

Patent Owner's Oral Argument Demonstratives

**ADB SAFEGATE SWEDEN AB, ADB SAFEGATE BV, and
ADB SAFEGATE AMERICAS, LLC,**
Petitioners,
v.
HONEYWELL INTERNATIONAL INC.,
Patent Owner.

PGR2023-00053
U.S. Patent No. 11,538,349 B2

The Honeywell logo is displayed in a large, bold, red sans-serif font.

Ex2004
PGR2023-00053

Summary

'349 Patent

- Overview of claimed invention

Ground 1: Subject Matter Eligibility

- *Alice* Step 1: The claims are not directed to an “abstract idea”
- *Alice* Step 2: The claims include an “inventive concept”

Ground 2: Berkmo

- No disclosure of “displaying” limitations
- No disclosure of “merging” limitations
- No disclosure of dependent claims 7 and 9

Ground 3: Berkmo + Richman

- Independent claims fail for same reason as ground 2
- Insufficient motivation to combine

Overview of Claimed Invention

'349 Patent, Overview

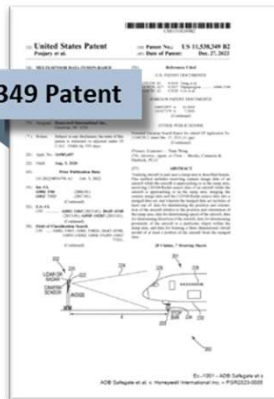
The '349 Patent is directed to an invention that provides enhanced detection, tracking, and guidance to an aircraft from entry into ramp area to docking.

MULTI-SENSOR DATA FUSION-BASED AIRCRAFT DETECTION, TRACKING, AND DOCKING

TECHNICAL FIELD

The present disclosure relates to detection, tracking, and docking aircraft in a taxiway, apron, or ramp area of an airport.

'349 Patent



image, laser and radar sensors. For example, the camera sensor capability can provide the detection of the aircraft from the longer distances, such as from the ramp area stand entry lead-in lines and the LIDAR/Radar can provide the clear guidance to the aircraft to perform the precise docking. The data from multiple systems are collected and merged via a data fusion process described herein which provides a rich data set to track and provide guidance to the aircraft, from entry into the ramp area to docking.

'349 Patent, Claim 18

The claimed technical features provide for the enhanced detection, tracking, and guidance.

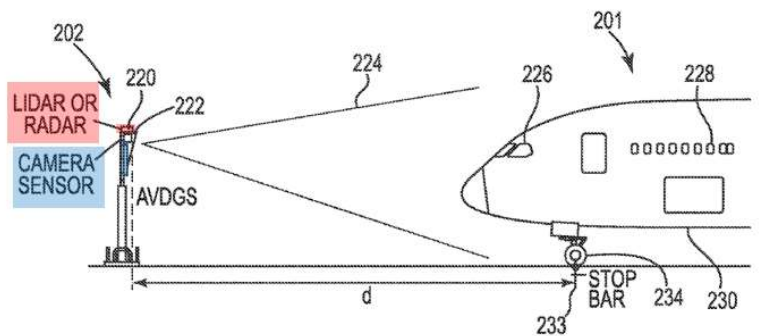


FIG. 2

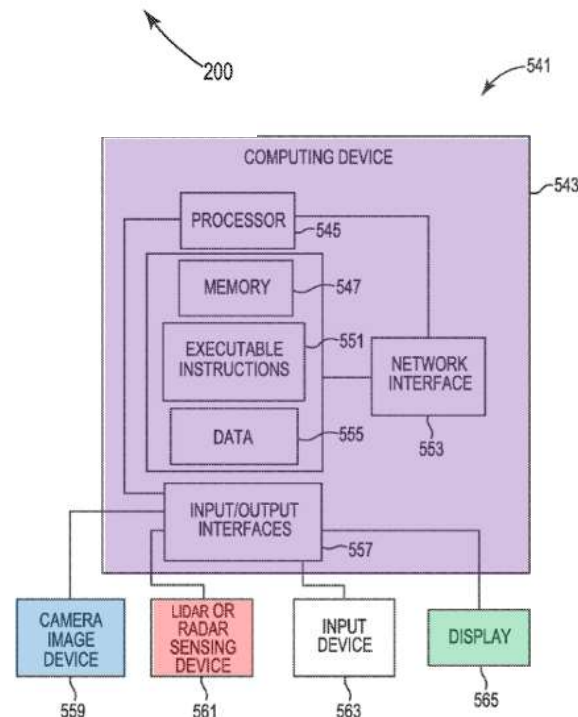
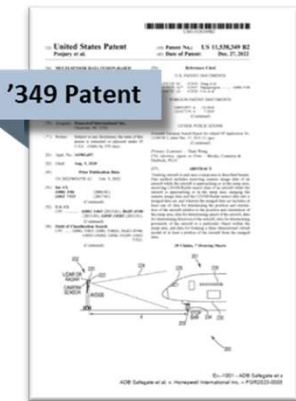


FIG. 5

18. A system for tracking an aircraft, comprising:
a camera image sensor for capturing camera image data of the aircraft while the aircraft is approaching a ramp area for parking the aircraft on an airside of an airport;
a computing device having memory associated therewith for receiving the camera image data from the camera image sensor;
a Light Detection And Ranging (LIDAR) or RADAR Detection And Ranging (RADAR) sensor for capturing LIDAR/RADAR sensor data of the aircraft while the aircraft is approaching the ramp area;
the computing device for receiving the LIDAR/RADAR sensor data and merging the camera image data and the LIDAR/RADAR sensor data associated with the aircraft 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
the computing device for displaying messages to provide directional and speed guidance to a pilot with the merged data set.



'349 Patent, Claim 1

The claimed technical features provide for the enhanced detection, tracking, and guidance.

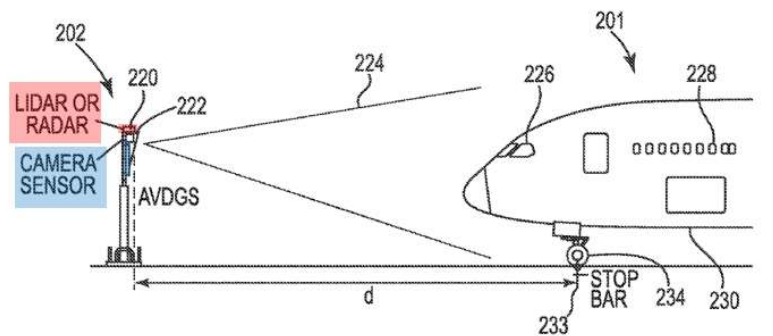


FIG. 2

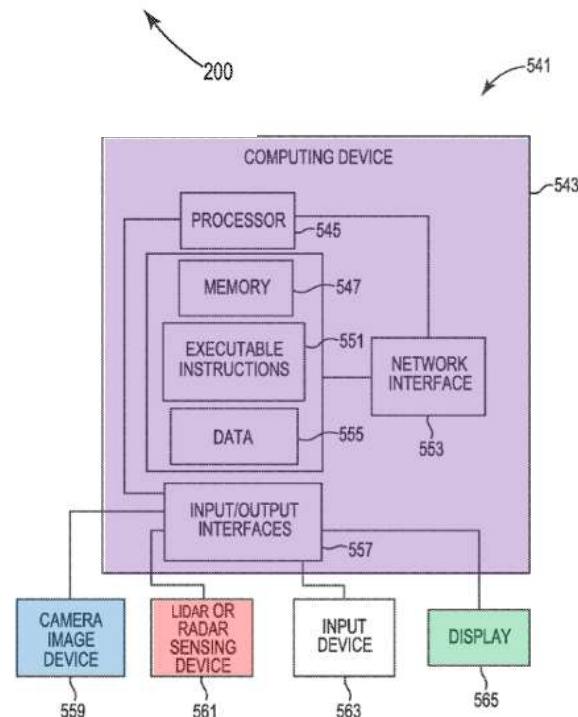
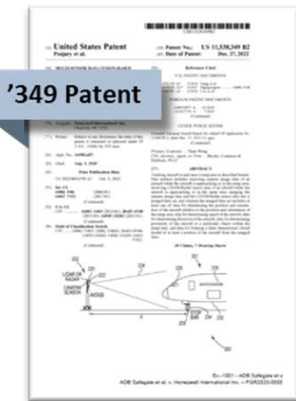


FIG. 5

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.



Ground 1

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

Alice Step 1 - The claims are not directed to an abstract idea

Alice Step 2 – The claims include an inventive concept

Alice – Subject Matter Eligibility Legal Standard



Alice Two-Step Framework:

- Step 1: determine whether the claims are “directed to” a patent ineligible concept, such as an abstract idea.
- Step 2: consider whether claims contain “additional elements” that constitute an “inventive concept” sufficient to “transform” the concept into a patent eligible “application.”

Courts should “tread carefully” lest the judicial exception “swallow all of patent law.”

Alice Corp. v. CLS Bank Int’l, 573 U.S. 208, 217-218 (2014)

Alice Step 1 – Identified “Abstract Idea” is Untethered to Claims

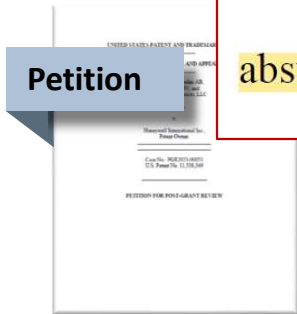


“The Step 1 ‘directed to’ analysis ... depends on an accurate characterization of what the claims require and of what the patent asserts to be the claimed advance.”

“To disregard[] express claim elements is to proceed at a high level of abstraction that is untethered from the claim language and that overgeneraliz[es] the claim.”

TecSec, Inc. v. Adobe Inc., 978 F.3d 1278, 1294-95 (Fed. Cir. 2020)

Alice Step 1 – Identified “Abstract Idea” is Untethered to Claims



Claims 1-20 of the '349 Patent are unpatentable as being directed to the abstract idea of receiving, merging, and displaying data. Moreover, the claims solely

Petitioners picked out some verbs, and ignored the rest.

Petitioners “[have] not shown how it could properly disregard these claim requirements in determining what the patent asserts to be the focus of the claimed advance over the prior art.” *TecSec*, 978 F.3d at 1295

Paper 1 at 16, 24; Paper 15 at 31-33; Ex1001

18. A system for tracking an aircraft, comprising:
a camera image sensor for capturing camera image data of the aircraft while the aircraft is approaching a ramp area for parking the aircraft on an airside of an airport;
a computing device having memory associated therewith for receiving the camera image data from the camera image sensor;
a Light Detection And Ranging (LIDAR) or Radio Detection And Ranging (RADAR) sensor for capturing LIDAR/RADAR sensor data of the aircraft while the aircraft is approaching the ramp area;
the computing device for receiving the LIDAR/RADAR sensor data and merging the camera image data and the LIDAR/RADAR sensor data associated with the aircraft 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
the computing device for displaying messages to provide directional and speed guidance to a pilot with the merged data set.

Alice Step 1 – Identified “Abstract Idea” is Untethered to Claims

CardioNet, LLC v. InfoBionic, Inc., 955 F.3d 1358, 1371 (Fed. Cir. 2020)

- “[B]e careful to avoid oversimplifying the claims by looking at them generally and failing to account for the specific requirements of the claims.”



Dr. Campbell

A I don't believe the type of sensor data is relevant to whether it's abstract or not.

Alice Step 1 – Similar Claims Found Non-Abstract in *Thales*

Thales Visionix Inc. v. US, 850 F.3d 1343 (Fed. Cir. 2017):

Non-Abstract in <i>Thales</i>	Independent System Claim in '349 Patent
<p>1. A system for tracking the motion of an object relative to a moving reference frame, comprising:</p> <p>a first inertial sensor mounted on the tracked object;</p> <p>a second inertial sensor mounted on the moving reference frame; and</p> <p>an element adapted to receive signals from said first and second inertial sensors and</p> <p>configured to determine an orientation of the object relative to the moving reference frame based on the signals received from the first and second inertial sensors.</p>	<p>18. A system for tracking an aircraft, comprising:</p> <p>a camera image sensor for capturing camera image data of the aircraft while the aircraft is approaching a ramp area for parking the aircraft on an airside of an airport;</p> <p>a computing device having memory associated therewith for receiving the camera image data from the camera image sensor;</p> <p>a Light Detection And Ranging (LIDAR) or RAdio Detection And Ranging (RADAR) sensor for capturing LIDAR/RADAR sensor data of the aircraft while the aircraft is approaching the ramp area;</p> <p>the computing device for receiving the LIDAR/RADAR sensor data and</p> <p>merging the camera image data and the LIDAR/RADAR sensor data associated with the aircraft into a merged data set; and</p> <p>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</p> <p>the computing device for displaying messages to provide directional and speed guidance to a pilot with the merged data set.</p>

Alice Step 1 – Similar Claims Found Non-Abstract in *Thales*

Thales Visionix Inc. v. US, 850 F.3d 1343 (Fed. Cir. 2017):

Non-Abstract in <i>Thales</i>	Independent Method Claim in '349 Patent
<p>22. A method comprising determining</p> <p>an orientation of an object relative to a moving reference frame</p> <p>based on signals from two inertial sensors mounted respectively on the object and on the moving reference frame.</p>	<p>1. A method for tracking an aircraft, comprising:</p> <p>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;</p> <p>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;</p> <p>merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set; and</p> <p>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</p> <p>displaying messages to provide directional and speed guidance to a pilot with the merged data set.</p>

Alice Step 1 – Similar Claims Found Non-Abstract in *Thales*



“Just as claims directed to a new and useful technique for defining a database that runs on general-purpose computer equipment are patent eligible, so too are claims directed to a new and useful technique for using sensors to more efficiently track an object on a moving platform.”

Thales Visionix Inc. v. US, 850 F.3d 1343, 1349 (Fed. Cir. 2017)

Alice Step 1 – The Claims are Focused on Advances over Prior Art



The claimed method/system are focused on advances over the prior art – as demonstrated through the *intrinsic record*.

“[O]ur analysis at *Alice* step one involves examining the patent claims in view of the plain claim language, statements in the written description, and the prosecution history, if relevant.”

“The § 101 patent-eligibility inquiry is only a threshold test ... and we reserve for §§ 102 and 103 purposes our comparison of the prior art and the claims to determine if the claims are, in fact, an improvement over the prior art.”

CardioNet, LLC v. InfoBionic, Inc., 955 F.3d 1358, 1373-74 (Fed. Cir. 2020)

Alice Step 1 – The Claims are Focused on Advances over Prior Art

'349 Patent

Problems with Prior Art:

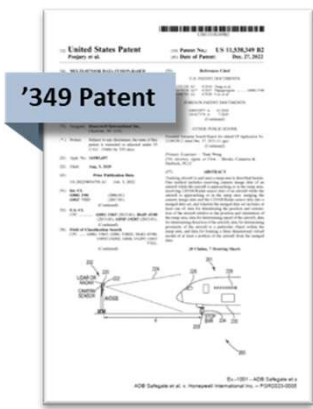
movement on the ground. However, conventional laser/LIDAR systems have issues with: a curved approach of an aircraft to a ramp area, long range detection of the aircraft as it approaches, dark colored aircraft detection, and thick snow/foggy/heavy rain conditions or conditions with precipitation. Also, they do not generate images for use by the

Other airports use camera systems that relay information to the pilots for managing aircraft movement in areas close to the ramp area and use cameras to track the aircraft's movement. Camera systems airports currently use may have issues with accuracy of docking due to accuracy of distance measurements, and they have precise calibration requirements which can make the system difficult to set up and be relied upon for accurate measurements. Camera systems also may not require frequent calibrations and monitoring of the systems, and can have no redundancy if the camera system malfunctions or cameras are obscured for some reason, among other potential issues.

even more important. These current technologies also both still continue to fall short on the ability to meet the critical requirements of today's airports, which can include: having a long scan range of, for example, more than 150 m; being operationally flexible and adaptable; being auto-calibration able, allowing for detection and tracking of aircraft, vehicles, people, etc.; providing aircraft type and/or subtype identification; providing accurate and repeatable guidance; improved safety through apron mapping, wing tip clearance, obstacle detection, FOD, etc.; improved surveillance by being an extension to surveillance sensors that cover gate areas; all weather capable; and low maintenance.

Alice Step 1 – The Claims are Focused on Advances over Prior Art

New and Useful Technique that Improves Existing Technological Process:



image, laser and radar sensors. For example, the camera sensor capability can provide the detection of the aircraft from the longer distances, such as from the ramp area stand entry lead-in lines and the LIDAR/Radar can provide the clear guidance to the aircraft to perform the precise docking. The data from multiple systems are collected and merged via a data fusion process described herein which provides a rich data set to track and provide guidance to the aircraft, from entry into the ramp area to docking.

Benefits of the concepts proposed herein are important to an airport because of several factors. For example, some factors include: the safety of the aircraft and ground operators during the ramp operations from docking to pushback; early detection of aircraft via the docking system's long range capabilities to meet ripple taxiway lines; precise and/or accurate docking so that there is no significant time taken for connecting a ramp or the need for tow vehicles to adjust the docking; obstacle detection prior to docking; and pre-positioning of the ramp area equipment before the docking to reduce turnaround times. Further, the solutions herein can be beneficial in aircraft detection at all times during the day and night, in all weather conditions, in all lighting conditions, and for all aircraft types and subtypes with all colors, unlike prior systems.

Alice Step 1 – The Claims can NOT be Performed in the Mind



Mr. Wilson

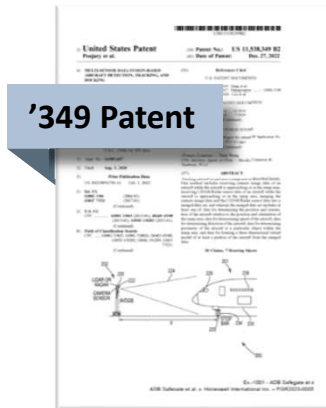
support or explanation as to *how* that is possible. Ex1003, ¶¶78-79. As explained above, the human mind is incapable of comprehending the data from these different sensors, is incapable of merging the two distinct types of data (e.g., camera image data and 3D point cloud data from LIDAR/RADAR sensor), and is incapable of determining and displaying messages to provide directional guidance and speed guidance to the pilot.

SiRF Tech., Inc. v. Int’l Trade Comm’n, 601 F.3d 1319, 1333 (Fed. Cir. 2010).

- Claims were directed to eligible subject matter because “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.”

Alice Step 1 – The Claims can NOT be Performed in the Mind

The claims have a timing component:



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

Even if collecting/merging can be done in the mind, the timing component could not be satisfied:



Dr. Campbell

Q Okay. But for one scan, you said it may take a very long time, right?

A To do it as a mental process, yes.

* * *

Q So how long would it take for the human mind to receive, merge, and determine directional and speed guidance for multiple scans?

A I don't know how long, but it would take a long time.

Alice Step 1 – Thales is Directly on Point; Electric Power is NOT

Petitioners' main authority – relied on in Petition and Reply – is *Electric Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1355 (Fed. Cir. 2016).

- “The claims in this case do not even require a new source or type of information, or new techniques for analyzing it..... As a result, they do not require an arguably inventive set of components or methods, such as measurement devices or techniques, that would generate new data.”

In contrast, the '349 Patent claims use new techniques that generate new data:

- The “merging” feature generates “a merged data set” from different types of sensors (a new technique)
- The messages that are displayed to the pilot include directional and speed guidance (newly generated data)

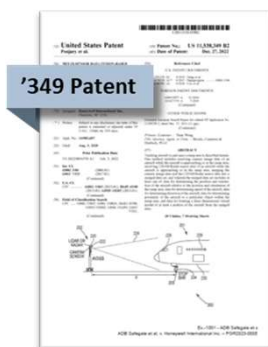
Alice Step 1 – Claim 7 is NOT Abstract

Core Wireless Licensing S.A.R.L. v. LG Elecs., Inc., 880 F.3d 1356, 1363 (Fed. Cir. 2018)

- Claims that “improve[d] the efficiency of using the electronic device” found patent-eligible as an improvement to the functioning of computers.

7. The method of claim 1, further comprising:
comparing the camera image data and the LIDAR/RADAR sensor data to identify that the aircraft is present in both the camera image data and the LIDAR/RADAR sensor data before merging the camera image data and the LIDAR/RADAR sensor data.

The specification explains how claim 7 improves the efficiency of the computing device:



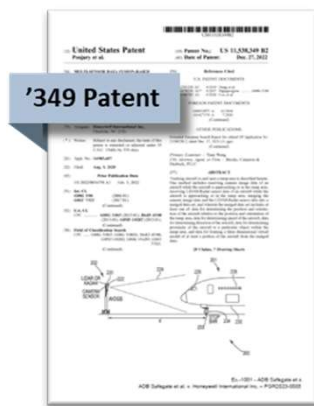
checks to see if it is the correct type of aircraft. In some embodiments, camera image data and LIDAR/Radar sensor data can be compared to identify whether an aircraft is present in both the camera image data and the LIDAR/Radar sensor data. This can, for example, be done before merging the camera image data and the LIDAR/Radar sensor data. In this way, computing resources won't be wasted on analysis of objects that are not aircraft.

Alice Step 1 – Claim 19 is NOT Abstract

Research Corp. Techs., Inc. v. Microsoft Corp., 627 F.3d 859, 868 (Fed. Cir. 2010).

- Claims directed to “rendering a halftone image of a digital image by comparing, pixel by pixel, the digital image against a blue noise mask” found patent eligible.

19. The system of claim **18**, wherein the LIDAR/RADAR sensor data is analyzed using a point cloud process to correlate points in the LIDAR/RADAR sensor data to points in the camera image data.



Additionally, once the camera image data and data have been collected, a data fusion process can occur, where qualities of each data set can be used together to identify the 6D elements. One process for accomplishing data fusion can be to: receive data to be used to form a 3D point cloud from the sensor, calculate a transformation between the coordinates of the system and a vision coordinate system of the camera image system (representative of a real world coordination system of the ramp area), determine an estimated pose of the 3D model from the vision pose estimation process described above. This transformation can be accomplished, for example, by having the sensor data analyzed using a point cloud process to correlate points in the sensor data to points in the camera image data.

Alice Step 2 – Claims are Directed to Inventive Concept



“Step two is a search for an inventive concept—i.e., an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself.”

Weisner v. Google LLC, 51 F.4th 1073, 1081 (Fed. Cir. 2022)

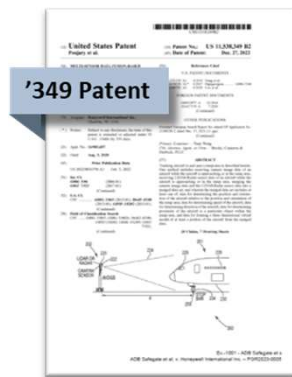
“[A]n inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces.”

BASCOM Glob. Internet Servs., Inc. v. AT&T Mobility LLC, 827 F.3d 1341, 1350 (Fed. Cir. 2016)

Alice Step 2 – Claims are Directed to Inventive Concept

Claimed combination provides non-conventional arrangement of pieces.

- Claims recite a combination that includes merging data from both the camera and LIDAR/RADAR sensors into a merged data set, and then using that merged data for guiding the aircraft.



image, laser and radar sensors. For example, the camera sensor capability can provide the detection of the aircraft from the longer distances, such as from the ramp area stand entry lead-in lines and the LIDAR/Radar can provide the clear guidance to the aircraft to perform the precise docking. The data from multiple systems are collected and merged via a data fusion process described herein which provides a rich data set to track and provide guidance to the aircraft, from entry into the ramp area to docking.

See *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, 841 F.3d 1288, 1302 (Fed. Cir. 2016) (finding claims eligible under Alice Step 2 in view of the specification's explanation that the ordered combination is unconventional and improves the prior art)

Alice Step 2 – Claims are Directed to Inventive Concept

The evidence of conventionality of the “merging” step cited in Petition (at 32-33) is the following statement in expert declaration:



Dr. Campbell

89. Element [1.3] of representative claim 1 recites merging the camera image data and sensor data into a merged data set. This element does not provide any details about the merging. It recites nothing about how the data is merged, nothing about the structure of the merged data, and nothing about how the data is stored or accessed.

That is NOT evidence establishing that the claimed limitations are conventional.

See Coop. Entm't. Inc. v. Kollektive Tech., 50 F. 4th 127, 135-36 (Fed. Cir. 2022) (finding claims eligible when challenger failed to adequately show that the claims are conventional and not inventive)

Ground 2

Berkmo

Does not disclose “displaying messages to provide directional and speed guidance to a pilot with the merged data set.”

Does not disclose “merging” camera image sensor data with LIDAR/RADAR sensor data.

Berkmo Fails to Disclose Numerous Limitations

Ground 2 asserts claims 1, 6-10, and 13-20 are **anticipated** by Berkmo.

- *Tf3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1374 (Fed. Cir. 2018) (reversing Board's invalidity finding, explaining "[a]nticipation requires the presence in a single prior art disclosure of all elements of a claimed invention arranged as in the claim")

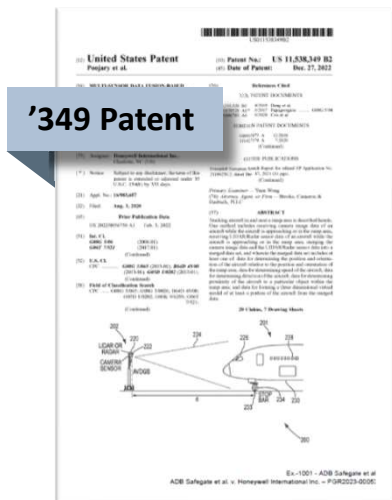
Ground 2's **alternative assertion of obviousness** if any limitation is "not expressly or inherently taught by Berkmo" is **vague and improper**.

- *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1001 (Fed. Cir. 2023) ("Because IPRs are formal adjudications, the APA also requires that the parties to IPRs receive notice of arguments and evidence.")

'349 Patent, Claim Construction

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot with the merged data set”

Proper Construction: navigational instructions, including the horizontal deviation with respect to the center line of a path.



point. The guidance module of the central docking system can, for example, provide the remaining distance and the horizontal deviation with respect to the center line of the path (e.g., lead-in line) that the aircraft is supposed to follow. This can provide the pilot with directions regarding how to get the aircraft to the correct location. In some embodiments,

'349 Patent, Claim Construction

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot with the merged data set”

Proper Construction: navigational instructions, including the horizontal deviation with respect to the center line of a path.



Mr. Wilson

64. A POSITA would understand that the horizontal deviation is part of the directional guidance here because a goal of these instructions is to provide directions to keep the plane on the lead-in line, which would be done through information on the horizontal deviation. Likewise, another goal is to provide for mid-course adjustments to the pilot. All of this guidance informs the pilot “which direction,” including how much horizontally, it should move. That is particularly significant within the context of the '349 Patent which clearly stresses increasing accuracy and reliability in the docking process. The '349 Patent instruction is

'349 Patent, Claim Construction

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot with the merged data set”

Proper Construction: navigational instructions, including the horizontal deviation with respect to the center line of a path.



Dr. Campbell

A This step is to provide direction and speed information, which, collectively, could be referred to as guidance on the pilot, such as which direction to go and how fast to go. And then the second part is with the merged dataset.

Ground 2 - Berkmo Fails to Disclose “Displaying” Requirements

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot with the merged data set”

Berkmo only discloses providing **stop/go** instructions – lacking any “directional” component:

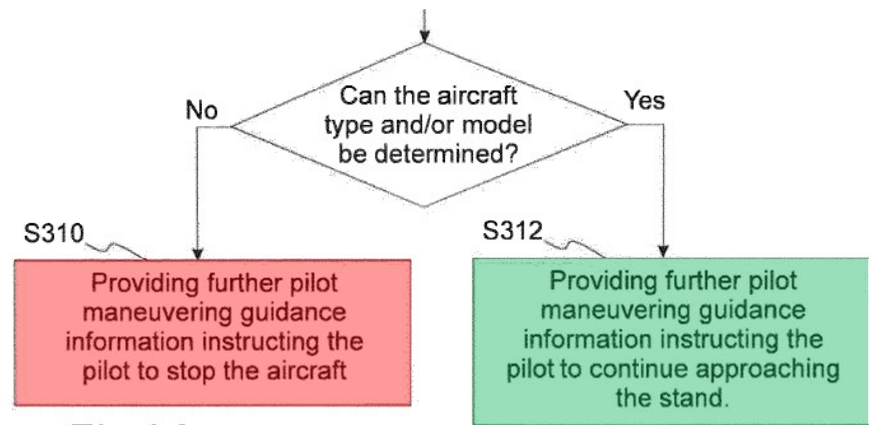


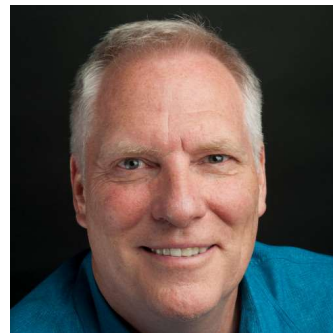
Fig 8A

Relied on in Petition at 54, and Ex1003 (Campbell Decl.) ¶ 134

Ground 2 - Berkmo Fails to Disclose “Displaying” Requirements

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot with the merged data set”

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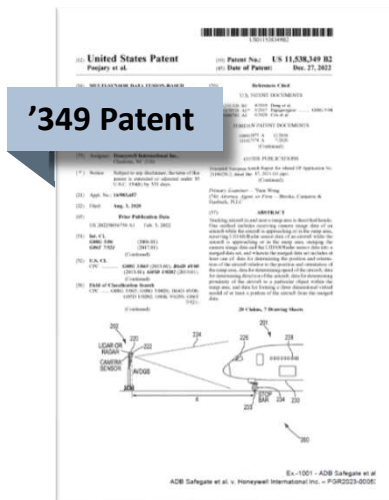
Mr. Wilson

89. “Approach the stand” is equivalent of “proceed” or “go” (the equivalent of a green traffic light) and does not provide directional guidance. “Approach the stand” is permission to proceed into the protected area, *see* Ex1004, ¶¶48, 50, 53, 65, 66, 143, 145, claim 42, each discussing “allowing” the aircraft to approach the stand. Berkmo discloses that guidance is for safety reasons –that is proceed if it is safe for the plane to enter the protected gate area or stop if the area is not clear or there is a safety threat. *See*, for example, Ex1004, ¶2 (docking “in a safe and reliable way”); ¶65 (“the aircraft may be ordered to stop, as safety cannot be guaranteed”); ¶76 (bridge not properly stowed); ¶¶79, 135 (collision course with objects); ¶¶80, 136 (other objects not predicted to leave stand area before aircraft arrives); ¶¶55, 143-144 (unable to determine type or model of aircraft); ¶¶57-63, 145 (unable to detect backscattering signals). None of these examples are “directional” guidance. Indeed, Berkmo provides no guidance regarding horizontal deviation with respect to the center line of a path, as required by the proper construction of the “directional guidance,” as discussed above.

'349 Patent, Claim Construction

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

Proper Construction: instructions concerning maximum speeds for approaching a gate.



The docking system can also provide and monitor maximum speeds for approaching a gate. These speed thresholds can be set and monitored and instructions can be passed to the pilot to slow down. For example, in some embodiments,

'349 Patent, Claim Construction

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

Proper Construction: instructions concerning maximum speeds for approaching a gate.



Mr. Wilson

68. A POSITA would understand that such “speed guidance” reflects actual speed values – e.g., such as those thresholds described in the specification. It refers to an actual speed value that can be used to inform the pilot how to proceed. This instruction is clearly more than an instruction to a stop, which avoids any actual “speed” component from the “speed guidance,” which is how Dr. Campbell and Petitioners have interpreted the term.

'349 Patent, Claim Construction

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

Proper Construction: instructions concerning maximum speeds for approaching a gate.



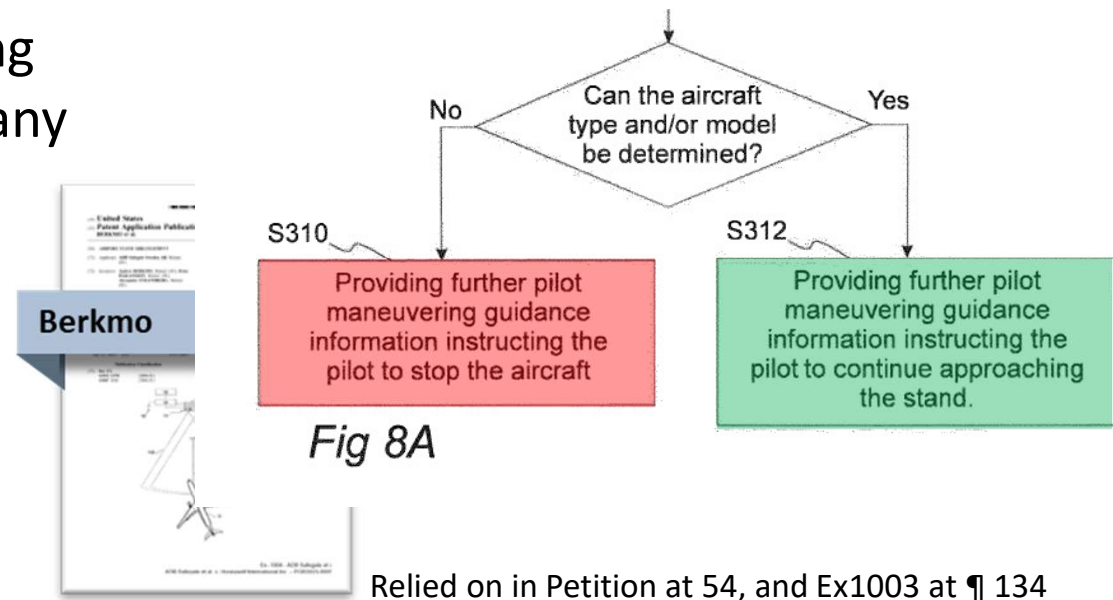
Dr. Campbell

A This step is to provide direction and speed information, which, collectively, could be referred to as guidance on the pilot, such as which direction to go and how fast to go. And then the second part is with the merged dataset.

Ground 2 - Berkmo Fails to Disclose “Displaying” Requirements

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

Berkmo only discloses providing **stop/go** instructions – lacking any maximum speed component:



Dr. Campbell

Q But there's no disclosure in Berkmo of any specific speeds other than zero or nonzero, right?

A As I recall, that is correct.

Ground 2 - Berkmo Fails to Disclose “Displaying” Requirements

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

Berkmo only discloses providing stop/go instructions – lacking any maximum speed component:



Mr. Wilson

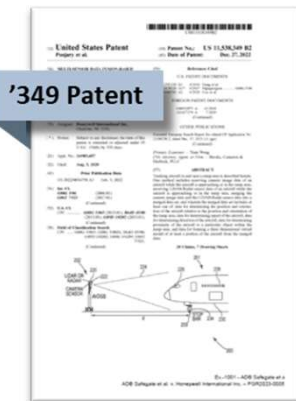
92. It is my opinion that Berkmo does not disclose displaying speed guidance to a pilot. Dr. Campbell asserts that “Berkmo discloses the guidance information includes ‘instructing the pilot to stop the aircraft,’ which is providing speed guidance, i.e., speed is 0.)” Ex1003, ¶134. This is not speed guidance as required, rather this is revoking permission to proceed, as discussed above. This also does not provide any information as to a maximum speed. In my opinion a POSITA would not consider this to be speed guidance as the term is used in the ’349 Patent. Instead, a POSITA would understand the stop instruction to be an instruction to cease approaching the gate, rather than speed related instructions for approaching the gate.

Ground 2 - Berkmo Fails to Disclose “Displaying” Requirements

Claims 1, 10, 18: “displaying messages to provide directional and speed guidance to a pilot **with the merged data set**”

The claims define the “merged data set”:

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



The ‘349 specification provides example of displaying messages with the “merged data set”:

the pilot to slow down. For example, in some embodiments, the determined speed, position, orientation, and/or direction can be sent to a ramp docking system controller device in the ramp docking system and then passed to the pilot unit computing device. After docking at the stop point, the use of

The Petition ignores this limitation. Berkmo contains no such disclosure.

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set

The Petition misconstrues Berkmo:



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

Berkmo teaches merging the camera image data of imaging system 110C and the sensor data of laser system 110L and radar system 110R into combined output data (i.e., a merged data set). EX1003, ¶117. Berkmo discloses detecting and tracking aircraft 10 “based on combined output data from said radar-based system 110R, on the one hand, and from the one or more additional systems” such as imaging system 110C and laser system 110L. EX1004, ¶0129; see also ¶¶0126-0127, 0130, 0134, 0137-0139.

Berkmo’s disclosure refers to output from a radar and laser system:



[0129] The airport stand arrangement 100 is further configured to detect and track the approaching aircraft 10 based on combined output data from said radar-based system 110R, on the one hand, and from the one or more additional systems (in the example: the laser-based system 110L), on the other hand. This functionality allows for increasing the

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set



Dr. Campbell

Q In Berkmo paragraph 129, it specifically states that it is referring to the laser-based system as the one or more additional system, right?

A That is correct, yes.

Q So, Berkmo is specifically talking about merging data from the radar-based system and the laser-based system in that example, right?

A In that embodiment, yes.

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set

Berkmo discloses different types of data:

- image data includes 2D representations and
- radar data includes 3D representations (e.g., a point cloud).



Mr. Wilson

100. Moreover, there is no disclosure of combining the camera data in the same manner as the Radar/LIDAR combination. Notably, the camera data is qualitatively different from the LIDAR or radar data as, for example, camera data is 2D, while radar and LIDAR data are 3D. Combining radar with LIDAR data (3D x 3D) cannot use an identical process to combining radar or LIDAR data with camera data (3D x 2D), and no suitable process is addressed or disclosed by Dr. Campbell or Berkmo. A POSITA reading Berkmo would not understand that the 2D camera data is to be combined with the 3D radar/LIDAR data, nor how that would be done.

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set

Berkmo discloses different types of data:

- image data includes 2D representations and
- radar data includes 3D representations (e.g., a point cloud).



Dr. Campbell

A I don't recall seeing any specific wording in Berkmo about capturing depth with the camera data.

There is no disclosure or explanation in Berkmo concerning how those two disparate types of data would be merged through a weighted average process.

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set

Contrary to assertion in the Petition, Berkmo’s disclosure of “weighted averages” does not refer to merging camera image data with LIDAR/RADAR sensor data.

None of the paragraphs cited in Petition mention or refer to imaging system:



Berkmo also discloses the combined output can be combined or merged by determining a spatially resolved weighted average of the combined output data, such as based on statistical weights for each of imaging system 110C, laser system 110L and radar system 110R. *Id.*, ¶¶0022-0025, 0129-0130. The weighted average can be a matrix of average data values, where each average data value corresponds to a specific spatial location on the stand area and is calculated as a sum of weighted data values corresponding to the same spatial location. *Id.*, ¶¶0025, 0130; EX1003, ¶¶117, 118.

Ground 2 - Berkmo Fails to Disclose “Merging” Requirements

Claims 1, 10, 18: merging the camera image data and the LIDAR/RADAR-sensor data into a merged data set

Contrary to assertion in the Petition, Berkmo’s disclosure of “weighted averages” does not refer to merging camera image data with LIDAR/RADAR sensor data.

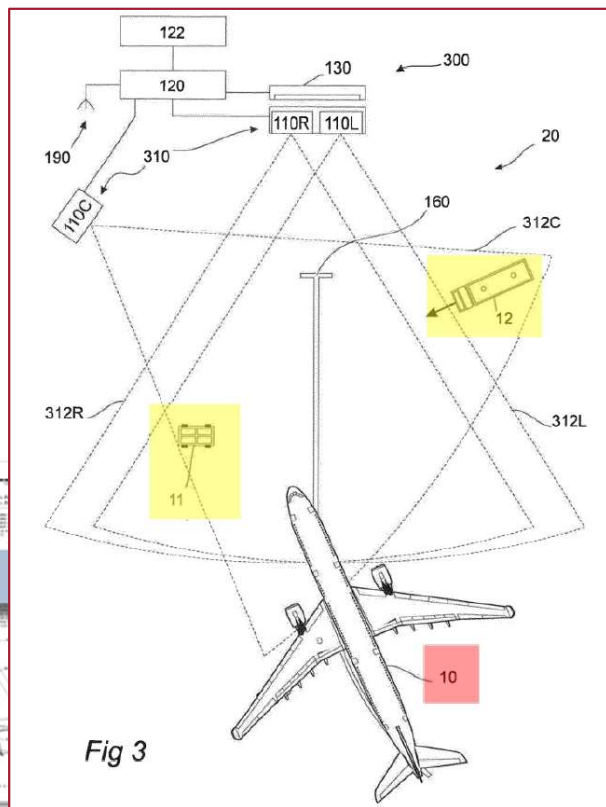


Mr. Wilson

129 discussing an embodiment with just radar and laser data. In addition, the “weighted average” in this citation, or anywhere else in Berkmo, never refers to using camera data, nor is the manner identified in which one would “average” 3D radar data with 2D camera image data ever disclosed or explained. These two facts are reconciled by the POSITA’s understanding that Berkmo’s “averaging” process does not pertain to the 2D camera data, and instead, the camera data is used for identifying objects rather than being combined with the other sources.

Ground 2 - Berkmo Fails to Disclose Claim 7

7. The method of claim 1, further comprising:
comparing the camera image data and the LIDAR/RADAR sensor data to identify that the aircraft is present in both the camera image data and the LIDAR/RADAR sensor data before merging the camera image data and the LIDAR/RADAR sensor data.



Berkmo only refers to verifying the existence of other objects 11, 12. It does not disclose a comparison/verification of the aircraft 10.

[0138] The airport stand arrangement 300 is further configured to detect and track an object of said other objects 11,12 based on output data from the imaging system 110C, and verify the existence of said detected and tracked object based on output data from a further system 110L of the one or more additional systems and/or output data from the radar-based system 110R.

Ground 2 - Berkmo Fails to Disclose Claim 7

7. The method of claim 1, further comprising:
comparing the camera image data and the LIDAR/RADAR sensor data to identify that the aircraft is present in both the camera image data and the LIDAR/RADAR sensor data before merging the camera image data and the LIDAR/RADAR sensor data.

Berkmo only refers to verifying the existence of other objects 11, 12. It does not disclose ANY comparison/verification of the aircraft 10.



Dr. Campbell

A So, I think Berkmo, the way it describes it, does not describe verifying tracked aircraft, similarly to verifying the tracked objects. I do think the process for a POSITA

Ground 2 - Berkmo Fails to Disclose Claim 19

19. The system of claim 18, wherein the LIDAR/RADAR sensor data is analyzed using a point cloud process to correlate points in the LIDAR/RADAR sensor data to points in the camera image data.

The Petition relies on “pixel-to-pixel” matching, which is unrelated to the camera data:



14. Claim 19: “The system of claim 18, wherein the LIDAR/RADAR sensor data is analyzed using a point cloud process to correlate points in the LIDAR/RADAR sensor data to points in the camera image data.”

Berkmo teaches using a point cloud process to correlate data points from laser system 110L, radar system 110R, and imaging system 110C. EX1003, ¶156. Berkmo discloses “[a]n algorithm may run a pre-processing sub-algorithm to determine *corresponding spatial regions* of the output data (e.g. *pixel-to-pixel matching*).” EX1004, ¶[0129]. Using the data points from each system, Berkmo

Berkmo’s disclosure refers to output from a **radar and laser** system:



[0129] The airport stand arrangement 100 is further configured to detect and track the approaching aircraft 10 based on combined output data from said radar-based system 110R, on the one hand, and from the one or more additional systems (in the example: the laser-based system 110L), on the other hand. This functionality allows for increasing the

Ground 3

Berkmo + Richman

Fails for same reasons as Ground 2

Insufficient motivation to combine

Ground 3 – Fails for the Same Reasons as Ground 2

- The Petition only relies on Berkmo for each of the elements shown to be missing in the independent claims for Ground 2.
- The Petition also only relies on Berkmo for claims 7 and 19.

Ground 3 Fails for the Same Reasons as Ground 2.

Ground 3 – Insufficient Motivation to Combine



“Petitioners must “clearly explain[], or cite[] evidence showing, **how** the combination of the two references was supposed to work.”

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

Ground 3 – Insufficient Motivation to Combine

The Petition / Dr. Campbell assert that a POSITA would combine Richman's 3D modeling, orientation detection, and template matching functionality **into Berkmo's laser sensor**. There is no explanation of **how** that would be done.



Dr. Campbell

Accordingly, a POSITA would have understood that incorporating this functionality from Richman **into Berkmo's laser sensor** results in a predictable combination of familiar elements according to known methods.

Mr. Wilson demonstrates the flaws with that analysis:



Mr. Wilson

POSITA. The laser sensors of Richman and Berkmo are sensors which gather certain data and pass that data to other systems for processing. They do not perform processing other than the low level processing of the laser returns to form a point cloud. However, Petitioners and Dr. Campbell propose to add "Richman's 3D modeling, orientation detection, and template matching functionality" into Berkmo's laser sensor. These "functionalities" in Richman are distributed throughout several elements external to the ladar (see Fig. 2 of Richman) and a POSITA would not understand how to include them in the "laser sensor" of Berkmo.

Ground 3 – Insufficient Motivation to Combine

Elekta Ltd. v. ZAP Surgical Sys., Inc., 81 F.4th 1368, 1375 (Fed. Cir. 2023)

- “[A]n obviousness determination requires finding that a person of ordinary skill in the art would have had a reasonable expectation of success”

Eli Lilly & Co. v. Teva Pharms. Int’l GmbH, 8 F.4th 1331, 1348-49 (Fed. Cir. 2021)

- “[I]t was, at all times, [petitioner’s] burden to show . . . a reasonable expectation of success”

The Petition does not allege or present any evidence that a POSITA would have had a **reasonable expectation of success** regarding the proposed modifications.