

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ADB SAFEGATE SWEDEN AB,
ADB SAFEGATE BV, and
ADB SAFEGATE AMERICAS, LLC,
Petitioner,

v.

HONEYWELL INTERNATIONAL INC.,
Patent Owner.

PGR2023-00053
Patent 11,538,349 B2

Before JAMES P. CALVE, BENJAMIN D. M. WOOD, and
JASON W. MELVIN, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION
Granting Institution of Post-Grant Review
35 U.S.C. § 324

I. BACKGROUND

ADB Safegate Sweden AB, ADB Safegate BV, and ADB Safegate Americas, LLC (collectively, “Petitioner”) filed a petition seeking a post-grant review of claims 1–20 (the “challenged claims”) of U.S. Patent No. 11,538,349 B2 (“the ’349 patent”) (Ex. 1001). Paper 1, 1 (“Pet.”). Honeywell International Inc. (“Patent Owner”) filed a preliminary response. Paper 8 (“Prelim. Resp.”).

We have authority to determine whether to institute a post-grant review. 35 U.S.C. § 324; 37 C.F.R. § 42.4(a) (“The Board institutes the trial on behalf of the Director.”). Section 324(a) provides that a post-grant review may not be instituted “unless . . . the information presented in the petition . . . , if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable.”

Upon consideration of the evidence and arguments in the Petition (including its supporting testimonial evidence) and the evidence and arguments in the Preliminary Response, we determine that the information presented shows that it is more likely than not that Petitioner would prevail with respect to at least one of the challenged claims. Accordingly, we institute post-grant review on all challenged claims on all asserted grounds. *See* 37 C.F.R. § 42.208(a) (“When instituting post-grant review, the Board will authorize the review to proceed on all of the challenged claims and on all grounds of unpatentability asserted for each claim.”).

A. Related Proceedings

The parties indicate that the '349 patent is not currently involved in any other judicial or administrative matter. Pet. 2; Paper 6, 1.

B. Real Parties in Interest

Petitioner asserts that ADB Safegate Sweden AB, ADB Safegate BV, and ADB Safegate Americas, LLC are the real parties in interest. Pet. 2. Patent Owner identifies Honeywell International Inc. as the sole real party in interest. Paper 6, 1.

C. The '349 Patent

The '349 patent describes systems for detecting, tracking, and docking aircraft in a taxiway, apron, or ramp area of an airport, as shown in Figure 1, which is reproduced below. Ex. 1001, 1:7–9.

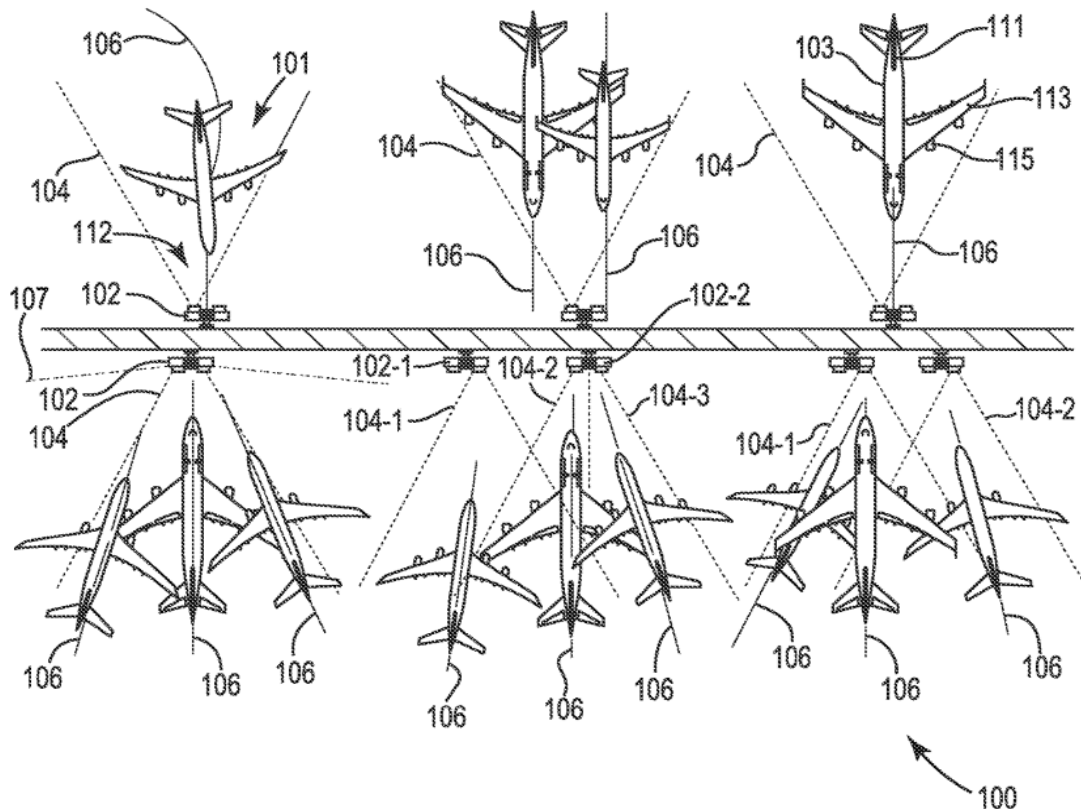


FIG. 1

Figure 1 depicts aircraft ramp areas with sensor arrays 102 that combine at least one camera image sensor and at least one laser or radar sensor (LIDAR/Radar sensor) at a ramp area within a field of view 104 of at least one sensor of sensor array 102. *Id.* at 3:53–67. Ramp areas provide a parking space where passengers and crew may access an aircraft. *Id.* at 4:1–8.

The top left arrangement shows aircraft 101 moving into a ramp area within field of view 104 of sensor array 102 that comprises a camera image sensor and a LIDAR/Radar sensor 112 (represented together) with aircraft 101 altering its path 106 to align itself with the lead-in line. Ex. 1001, 4:26–37. Using multiple sensor arrays 102 allows for more precise movements and provides aircraft docking scenarios that are not straight. *Id.* at 4:38–43.

The bottom left arrangement depicted in Figure 1 uses two sensors in a single location. One sensor provides a wider field of view 107. The other sensor provides a narrower field of view 104. Ex. 1001, 4:44–50.

The bottom middle arrangement has two sensor arrays spaced apart. Sensor array 102-1 is a camera image sensor with field of view 104-1, and sensor array 102-2 has multiple camera image sensors with different fields of view 104-2, 104-3 for determining the six dimensional information (x, y, z, roll, pitch, yaw) used to create a 3D model. Ex. 1001, 4:60–5:3, 8:50–54.

The bottom right arrangement arranges two arrays spaced apart from each other. Each array has one camera image sensor and one LIDAR/Radar sensor with overlapping fields of view 104-1, 104-2. Ex. 1001, 5:4–8.

The different sensor arrangements collect different information for determining the six dimensional information used to create the 3D model for determining an aircraft's position, orientation, and movement using a system shown in Figure 3, which is reproduced below. Ex. 1001, 2:39–42, 4:51–59.

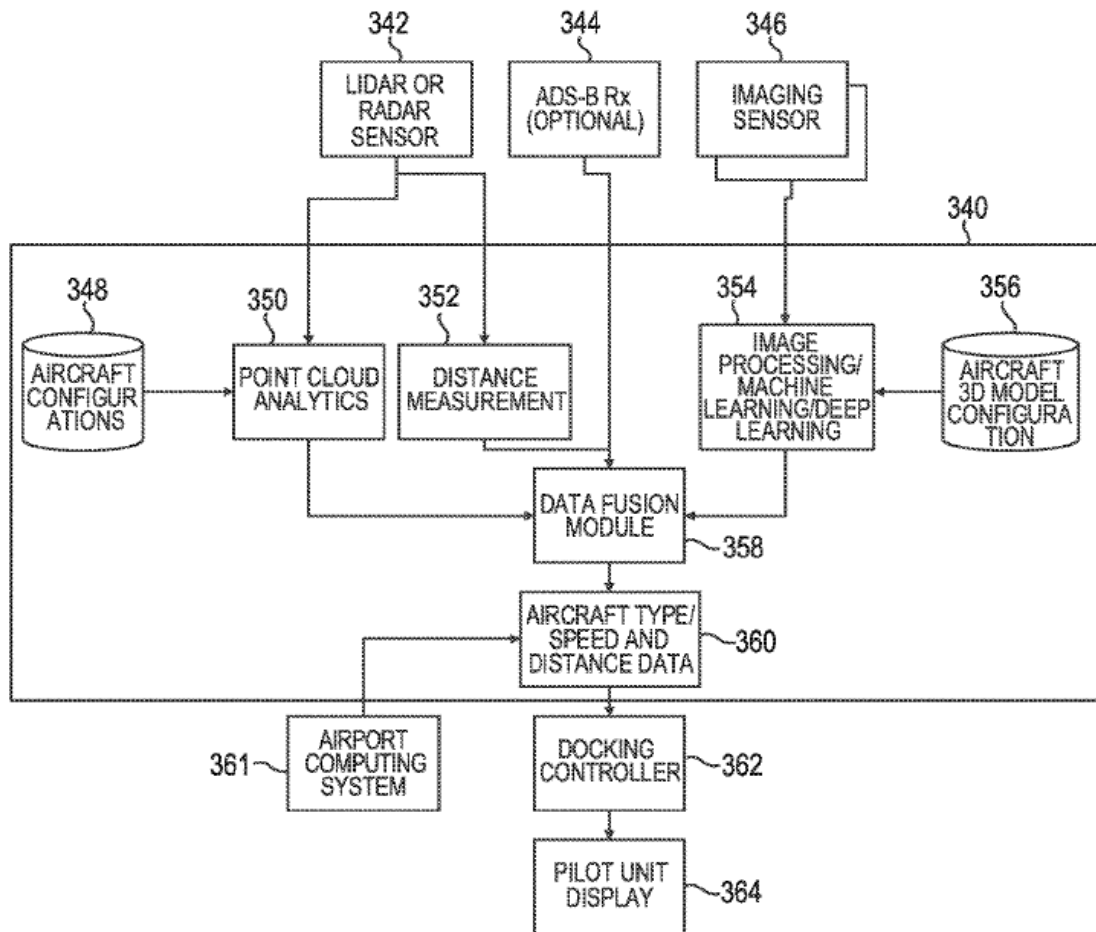


FIG. 3

Figure 3 is a flow diagram of LIDAR/Radar sensor 342 and imaging sensor 346 that send data to central docking system controller 340. *Id.* at 6:1–8. LIDAR/Radar sensor 342 captures data to send to central docking system 340 to create a LIDAR/Radar point cloud. *Id.* at 6:9–23. Camera image sensor 346 sends image sensor data to central docking station controller 340. *Id.* at 6:35–45. Image processing system 354, 356 creates a 3D image model and LIDAR/Radar point cloud analytics 348, 350 creates a point cloud as the aircraft nears the ramp area. *Id.* at 6:46–52, Fig. 4 (elements 468, 470).

D. Challenged Claims

Claims 1, 10, and 18 are the independent claims that are challenged in this proceeding. Claims 2–9 depend from claim 1. Claims 11–17 depend from claim 10. Claims 19 and 20 depend from claim 18. Ex. 1001, 12:38–14:64. Claim 1 illustrates the claimed subject matter and is reproduced below.

1. A method for tracking an aircraft, comprising:
 - receiving camera image data of the aircraft while the aircraft is approaching a ramp area for parking the aircraft on an airside of an airport;
 - receiving Light Detection And Ranging (LIDAR) or Radio Detection And Ranging (RADAR) sensor data of the aircraft while the aircraft is approaching or in the ramp area;
 - merging the camera image data and the LIDAR/RADAR sensor data into a merged data set; and
 - wherein the merged data set includes at least one of: data for determining position and orientation of the aircraft relative to the position and orientation of the ramp area, data for determining speed of the aircraft, data for determining direction of the aircraft, data for determining proximity of the aircraft to a particular object within the ramp area, and data for forming a three dimensional virtual model of at least a portion of the aircraft from the merged data; and
 - displaying messages to provide directional and speed guidance to a pilot with the merged data set.

Ex. 1001, 12:38–58.

E. Asserted Grounds of Unpatentability

Petitioner asserts the following three grounds of unpatentability (Pet. 10):

Ground	Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1	1–20	101	Ineligibility
2	1, 6–10, 13–20	102/103 ¹	Berkmo ²
3	1–20	103	Berkmo, Richman ³

Petitioner also relies on a Declaration of Mark Campbell, Ph.D. Ex. 1003.

II. DISCUSSION

A. Eligibility for Post-Grant Review

A petitioner seeking post-grant review must certify that the challenged patent is available for post-grant review. 37 C.F.R. § 42.204(a). “A petition for a post-grant review may only be filed not later than the date that is 9 months after the date of the grant of the patent or of the issuance of a reissue patent (as the case may be).” 35 U.S.C. § 321(c). Petitioner must establish eligibility for post-grant review. *See Mylan Pharms. Inc. v. Yeda Res. & Dev. Co.*, PGR2016-00010, Paper 9 at 10 (PTAB Aug. 15, 2016).

¹ The Leahy-Smith America Invents Act (“AIA”) revised 35 U.S.C. §§ 102 and 103 effective on March 16, 2013. Because the ’349 patent has an effective filing date after March 16, 2013, we apply the AIA versions of 35 U.S.C. §§ 102 and 103.

² US 2022/0066025 A1, published Mar. 3, 2022 (Ex. 1004, “Berkmo”).

³ US 5,675,661, issued Oct. 7, 1997 (Ex. 1005, “Richman”).

Petitioner “certif[ies] that the ’349 Patent is eligible for post-grant review because it contains at least one claim with an effective filing date after March 16, 2013,” and it has “not filed a civil action challenging the validity of any claim of the ’349 Patent.” Pet. 3; *see* 37 C.F.R. § 42.201(a). Petitioner also asserts that it is “not barred or estopped from requesting post-grant review challenging the patent claims on the grounds identified in this Petition.” Pet. 3.

On this record, we determine that the ’349 patent is eligible for post-grant review. The patent’s earliest effective filing date is August 3, 2020, which is after March 16, 2013. The Petition’s September 27, 2023, filing date (Paper 3, 1) is not later than the date that is nine months after the ’349 patent’s grant date of December 27, 2022. Ex. 1001, code (45). Finally, we accept Petitioner’s certification that it has not filed a civil action challenging the validity of a claim of the ’349 patent before filing the Petition. Pet. 3.

B. Level of Ordinary Skill in the Art

Petitioner asserts that a skilled artisan would have “held at least a degree in electrical engineering, computer engineering, computer science or a similar discipline, with at least two years of relevant industry or research experience, including experience designing, planning, or implementing sensor networks using LIDAR, radar and/or cameras and corresponding data analysis” and “[a]dditional work or research experience can substitute for less or different education, and vice versa.” Pet. 10 (citing Ex. 1003 ¶¶ 18–23). Patent Owner does not address the level of ordinary skill in the art.

On the present record, we find that Petitioner’s uncontested level of ordinary skill in the art is consistent with the ’349 patent and the prior art of record, and we adopt it for consideration of the issues presently before us.

C. Claim Interpretation

We interpret claims using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b). 37 C.F.R. § 42.200(b). Under this standard, we construe the claim in accordance with the ordinary and customary meaning of the claim as understood by a skilled artisan and the prosecution history. *Id.*

Petitioner asserts that “[n]o terms require construction to determine that claims 1–20 are invalid under §§ 101, 102, 103.” Pet. 9. At this stage, Patent Owner does not address the construction of any term or phrase.

On the present record, we determine that we do not need to construe any claim terms to reach our decision. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

D. Principles of Law

1. Subject Matter Eligibility under 35 U.S.C. § 101

The Supreme Court interprets 35 U.S.C. § 101 to include exceptions for “[l]aws of nature, natural phenomena, and abstract ideas.” *Alice Corp. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014). To determine whether a claim falls within a judicial exception to § 101, we apply the two-step framework set forth in *Mayo Collaborative Services v. Prometheus Laboratories, Inc.*, 566 U.S. 66 (2012), and reaffirmed in *Alice*. *Alice*, 573 U.S. at 217–18 (citing *Mayo*, 566 U.S. at 75–77). The USPTO’s Patent Subject Matter Eligibility Guidance⁴ designates the first step of *Alice* as Step 2A.

⁴ 2019 Revised Patent Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Guidance”) available at <https://www.govinfo.gov/content/pkg/FR-2019-01-07/pdf/2018-28282.pdf>; *see also* MPEP § 2106.03 (9th Ed., Rev. 7.2022 (June 2023)).

At Step 2A, we determine whether claims are directed to a patent-ineligible abstract idea, law of nature, or natural phenomenon. MPEP § 2106.04; *Alice*, 573 U.S. at 217. If so, we advance to the second step of *Alice* (Step 2B of the Guidance) where we consider the additional elements of a claim, individually and as an ordered combination, to determine whether the additional elements transform the claim into a patent-eligible application of the ineligible concept. MPEP § 2106.05; *Alice*, 573 U.S. at 217.

The Guidance establishes a two-prong inquiry to determine whether a claim is directed to a judicial exception. Guidance at 54. We first determine whether a claim *recites* a judicial exception (prong one). *Id.* Abstract ideas include mathematical concepts, certain methods of organizing human activity, and mental processes. *Id.* at 52. If a claim recites a judicial exception, we consider whether it recites additional elements that *integrate* the judicial exception *into a practical application*. *Id.* at 54. A claim is *directed to* a judicial exception if it recites a judicial exception *and* does not integrate that exception into a practical application. *Id.* “Integration into a practical application” requires an additional element or a combination of additional elements to apply, rely on, or use a judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the exception. *Id.* at 54–55. If we determine the claim is directed to a judicial exception, we then determine whether the claim adds a specific limitation beyond the judicial exception that is not a well-understood, routine, and conventional activity in the field, or whether the claim simply appends well-understood, routine, and conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception. *Id.* at 56 (Step 2B).

2. *Anticipation under 35 U.S.C. § 102*

A “prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008) (citation omitted). “A single prior art reference may anticipate without disclosing a feature of the claimed invention if such feature is necessarily present, or inherent, in that reference.” *Allergan, Inc. v. Apotex Inc.*, 754 F.3d 952, 958 (Fed. Cir. 2014).

3. *Unpatentability under 35 U.S.C. § 103*

A patent claim is unpatentable under 35 U.S.C. § 103 if differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. 35 U.S.C. § 103; *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). “The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *KSR*, 550 U.S. at 416.

The question of obviousness is resolved based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of non-obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Neither party has presented any objective evidence of non-obviousness or obviousness at this stage of the proceeding.

E. Petitioner's Power of Attorney and Corrected Power of Attorney

1. Patent Owner's arguments

Patent Owner argues that the Power of Attorney filed with the Petition is deficient because it: (1) authorized attorneys at Xsensus LLP to represent Petitioners before the USPTO in connection with U.S. Patent No. 9,635,656 rather than the '349 patent; and (2) misidentified the signatories. Prelim. Resp. 1–4. As a result, Patent Owner asserts the Petition was incomplete as of the filing date because Petitioner did not certify that the challenged patent is available for post-grant review. *Id.* at 4. Patent Owner asserts:

Without a proper power of attorney (as required by regulation), there is nothing to show that counsel that signed and filed the Petition was authorized to make such statements in Petitioner's Grounds for Standing, nor should the Patent Office afford any weight to such statements.

Id. Patent Owner argues that ADB “cannot correct the defects within the 9 months allowed to file a post-grant review [and] [i]t cannot correct the defects with the Petition now because the statutory deadline of September 27, 2023, for filing a post-grant review petition has expired” and “[t]he Board lacks the authority to waive the statutory time-bar.” *Id.* at 5.

2. Analysis

A petitioner may correct a clerical or typographical mistake in a petition for post-grant review. *See* 37 C.F.R. § 42.204(c). In response to a January 10, 2024, email from Petitioner seeking to correct a clerical error in the Power of Attorney (POA) that was filed, we authorized Petitioner to file a Corrected Power of Attorney to correct clerical errors in the original POA that misidentified the challenged patent and some names of the signatories of the original POA. *See* Paper 2 (Petitioner's original POA).

The Corrected Power of Attorney (Paper 9) states that:

Petitioners, ADB Safegate Sweden AB, ADB Safegate BV, and ADB Safegate Americas, LLC, hereby appoint practitioners associated with Xsensus LLP, Customer Number 154930, as its attorneys to transact all business before the United States Patent & Trademark Office associated with a Post Grant Review of U.S. Patent No. 11,538,349.

Paper 9, 2. This language corrected a clerical error in the original POA that was titled “Post Grant Review of U.S. Patent No. 11, 538,349” (Paper 2, 1) but listed U.S. Patent No. 9,635,656 as the challenged patent (*id.* at 2). U.S. Patent No. 9,635,656 is owned by Mitsubishi Electric Corporation, which is not a party to this post-grant review. Ex. 2001, code (71); *see* Pet.

The Corrected POA is signed by Laurent Dubois as CEO, Alexander Strandberg as Managing Director, and Peter Håkansson as Director Product Management, who are “authorized to sign this Power of Attorney on behalf of Petitioners, ADB Safegate Sweden AB, ADB Safegate BV, and ADB Safegate Americas, LLC” (collectively “ADB”). Paper 9, 3. A comparison of the original POA and the Corrected POA indicates that Messrs. Dubois, Strandberg, and Håkansson signed the original POA authorizing Xsensus, LLP and its attorneys at Customer Number 154930 to represent ADB in a “Post Grant Review of U.S. Patent No. 11,538,349.” Paper 2, 1–3; Paper 9, 1–3. Paper 2, 1. A comparison of the original POA and the Corrected POA confirms that Mr. Weinstein acted as ADB’s attorney when he filed the Petition seeking post-grant review of the ’349 patent and certified that the ’349 patent is eligible for post-grant review, ADB is not barred/estopped from seeking post-grant review on grounds asserted in the Petition, and ADB has not filed a civil action against the ’349 patent. *See* Pet. 3.

The Corrected POA confirms Mr. Weinstein was authorized to certify that the '349 patent is eligible for post-grant review, contrary to Patent Owner's arguments. Pet. 3; *see* Prelim. Resp. 4. Patent Owner does not dispute any of Mr. Weinstein's representations regarding Petitioner's ability to bring this post-grant review proceeding. *See generally* Prelim. Resp.

The Corrected POA confirms that ADB authorized Mr. Weinstein to file a "Petition for Post-Grant Review" of the '349 patent, rather than U.S. Patent No. 9,635,656, which is not challenged in this proceeding. *See* Pet. The original POA and Corrected POA are captioned "Post Grant Review of U.S. Patent No. 11,538,349." Paper 2, 1; Paper 9, 1.

3. *Conclusion*

Our analysis of the original POA and the Corrected POA leads us to determine that the original POA contained clerical errors that mistakenly identified U.S. Patent No. 9,635,656 as the challenged patent on page 2 even though its title page and the Petition sought post-grant review of the '349 patent, and it mistakenly identified Laurent Dubois as CEO *and* Director Product Management when he is CEO of ADB and Mr. Håkansson is ADB's Director Product Management, both of whom signed the original POA and Corrected POA authorizing Mr. Weinstein to represent ADB in a post-grant review of the '349 patent. We determine these errors were merely clerical, and Petitioner has demonstrated that the '349 patent is eligible for post-grant review by filing a Petition within nine months of the December 27, 2022, grant date of the '349 patent, and by certifying that Petitioner is not barred or estopped from seeking post-grant review of the challenged claims on the grounds asserted in the Petition and that Petitioner has not filed a civil action challenging the validity of any claim of the '349 patent. Pet. 3.

Accordingly, we decline to deny the Petition based on the clerical errors in the original POA.

F. Ground 1: Alleged Ineligibility

Petitioner asserts that claims 1–20 are directed to a judicial exception to 35 U.S.C. § 101 without significantly more. Pet. 10, 16–38.

1. Step 1

Petitioner contends that claims 1–17 recite methods, which are within a statutory category of a “process,” and claims 18–20 recite a system, which is within the statutory category of a “machine.” Pet. 19.

2. Step 2A, Prong 1

a. Petitioner’s contentions

Petitioner contends that claim 1 recites a “method for tracking an aircraft” by receiving and merging camera and sensor (LIDAR, RADAR) data of the aircraft and displaying messages with that data, which recites a mental process of collecting information, analyzing it, and displaying certain results of the collection and analysis, and can be performed in the human mind. Pet. 19–23 (citing MPEP § 2106.04(a); Ex. 1003 ¶¶ 78–83; decisions of the federal courts). Petitioner contends that independent claims 10 and 18 recite the same abstract idea with claim 10 reciting additional determining steps and claim 18 adding conventional, well-known elements to perform the same functionality. *Id.* at 35–36. Petitioner assert that the dependent claims recite steps of comparing and analyzing data to identify aircraft type or presence, the content of information, sending information, and analyzing sensor data using a point cloud process using entirely well-known, routine, and conventional elements. *Id.* at 36–38.

b. Patent Owner's arguments

At this stage, Patent Owner does not contest these assertions.

c. Analysis

Collecting and analyzing information, even when limited to certain content, and analyzing information by mental steps or by mathematical algorithms are mental processes within the abstract-idea category, and presenting the results of such abstract processes is an ancillary part of that collection and analysis. *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353–54 (Fed. Cir. 2016). In *Electric Power*, the method received data streams of time stamped synchronized phasor measurements collected in real time at different points of an electric power grid and data from other power system data sources to detect and analyze events in real time by limits, sensitivities, and rates of change of dynamic stability metrics derived from voltages, power flows, phase angles, damping, and oscillation modes and displayed results of the analysis. *Id.* at 1351–52.

Claim 1 recites mathematical calculations and relationships that the '349 patent describes as iterated point cloud algorithms, mapping data sets in virtual space with a common coordinate system, using an estimation algorithm, calculating a transformation between coordinate systems in six dimensions of x, y, z, roll, pitch, and yaw of the aircraft for a vision pose estimation. Ex. 1001, 8:50–9:28. We, therefore, determine claim 1 recites an abstract idea. See Guidance at 52; *SAP Am., Inc. v InvestPic, LLC*, 898 F.3d 1161, 1168 (Fed. Cir. 2018) (collecting and analyzing information and reporting or displaying the results is an abstract idea); *Coffelt v NVIDIA Corp.*, 680 F. App'x 1010, 1011 (Fed. Cir. 2017) (calculating a steradian region of space is a purely arithmetic exercise).

On this record, we also determine that independent claims 10 and 18 and the dependent claims recite the same abstract idea.

d. Conclusion

We determine that claims 1–20 recite data collection, analysis, and display steps as mental processes and mathematical concepts/calculations.

3. Step 2A, Prong 2

a. Petitioner's contentions

Petitioner contends that the claims do not integrate the abstract idea into a practical application because the additional elements do not improve the functioning of computers or other technology or resolve a technological problem but instead require generic computer components or operations that a human can perform so that the focus of the claims as a whole is on using computers and standard off-the-shelf electronic components as tools to perform the abstract idea of collecting, combining, analyzing, and displaying data. Pet. 23–30 (citing Ex. 1003 ¶¶ 42–67, 78–83; Ex. 1001, 1:57–64, 2:61–3:18, 3:25–28, 6:9–45, 10:50–51, 10:56–62, 11:14–24, 11:32–50, claim 18; MPEP § 2106.05(a); decisions of the federal courts).

b. Patent Owner's arguments

At this stage, Patent Owner does not contest these assertions.

c. Analysis

We agree with Petitioner that using generic, off-the-shelf computers and components as tools to implement the abstract idea does not improve computers or other technology, recite a particular machine that is integral to the claim, or transform or reduce a particular article to a different state or thing to integrate the abstract idea into a practical application. Guidance 55.

The generic description of these components (e.g., LIDAR/Radar sensor and system, camera image system, and imaging processing system) confirms that the broad language of the claims does not provide technical details of any improvements in these components or their functions beyond the abstract idea. *See* Ex. 1001, 6:1–9:46, 10:47–11:50, Figs. 3, 5.

d. Conclusion

We determine that claims 1–20 do not recite any additional elements that are sufficient to integrate the abstract idea into a practical application.

4. Step 2B

a. Petitioner's contentions

Petitioner asserts that the additional elements append well-understood, routine, and conventional aircraft tracking activity to the abstract idea using generic computers, camera sensor, LIDAR sensor, and RADAR sensor that are commercially-available versions without improving these components, such as by receiving camera image data and LIDAR, and RADAR sensor data, merging it into a data set, and displaying messages to a pilot. Pet. 30–34 (citing Ex. 1003 ¶¶ 42–67, 78–89, 92; Ex. 1001, 10:47–60; MPEP § 2106.05(I)(A); federal court decisions). Petitioner asserts that the ordered combination of these conventional functions for performing aircraft tracking and guidance to a gate is conventional because the sequence of steps reflects the ordinary course of using sensor data to track and guide an aircraft. *Id.* at 35 (citing Ex. 1003 ¶ 94; federal court decisions).

b. Patent Owner's arguments

At this stage, Patent Owner does not contest these assertions.

c. Analysis

Considered individually and as an ordered combination, the additional elements do not provide an inventive concept that is significantly more than the abstract idea. *See Elec. Power*, 830 F.3d at 1355 (the claims understood in light of the specification required off-the-shelf, conventional computer, network, and display technology for gathering, sending, and presenting desired information, and “such invocations of computers and networks that are not even arguably inventive are ‘insufficient to pass the test of an inventive concept in the application’ of an abstract idea”). Petitioner has provided persuasive evidence and contentions to support its assertion that the additional elements simply append well-understood, routine, and conventional aircraft tracking activities to the abstract idea. Pet. 31–34.

d. Conclusion

We determine claims 1–20 are directed to the abstract idea identified in Step 2A without significantly more.

5. Conclusion

For the foregoing reasons, based on the current record, we determine that Petitioner has demonstrated that it is more likely than not that claims 1–20 are directed to an abstract idea without significantly more and are directed to ineligible subject matter under 35 U.S.C. § 101. Accordingly, institution of post-grant review on this basis is appropriate.

G. Ground 2: Alleged Anticipation by or Obviousness over Berkmo

Petitioner asserts that claims 1, 6–10, and 13–20 are unpatentable under 35 U.S.C. § 102 as anticipated by, and/or obvious under 35 U.S.C. § 103 over, Berkmo. Pet. 10, 38–67.

1. *Berkmo*

Berkmo describes an airport stand arrangement shown in Figure 3, which is reproduced below. Ex. 1004 ¶ 132.

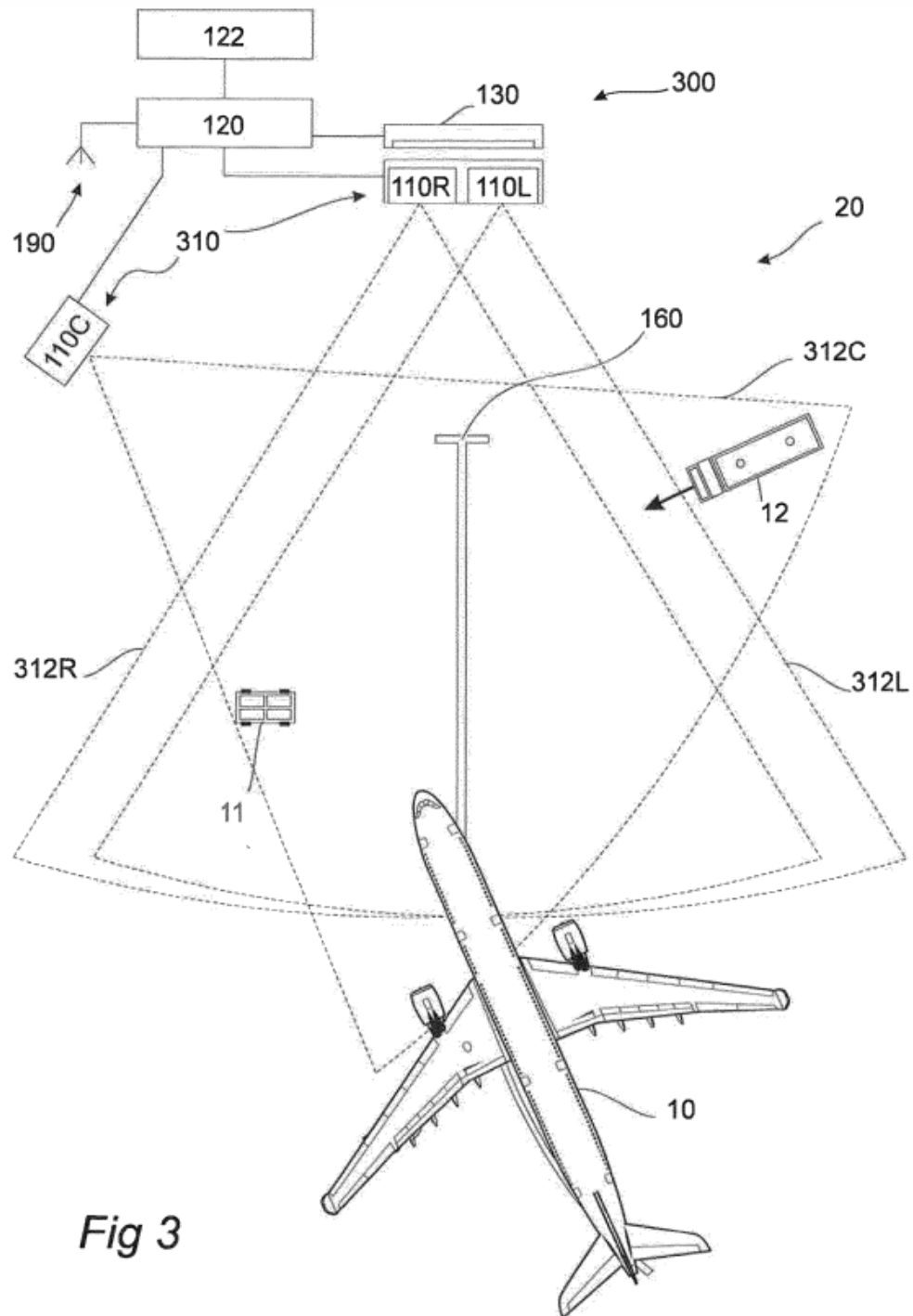


Figure 3 depicts aircraft 10 guided toward parking position 160 using data provided by image-based system 110C, radar-based system 110R, and laser-based system 110L within their respective coverage areas 312C, 312R, 312L to control unit 120. *Id.* ¶¶ 127, 132. The offset of camera-based image system 110C enables arrangement 300 to detect approaching aircraft 10 at each position in time using different collection angles with coverage area 312C of camera-based system 110C arranged to complement the areas of coverage 312L and 312R of radar-based system 110R and laser-based system 110L. *Id.* ¶ 132. The airport stand arrangement comprises display 130 mounted on the wall of the terminal building at a vertical position that is in clear view of the pilot of the approaching aircraft 10 to provide maneuvering guidance information to the pilot. *Id.* ¶ 120.

Airport stand arrangement 300 also is configured to detect and track other objects within stand area 20 including luggage dolly 11 and food delivery truck 12 to allow for continuous, automatic monitoring of stand area 20 for potential objects that may cause accidents at the stand. Ex. 1004 ¶ 133. In the illustration of Figure 3, luggage dolly 11 is stationary while food delivery truck 12 is approaching the stand area from the right. *Id.*

Airport stand arrangement 300 is configured to predict if approaching aircraft 10 is on a collision course with any object 11, 12 and, in response to predicting a collision course, to provide the pilot with maneuvering guidance instructing the pilot to stop aircraft 10. Ex. 1004 ¶ 135. Based on speed and direction of each object 11, 12 and approaching aircraft 10, the system can predict if objects 11, 12 will leave stand area 20 before approaching aircraft is predicted to arrive and provide guidance to the pilot concerning any of objects 11, 12 that are not predicted to leave stand area 20. *Id.* ¶ 136.

2. *Claim 1*

a. *“A method for tracking an aircraft, comprising:”*

Petitioner asserts that Berkmo’s stand arrangement 100 is configured to detect and track aircraft in stand area 20. Pet. 42 (citing Ex. 1004 ¶¶ 125–126, 129, Abstr., Figs. 1–3; Ex. 1003 ¶ 112). This contention, which Patent Owner does not contest at this stage, is supported by record evidence.

b. *“receiving camera image data of the aircraft while the aircraft is approaching a ramp area for parking the aircraft on an airside of an airport;”*

Petitioner contends that Berkmo’s imaging system 110C includes a camera sensitive to optical or infrared radiation and outputs data pertaining to an imaging system coverage area 112C in stand area 20 (i.e., a ramp area) by producing image data of aircraft 10 as it approaches stand area 20 for parking it at parking position 160. Pet. 42–43 (citing Ex. 1004 ¶¶ 131, 132, 140, Figs. 2, 3; Ex. 1003 ¶¶ 113, 114). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

c. *“receiving LIght Detection And Ranging (LIDAR) or RAdio Detection And Ranging (RADAR) sensor data of the aircraft while the aircraft is approaching or in the ramp area;”*

Petitioner asserts that Berkmo’s laser system 110L and radar system 110R emit continuous or pulsed laser radiation and radar signals towards a target and detect laser radiation and radar pulses backscattered from a target to output data for laser system coverage 112L and radar system coverage 112R at stand area 20. Pet. 44–45 (citing Ex. 1004 ¶¶ 117, 118, 131, 132, 140, Figs. 1–3; Ex. 1003 ¶¶ 115, 116). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- d. *“merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set; and,”*

Petitioner asserts that Berkmo merges camera image data of imaging system 110C with sensor data of laser system 110L and radar system 110R into combined output data that is a merged data set. Pet. 46 (citing Ex. 1004 ¶¶ 22–25, 126, 127, 129, 130, 134, 137–139; Ex. 1003 ¶¶ 117, 118). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- e. *“wherein the merged data set includes at least one of: data for determining position and orientation of the aircraft relative to the position and orientation of the ramp area;”*

Petitioner asserts that Berkmo outputs combined data for determining a position and orientation of aircraft 10 relative to stand area 20 to controller 120, which determines tracking data of aircraft 10 to determine its position, speed, and direction and its orientation relative to stand area 20. Pet. 47–48 (citing Ex. 1004 ¶¶ 25, 80, 82, 89, 120, 126, 136; Ex. 1003 ¶ 119).

Petitioner contends that even if Berkmo does not disclose that the combined output data is for *determining* aircraft orientation, it would have been obvious to a skilled artisan based on the use of 3D sensors to determine position, orientation, velocity, and direction of an object and apply a Kalman filter to the output data of imaging system 110C, laser system 110L, and/or radar system 110R to determine aircraft orientation. *Id.* at 48–50 (citing Ex. 1004 ¶¶ 134–136; Ex. 1003 ¶¶ 121–123; Ex. 1030, 23; Ex. 1031, 1, 4–5, 7, 9, 11, 16–17; Ex. 1019, 2–4, 7–11). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

f. “data for determining speed of the aircraft,”

Petitioner contends that Berkmo’s combined output data (the merged data set) includes data for determining a speed of aircraft 10, and controller 120 analyzes the combined output data to determine tracking data of aircraft 10 including the position of aircraft 10 and the velocity of aircraft 10.

Pet. 50 (citing Ex. 1004 ¶¶ 80, 126, 136, claim 50; Ex. 1003 ¶ 124). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

g. “data for determining direction of the aircraft,”

Petitioner contends that Berkmo’s combined output data includes data for determining speed and direction of approaching aircraft 10 to stand area 20 and the velocity of aircraft 10, which include vectors for direction and speed of an object. Pet. 50–51 (citing Ex. 1004 ¶¶ 80, 126, 136, claim 50; Ex. 1003 ¶ 125). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

h. “data for determining proximity of the aircraft to a particular object within the ramp area, and”

Petitioner contends that Berkmo’s combined output data include data for determining proximity of aircraft 10 to a particular object such as objects 11, 12 in stand area 20 during maneuvering of aircraft 10 towards parking position 160 for collision avoidance. Pet. 51–52 (citing Ex. 1004 ¶¶ 134–136; Ex. 1003 ¶¶ 126–128). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- i. “data for forming a three dimensional virtual model of at least a portion of the aircraft from the merged data; and”*

Petitioner contends that Berkmo’s combined output data from imaging system 110C, laser system 110L, and radar system 110R includes data that is sufficient to form a 3D virtual model of at least an aircraft portion by using spatially-distributed measured data produced by sensors and an algorithm to determine corresponding spatial regions of output data. Pet. 52–53 (citing Ex. 1004 ¶¶ 37, 129–130, 132–134, 143, Figs. 1–3, 6; Ex. 1003 ¶¶ 129–132; Ex. 1016, 2, 6–7, 10, 12). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- j. “displaying messages to provide directional and speed guidance to a pilot with the merged data set.”*

Petitioner contends that Berkmo uses the combined output data to display messages that provide directional and speed guidance to a pilot via display 130 for providing pilot maneuvering guidance information to a pilot of an approaching aircraft on the wall of the terminal building in clear view of the pilot. Pet. 54–55 (citing Ex. 1004 ¶¶ 120, 127, 128, 135–136, 143, Figs. 2–4; Ex. 1003 ¶¶ 133, 134). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- k. Conclusion*

On this record, we find that Petitioner has established that it is more likely than not that claim 1 is anticipated by, and/or unpatentable over, Berkmo.

3. *Claims 6–10 and 13–20*

a. *Petitioner’s contentions*

Petitioner provides detailed contentions and citations to teachings of Berkmo and testimony of Dr. Campbell to support its assertions that Berkmo teaches and/or suggests limitations of claims 6–10 and 13–20. Pet. 55–67.

b. *Patent Owner’s arguments*

At this stage, Patent Owner does not contest Petitioner’s assertions of unpatentability of claims 6–10 and 13–20 based on Berkmo. *See generally* Prelim. Resp.

c. *Conclusion*

On this record, we find that Petitioner has established that it is more likely than not that claims 6–10 and 13–20 are anticipated by, or unpatentable over, Berkmo.

H. *Ground 3: Alleged Obviousness over Berkmo and Richman*

Petitioner asserts that claims 1–20 are unpatentable under 35 U.S.C. § 103 over Berkmo and Richman. Pet. 10, 67–80.

1. *Richman*

Richman describes a system for guiding an aircraft from a taxiway into a dock by automatically viewing an arriving aircraft and the dock area to detect the aircraft and any obstacles that may be in the travel path of the aircraft. Ex. 1005, 1:4–8. The system matches stored three-dimensional models of the aircraft with an image of the aircraft obtained using ranging circuitry of a laser radar (Ladar) to determine the location and orientation of the approaching aircraft and to update that data to determine the aircraft’s travel path as shown in Figure 1 reproduced below. *Id.* at 1:8–13, 2:4–11.

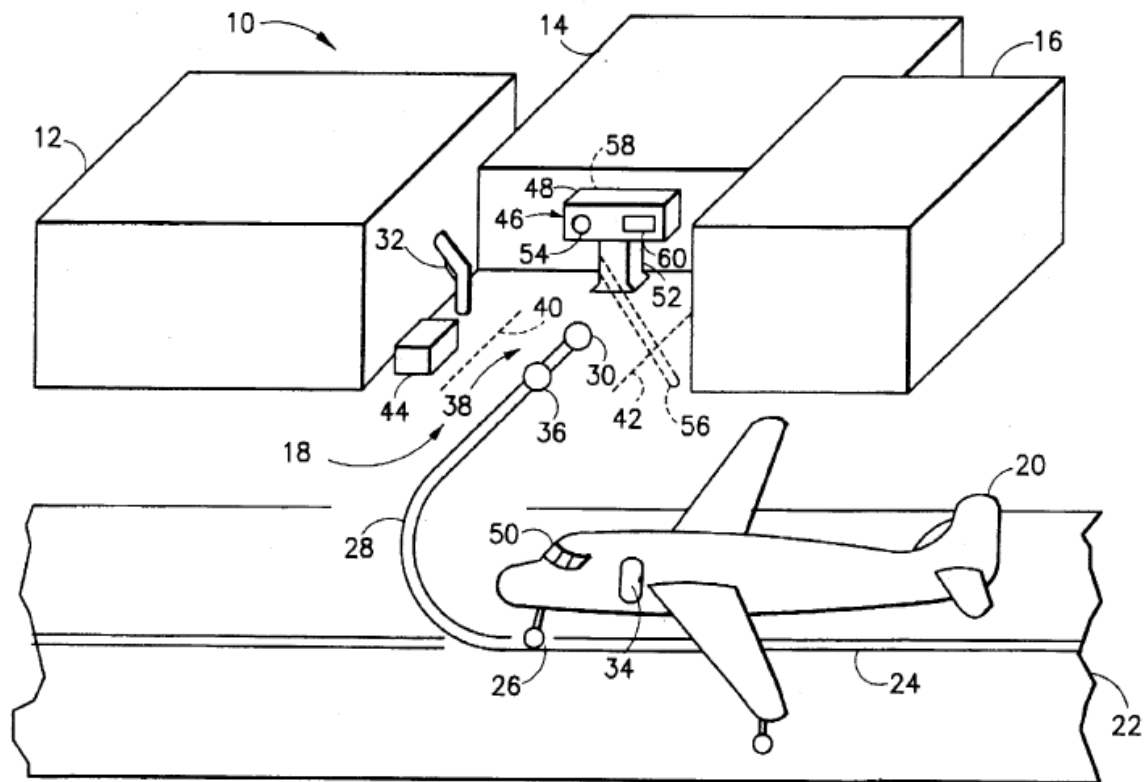


FIG. 1

Figure 1 shows aircraft 20 approaching dock 18 along taxiway 22 guidelines 24, 28 for nose wheel 26 leading into dock 18 to stop point 30 so passenger bridge 32 registers at aircraft door 34 for passengers. *Id.* at 2:57–3:8.

Docking system 46 provides steering and speed commands to the pilot and warns the pilot of obstacles. *Ex.* 1005, 3:21–24. Laser radar 54 scans dock 18 area in elevation and azimuth with beam 56 (e.g., infrared radiation beam) to obtain an image of an aircraft or obstacle present within dock 18. *Id.* at 3:24–36. Display 60 presents instructions to help a pilot dock aircraft 20. *Id.* at 3:36–47. Ladar target points provide a 3D image of the aircraft that is compared to a library of aircraft templates by correlator 68 to determine the aircraft's position and orientation. *Id.* at 3:48–4:50.

2. *Motivation to Combine and Expectation of Success*

a. *Petitioner's contentions*

Petitioner asserts that a skilled artisan would have combined the 3D modeling, orientation detection, and template matching of Richman with Berkmo, which also uses laser data, as a predictable combination of familiar elements by known methods. Pet. 70–71 (citing Ex. 1004 ¶¶ 116–132, Figs. 1–3; Ex. 1005, 2:4–24, 3:48–4:34; Ex. 1003 ¶ 163). Petitioner asserts the combination improves 3D models by returning the location and *orientation* of objects, lowers missed detections resulting from partial sensor returns by matching partial shape sensor data to a 3D model, identifies the aircraft type, and improves tracking by arranging the detections in series over time and using “feature extraction” from sensor data to match aircraft type within a library to multiple specific parts such as a nose wheel and wing wheel, and would improve Berkmo by using more detailed aircraft information. Pet. 71–73 (citing Ex. 1005, 1:4–13, 2:3–11, 4:1–7; Ex. 1003 ¶¶ 164–168).

b. *Patent Owner's arguments*

At this stage, Patent Owner does not contest Petitioner's motivation to combine or expectation of success assertions. *See generally* Prelim. Resp.

c. *Conclusion*

On this record, we find that Petitioner has established that it is more likely than not that it would have been obvious to combine the teachings of Richman and Berkmo with a reasonable expectation of success.

3. *Independent Claim 1*

Petitioner asserts that Berkmo teaches or suggests every limitation of claim 1, and any limitation not taught or suggested by Berkmo is taught by Richman. Pet. 73 (citing Pet. § X.B.2.).

- a. *“wherein the merged data set includes at least one of: data for determining position and orientation of the aircraft relative to the position and orientation of the ramp area,”*

Petitioner contends that Richman’s docking system detects arriving aircraft and matches stored models of the aircraft with aircraft sensor data to determine the orientation of the aircraft and a tracking point of the aircraft such as the nose wheel by comparing a detected image with a rotated or scaled model. Pet. 73 (citing Ex. 1005, 1:4–14, 1:54–2:24, 7:55–8:13, 8:32–52, 8:65–10:11, Abstr.; Pet. ¶ X.C.2. (motivation to combine); Ex. 1003 ¶ 170). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- b. *“data for forming a three dimensional virtual model of at least a portion of the aircraft from the merged data;”*

Petitioner contends that Richman’s docking system includes ladar 54 that “outputs target data in the form of elevation (EL), azimuth (AZ) and range (R) data for each point of a target, such as an aircraft” to provide a three-dimensional image of the target, and memory 64 stores templates as a 3D representation of candidate aircraft used by correlator 68 to determine the quality of a match of a template and an image. Pet. 74 (citing Ex. 1005, 1:65–2:24, 3:49–55, 3:57–67, 4:23–34, 6:59–7:5, 8:13–17, 8:31–52, 8:65–10:11, Abstr., Fig. 2; Ex. 1003 ¶ 171). These contentions, which Patent Owner does not contest at this stage, are supported by record evidence.

- c. *Conclusion*

On this record, we find that Petitioner has established that it is more likely than not that claim 1 is unpatentable over Berkmo and Richman.

4. *Claims 2–20*

a. *Petitioner’s contentions*

Petitioner provides detailed contentions with citations to teachings of Berkmo and testimony of Dr. Campbell to supports its contentions that Berkmo and Richman teach and/or suggest each of the limitations of claims 2–20. Pet. 74–80.

b. *Patent Owner’s arguments*

At this stage, Patent Owner does not contest Petitioner’s assertions of unpatentability of claims 2–20 over based on Berkmo and Richman. *See generally* Prelim. Resp.

c. *Conclusion*

On this record, we find that Petitioner has established that it is more likely than not that claims 2–20 are unpatentable over Berkmo and Richman.

III. ORDER

Accordingly, it is:

ORDERED that, pursuant to 35 U.S.C. § 324(a), post-grant review is instituted as to all of the challenged claims, i.e., claims 1–20 of the ’349 patent, on all of the grounds of unpatentability set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 324(c) and (d), and 37 C.F.R. § 42.4(b), notice is hereby given of the institution of a trial on the grounds of unpatentability authorized above; the trial commences on the entry date of this Decision.

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