

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,
Petitioner,

v.

AUTONOMOUS DEVICES, LLC,
Patent Owner.

IPR2023-01054
Patent 10,452,974 B1

Before BARBARA A. PARVIS, ROBERT J. WEINSCHENK, and
RUSSELL E. CASS, *Administrative Patent Judges*.

CASS, *Administrative Patent Judge*.

PRELIMINARY GUIDANCE
PATENT OWNER'S MOTION TO AMEND

I. INTRODUCTION

On December 13, 2023, we instituted trial as to claims 4, 5, 7, 11, 14, and 15¹ of U.S. Patent No. 10,452,974 B1 (“the ’974 patent,” Ex. 1001). Paper 20 (“Inst. Dec.”). After institution, Patent Owner filed a Motion to Amend (Paper 28 (“Mot.”)) presenting proposed substitute claims 21–24 on a *contingent* basis, and proposed substitute claims 25 and 26 on a *non-contingent* basis. Mot. 1–2, 24. In particular, Patent Owner’s Motion to Amend requests “[i]n the event the Board finds any of original claims 4, 5, 7, or 11 unpatentable . . . the Board grant this motion to amend and issue the corresponding substitute claims [among 21, 22, 23, and 24].” Mot. 1. The Motion to Amend also submits that “[c]laims 14 and 15 are hereby cancelled” and requests that “that the Board issue claims 25 and 26 as substitutes for claims 14 and 15, respectively,” noting that “[Patent Owner] does not condition its request regarding claims 25 and 26 on any condition.” *Id.* at 1–2, 24. Patent Owner submitted a Declaration of Eli Saber, Ph.D. (Ex. 2007) in support of the Motion. Petitioner filed an opposition on May 30, 2024. Paper 31 (“Opp.”). Petitioner submitted a second Declaration of Jason Janet, Ph.D. (Ex. 1010) in support of the Opposition.

In the Motion, Patent Owner requested that we provide preliminary guidance concerning the Motion in accordance with the Board’s pilot program concerning motion to amend practice and procedures. Mot. 1; *see also* Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures in Trial Proceedings under the America Invents Act before the Patent Trial and Appeal Board, 84 Fed. Reg. 9,497 (Mar. 15, 2019) (providing a patent owner with the option to receive preliminary guidance from the Board on its motion to amend)

¹ Patent Owner previously disclaimed claims 1–3, 6, 8–10, 12, 13, and 16–20 of the ’974 patent. *See* Paper 11, 1 (citing Ex. 2004; 37 C.F.R. § 42.107(e)).

(“Notice”). We have considered Patent Owner’s Motion and Petitioner’s Opposition.

In this Preliminary Guidance, we provide information indicating our initial, preliminary, non-binding views on whether Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend in an *inter partes* review and whether Petitioner (or the record) establishes a reasonable likelihood that the substitute claims are unpatentable. *See* Notice, 84 Fed. Reg. at 9,497 (“The preliminary guidance . . . provides preliminary, non-binding guidance from the Board to the parties about the [motion to amend]”); *see also* 35 U.S.C. § 316(d) (statutory requirements for a motion to amend); 37 C.F.R. § 42.121 (regulatory requirements and burdens for a motion to amend); *Lectrosonics, Inc. v Zaxcom, Inc.*, IPR2018-01129, Paper 15 (PTAB Feb. 25, 2019) (precedential) (providing information and guidance regarding motions to amend).

For purposes of this Preliminary Guidance, we focus on the proposed substitute claims, and specifically on the amendments proposed in the Motion. *See* Notice, 84 Fed. Reg. at 9,497. We do not address the patentability of the originally challenged claims. *Id.* Moreover, in formulating our preliminary views on the Motion and Opposition, we have not considered the parties’ other substantive papers on the underlying merits of Petitioner’s challenges. We emphasize that the views expressed in this Preliminary Guidance are subject to change upon consideration of the complete record, including any revision to the Motion filed by Patent Owner. Thus, this Preliminary Guidance is not binding on the Board when rendering a final written decision. *See id.* at 9,500.

II. PRELIMINARY GUIDANCE

A. Statutory and Regulatory Requirements

For the reasons discussed below, at this stage of the proceeding, and based on the current record, it appears that Patent Owner has shown a reasonable likelihood that it has satisfied the statutory and regulatory requirements associated with filing a motion to amend with respect to proposed substitute claims 21–26.

1. Reasonable Number of Substitute Claims

Does Patent Owner propose a reasonable number of substitute claims? (35 U.S.C. § 316(d)(1)(B))

Yes.

Patent Owner proposes no more than 1 substitute claim for each of challenged claims 4, 5, 7, 11, 14, and 15. Mot. 1–3, App. A 1–16 (Substitute Claims Listing). Petitioner does not argue otherwise. *See generally* Opp.

2. Respond to Ground of Unpatentability

Does the Motion respond to a ground of unpatentability involved in the trial? (37 C.F.R. § 42.121(a)(2)(i))

Yes.

Patent Owner responds to the grounds of unpatentability on which we instituted trial. Mot. 3, 18–23. Upon review of Patent Owner’s arguments, we agree that proposed substitute dependent claims 21–26 recite new limitations, and new combinations of limitations, that directly respond to the grounds of unpatentability involved in the trial. *See* Mot. 3, 18–23, App. A 1–16 (Substitute Claims Listing). Petitioner does not argue otherwise. *See generally* Opp.

3. Scope of Amended Claims

Does the amendment seek to enlarge the scope of the claims? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No.

Proposed substitute claims 21–26 (i) retain all limitations of their original corresponding claims 4, 5, 7, 11, 14, and 15 (including the original independent claim from which claims 4, 5, 7, 11, 14, and 15 depend), and (ii) further include additional limitations as compared to respective claims 4, 5, 7, 11, 14, and 15. *See* Mot. 3–5, App. A 1–16 (Substitute Claims Listing). Therefore, proposed substitute claims 21–26 do not enlarge the scope of the claims of the challenged patent. *See* Mot. 3–5. Petitioner does not argue otherwise. *See generally* Opp.

4. New Matter

Does the amendment seek to add new subject matter? (35 U.S.C. § 316(d)(3); 37 C.F.R. § 42.121(a)(2)(ii))

No.

On this record, Patent Owner appears to have identified adequate written description support for proposed substitute claims 21–26. *See* Mot. 5–16. Petitioner does not argue otherwise. *See generally* Opp.

Thus, at this stage of the proceeding, on the record before us, Patent Owner has shown a reasonable likelihood that there is adequate written description support in the original disclosure of the '974 patent for proposed substitute claims 21–26.

B. Patentability

For the reasons discussed below, at this stage of the proceeding, and based on the current record,² it appears that Petitioner has not shown a reasonable likelihood that proposed substitute claims 21–26 are unpatentable.

² We express no view on the patentability of original claims 4, 5, 7, 11, 14, and 15 in this Preliminary Guidance. Instead, we focus on limitations added to the challenged claims in the Patent Owner's Motion to Amend.

Does the record establish a reasonable likelihood that the proposed substitute claims are unpatentable?

I. Obviousness

No, as to substitute claims 21–26 and Petitioner’s grounds based on the combinations of Grotmol and Hickman, and Grotmol and Tolstedt.

Petitioner has asserted the following combinations of cited art against the following substitute claims:

- Ground asserting Grotmol (Ex. 1004) and Hickman (Ex. 1005)³ against proposed substitute claims 21–26; and
- Ground asserting Grotmol and newly cited Tolstedt (Ex. 1015)^{4,5} against proposed substitute claims 21–26.

³ Petitioner’s ground table on pages 11–12 of the Opposition lists a “103: Grotmol and Hickman” ground against substitute claims 21–26, and also a “103: Grotmol, *POSITA* knowledge, and Hickman” ground against proposed substitute claim 24. *See* Opp. 11–12 (emphasis added). Petitioner’s § 103 arguments, however, do not differentiate between the “Grotmol and Hickman” ground and the “Grotmol, *POSITA* knowledge, and Hickman” ground. Rather, Petitioner presents the same § 103 arguments against all proposed substitute claims with respect to the ground including Grotmol and Hickman, and submits that “[t]he motivation to combine Hickman with Grotmol in view of *POSITA* knowledge would have involved the same reasons noted above [with respect to the Grotmol and Hickman ground].” *See* Opp. 15, 18–25.

⁴ US 2010/0063663 A1, published March 11, 2010.

⁵ Petitioner’s ground table on pages 11–12 of the Opposition lists a “103: Grotmol and Tolstedt” ground against substitute claims 21–23, 25, and 26, and a “103: Grotmol, *POSITA* knowledge, and Tolstedt” ground against proposed substitute claim 24. *See* Opp. 11–12 (emphasis added). Petitioner’s § 103 arguments, however, do not differentiate between the “Grotmol and Tolstedt” ground and the “Grotmol, *POSITA* knowledge, and Tolstedt” ground. Rather, Petitioner presents the same § 103 arguments against all proposed substitute claims with respect to the ground including Grotmol and Tolstedt, and submits that “[t]he motivation to combine Tolstedt with Grotmol in view of *POSITA* knowledge would have involved the same reasons noted above [with respect to the Grotmol and Tolstedt ground].” *See* Opp. 18–25.

Opp. 11–12.

On this record, it appears that Petitioner has not sufficiently shown that:

- proposed substitute claims 21–26 are unpatentable as obvious over the combination of Grotmol and Hickman, and
- proposed substitute claims 21–26 are unpatentable as obvious over the combination of Grotmol and Tolstedt.

Below, we analyze each of Petitioner’s proposed grounds against the substitute claims.

Grotmol-Hickman Ground

Proposed Substitute Claim 21

Proposed substitute independent claim 21 replaces original dependent claim 4 by rewriting it into independent form and also adding new limitations. *See* Mot. 4, App. A 1–3 (Substitute Claims Listing). In particular, proposed substitute claim 21 amends original claim 4 to recite:

[Sub-1]⁶ wherein the first circumstance representation includes a first collection of object representations, and the second circumstance representation includes a second collection of object representations;

[Sub-2] wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period, and comprises a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

[Sub-3] wherein the second collection of object representations represents the multiple objects detected at a second time or during a second time period, and comprises a second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects;

[Sub-4] wherein the first data structure is correlated with the first one or more instruction sets for operating the first device; and

[Sub-5] wherein the second data structure is correlated with the second one or more instruction sets for operating the first device.

⁶ We also provide the bracketed designations added by Petitioner to the claim limitations (*see* Opp. 18–25).

Mot. App. A 1–3 (Substitute Claims Listing).

With respect to claim element [Sub-1], Petitioner contends that Grotmol teaches a “circumstance representation” that includes “various types of data including, but not limited to, a collection of object representations, such as images of objects in a training set detected by one or more [of Grotmol’s] robot sensors, and data structures related to the objects and images.” Opp. 18 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B). Petitioner submits that (i) Grotmol’s image 2000 is “an example part of a ‘**first circumstance representation**’ and ‘may comprise representations [of] one or more objects, e.g., a tree 2002, a rectangle, a ball 2008, and/or other objects,’” and (ii) subsequent image 2010 in Grotmol is “an example part of a ‘**second circumstance representation**,’ and may comprise representations of objects from image 2010,” such that “images 2000 and 2010 respectively include first and second collections of object representations.” *Id.* at 18–19 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 78).

Petitioner relies on a combination of Grotmol and Hickman for claim elements [Sub-2]–[Sub-5], as follows. *See* Opp. 19–25.

With respect to limitation [Sub-2], Petitioner contends that “Grotmol teaches at least ‘**wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period**’” because Grotmol’s Figures 20A and 20B illustrate how images 2000 and 2010 may be shifted “based on relative motion between the images (e.g., motion speed and time interval $t_2 - t_1$ between the images)” and an ordinarily skilled artisan “would have understood that time t_1 corresponds to the time at which the first image (e.g., image 2000) was taken.” Opp. 19 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 80). With respect to limitation [Sub-3], Petitioner contends that Grotmol also teaches “**wherein the second collection of object representations represents multiple objects detected at a second time or during a second time period**” because Grotmol’s image 2010 includes representations of the tree 2012, rectangle 2014, and ball 2018 imaged at time t_2 referenced by Grotmol and which “[an ordinarily skilled artisan] would have understood . . . [to] correspond[] to the time at which the second image (e.g., image 2010) was taken.” Opp. 22 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 86).

Based on the present record, Petitioner’s assertions regarding Grotmol appear reasonable, particularly as Grotmol discloses that “[i]mages 2000, 2010 may comprise representations of visual field that may be obtained at times $t_1 < t_2$,

respectively.” *See* Ex. 1004, 38:54–56. Grotmol also provides that “[c]omparing image 2010 to image 2000, representations of the tree 2012[,] the rectangle, 2014, and the ball 2018 are shifted (horizontally) within the frame 2010 relative [to] representations, 2002, 2004, 2008 [of the tree, rectangle, and ball]” in the prior frame 2000. *See id.* at 39:2–5.

Petitioner relies on Hickman for the claimed “first data structure” and “second data structure” limitations. *See* Opp. 19–20, 22–23. In particular, Petitioner contends that Hickman stores data associated with a particular object in a knowledge base and such data “can include one or more of the object’s physical dimensions, weight, material composition, object identifier, serial number, image data, and location of the object (LOC).” Opp. 19–20 (citing Ex. 1005, 2:65–3:7, 12:5–18, 14:3–29, Fig. 3). Petitioner further contends that “the stored data associated with an object may include ‘data about different ‘types’ of objects that a robot may encounter or interact with in its environment, including different ‘types’ of ‘unique’ and ‘non-unique’ objects.’” Opp. 20 (citing Ex. 1005, 14:61–19:22). According to Petitioner:

Such object data is stored in *data structures*, e.g., *data structures 313, 314, or 315 [of Hickman]*, which along with object image data corresponds to the “**first collection of object representations**” in “**the first circumstance representation.**” Accordingly, GHC [(the Grotmol-Hickman combination)] renders obvious “**a first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects.**” TESLA1010, ¶81.

...

For the reasons explained above with respect to feature 2, *Hickman* discloses *data structures* (“**second data structure**”) that store “**labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects.**” It would have been obvious to a POSITA that, in the GHC, *a row or set of rows in Hickman’s structure 314 (or 313)* that include Grotmol’s image 2000 and objects therein *may correspond to the “first data structure,”* and *a row or set of rows in Hickman’s structure 314 (or 313)* that include Grotmol’s image 2010 and objects therein *may correspond to the “second data structure.”* The depiction of objects in the images together with the first and second data structures provide the claimed “**first collection of object representations**” and

“second collection of object representations,” respectively.
TESLA1010, ¶87.

Opp. 20, 22–23 (emphases added); *see also* Ex. 1005, 12:5–6 (describing “conceptual data structure 313 for the unique object knowledge base 307”), 15:28–30 (describing “conceptual data structure 314 for the general object knowledge base 308”), 20:28–30 (describing “conceptual data structure 315 for the task knowledge base 309”).

We have reviewed Hickman and observe that it indeed discloses *data structures* (whose rows represent objects, as noted by Petitioner, *see* Opp. 22), such as: *data structure 313 whose rows each include* “an individual unique object identifier (UID)⁷ [that] may have the following corresponding data: (i) a general object identifier (GID); (ii) image data (IMG); (iii) location data (LOC); and (iv) serial number data (SER)” (*see* Ex. 1005, 12:5–10, Fig. 3); and *data structure 314 whose rows each include* “an individual general object identifier (GID) may have the following corresponding data: (i) language data (LNG); (ii) image data (IMG); (iii) manufacturer data (MFG) (if applicable); (iv) model number data (MOD) (if applicable); (v) specification data (SPC); and (vi) task data (TASKS)” (*see id.* at 15:28–34, Fig. 3). A “unique” object in Hickman’s data structure 313 is “an object that can be identified with specificity as being a specific, individual object” (such as “a specific refrigerator that belongs to a specific person, i.e. John Smith’s specific refrigerator”), while a “non-unique” object in data structure 314 is an object “that may not be distinguishable (at least in any practical manner) from all other objects of its same ‘type’” (for example, a generic refrigerator, or a can of soda). *See id.* at 11:53–56, 15:1–6, 16:33–36. The rows representing objects in Hickman’s data structures 313, 314 indicate *types* of the objects. *See id.* at 11:56–63, 12:55–58, 14:65–67, 15:38–43.

Thus, at this stage, we are persuaded that Hickman teaches or at least suggests a “first data structure that includes: labels indicating *types* of the multiple objects,” as required by claim 21 (e.g., Hickman’s data structure 313 in which multiple rows indicate *types* of multiple unique objects, or data structure 314 in which multiple rows indicate *types* of multiple non-unique objects).

As further noted by Petitioner (Opp. 20), Hickman discloses that rows in *data structure 313* also include location data (in the LOC field) with *coordinates* indicating *locations* of multiple unique objects. *See* Ex. 1005, 12:9, 14:2–29

⁷ Hickman notes that “two ‘unique’ objects should not have the same unique object identifier (UID).” Ex. 1005, 12:28–29.

(describing location data (LOC) in data structure 313 including GPS coordinates indicating the last recorded location of a unique car, or GPS coordinates that describe a unique musical instrument's location in a case on a particular shelf), Fig. 3; Opp. 20 (noting that column 14, lines 3–29 of Hickman describe the “location data (LOC)” field in data structure 313 as “includ[ing] GPS coordinates and/or other location-based information, e.g., an association with (or a link to) one or more maps stored in the map knowledge base 310”). Thus, Hickman's data structure 313 also includes “coordinates indicating locations of the multiple objects” as required by proposed substitute claim 21.

Although Petitioner sufficiently shows that Hickman describes a “first data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects” (as required by claim 21), we find that Petitioner has *not* sufficiently explained how the teachings of Grotmol and Hickman would render obvious the claimed “second data structure” as well as the correlation limitations recited in claim 21 (i.e., “wherein the first data structure is *correlated* with the first one or more instruction sets for operating the first device; and wherein the second data structure is *correlated* with the second one or more instruction sets for operating the first device”). See Mot. App. A 1–3 (claim 21).

With respect to the “second data structure,” Petitioner has not sufficiently explained where or how Hickman discloses or renders obvious *multiple data structures that (i) each include information (types and locations) for the same multiple objects* (as detected at different times or time periods). See Mot. App. A 1–3. Claim 21 appears to require that the first and second data structures each store information about the *same* objects by reciting that the “the first collection of object representations represents multiple objects . . .,” the “*first data structure . . . includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects,*” and the “second data structure . . . includes: labels indicating types of *the multiple objects,* and coordinates indicating locations of *the multiple objects.*” The use of the term “the” before “multiple objects” in the “second data structure” limitation appears to indicate that the objects in the second data structure are the same objects as those in the first data structure. Petitioner references various data structures in Hickman—e.g., (i) “object data [that] is stored in data structures, e.g., data structures 313, 314, or 315 [of Hickman]” (Opp. 20), (ii) “data structures . . . that store ‘labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects’” (Opp. 22 (emphases

omitted)), and (iii) “a row or set of rows in Hickman’s structure 314 (or 313) that include Grotmol’s image 2000 and objects therein.” Petitioner, however, has not identified *two data structures* that *each include* information (such as *locations*) *for the same multiple objects* (as detected at different times or time periods).

Turning to the correlation limitations, Petitioner asserts that Hickman in combination with Grotmol teach these limitations because

Hickman teaches that for each detected object, the knowledge base may store “relevant tasks that a robot may perform with the object” *in the task data (TASK) field*. TESLA1005, 2:65–3:8, 15:28–43, 18:34–20:20; FIG. 3. Accordingly, a POSITA would have understood that because the tasks for the robot (“***the first one or more instruction sets for operating the first device***”) are part of the first data structure and provide instructions for the robot, “***the first data structure is correlated with the first one or more instruction sets.***” TESLA1010, ¶90.

...

For reasons similar to those noted above with respect to substitute feature 4, it would have been obvious to a POSITA that in GHC, tasks (“***second one or more instruction sets for operating the first device***”) for operating the robot when objects in image 2010 are detected, are stored in a second data structure. TESLA1010, ¶93. Thus, GHC renders obvious substitute feature 5.

Opp. 24–25 (emphases added).

Although Hickman discloses that *data structure 314* is *correlated* with instruction sets (TASKS for operating an object)—because each row in data structure 314 includes “an individual general object identifier (GID) [that] may have the following corresponding data: . . . *task data (TASKS)*” (see Ex. 1005, 15:28–35, Fig. 3)—Petitioner has not sufficiently explained where or how Hickman discloses or renders obvious *multiple data structures* that (i) *each include* information (type and locations) *for the same multiple objects* (as detected at different times or time periods) and (ii) *are each correlated* with instruction sets for operating a device, as recited in proposed substitute claim 21. See Mot. App. A 1–3. In other words, Petitioner has not identified *two data structures* that *each include* information (such as *locations*) *for the same multiple objects* (as detected at different times or time periods) *and that are*

each correlated with instruction sets for operating a device (as recited in proposed substitute claim 21).

Moreover, Petitioner has not sufficiently explained how data structures 313, 314, and 315 of Hickman (referenced by Petitioner, *see* Opp. 20) teach *two such data structures* as claimed because (i) while *data structure 313* includes *locations for multiple objects* (in the LOC field, as noted by Petitioner, Opp. 20), *data structure 313* does not include the TASKS field (which Petitioner relied upon to show that a data structure is correlated with instruction sets, *see* Opp. 24); (ii) while *data structure 314* includes the TASKS field (which Petitioner relied upon to show that a data structure is *correlated* with instruction sets), *data structure 314* does not include the LOC field (which Petitioner relied upon to show that a data structure includes coordinates indicating objects' locations); and (iii) *data structure 315* includes rows of individual task identifiers (TID) but does not include *types and locations for multiple objects* (which are in the other data structure 313). *See* Ex. 1005, 12:5–10, 15:28–35, Fig. 3. That is, Petitioner identifies one data structure (*data structure 313*) in Hickman whose rows include *types and locations for multiple objects* but Petitioner has not sufficiently explained how *data structure 313* is “correlated with . . . instruction sets for operating the first device” as claimed (since structure 313 does not include the TASKS field). *See* Opp. 20; Ex. 1005, Fig. 3. Petitioner also identifies a second data structure (*data structure 314*) in Hickman whose rows are *correlated*, via the TASKS field, with instruction sets for operating a device, but the rows in structure 314 do not include *locations* for multiple objects (since structure 314 does not include the LOC field). *See* Opp. 24; Ex. 1005, Fig. 3. And, Petitioner identifies a third data structure 315 without explaining how that structure would include types and locations of multiple objects. *See* Opp. 20. To the extent Petitioner proposes combining the features of data structures 313–315, neither Petitioner nor its expert explains how it would do so with any specificity. Moreover, Petitioner does not sufficiently explain how any two data structures among data structures 313, 314, and 315 include types and coordinates indicating locations of the *same* multiple objects as detected at first and second times/time periods (as required in claim 21).

We also do not find persuasive Petitioner's arguments that the claimed correlation limitations would have been obvious to a person of ordinary skill in the art (POSITA). *See* Opp. 24–25. Petitioner has not explained persuasively why (*see* Opp. 25) “it would have been obvious to a POSITA that in GHC, tasks (‘second one or more instruction sets for operating the first device’) for

operating the robot when objects in image 2010 are detected, *are stored in a second data structure*” that meets all the limitations of the second data structure recited in claim 21 (i.e., “second data structure that includes: labels indicating types of the multiple objects, and coordinates indicating locations of the multiple objects [as detected at a second time or during a second time period, the multiple objects also being represented in the first data structure]”). *See* Opp. 25. And, Dr. Janet’s supporting declaration testimony (Ex. 1010 ¶¶ 90, 93, relied upon at Opp. 24–25) is insufficient to remedy the deficiency in Petitioner’s argument because the testimony simply restates Petitioner’s contention without providing further explanation.

Thus, based on the current record, Petitioner does not appear to have shown a reasonable likelihood that Grotmol and Hickman disclose or suggest first and second data structures that include information “of the multiple objects” and are “correlated” as recited in proposed substitute claim 21.

Proposed Substitute Claims 22–26

Petitioner submits the same arguments (as for claim 21) for proposed substitute claims 22–26. *See* Opp. 18–25.

The new limitations added to claims 22–26 (with respect to their corresponding original claims) are similar to the new limitations added into proposed substitute claim 21 discussed *supra*. Thus, for the same reasons discussed above, Petitioner does not appear to have shown a reasonable likelihood that Grotmol and Hickman disclose or suggest first and second data structures that include information “of the multiple objects” and are “correlated” as recited in proposed substitute claims 22–26.

Grotmol-Tolstedt Ground

Proposed Substitute Claim 21

With respect to claim element [Sub-1], Petitioner contends Grotmol teaches a “circumstance representation” that includes “various types of data including, but not limited to, a collection of object representations, such as images of objects in a training set detected by one or more [of Grotmol’s] robot sensors, and data structures related to the objects and images.” Opp. 18 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B). Petitioner submits that (i) Grotmol’s image 2000 is “an example part of a ‘**first circumstance representation**’ and ‘may comprise representations [of] one or more objects, e.g., a tree 2002, a rectangle, a ball 2008, and/or other objects,’” and (ii) subsequent image 2010

in Grotmol is “an example part of a ‘*second circumstance representation*,’ and may comprise representations of objects from image 2010,” such that “images 2000 and 2010 respectively include first and second collections of object representations.” *Id.* at 18–19 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 78).

Petitioner relies on a combination of Grotmol and Tolstedt for claim elements [Sub-2]–[Sub-5], as follows. *See* Opp. 19–25.

With respect to limitation [Sub-2], Petitioner contends that “Grotmol teaches at least ‘*wherein the first collection of object representations represents multiple objects detected at a first time or during a first time period*’” because Grotmol’s Figures 20A and 20B illustrate how images 2000 and 2010 may be shifted “based on relative motion between the images (e.g., motion speed and time interval $t_2 - t_1$ between the images)” and an ordinarily skilled artisan “would have understood that time t_1 corresponds to the time at which the first image (e.g., image 2000) was taken.” Opp. 19 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 80). With respect to limitation [Sub-3], Petitioner contends that Grotmol also teaches “*wherein the second collection of object representations represents multiple objects detected at a second time or during a second time period*” because Grotmol’s image 2010 includes representations of the tree 2012, rectangle 2014, and ball 2018 imaged at time t_2 referenced by Grotmol and which “[an ordinarily skilled artisan] would have understood . . . [to] correspond[] to the time at which the second image (e.g., image 2010) was taken.” Opp. 22 (citing Ex. 1004, 38:43–39:12, Figs. 20A–20B; Ex. 1010 ¶ 86).

Based on the present record, Petitioner’s assertions regarding Grotmol appear reasonable, particularly as Grotmol discloses that “[i]mages 2000, 2010 may comprise representations of visual field that may be obtained at times $t_1 < t_2$, respectively.” *See* Ex. 1004, 38:54–56. Grotmol also provides that “[c]omparing image 2010 to image 2000, representations of the tree 2012[,], the rectangle, 2014, and the ball 2018 are shifted (horizontally) within the frame 2010 relative [to] representations, 2002, 2004, 2008 [of the tree, rectangle, and ball]” in the prior frame 2000. *See id.* at 39:2–5.

Petitioner relies on Tolstedt for the claimed “first data structure” and “second data structure” limitations. *See* Opp. 20–21, 23. In particular, Petitioner contends that Tolstedt discloses processing sensor data (such as images) to classify objects detected in the data and identify attributes of the detected objects. Opp. 16, 20–21 (citing Ex. 1015 ¶¶ 30–31, 68, 70, 73, 82–88, Fig. 4). Petitioner references paragraph 83 of Tolstedt which provides that after sensor

processing algorithms receive sensor data from sensors, the algorithms classify the sensor data into features, where

[the] classification may include identifying objects that have been detected in the environment. For example, sensor processing algorithms 604 may classify an object as a person, curb, tree, waste container, light pole, driveway, or some other type of object. The classification may be performed to provide information about objects in the environment. This information may be used to generate a thematic map, which may contain a spatial pattern of attributes. The attributes may include classified objects. The classified objects may include dimensional information, such as, for example, location, height, width, color, and other suitable information. This map may be used to plan actions for the vehicle. The action may be, for example, planning paths to follow an operator in a side following mode or performing object avoidance.

See Ex. 1015 ¶ 83; Opp. 16 (citing Ex. 1015 ¶ 83); *see also* Opp. 20. Petitioner submits that Tolstedt discloses or at least suggests the claimed “first data structure” and “second data structure” that represent multiple objects detected at different times (as required by proposed substitute claim 21) because

identif[ied] attributes of the detected objects, such as the type, dimensional information, location, height, width, and color of the object, ... is *stored in a data structure* in a knowledge base. [TESLA1015, ¶¶83–88]; TESLA1010, ¶82.

In some cases, *this data structure may also be a map* that the vehicle uses for navigation purposes *and includes labels for the types and locations of objects*. TESLA1015, ¶¶83–88 (“[t]his information may be used *to generate a thematic map*, which may contain a spatial pattern of attributes”), 73, 103, 123, 134; TESLA1001, 65:45–66:2. *This map* can be stored in the knowledge base. TESLA1015, ¶¶84–87; TESLA1010, ¶83.

. . .

It would have been obvious to a POSITA that Tolstedt discloses a “**second data structure.**” TESLA1010, ¶88. This “**second data structure**” *would have included images at a time (and/or location) and a set of objects from the objects that may be different than the images (and/or location) associated with the first data structure* in Section III.B.2(b). *Id.* In some cases, *the second data structure can be a second map of a second location different from the first location*

and on which multiple objects and their coordinates are added. TESLA1015, ¶¶123, 134, 83–88. In other cases, the knowledge base includes the same type of information as added to the *second map*. The depiction of objects in the images together with the first and second data structures provide the claimed “***first collection of object representations***” and “***second collection of object representations***,” respectively.

Opp. 21, 23 (emphases added); *see also id.* at 24 (referencing “a portion of the knowledge base storing information on an object or a map showing the object”), 25 (asserting that a “second data structure could include object data . . . for objects detected at a different time and/or location than objects for which information is stored in the first data structure”).

Based on the present record, Petitioner’s arguments based on Tolstedt’s map and attributes of detected objects and on Dr. Janet’s associated testimony do not sufficiently explain how the teachings of Tolstedt (in combination with Grotmol) render obvious the claimed “first data structure” and “second data structure.”

Specifically, Petitioner has not sufficiently explained how Tolstedt teaches or suggests *two data structures* that *each include labels indicating types and coordinates indicating locations of the same multiple objects* as detected at different times or time periods (as recited in proposed substitute claim 21). Petitioner argues that “the second data structure can be a second map of a second location different from the first location and on which multiple objects and their coordinates are added” and that “the knowledge base [of Tolstedt] includes the same type of information as added to the second map.” *See* Opp. 23 (citing Ex. 1015 ¶¶ 83–88, 123, 134). Petitioner, however, does not sufficiently explain how Tolstedt discloses or suggests “a second map of a second location different from the first location” which includes types and locations *of the same multiple objects* from a first map of the first, different, location. Petitioner also has not identified where in paragraphs 83–88, 123, 134 of Tolstedt is there a teaching or suggestion of *not one but two maps or data structures that each include types and coordinates indicating locations of the same multiple objects* as detected at different times or periods (as required by claim 21).

Petitioner’s additional arguments that

It would have been obvious to a POSITA that Tolstedt discloses a “***second data structure***.” . . . This “second data structure” would

have included images at a time (and/or location) and a set of objects from the objects that may be different than the images (and/or location) associated with the first data structure.

...

[I]t would have been obvious to a POSITA that the second data structure could include object data and correlated instructions for objects detected at a different time and/or location than objects for which information is stored in the first data structure,

also lack sufficient support on this record. *See* Opp. 23, 25. Petitioner does not identify where Tolstedt discloses or suggests *multiple maps or data structures that each include types and coordinates indicating locations of the same multiple objects* as detected at different times or periods (as required by claim 21). The arguments also do not sufficiently explain why an ordinarily skilled artisan would have found it “obvious . . . that Tolstedt discloses a ‘second data structure’” or that a “second data structure could include object data and correlated instructions for objects detected at a different time and/or location than objects for which information is stored in the first data structure.” *See id.* And, Dr. Janet’s supporting declaration testimony (Ex. 1010 ¶¶ 88, 94, relied upon at Opp. 23, 25) is insufficient to remedy the deficiency in Petitioner’s arguments because the testimony simply restates Petitioner’s contentions without providing further explanation. The testimony relies on the same paragraphs 83–88, 123, 134 of Tolstedt—which do not appear to disclose a second thematic map including labels indicating types and coordinates indicating locations of the same multiple objects as in the first thematic map (as required by claim 21). *See* Ex. 1010 ¶¶ 88, 94.

Thus, based on the current record, Petitioner does not appear to have shown a reasonable likelihood that Grotmol and Tolstedt disclose or suggest first and second data structures that include “labels indicating types of the [same] multiple objects, and coordinates indicating locations of the multiple objects” as detected at different times or periods, as recited in proposed substitute claim 21.

Proposed Substitute Claims 22–26

Petitioner submits the same arguments (as for claim 21) for proposed substitute claims 22–26. *See* Opp. 18–25.

The new limitations added to claims 22–26 (with respect to their corresponding original claims) are similar to the new limitations added into proposed

substitute claim 21 discussed *supra*. Thus, for the same reasons discussed above, Petitioner does not appear to have shown a reasonable likelihood that Grotmol and Tolstedt disclose or suggest first and second data structures that include “labels indicating types of the [same] multiple objects, and coordinates indicating locations of the multiple objects,” as recited in proposed substitute claims 22–26.

II. Patent-Ineligibility

No, as to Petitioner’s contention that proposed substitute claims 21–26 are patent-ineligible.

Based on the current record, it appears that Petitioner has not shown a reasonable likelihood that proposed substitute claims 21–26 are patent-ineligible.

Under the 2019 Revised Patent Subject Matter Eligibility Guidance and the October 2019 Update, we must first evaluate whether a claim recites a judicial exception in Revised Step 2A, Prong One. *See* 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50, 54 (Jan. 7, 2019) (hereinafter “Guidance”) *updated by* USPTO, October 2019 Update: Subject Matter Eligibility (available at https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.pdf) (“October 2019 Guidance Update”); *see also* October 2019 Patent Eligibility Guidance Update, 84 Fed. Reg. 55942 (Oct. 18, 2019) (notifying the public of the availability of the October 2019 Guidance Update). Prong One of Step 2A under the Guidance is to determine whether the claims recite a judicial exception including: (a) mathematical concepts; (b) certain methods of organizing human activity; and (c) mental processes. Guidance, 51–52. For abstract ideas, we then proceed to Revised Step 2A, Prong Two, where we “evaluate whether the claim as a whole integrates the recited judicial exception into a practical application of the exception.” *Id.* at 54. If the claim is directed to a judicial exception, we then proceed to Step 2B and evaluate whether the claim provides an inventive concept. *Id.* at 56.

Petitioner argues that “[Patent Owner’s] substitute claims are directed to an abstract idea of determining a manner of operating a device in a current circumstance based on how that that device, or another device, operated in similar circumstance(s) in the past” which is “a mental process that continues to be performed in the mind by humans in countless contexts each day.” Opp. 2. Petitioner contends the “substitute claims simply take th[e] basic

human intuition [of making real-time driving decisions informed by past driving experiences and basing present actions on past experiences] and apply it in a purportedly computer-implemented method.” *Id.* at 2–3. Petitioner argues this is so because the constituent elements of the substitute claims have a “generic, non-technical character” and encompass operations of “learning process[es],” “receiving data representative of a device’s ‘circumstance’” and “storing and accessing data” that is “limited to particular content,” and “basic . . . processing” of that data—which are “capable of performance in the mind” and in fact “can be carried out in the mind.” *Id.* at 3–7 (citing *Elec. Power Grp., LLC v. Alstom, S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016)).

We are not persuaded by Petitioner’s arguments that the proposed substitute claims recite an abstract idea. Petitioner highlights the claimed “accessing” a memory that stores correlations, “generating” or “receiving” circumstance representations associated with sensor data, and representing objects in a “data structure” (*see* Opp. 3–10), but Petitioner’s analysis ignores how the claimed circumstance representations and instruction sets are employed by a computing system/processor circuit(s) to make autonomous decisions about a device’s circumstances and enable the device to autonomously perform operations that match those circumstances. *See* App. A 1–16 (Substitute Claims Listing). That is, proposed substitute claims 21–26 recite methods implemented by a computing system/processor circuit(s) for learning, anticipating, decision making, and using a device’s circumstances for autonomous device operation—operations that are *not* performable in the human mind (as Petitioner asserts). Rather, the claimed operations and systems implementing them exist exclusively in the realm of computers and control systems, and cannot practicably be performed in the human mind or with pen and paper, and thus do not amount to a mental process. For example, the computing system/processor circuit(s) in proposed substitute claim 21 (and proposed substitute claims 22–26 that recite similar limitations) are programmed for “executing . . . instruction sets for operating the first device” with the instruction sets learned in a learning process and anticipated by the processor circuits based on an analysis of the device’s circumstances and the circumstances’ data structures, the instruction sets enabling that device and other devices to “autonomously performs one or more operations defined by the . . . instruction sets.” *See* App. A 1–16 (Substitute Claims Listing). Such artificially intelligent computer-implemented operations enable autonomous device operation responsive to device-specific environmental conditions—and thus, they exist exclusively in the realm of computers and control systems and could not be performed as a mental process either in practice or in theory. *See*

App. A 1–16 (Substitute Claims Listing). The operations also do not belong to the other two judicially-excepted groupings of abstract ideas identified in the Guidance (mathematical concepts, and methods of organizing human activity such as fundamental economic principles or practices, commercial or legal interactions, or managing personal behavior or relationships or interactions between people). *See* Guidance, 51–52.

We are also not persuaded by Petitioner’s arguments that the substitute claims are “divorced from any technical context,” “provide no meaningful technological improvement,” “fail to integrate the abstract idea into a practical application,” and recite only “generic, non-technical” elements and “mere instructions to implement [an] abstract idea on a computer.” *See* Opp. 3–4, 6–9 (citing Ex. 1010 ¶¶ 62–64). We find Petitioner’s arguments (and the relied upon declaration testimony at paragraphs 62–64 in Exhibit 1010) conclusory, as they ignore or oversimplify the limitations recited in the proposed substitute claims. For example, Petitioner’s arguments that the claimed “anticipating” limitations are “directed to basic data processing and mental steps” (Opp. 5–6), that the claimed “executing” limitation is an “insignificant post-solution” step that is “merely incidental to the abstract idea itself and amounts to no more than insignificant post-solution activity. . . . [that] does nothing to meaningfully limit the application of the abstract idea or otherwise integrate it into a practical application” (*id.* at 7–8), and that the claimed autonomous device operations merely “automat[e] conventional processes” and “instruct[] a computing system to apply an abstract idea” (*id.* at 9), do not adequately address the additional elements and combinations of additional elements recited in the proposed substitute claims by which “a computing system that includes one or more processor circuits” performs operations (as recited in, e.g., claim 21) for

anticipating the first one or more instruction sets for operating the first device learned in the learning process based on at least partial match between the third circumstance representation and the first circumstance representation [detected at least in part by one or more sensors of the first device]; and

at least in response to the anticipating, executing the first one or more instruction sets for operating the first device learned in the learning process, wherein the first device or the second device autonomously performs one or more operations defined by the first one or more instruction sets for operating the first device learned in the learning process;

...

wherein the first circumstance representation includes a first collection of object representations [representing multiple objects detected at a first time or during a first time period, and comprising a first data structure correlated with the first one or more instruction sets for operating the first device].

See App. A 1–16 (Substitute Claims Listing). By these additional elements and combinations of additional elements, the substitute claims (even if they were considered to recite some abstract idea) integrate practical technical applications that enable autonomous device operation responsive to device-specific environmental conditions and circumstances. *See* App. A 1–16 (Substitute Claims Listing); Ex. 1001, codes (54), (57), 1:39–2:9, 15:23–32, 24:20–25:9. Thus, the proposed substitute claims provide a technological solution rooted in computer and control systems technologies, for “artificially intelligent systems, devices, and methods for learning and/or using a device’s circumstances for autonomous device operation.” *See* Ex. 1001, Title (capitalization altered), Abstract; *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257–58 (Fed. Cir. 2014) (holding patent-eligible a claim that “address[es] a business challenge (retaining website visitors)” by enabling visitors “to purchase products from the third-party merchant without actually entering that merchant’s website,” thus providing a “claimed solution . . . necessarily rooted in computer technology in order to overcome a problem specifically arising in the realm of computer networks”).

Petitioner’s conclusory “mental steps” analysis (and summary dismissal) of the substitute claims’ limitations (*see* Opp. 2–7)—such as limitations directed to “anticipating . . . instruction sets for operating [a device],” and “executing [in response to anticipating] the first one or more instruction sets for operating” the device such that the “device autonomously performs one or more operations defined by the first one or more instruction sets for operating the first device”—is not well-founded because the claimed processor and device operations for anticipating, executing, and autonomously performing relevant operations cannot be *practically performed in the human mind*. *See SiRF Tech., Inc. v. Int’l Trade Comm’n*, 601 F.3d 1319, 1331, 1333 (Fed. Cir. 2010). In *SiRF Technology*, the claims included limitations to, *inter alia*, “calculating an absolute position of a GPS receiver,” “computing absolute position,” and updating an “estimate of position of the GPS receiver.” *SiRF Tech.*, 601 F.3d at 1332. In the abstract, “calculating,” “computing,” and “estimating” are mental processes. However, the Federal Circuit found that:

The claims do not recite a method that can be performed without a machine. Contrary to appellants' contention, there is no evidence here that the calculations here can be performed entirely in the human mind. Here, as described, the use of a GPS receiver is essential to the operation of the claimed methods.

SiRF Tech., 601 F.3d at 1333. Thus, even if Patent Owner's proposed substitute claims were considered to recite some abstract idea, the substitute claims appear to integrate an abstract idea into a practical application.

In conclusion, based on the current record, Petitioner has not shown a reasonable likelihood that proposed substitute claims 21–26 are patent-ineligible.

III. CONCLUSION

This concludes the Preliminary Guidance, which is Patent Owner's first option under the Board's pilot program. Notice, 84 Fed. Reg. at 9,497. Patent Owner has an additional option under the Board's pilot program to file a revised MTA by DUE DATE 3. *See* Scheduling Order.

In addition to those two options under the Board's pilot program, Patent Owner is reminded that amendments of the challenged claims may also be pursued in a separate reissue or reexamination proceeding before, during, or after an AIA trial proceeding, including subsequent to the issuance of the Final Written 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).

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