible. The success of the initial launch quickly led to Brain deploying autonomous floor scrubbers in stores nationwide.

Following this success, Brain continued to expand in the areas of autonomous technology and artificial intelligence. In 2019, Brain was named a top Autonomy Solution Provider. Brain's technology has now been implemented in over 40,000 mobile robots that have operated for more than 21 million operational hours.

U.S. Patent No. 10,379,539 ("539 Patent") is one of many patents that Brain has applied for and received to protect its innovations in robotics and artificial intelligence.

B. The '539 Patent

The '539 Patent is titled “Systems and Methods for Dynamic Route planning in Autonomous Navigation,” and issued August 13, 2019. EX1001, Cover. The '539 Patent is a continuation of an earlier application filed November 2, 2016 that issued as U.S. Patent No. 10,001,780. *Id.*

Autonomous robots, including floor cleaning robots, can determine routes for the robot to travel. EX1001, 1:33-39. Robots can learn routes through demonstrations by a user (such as a user manually controlling a robot through a route or a user-uploaded map containing a route) or by planning their routes based on the robot's knowledge of the environment. *Id.* However, robots can struggle to follow their routes when their sensors detect unexpected changes in their environment—such as when new obstacles appear or existing obstacles have moved. *Id.*, 1:39-50. In such cases, prior art robots may have been unable to make real time adjustments to their routes, resulting in the robots stopping, colliding into objects, or making suboptimal adjustments. *Id.*; *see also* EX2050, ¶32.

The '539 Patent discloses autonomous robot navigation techniques that overcome these challenges and allow robots to deviate from their routes, including by making complex adjustments to avoid obstacles. A key innovation is the modeling of a robot's route using route poses, wherein each route pose comprises a footprint. EX1001, 12:37-14:51. In contrast to prior art methodologies which

modeled robots as singular points (or vectors) and orientations, the '539 Patent models the robot's footprint associated with the robot's pose. *Id.*; EX2050, ¶33. Each footprint can also comprise a plurality of points which can provide a representation of the robot's body. EX1001, 14:28-43. Figure 4D illustrates an example of robot 202 and its route poses 414 and 416 with corresponding footprints as the robot travels a route.

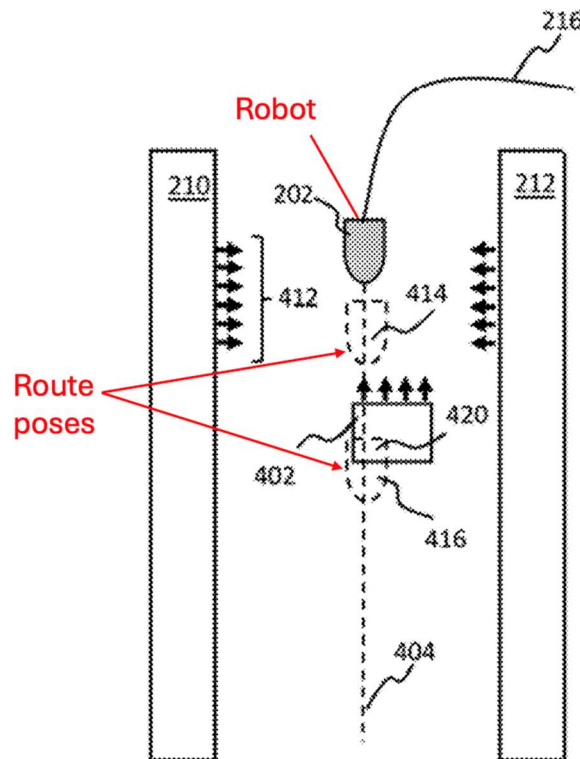


FIG. 4D

EX1001, Fig. 4D (annotated); EX2050, ¶33.

Figure 4E illustrates an example of a route pose where a plurality of points are distributed around and within the footprint.



FIG. 4E

EX1001, Fig. 4E; 4:25-27. The patent explains that a robot can adjust its route to avoid obstacles by calculating “forces” on points of route poses to alter the robot’s future route. *Id.*, 13:62-14:27; EX2050, ¶34. For example, points on obstacles may exert a repulsive force that can be calculated on each of the plurality of points within a route pose and push a robot away from the obstacle. EX1001, 13:62-14:2. In contrast, points on other route poses can exert attractive forces, which pull the robot towards its originally intended path. *Id.*, 16:64-17:11; Fig. 4F. Advantageously, by having a plurality of points that can experience forces, the points of each route pose can translate and/or rotate relative to one another, causing repositioning of the route poses and modification of the robot’s route. *Id.* 14:44-51; EX2050, ¶35.

C. Level of Ordinary Skill in the Art

For purposes of this preliminary response only, Patent Owner applies Petitioner’s description of the level of ordinary skill in the art. *See* Pet., 10; EX2050, ¶¶36-39. As discussed herein, the asserted art fails to teach the claim limitations alone or in combination regardless of the level of ordinary skill in the art. Patent

Owner does not necessarily agree with Petitioner's description of the level of skill and reserves the right to contest that description and propose a different level of skill if this proceeding is instituted.

D. Prosecution History

The '539 Patent was filed on June 18, 2018 as a continuation of an earlier application filed November 2, 2016 that issued as U.S. Patent No. 10,001,780. EX1001, Cover. The same PTO Examiner, Russell Frejd, examined both the applications that issued as '539 Patent and the '780 Patent. EX1001, Cover; U.S. Pat. No. 10,001,780, Cover.

On October 4, 2018—months after the Examiner already allowed the claims of the '780 Patent—the Examiner issued a non-final rejection based on nonstatutory double patenting over the claims of the '780 Patent, but also allowing claims 1-20 pending resolution of the double-patenting rejection. EX1002, 87-93.

On November 2, 2016, Brain amended the claims “such that they are patentably distinguishable over U.S. Pat. 10,001,780.” *Id.*, 115.

On April 4, 2019, the Examiner issued a notice of allowance. *Id.*, 118.

III. PETITIONER FAILED TO IDENTIFY, MUCH LESS EXPLAIN, ITS INCONSISTENT CLAIM CONSTRUCTIONS BETWEEN THE PTAB AND DISTRICT COURT

The Director and the Board have recently made it clear that a Petitioner fails to satisfy 37 C.F.R. §42.104(b)(3) when it advances different claim construction

positions in a co-pending district court litigation and in IPR without sufficiently explaining why the alternative positions are warranted. *Revvo Techs., Inc. v. Cerebrum Sensor Techs., Inc.*, IPR2025-00632, Paper 20 at 4-5 (Nov. 3, 2025) (precedential); *Tesla, Inc. v. Intellectual Ventures II LLC*, IPR2025-00340, Paper 18 at 2-4 (Nov. 5, 2025) (informative) (vacating and denying institution where petitioner argued in district court that a claim limitation is indefinite but argued no claim terms required construction in IPR petition).

Like in *Tesla*, Petitioner appears to be arguing in district court that multiple claim terms of the '539 Patent are indefinite, yet the Petition stated that “[n]o construction of any claim term is necessary for the Board to resolve[.]” Pet., 5. Specifically, in its final invalidity contentions in the district court, Petitioner has argued that the following terms are indefinite:

- “first point being discretized than a second point” (appears in independent claims 1, 8, 14)
- “[large]/[small]/[] footprint” (appears in claims 3, 8, 10, 14, 16)
- “uniform on the respective post” (appears claims 4, 11, 17).

EX2021, 32-33.

Here, Petitioner’s contention that “first point being discretized than a second point” is indefinite would impact every claim of the '539 Patent because the term appears in each independent claim. Petitioner first advanced this indefiniteness

theory in its initial infringement contentions, which were served on August 27, 2025—long before this Petition was filed. EX2008, 102. Yet, Petitioner never mentioned in the Petition that it was advancing a different construction in the district court, much less provide a sufficient explanation why the different positions are warranted. *See generally* Pet.

On March 4, hours before the filing of this Preliminary Response, Avidbots filed a Brief Opposing Discretionary Denial in this proceeding. Paper 13. In that brief, Avidbots stated that “Avidbots is not seeking different claim constructions in the Litigation compared to the IPR, nor is it seeking a construction of indefinite for any claim term among the patents that Brain asserted in the Litigation, contrary to Brain’s claim.” *Id.*, 17.

On the same day, the parties met and conferred on claim construction in the district court litigation involving the ’539 Patent. At that meet and confer, district court counsel for Avidbots declined to clearly specify whether Avidbots was still pursuing indefiniteness at the district court. Instead, Avidbots suggested that it may continue to argue that terms are indefinite during expert discovery. After the meet and confer, Avidbots still declined to clearly state its position. It stated in full:

We write regarding the indefiniteness issue specifically, as we promised you an urgent response on that. Avidbots’s position is as stated in its brief opposing discretionary denial. Your comment below that "Avidbots suggested that it would continue to pursue indefiniteness

in the district court litigation after claim construction” is not accurate; rather, Avidbots is not making any representation beyond what is in the aforementioned filing.

EX2024, 1. Thus, Avidbots is deliberately obfuscating its position. Avidbots is openly suggesting to the PTAB that it is ***not*** pursuing indefiniteness as part of claim construction in district court to obtain institution. But Avidbots is refusing to agree that it has waived its indefiniteness arguments in district court. Patent Owner obviously does not agree that any claim terms are indefinite. Further, Avidbots has now very clearly waived its indefiniteness arguments. Regardless, Avidbots’s misleading statement to the PTAB is a reason to deny institution.

IV. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS

Petitioner argues in Ground 1 that all claims would have been obvious over Beardsley (EX1004) and Castellanos (EX1007). However, as discussed herein and as supported by the Declaration of Dr. Marilyn Wolf (EX2050), Petitioner fails to demonstrate the combination discloses numerous limitations in each of the independent claims. EX2050, ¶40.

A. The Petition Fails to Identify “Detected Points on One or More Objects in the Environment” (Limitation 1[a])¹

Limitation 1[a] recites, in part, “one or more sensors configured to collect data about an environment proximate to the robot including detected points on one or more objects in the environment.”² The Petition cites Beardsley’s “sensor data 119,” which Petitioner argues indicates that Beardsley’s robot has one or more sensors coupled to the robot. Pet., 24. However, the Petition fails to demonstrate that such one or more sensors collect “detected points on one or more objects in the environment.” The Petition never identifies any disclosure in Beardsley that corresponds to “detected points on one or more objects.” *Id.*; EX2050, ¶41. Instead, Petitioner merely relies on its expert to argue that “[a] POSITA would have understood that Beardley’s [sic] sensors collect data at ‘detected points on one or more objects in the environment,’ as was commonly known.” Pet., 24 (citing EX1003, ¶67).

That argument fails for multiple reasons. *First*, neither Petitioner nor its expert ever explain *why* a POSITA would have “understood” Beardsley’s sensor collects data at “detected points on one or more objects in the environment.”

¹ For the purposes of this proceeding only and for the convenience of the Board, Patent Owner uses the limitation numbering applied by Petitioner. Patent Owner may use different limitation numbering in other proceedings.

² All *emphases* added unless noted otherwise.

EX2050, ¶41. The expert declaration merely repeats the same sentence *verbatim* without any further evidence or analysis. EX1003, ¶67. Such testimony is entitled to little or no weight. 37 C.F.R. §42.65(a); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9 at 15 (Aug. 24, 2022) (precedential) (expert testimony that repeats verbatim the conclusory assertion for which it is offered to support is entitled to little weight). Thus, Petitioner makes no showing that Beardsley discloses a sensor that collects data about “detected points on one or more objects in the environment.”

Second, Petitioner’s argument relies on a POSITA’s purported knowledge to supply the missing claim limitation, not any disclosure from Beardsley. *See* Pet., 24 (arguing limitation “was commonly known”). However, on July 31, 2025, Acting Director Stewart indicated in a memorandum that the USPTO “will enforce and no longer waive the requirement of 37 C.F.R. § 42.104(b)(4)” and that “enforcement of Rule 104(b)(4) means that applicant admitted prior art (AAPA), expert testimony, common sense, and other evidence that is not ‘prior art consisting of patents or printed publications’ (collectively, ‘general knowledge’) may not be used to supply a missing claim limitation.” July 31, 2025 Memorandum from Acting Director Coke Morgan Stewart to Members of the Patent Trial and Appeal Board Re Enforcement and Non-Waiver of 37 C.F.R. § 42.104(b)(4) and Permissible Uses of General Knowledge in Inter Partes Reviews at 1. That memorandum “appl[ies] to any petition for IPR filed on or after September 1, 2025.” *Id.* at 3. Because the Petition

argues the claim limitation is met, not by Beardsley's disclosure, but by a POSITA's knowledge, the Petition fails to satisfy Rule 104(b)(4) and should be denied.

The Petition also argues in the alternative that “[t]o the extent a POSITA would not have understood Beardsley to have disclosed sensors on the robot, it would have been obvious to modify Beardsley to incorporate Castellanos’ teachings regarding sensors.” Pet., 24. Petitioner then argues that Castellanos “include[s] different types of features obtained by different types of sensors” and “[t]his multisensory system, which can obtain information on ‘different types of features,’ constitutes detecting ‘points’ on one or more objects in the environment.” Pet., 24-25. This alternative argument also fails for multiple reasons.

First, the Petition conditioned the combination of Beardsley with Castellanos’s purported sensor teachings “[t]o the extent a POSITA would not have understood Beardsley to have disclosed sensors on the robot[.]” Pet., 24. But Beardsley does disclose sensors on a robot. *See* EX1004, [0047] (describing “sensor data 1142 from the vehicle 110”). Beardsley simply does not disclose “detected points on one or more objects in the environment.” Thus, under Petitioner’s reasoning, because Beardsley already discloses sensors on a robot, there would be no reason to further combine Beardsley with Castellanos. EX2050, ¶42.

Second, the Petition fails to demonstrate that Castellanos describes “detected points on one or more objects in the environment.” The Petition argues that

Castellanos “can obtain information on ‘different types of features’” and that this “constitutes detecting ‘points’ on one or more objects[.]” Pet., 25. But Castellanos’s reference to “different types of features obtained by different types of sensors” does not describe “detected points on one or more objects in the environment.” EX1007, 949; EX2050, ¶43. The Petition never explains how or why it equates “types of features” with “points.” The Petition again cites its expert declaration, but that declaration again merely repeated the same sentence verbatim without further evidence or explanation. Pet., 25 (citing EX1003, ¶68); 37 C.F.R. §42.65(a); *Xerox*, IPR2022-00624, Paper 9 at 15; EX2050, ¶43. Accordingly, the Petition fails to demonstrate that Ground 1 discloses Limitation 1[a].

B. The Petition Fails to Demonstrate that Beardsley/Castellanos Discloses a “Respective Pose of the Robot Including a Plurality of Points Disposed Therein” and the “Respective Pose Corresponding to at Least One of Position and Orientation of the Robot” (Limitation 1[b][1])

Limitation 1[b][1] recites, in relevant part, “the respective pose of the robot including a plurality of points disposed therein, the respective pose corresponding to at least one of position and orientation of the robot.” The Petition fails to demonstrate how the Beardsley/Castellanos combination discloses (1) “the respective pose corresponding to at least one of position and orientation of the robot,” and (2) “the respective pose of the robot including a plurality of points disposed therein.” EX2050, ¶44.

1. Beardsley's Waypoints Do Not Correspond to Either of Position or Orientation of the Robot

The Petition attempts to map Beardsley's waypoints to the "respective pose of the robot" and argues that "[i]n Beardsley, each waypoint and/or active area corresponds to the claimed 'position and orientation of the robot.'" Pet., 34. However, the Petition is incorrect because Beardsley's waypoints and active areas have nothing to do with the position and orientation of the robot. Rather, Beardsley's waypoints and active areas represent areas where the robot is free to move, not the robot's actual position or orientation. EX2050, ¶45.

Beardsley discloses a method for providing shared control of a vehicle (e.g., a local or remote human driver tells the vehicle where to go and the vehicle has semi-autonomy to avoid collisions). See EX1004, [0003]-[0008]; EX2050, ¶46. Beardsley discloses that in some instances, a guidance trajectory can be created with a set of waypoints, where each waypoint has an "active area (where the vehicle is allowed to freely move) of a predefined radius." EX1004, [0058]. Beardsley's Figure 4 illustrates an example of a trajectory with nine waypoints (labeled 1-9) and active areas (the circles around waypoints 1-9). See *id.*, FIG. 4 (shown below), [0060]; EX2050, ¶46.

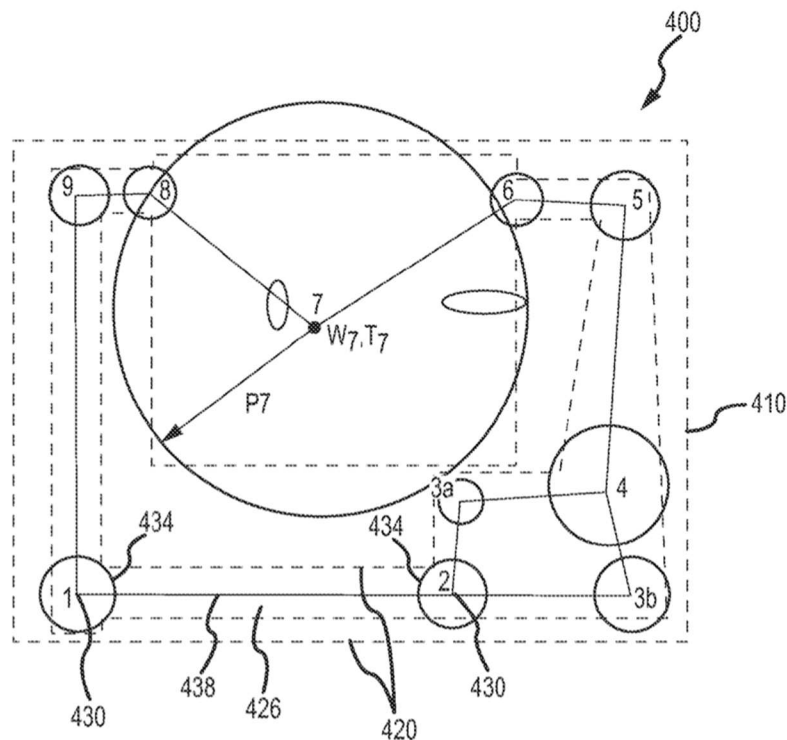


FIG.4

Beardsley explains that the waypoint and active area method “giv[es] the vehicles and their drivers/operators limited freedom in their movement via the active areas” and that “[a]n active area with a large radius, ρ , implies greater freedom of movement for the vehicle.” *Id.* [0059]. In particular, Beardsley points out that waypoint 7 (W7) in Figure 4 “has a large active area where the vehicles are allowed to freely drive.” *Id.* [0060].

Thus, a POSITA would understand that the waypoints and active areas represent areas where a vehicle is **allowed** to freely move, but do not correspond to the robot’s position or orientation. EX2050, ¶47. Beardsley’s Figure 5 further

confirms this understanding. As annotated below, Figure 5 depicts “a vehicle 510 *within* the active area 520 of the current point, q.” EX1004, [0063]. Thus, the location and orientation of the vehicle/robot is separate and distinct from the waypoint and active area. EX2050, ¶48.

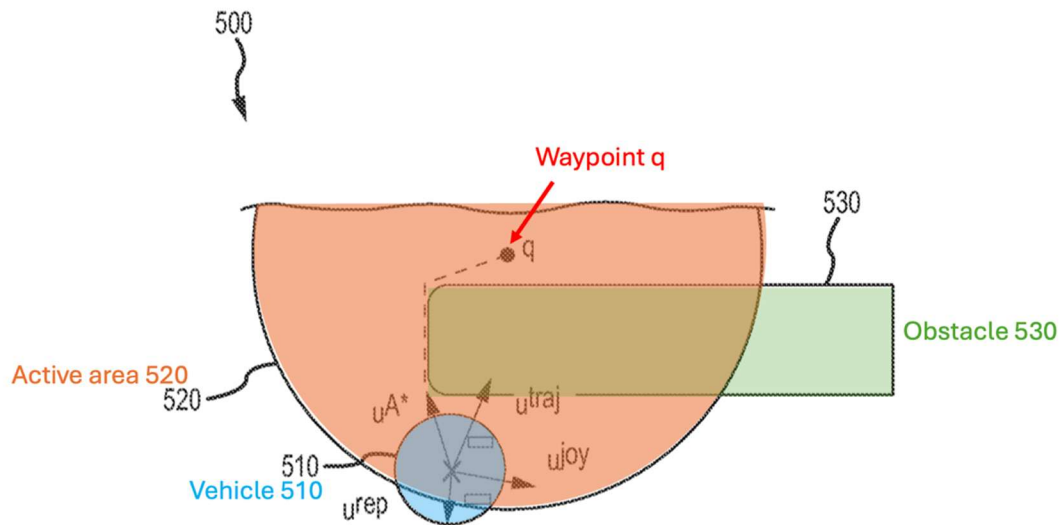


FIG. 5

EX1004, Fig. 5 (annotated); EX2050, ¶48.

To analogize, Beardsley’s waypoints and active areas are akin to a dog on a leash, where the waypoint is where the leash is anchored or held and the length of the dog’s leash dictates the active area in which the dog is allowed to move. But the leash anchor and length of the leash do not represent the actual location of the dog or which way it is pointing. EX2050, ¶49.

Notably, the Petition fails to demonstrate how Beardsley’s waypoints and active areas correspond to a robot’s position and orientation. When attempting to

address “position and orientation,” the Petition cites paragraphs [0012], [0050], and [0056] from Beardsley, but none of those paragraphs were describing Beardsley’s waypoints and active areas. Pet., 34-35; EX1004, [0012], [0050], [0056]; EX2050, ¶50.

Accordingly, Beardsley’s waypoints and active areas do not correspond to a robot’s position or orientation.

2. Beardsley Does Not Disclose a Plurality of Points Disposed Within a Route Pose

The Petition also fails to demonstrate that each “respective pose of the robot includ[es] a plurality of points disposed therein.” The Petition references Beardsley’s Figure 2 and argues that “each waypoint has multiple points, including point *p*, and points around the circle of the radius that envelopes the shape of the vehicle.” Pet., 34. This argument is flawed for several reasons.

First, Petitioner confuses the circle shown in Beardsley’s Figure 2 (which describes a vehicle) with the waypoints and active areas shown in Figure 4.

Describing Vehicle 210

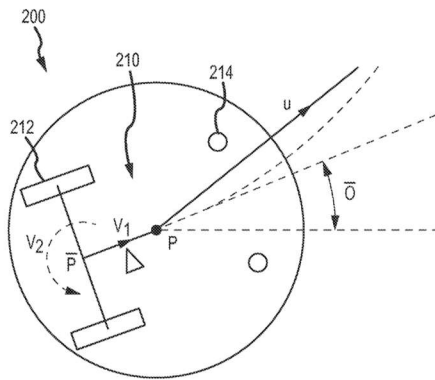


FIG. 2

Describing Waypoints and Active Areas

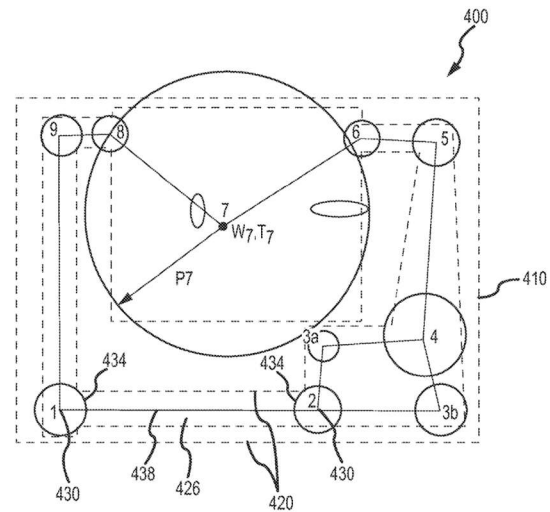


FIG. 4

EX1004, Figs. 2, 4. As discussed above, the waypoints and circular active areas in Beardsley's Figure 4 represent areas where a vehicle is allowed to move, not the position or orientation of the vehicle. *See supra* Section IV.B.1; EX2050, ¶¶51-52. In contrast, Beardsley's Figure 2 is a "graph of a wheelchair used as the semi-autonomous vehicle." EX1004, [0015], [0056]. Beardsley explains that the point *p* is "the point in-between both tractor wheels" of the wheelchair. But point *p* is not a point within each waypoint because the waypoints and the location of the vehicle are different concepts. EX2050, ¶52.

Second, the Petition does not identify a plurality of points. The Petition identifies "point *p*, and points around the circle of the radius that envelopes the shape of the vehicle," (Pet., 34). But the Petition does not identify even one point on the circle. *Id.* Beardsley also does not identify any particular point on the circle around

the point *p*. EX1004, [0056], [0050]; EX2050, ¶53. And, as discussed below, the Petition never argues that any repulsive forces would be calculated on any point on the circle. *See* Pet., 39-40; EX2050, ¶53.

3. Castellanos Does Not Disclose a Pose of the Robot Including a Plurality of Points Disposed Therein

The Petition argues in the alternative that “[t]o the extent a POSITA would not have understood Beardsley to have disclosed a ‘pose of the robot’, it would have been obvious to modify Beardsley to incorporate Castellanos’ route poses.” Pet., 35. The Petition then argues that Castellanos “depicts poses for the mobile robot along the route in Figures 2, 3, and 5” and that “a POSITA would have understood that each pose comprises a plurality of points on the map disposed therein.” *Id.* Again, this argument fails.

First, the Petition argued “it would have been obvious to modify Beardsley to incorporate Castellanos’ route poses,” but never explained what that modification would entail. Pet., 35. For example, the Petition does not explain what aspect of Beardsley would be modified, whether it be the waypoints, active areas, or the point and circle representing the vehicle, and how Castellanos would be so incorporated. EX2050, ¶60.

The Federal Circuit has instructed that “a clear, evidence-supported account of the contemplated workings of the combination is a prerequisite to adequately explaining and supporting a conclusion that a relevant skilled artisan would have

been motivated to make the combination and reasonably expect success in doing so.”

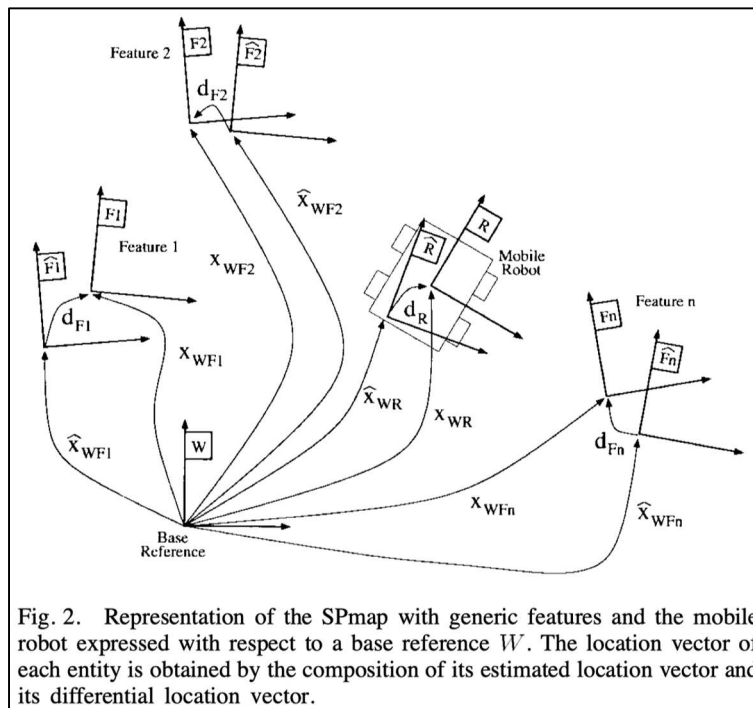
Personal Web Techs., LLC v. Apple, Inc., 848 F.3d 987, 994 (Fed. Cir. 2017).

Because the Petition does not explain how Beardsley would be modified with Castellanos, the Petition fails to demonstrate a motivation and a reasonable likelihood of success on the merits.

Second, the Petition failed to identify a plurality of points in Castellanos. The Petition’s entire argument is a single conclusory statement that “As illustrated in the figures, a POSITA would have understood that each pose comprises a plurality of points on the map disposed therein.” Pet., 35 (citing EX1003, ¶84). Again, the expert declaration contains no explanation beyond repeating the sentence verbatim. EX1003, ¶84. Notably, Castellanos’s Figures 2, 3, and 5 are vastly different from each other and it is unknown what the Petition refers to in these figures as the “pose of the robot.” The Petition does not annotate or otherwise identify anything in Figures 2, 3, and 5 as corresponding to the “plurality of points.” Pet., 29-30. And the Petition does not cite any text within Castellanos supporting the notion that each respective pose of the robot contains a plurality of points disposed therein. *Id.*; see EX2050, ¶¶54-55.

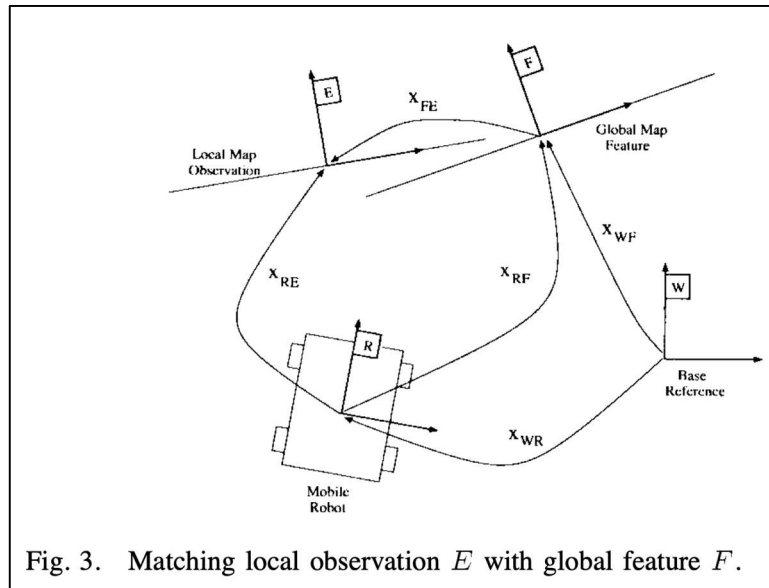
Indeed, a POSITA would not understand Figures 2, 3, and 5 to show that any supposed “pose” of a robot contains a plurality of points. EX2050, ¶¶55-59. Castellanos was concerned with the error in locating robots and other features in an

environment. See EX1007, 948-949; EX2050, ¶¶56. Castellanos describes that “The estimation of the location of an element is denoted by $\hat{x}_{WE}$, and the estimation error is represented locally by a *differential location vector* d_E relative to the reference attached to the element.” EX1007, 948 (original emphasis). Thus, the “true location of the element” is the composition of those two vectors. *Id.* In Figure 2, Castellanos merely illustrates the concept of an estimated location and a differential location vector for a “Mobile Robot” and three “Feature[s]” in the environment. A POSITA would not understand Figure 2 to describe a pose of a robot with a plurality of points disposed therein. EX2050, ¶¶56-57.



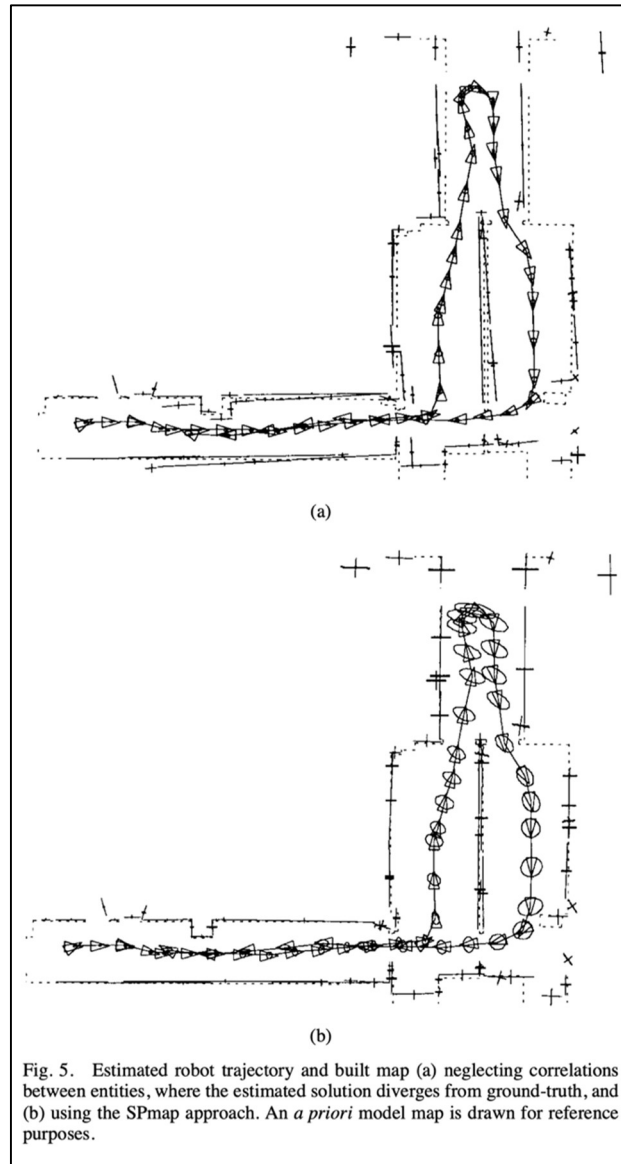
EX1007, Fig. 2.

Likewise, Figure 3 does not show any pose or a plurality of points within a pose. Figure 3 depicts matching local observations with a global map. EX1007, 949-950; EX2050, ¶58.



EX1007, Fig. 3.

Figure 5 also does not show that each pose of the robot includes a plurality of points disposed therein. Figure 5 depicts two versions of an “[e]stimated robot trajectory.” EX1007, Fig. 5. The trajectories are depicted with triangles, which a POSITA would understand to illustrate only one point and a direction. EX2050, ¶59.



EX1007, Fig. 5.

Accordingly, the Petition fails to demonstrate that Beardsley and/or Castellanos discloses limitation 1[b][1]. EX2050, ¶61.

C. Petitioner Failed to Demonstrate Computation of Repulsive Forces from a Point on an Object Onto the Plurality of Points of

the Respective Pose
(Limitation 1[b][2])

Limitation 1[b][2] recites “compute repulsive forces from a point on an object onto the plurality of points of the respective pose, the object being on the map.” The Petition fails to demonstrate that any forces are determined on more than one point. Pet., 39-41.

The Petition argues that Beardsley’s Equation 8 is an example of a function that computes a “repulsive velocity u_i^{rep} .” Pet., 39. But the Petition does not demonstrate that the “repulsive velocity” is determined on more than a single point. EX2050, ¶¶62-63. For example, the Petition attempted to map the “plurality of points” to Beardsley’s point p (which is the location of a vehicle, not a waypoint) and a circle around point p . Pet., 34. As discussed above, that mapping failed to identify more than one point. *See supra* Section IV.B.2; EX2050, ¶63. Regardless, the Petition does not demonstrate that any repulsive velocities are calculated for any point on the circle around point p . Pet., 39-41; EX2050, ¶63.

Moreover, the Petition also inconsistently maps Beardsley’s waypoints to the “respective pose of the robot including a plurality of points disposed therein.” Pet., 34. But the Petition does not argue that any forces are calculated on a waypoint, let alone that such forces are calculated on more than one point for each waypoint. *Id.* 39-41; EX2050, ¶64.

Instead, the Petition points to the u^{rep} of Figure 5 of Beardsley to show supposed forces. Pet., 39-40. But Figure 5 depicts u^{rep} as acting on a vehicle, not the waypoint q . EX1004, [0063] (Figure 5 depicts u^{rep} acting on vehicle 510, not waypoint q); EX2050, ¶64.

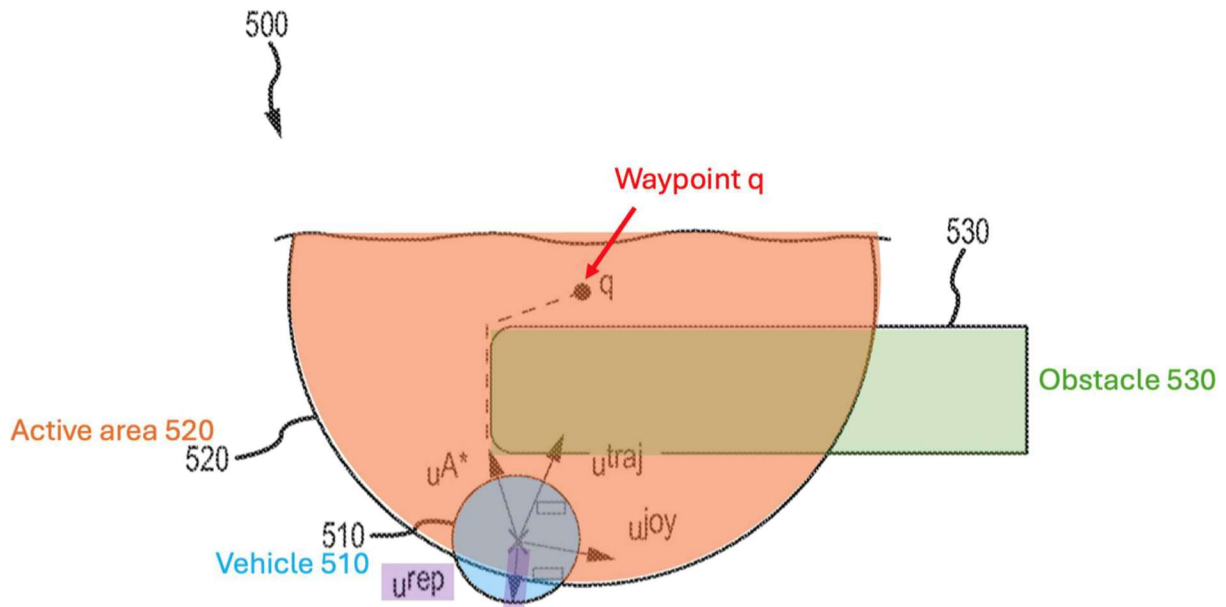


FIG.5

EX1004, Fig. 5 (annotated).

The Petition also argues that “[a] POSITA would have understood that [Beardsley’s] Figure 14 illustrates examples of repulsive velocities ‘from a point on an object,’ which affect ‘the plurality of points of the respective pose[.]’” Pet., 39-40 (citing EX1003, ¶86). Again, the Petition never provides any explanation as to why Figure 14 supposedly shows forces on a plurality of points. *Id.*; EX2050, ¶65.

The expert declaration does not either. EX1003, ¶86 (repeating same sentence from Petition verbatim). The Petition’s conclusory assertion does not make sense because Figure 14 does not show anything corresponding to a “plurality of points of the respective pose.” See EX1004, Fig. 14; EX2050, ¶65.

Accordingly, the Petition fails to demonstrate that the Beardsley/Castellanos combination discloses Limitation 1[b][2]. EX2050, ¶66.

D. Ground 1 Fails as to Independent Claims 8 and 14 for the Same Reasons as Claim 1

Claim 8 contains the substantively the same requirements as Claim 1 of “the respective pose of the robot including a plurality of points disposed therein, the respective pose corresponding to at least one of position and orientation of the robot” and “computing repulsive forces from a point on an object in the environment onto the plurality of points of a first route pose of the one or more route poses.” With respect to these limitations, the Petition’s arguments are substantively identical to Claim 1. See Pet., 52 (“Each of Beardsley’s waypoints and/or active areas corresponds to the claimed ‘route poses on the route.’”) (further referencing claim 1 arguments), Pet., 57 (for limitation 8[b], relying solely on cross-reference to 1[b][2] argument); EX2050, ¶67.

Claim 14 similarly contains substantively the same requirements as Claim 1 of “the respective pose of the robot including a plurality of points disposed therein, the respective pose corresponding to at least one of position and orientation of the

robot,” and “compute repulsive forces from a point on an object in the environment onto the plurality of points on a first route pose of the one or more route poses.” With respect to these limitations, the Petition incorporates by reference its Claim 8 arguments, which in turn incorporates its Claim 1 arguments. Pet., 60-61; EX2050, ¶67.

Accordingly, Ground 1 fails as to Claims 8 and 14 for the same reasons as Claim 1. EX2050, ¶67. Thus, Ground 1 does not demonstrate that any claim would have been obvious.

**V. GROUND 2 FAILS TO DEMONSTRATE A REASONABLE
LIKELIHOOD OF SUCCESS**

Ground 2 added Khatib to the Ground 1 combination, but only addresses a few limitations. See Pet., 67-75; EX2050, ¶68. Ground 2 does not resolve the deficiencies identified with Ground 1 above.

**A. Ground 2 Does Not Resolve the Petition’s Failure to Identify a
“Respective Pose of the Robot Including a Plurality of Points
Disposed Therein” and the “Respective Pose Corresponding to at
Least One of Position and Orientation of the Robot”
(Limitations 1[b][1], 8[a], 14[a])**

Ground 2 fails to demonstrate a reasonable likelihood of success because it does not address limitation 1[b][1] regarding “respective pose of the robot including a plurality of points disposed therein” and “respective pose corresponding to at least one of position and orientation of the robot.” Ground 2 skips those limitations and only addresses Limitation 1[b][2] in Claim 1. Ground 2 also does not address

Limitations 8[a] or 14[a]. *See* Pet., 67-74. Accordingly, Ground 2 fails for the same reasons as Ground 1. EX2050, ¶69.

B. Ground 2 Does Not Demonstrate Computing Repulsive Forces from a Point on an Object Onto the Plurality of Points of the Respective Pose (Limitations 1[b][2], 8[b], 14[b])

The Petition argues “Khatib explains that ‘[a]ny point of the robot can be subjected to the artificial potential field,’” and concludes that a POSITA would “apply this teaching to Beardsley’s robot to calculate forces for the plurality of points on a route poses [sic] of the Beardsley robot to protect all parts of the robot.” Pet., 70-71. However, the Petition fails to demonstrate that any repulsive forces are calculated on more than one point in the proposed Beardsley-Castellanos-Khatib combination because, as explained above, the Petition failed to identify a plurality of points in each route pose. *Supra* Section IV.B.2-3; EX2050, ¶70.

Additionally, because the Petition mapped Beardsley’s waypoints to the “respective pose of the robot,” the Petition needed to demonstrate that forces are determined on the waypoints themselves. *See* Pet., 34; EX2050, ¶71. But as discussed above, the Petition does not argue that forces are calculated on the waypoints themselves, and such a calculation would be nonsensical because the waypoints are a different concept than the pose of a robot. *Supra* Section IV.B.1; EX2050, ¶71.

The Petition’s arguments for the corresponding limitations in Claims 8 and 14 also rely on a cross-reference to Claim 1, and thus fail for the same reasons. Pet., 73-74; EX2050, ¶72. Accordingly, Ground 2 fails to demonstrate the combination discloses limitation 1[b][2], 8[b], and 14[b].

Accordingly, Ground 2 does not demonstrate a reasonable likelihood of success as to any claim.

VI. GROUND 3 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS

Ground 3 relies on a combination of Yamamoto and Khatib, but Petitioner fundamentally misunderstood the asserted art. Yamamoto does not disclose route poses that comprise footprints or a plurality of points. Instead, Yamamoto models the path of a robot using a *singular* reference point positioned ahead of the robot that the robot then chases. See EX1010, 424 (explaining implementation of “look-ahead control system” where “the mobile robot chases the reference point”). The Petition failed to demonstrate that the proposed combination determines repulsive forces on a plurality of points in each route pose because there is no such plurality of points.

A. Yamamoto Does Not Disclose Route Poses Comprising a Footprint or a Plurality of Points (Limitation 1[b][1])

The Ground 3 argument for Limitation 1[b][1] relies on Yamamoto only. See Pet., 81-86. The Petition argues: “Yamamoto discloses creating ‘sub-goals,’ ‘target

positions,’ ‘Voronoi edges,’ and ‘reference points’ on the map which represent potential positions of the robot along the route and comprise the respective pose of the robot including a plurality of points, the pose corresponding to the position and orientation of the robot.” Pet., 84. This argument fails for several reasons. EX2050, ¶74.

1. Sub-Goals and Target Locations Are Not Poses, Do Not Comprise a Plurality of Points, and Do Not Correspond to the Position and Orientation of the Robot

First, sub-goals and target positions are not a “respective pose of the robot” in a “route.” As their names suggest, sub-goals and target positions indicate places where the robot is trying to reach, but that does not describe the *route* that the robot takes to get there. EX2050, ¶75; EX1010, 429-430. For example, a finish line for a race is a target position, or end goal, but a finish line does not represent the route that a runner or vehicle takes to reach the finish line. EX2050, ¶75. Indeed, Yamamoto explains that a robot “explores a route for attaining the goal position,” meaning the robot has to determine a route to the sub-goal or target location. EX1010, 430; EX2050, ¶75.

Second, the Petition presents no argument showing how sub-goals and target locations “includ[e] a plurality of points disposed therein.” The Petition skips this portion of Limitation 1[b][1] entirely and makes no showing that a sub-goal or target position comprises more than just a single point. Pet., 84-85. Sub-goals and target

locations do not have a “plurality of points disposed therein” because Yamamoto describes them as singular points. *See* EX1010, Fig. 19, 429; EX2050, ¶76.

Third, the Petition presents no argument showing how sub-goals and target locations “correspond[] to at least one of position and orientation of the robot.” As explained above, sub-goals and target locations indicate places that a robot is trying to reach, but do not necessarily correspond to the robot’s actual position or route to reach that location. EX2050, ¶¶75, 77. And the Petition does not attempt to show how a sub-goal or target location corresponds to an orientation of the robot. Pet., 84-85.

2. Voronoi Edges Are Not Poses of a Robot; They Describe the Surrounding Environment

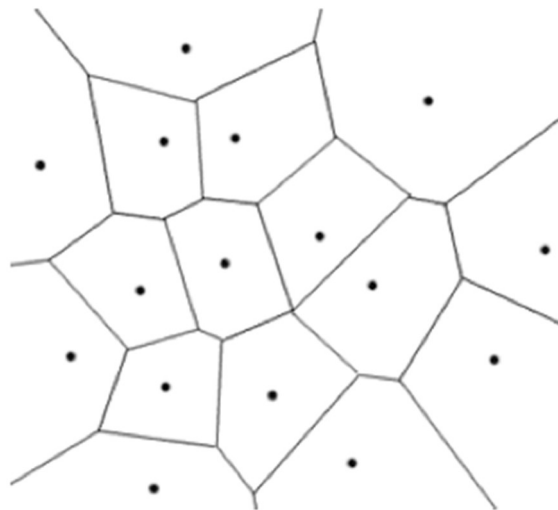
The Petition also attempts to map “Voronoi edges” to the claimed “pose of the robot,” but this argument fails for several reasons. Pet., 84.

First, Petitioner does not present any argument or explanation showing how a Voronoi edge includes a “plurality of points disposed therein” as required. Pet., 84-85; EX2050, ¶78.

Second, a Voronoi edge does not represent a robot’s position or orientation. EX2050, ¶78. Indeed, the Petition does not present any argument or explanation suggesting a Voronoi edge corresponds to an orientation of a robot.

Petitioner apparently believes that a Voronoi edge represents a robot’s position. *See* Pet., 84 (“Yamamoto discloses creating ... ‘Voronoi edges’ ... on the

map which represent potential positions of the robot along the route”). That is incorrect. Notably, neither Petitioner nor its expert ever explain what a Voronoi edge is. Pet. 84-85; EX1003, ¶¶207-208. A POSITA would have understood that a Voronoi edge is a property of a map of the environment, **not** a representation of a robot’s position. EX2050, ¶¶78-79; see EX1010, 428 (“In terms of modeling a configuration space of robot’s **environment** during navigation, we adopt Voronoi diagram approach to enable the robot to **generate a map of its workspace** while it is moving towards a destination.”). More specifically, a POSITA would have understood that, given a set of points, a Voronoi diagram can be calculated to show cells in which any particular location within a cell is closer to its point than any other point. See EX2050, ¶80; EX2052, 1-2.



EX2052, 1 (Voronoi diagram illustrating cells around each point, the boundaries of each cell being Voronoi edges that are equidistant to nearby points).

In terms of robotic mapping, Voronoi edges are calculated from a map and show line segments that are equidistant from obstacles/walls in the environment. EX2053, 124; EX2050, ¶80. Indeed, Yamamoto explains that Voronoi edges are calculated from the information obtained by a robot's laser range finder. EX1010, 429 (describing the “computational burden of the Voronoi edge calculation”), Fig. 14 (pseudo-code for calculating Voronoi diagram); EX2050, ¶79. Because Voronoi edges are calculated features of the map, they are *not* representations of a robot's position or orientation. EX2050, ¶81.

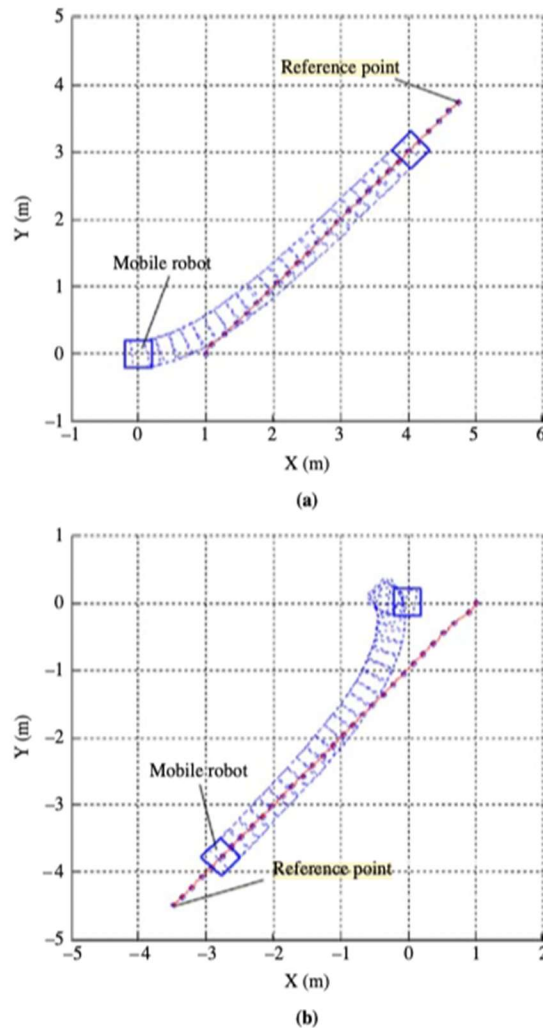
Thus, a Voronoi edge do not correspond to the claimed “respective pose of the robot” because it does not include “a plurality of points disposed therein” and does not correspond to “at least one of position and orientation of the robot.”

3. A Reference Point Is a Single Point

The Petition also attempts to map Yamamoto's “reference points” to the claimed “respective pose of the robot.” Pet., 84-85. But a reference point cannot correspond to the claimed “pose of the robot” which must comprise a “plurality of points” because a reference point is a *single* point. EX2050, ¶82. Indeed, the Petition presents no argument whatsoever explaining how a reference point could comprise more than one point. Pet., 84-85; EX2050, ¶83. Yamamoto explains that it uses a “look-ahead control system” to move a robot. EX1010, 424. In that system,

“the mobile robot chases the reference point.” *Id.* Yamamoto’s Figure 5 shows how the robot, depicted as blue squares, chases a singular reference point over time.

Figure 5 Experimental result: trajectory of mobile robot: (a) 45°; (b) 225°



EX1010, Fig. 5; EX2050, ¶82.

And Yamamoto confirms that a reference point is a single point represented merely by x and y coordinates. EX1010, 425 (“(x_r , y_r) is the coordinates of the

reference point”); EX2050, ¶83. Accordingly, a reference point is not a pose of the robot.

B. Ground 3 Fails to Demonstrate that Repulsive Forces Are Computed onto the Plurality of Points of a Respective Pose (Limitation 1[b][2])

The Petition fails to demonstrate that the Yamamoto/Khatib combination discloses “compute repulsive forces from a point on an object onto the plurality of points of the respective pose” as recited in Limitation 1[b][2].

Yamamoto does not disclose that repulsive forces are calculated on more than one point. Indeed, the Petition admits that “Yamamoto discloses using the potential field method to calculate forces *for a given reference point.*” Pet., 86 (citing EX1010, 426). But that calculation is only performed on *one* point, not onto a plurality of points of a respective pose. EX2050, ¶¶84-85.

Notably, the Petition also does not argue that any forces are calculated on sub-goals, target locations, or Voronoi edges, which the Petition also argued correspond to the claimed “pose[s] of the robot.” Pet., 84; EX2050, ¶86. Again, the Petition never identified a plurality of points within the sub-goals, target locations, or Voronoi edges, let alone show how there could be a calculation of forces on them. *See supra* Section VI.A.1-2.

The Petition then argues that “[a] POSITA would have found it obvious to compute repulsive forces for the plurality of points of the pose as Khatib discloses

defining an adequate number of PSPs would better ensure protection of the robot from collision.” Pet., 89. But this argument also fails because, as explained above, the Petition failed to identify a “plurality of points” for a respective pose. None of the Petition’s identified “sub-goals,” “target positions,” “Voronoi edges,” and “reference points” comprise a plurality of points. *Supra* Section VI.A. Regardless of Khatib’s description of PSPs, the Petition never identifies more than one point in what it (incorrectly) identified as the “respective pose of the robot” and never demonstrates that repulsive forces are calculated on more than one of those points. EX2050, ¶87.

Moreover, the Petition fails to explain how the purported combination would work. As discussed above, Yamamoto discloses a look-ahead control system where a robot chases a singular reference point. EX1010, 424. Yamamoto explains that it is that singular reference point that experiences repulsive potentials. *Id.*, 425-426. The Petition fails to explain how that look-ahead control system would be changed by the introduction of one or more additional points that experience forces. EX2050, ¶87. The Petition thus fails to provide “a clear, evidence-supported account of the contemplated workings of the combination,” which “is a prerequisite to adequately explaining and supporting a conclusion that a relevant skilled artisan would have been motivated to make the combination and reasonably expect success in doing so.” *Personal Web Techs.*, 848 F.3d at 994.

Accordingly, the Petition fails to demonstrate that the Yamamoto/Khatib combination discloses Limitation 1[b][2]. EX2050, ¶88.

C. Ground 3 Fails as to Independent Claims 8 and 14 for the Same Reasons as Claim 1 and Because the Petition Fails to Identify a Footprint

1. The Petition’s Arguments for Claims 8 and 14 Fail for the Same Reasons as Claim 1

Claim 8 contains the substantively the same requirements as Claim 1 of “the respective pose of the robot including a plurality of points disposed therein, the respective pose corresponding to at least one of position and orientation of the robot” and “computing repulsive forces from a point on an object in the environment onto the plurality of points of a first route pose of the one or more route poses.” With respect to these limitations, the Petition’s arguments are substantively identical to Claim 1. *See* Pet., 99 (cross-referencing claim 1 arguments and further addressing other sub-limitations in 8[a]), 102 (cross-referencing 1[b][2] for 8[b]); EX2050, ¶89.

Claim 14 similarly contains substantively the same requirements as Claim 1 of “the respective pose of the robot including a plurality of points disposed therein, the respective pose corresponding to at least one of position and orientation of the robot,” and “compute repulsive forces from a point on an object in the environment onto the plurality of points on a first route pose of the one or more route poses.” With respect to these limitations, the Petition incorporates by reference its Claim 8

arguments, which in turn incorporates its Claim 1 arguments. Pet., 104-105; EX2050, ¶89.

Accordingly, Ground 1 fails as to Claims 8 and 14 for the same reasons as Claim 1. EX2050, ¶89

2. The Petition Also Ignores Claims 8 and 14’s Requirements for a “Footprint” that Is Indicative of a “Shape of the Robot”

Claims 8 and 14 differ slightly from Claim 1 in that both claims also recite “each route pose comprising a footprint indicative at least in part of a pose and a shape of the robot along the route.”

For this portion of Limitation 8[a], the Petition cross-references its Claim 3 argument. But Claim 3 is different than Claim 8 in that Claim 3 does not recite that a footprint is indicative of “a shape of the robot.” The Petition *never addresses* how any disclosure in Yamamoto corresponds to the claimed “footprint” that is “indicative at least in part of ... a shape of the robot.” See Pet., 90-91; EX2050, ¶¶90-91.

The Petition argues for Claim 3 that “Yamamoto’s ‘sub-goals,’ ‘target positions,’ ‘Voronoi edges,’ and ‘reference points’ represent potential positions of the robot along the route (respective pose) and correspond to the footprint of the robot.” Pet., 90. But the Petition never demonstrates how any “sub-goal,” “target position,” “Voronoi edge,” and “reference point” even resembles a shape of the robot.

Accordingly, the Petition fails to demonstrate that independent Claims 8 and 14 would have been obvious. EX2050, ¶91.

Accordingly, Ground 3 fails to demonstrate a reasonable likelihood of success on the merits as to any claim. EX2050, ¶92.

VII. GROUND 4 FAILS TO DEMONSTRATE OBVIOUSNESS OF ANY CLAIM

Ground 4 adds Scholz to the Beardsley/Castellanos combination to address only dependent claims 3, 10, and 16. Ground 4 therefore does not resolve any of the deficiencies in Ground 1 and thus does not demonstrate a reasonable likelihood of success on the merits as to any claim. EX2050, ¶93.

VIII. PETITIONER FAILS TO DEMONSTRATE PUBLIC ACCESSIBILITY

The Board should deny institution because Petitioner has not demonstrated the prior art status of the non-patent literature it relies upon in each ground. Specifically, the Petition does not demonstrate the prior art status of the Castellanos, Yamamoto, and Scholz references. The Petition failed to meet its burden of proof for several reasons: (1) the Petition itself presents no argument as to why those references qualify as prior art printed publications and instead relies solely on arguments improperly incorporated by reference to an expert declaration; (2) even if considered, the expert declaration merely repeated dates that appear on the face of documents or in metadata, which are inadmissible hearsay regardless of whether a so-called expert repeats them; and (3) the expert declaration presents unreliable and

inconsistent testimony, including relying on a supposed record custodian who testified that an article was publicly available for download before the database was ever put online.

A. The Petition Improperly Incorporates by Reference Its Public Accessibility Arguments

“[A]t the institution stage, *the petition* must identify, with particularity, evidence sufficient to establish a reasonable likelihood that the reference was publicly accessible before the critical date of the challenged patent and therefore that there is a reasonable likelihood that it qualifies as a printed publication.” *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 13 (Dec. 20, 2019) (precedential) (“*Hulu*”). The Board’s rules prohibit a Petition from incorporating arguments by reference to an expert declaration. 37 C.F.R. § 42.6(a)(3); *Cisco Sys., Inc. v. C-Cation Techs., LLC*, IPR2014-00454, Paper 12 at 7-10 (Aug. 29, 2014) (informative) (refusing to consider arguments not made in the Petition but rather incorporated by reference to an expert declaration). Here, the Petition improperly incorporated the public accessibility arguments and evidence found only in expert declarations.

Regarding Castellanos, the Petition merely set forth a conclusion that “Castellanos was published in print in the IEEE journal, Transactions on Robots and Automation, in October 1999, and published on the well-known online database IEEE Xplore.” Pet., 4. The Petition cited only the Declaration of Mary Bolin for

support. *Id.* (citing EX1008, ¶¶24, 27). But the Bolin Declaration referred to multiple attachments and made purported conclusions based on those attachments. EX1008, ¶¶24-27 (discussing IEEE Xplore purported publication date, PDF search results, and another declaration from Gordon MacPherson).³ Notably, one of the attachments that Bolin relied upon is a declaration from an IEEE declarant, Gordon MacPherson. EX1008, Attachment D. But the Petition itself never cited the MacPherson declaration or hinted at its existence. One would only find this IEEE declaration as a nested exhibit to an exhibit, and only if one were to follow citations within citations to the Bolin Declaration. Thus, the actual arguments and evidence supporting an October 1999 publication date are found only in the Bolin Declaration, in violation of the prohibition on incorporation by reference. *See Cisco Sys., Inc. v. C-Cation Techs., Inc.*, IPR2014-00454, Paper 12 at 7-10 (Aug. 29, 2014) (informative) (citing declaration to support conclusory statements not otherwise supported in the petition is improper incorporation).

The Petition also separately concluded that “Castellanos would have been located by a POSITA ... at least as of May 2000, by searching on IEEE Xplore....” Pet., 4. But again, the Petition provided no argument or explanation of that May

³ Although the Petition asserted Castellanos was published “in print,” the Bolin Declaration does not provide any evidence or argument regarding publication in print as opposed to online. EX1008, ¶¶24-27.

2000 date. Instead, the Petition referred to two declarations (EX1008, ¶37 and EX1003, ¶26) for that supposed explanation. Again, the Petition improperly incorporated by reference those arguments concerning the May 2000 date.⁴

Regarding Yamamoto, the Petition similarly failed to set forth argument or evidence for its conclusion that “Yamamoto was published in print and online in the journal, *Industrial Robot an International Journal*, on August 22, 2008.” Pet., 4. The only evidence and argument concerning the August 22, 2008 date are found in the Bolin Declaration. *See id.* (citing EX1008, ¶44). But again, the Bolin Declaration discussed multiple other attachments to support the August 22, 2008 date. EX1008, ¶44.

Similarly, regarding Scholz, the Petition did not set forth argument or evidence for its conclusion that “Scholz was published in the IEEE Conference on Robotics and Automation and added to IEEE Xplore on August 18, 2011.” Pet., 5. Instead, the only argument and evidence are found in the Bolin Declaration. *Id.* (citing EX1008, ¶51). Again, the Bolin Declaration discussed another attachment to support the August 18, 2011 date. EX1008, ¶51.

⁴ As explained further below, the May 2000 date refers to the date that IEEE Xplore first came online, which contradicts Petitioner’s declarants who testified that Castellanos was published on IEEE Xplore in 1999.

The Board requires these arguments and evidence to be presented *in the Petition*, not buried in a declaration. Accordingly, the Petition repeatedly violated the prohibition on incorporation by reference and fails to meet its burden of demonstrating prior art status.

Moreover, had such arguments and evidence been included within the Petition, the Petition would likely have exceeded the 14,000-word limit. 37 C.F.R. §42.24(a)(1)(i). The Petition certified that it contained 13,918 words and the lengthy discussion of other attachments in the Bolin Declaration exceeds over 500 words. EX1008, ¶¶24-27, 44-46, 51-52 (comprising 537 words). Petitioner's incorporation by reference amounts to improper self-help in increasing its petition word limit. *See DeSilva v. DiLeonardi*, 181 F.3d 865, 866-67 (7th Cir. 1999) (Incorporation by reference "amounts to a self-help increase in the length of the [] brief A brief must make all arguments accessible to the judges, rather than ask them to play archaeologist with the record.").

B. The Petition Fails to Demonstrate When Castellanos Was Publicly Accessible

Even if the improperly incorporated arguments from the Bolin Declaration were considered, the Petition still fails to demonstrate when Castellanos was publicly accessible. The Petition relies on Dr. Bolin to testify that Castellanos was publicly accessible as of October 1999. Pet., 4. But Bolin is not a percipient witness. Bolin does not testify that she has any knowledge of when Castellanos was actually made

publicly available nor does she testify that she is a record custodian for any of the databases she downloaded the references from. *See generally* EX1008. Thus, Bolin does not and cannot testify as to when Castellanos was actually publicly available.

Instead, Bolin relies on the publication date shown in a website printout from the IEEE Xplore database to assert the “fact that [Castellanos] was published in the IEEE Xplore digital database on October 21 [sic], 1999.” EX1008, ¶¶25, 27. But the date appearing on a website database is inadmissible hearsay and insufficient to demonstrate public accessibility. *See, e.g., Apple Inc. v. DSS Tech. Mgm’t, Inc.*, IPR2015-00369, Paper 14 at 6 (Aug. 12, 2015) (date stamped by university library on a book was inadmissible hearsay when offered to prove public accessibility); *ServiceNow, Inc. v. Hewlett-Packard Co.*, IPR2015-00716, Paper 13 at 15-17 (Aug. 26, 2015) (date on face of reference and indications of the availability of the reference for download from online database were inadmissible hearsay); *Sophos Ltd. v. Open Text Inc.*, IPR2023-00732, Paper 23 at 15-19 (Nov. 2, 2023) (listing of a date in digital database insufficient to demonstrate public accessibility as of that date). Moreover, Petitioner cannot circumvent the hearsay rules by merely presenting the hearsay under the guise of an expert declaration. “Rule 703 does not authorize admitting inadmissible evidence ‘on the pretense that it is the basis for expert opinion when, in fact, the expert adds nothing to the [inadmissible evidence] other than transmitting [it] to the [factfinder].’” *Wi-Lan Inc. v. Sharp Elecs. Corp.*,

992 F.3d 1366, 1374 (Fed. Cir. 2021) (quoting Charles Alan Wright, Arthur R. Miller & Victor J. Gold, *Federal Practice and Procedure* § 6274 (2d ed. 2020)).

Bolin also relies on a declaration of Gordon MacPherson, who purports to be a record custodian for IEEE. EX1008, ¶26. But the MacPherson Declaration is also unreliable. MacPherson does not testify that he has personal knowledge of when Castellanos was published. EX1008, 41-42. Instead, MacPherson testifies that “The article [Castellanos] and abstract from IEEE Xplore show the dates of publication.” *Id.* But like Bolin, MacPherson did nothing more than rely on the date of the face of a document to aver that it was published on that date.

Further, Bolin’s and MacPherson’s declarations contradict each other. Here, MacPherson testified that Castellanos “was added to the IEEE digital library Xplore on October 31, 1999, as shown from the abstract from IEEE Xplore, and was publicly available for download from IEEE Xplore by October 31, 1999.” EX1008, 39-40. But Bolin testified that “The IEEE Xplore database has been online since May in the year 2000.” *Id.*, ¶17. Neither declarant ever addresses or reconciles how it would have been possible for an article to be published and available for download on IEEE Xplore **before** IEEE Xplore was ever online.

Bolin does not even question this seemingly impossible testimony from MacPherson and instead handwaves the issue away by merely stating that the article would have been available “a few months later in May 2000” after IEEE Xplore was

put online. EX1008, ¶27. But MacPherson unambiguously testified that the article was “publicly available for download from IEEE Xplore by October 31, 1999.” EX1008, 41-42. This contradiction shows that both declarations are unreliable and institution should be denied. *See Sophos Ltd. v. Open Text Inc.*, IPR2023-00732, Paper 23 at 17-18 (Nov. 2, 2023) (denying institution where petitioner’s expert alleged that reference was publicly available as of 2004 in a repository, but that repository did not exist until 2008).

The Director has reversed a final written decision and terminated a proceeding where a petitioner’s declarant provided materially inconsistent testimony. *Interactive Commc’ns Int’l, Inc. v. Blackhawk Network Inc.*, IPR2024-00465, Paper 39 at 3 (Oct. 1, 2025). So too here should the Director and the Board deny institution because the inconsistent testimony is irreconcilable.

C. The Petition Fails to Demonstrate Yamamoto Was Publicly Accessible

The Petition likewise fails to demonstrate Yamamoto’s prior art status. Bolin again relies on the date appearing in an online database (Emerald Insight) as the basis for her conclusion that Yamamoto was published on August 22, 2008. EX1008, ¶44. That date is likewise inadmissible hearsay that does not become admissible merely because Bolin repeated it.

Bolin also concludes that the August 22, 2008 shown on the Emerald Insight database represents *both* the print and online publication date for Yamamoto. *Id.*

But Bolin cited no evidence of simultaneous publication. At best, Bolin argues that the online version of Yamamoto “states that ‘the current issue and full text archive of this journal is available at [a particular URL].’” *Id.*, ¶45. But that is again inadmissible hearsay—using a statement from within Yamamoto to prove publication. And Bolin does not explain how a statement from within an online PDF is evidence of simultaneous print publication. Bolin’s declaration offers nothing more than speculation as to when Yamamoto was actually publicly accessible.

D. The Petition Fails to Demonstrate Scholz Was Publicly Accessible

The Petition similarly fails to demonstrate that Scholz was publicly accessible before the critical date. Bolin again relies only on the date appearing in a screenshot of the IEEE Xplore webpage. EX1008, ¶51. Like the others, that date is inadmissible hearsay that does not become admissible merely because Bolin repeated it.

Accordingly, the Petition fails to demonstrate that Castellanos, Yamamoto, and Scholz qualify as prior art. Because this failure infects every asserted ground, no ground demonstrates a reasonable likelihood of success on the merits.

Further, the credibility issues regarding Bolin and MacPherson are better suited for a federal district court to handle, where a factfinder can assess the credibility of the witnesses’ inconsistent testimony. Thus, the Board should also exercise discretion to deny institution for this additional reason.

IX. CONCLUSION

For the foregoing reasons, Brain respectfully requests the Board deny institution on the merits.

Respectfully submitted,

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Dated: March 4, 2026 / Daniel P. Hughes /
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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), Counsel for Patent Owner Brain Corporation hereby certifies that this document complies with the type-volume limitation of 37 C.F.R. §42.24(b). This document contains approximately 9,587 words, including any statement of material facts to be admitted or denied in support, and excluding the table of contents, table of authorities, mandatory notices under §42.8, exhibit list, certificate of service or word count, or appendix of exhibits or claim listing.

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: March 4, 2026

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CERTIFICATE OF SERVICE

I hereby certify that, pursuant to 37 C.F.R. §42.6(e) and with the agreement of counsel for Petitioners, a true and correct copy of **PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 10,379,539 AND EXHIBITS** are being served electronically on March 4, 2026, to the e-mail addresses shown below:

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