
BEFORE THE PATENT TRIAL AND APPEAL BOARD

HESAI TECHNOLOGY CO., LTD.
Petitioner

v.

OUSTER, INC.,
Patent Owner

Patent No. 11,287,515
Inter Partes Review No. 2023-01422

PATENT OWNER SUR-REPLY

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	CLAIM CONSTRUCTION	1
	A. “a stator assembly coupled to the stator circuit board” (Limitation 1(g)/14(h))	1
	B. “each of the plurality of stator elements including a coil wound around a magnetic core” (Limitation 1(g))	4
III.	CLAIMS 1 AND 14 ARE PATENTABLE.....	5
	A. Petitioner Provides No Rational Underpinning for Modifying Pacala with Johnson	5
	B. A POSITA Would Not Combine Pacala-Johnson with Pardhan	7
	i. Pardhan Does Not Teach Use of Its Thermal Rotary Links with Low-Power Devices	7
	ii. Pardhan Teaches Away from a Compact Design	9
	iii. Petitioner’s Reply Confirms the Petition’s Proposed Combination Was a Hindsight Reconstruction.....	11
	C. The Petition Failed to Show it Was Obvious to Modify Pardhan to Include Zhang’s “Arms”	16
	D. Petitioner’s Proposed Combination Does Not Disclose or Render Obvious the Required “Stator Assembly . . . Coupled to the Stator Circuit Board”	18
	E. Limitation 1(g) Is Not Met	19
IV.	DEPENDENT CLAIM 4 IS PATENTABLE	19
V.	DEPENDENT CLAIM 17 IS PATENTABLE	21
VI.	DEPENDENT CLAIMS 13 AND 21 ARE PATENTABLE.....	23

VII.	DEPENDENT CLAIM 23 IS PATENTABLE	24
VIII.	DR. LEBBY’S TESTIMONY MERITS NO WEIGHT	25
IX.	NO REASONABLE EXPECTATION OF SUCCESS.....	26
X.	SECONDARY CONSIDERATIONS REBUT ANY CASE OF OBVIOUSNESS.....	26
A.	Hesai’s Copying	26
B.	Industry Praise.....	27
XI.	CONCLUSION.....	27

I. INTRODUCTION

Hesai's Petition failed to 1) show all the elements of the challenged claims; and 2) provide a rationale for combination of the disparate cited prior art references; the Reply does not cure these deficiencies. Instead, Hesai now argues that the numerous gaps and inconsistencies identified by Ouster would be addressed "as part of the design process." Reply, 8. Such conclusory arguments, however, are insufficient to meet Hesai's burden. Nor do they hold up in the face of significant evidence of copying and industry praise, which Hesai makes only the feeblest of efforts to dispute. Ouster has developed the record with expert testimony by Dr. Janét that soundly rebuts Hesai's unsupported interpretation of the prior art and rationales for combination.

II. CLAIM CONSTRUCTION

A. "a stator assembly coupled to the stator circuit board" (Limitation 1(g)/14(h))

Challenged claims 1-2, 4-9, 11-14, 16-17, and 19-21 require "a stator assembly coupled to the stator circuit board." It is well-established that for two structures to be "coupled to" one another, they must be two physically distinct components. *See* POR, 9-10. Contrary to the mountain of Federal Circuit case law supporting this proposition, Hesai relies on the District of New Jersey's outlier decision in *Dicar, Inc. v. Stafford Corrugated Products, Inc.*, 2010 WL 988548, *8

(D.N.J. 2010). *Dicar*, however, is not applicable. In *Dicar*, the asserted patent's written description expressly used "coupled" to describe joining subcomponents of the same structural element. *See id.*, *6. The Federal Circuit's precedential decision in *Wi-LAN Inc. v. Sharp Elecs. Corp.*, 992 F.3d 1366, 1378 (Fed. Cir. 2021) mandates that where a specification consistently uses "coupled" to "refer to components that are not sub-components of each other," the claim phrase "coupled to" requires two separate components. Consistent with this rule, the '515 patent specification uses "coupled to" when referring to two mechanically distinct components such as "a bearing system coupled to the hollow shaft" (Ex. 1001, 5:11-13), "a second circuit board assembly rotationally coupled to the shaft" (*id.*, 4:57-59), "a first circuit board assembly disposed within and coupled to the housing" (*id.*, 5:42-44), and "a light ranging device electrically connected to and coupled to rotate with the second circuit board assembly" (*id.*, 5:56-57). The '515 patent's claims, like the specification, consistently use the phrase "coupled to" when referring to physically distinct components. *See* Ex. 1001, Claims. Unlike in *Dicar*, the stator assembly and the stator board of the '515 patent claims are clearly separate components.

Hesai also implies that the '515 patent's description of "stator and rotor elements *integrated on* upper and lower circuit boards" and "rotor and stator

elements *built onto* the circuit boards themselves” (Ex. 1001, 4:19-31) refers to an alternative embodiment – akin to Johnson’s PCB rotor and stator – that Ouster now purportedly seeks to read out of the claims. Even if Hesai’s interpretation of the specification were correct,¹ the ’515 patent *claims* use the “coupled to” language, not the “integrated on” or “built onto” language Hesai prefers. Regardless, the challenged claims are still like those in *Comcast Cable Commc’ns, LLC v. Promptu Sys. Corp.*, 838 Fed. Appx. 551 (Fed. Cir. 2021), where the challenged claims recited “a speech recognition system coupled to a wireline node.” The Federal Circuit explained that even where the specification disclosed one embodiment where the speech recognition system was *in* a wireline node, because the patentee used the “coupled to” phrase in the claims, it had plainly claimed the other embodiment where the two were “distinct components.” *Id.*, 553.

Hesai’s attempt to distinguish *Cutsforth, Inc. v. Motivepower, Inc.*, No. 2015-1314, 2016 WL 1358628, at *3-4 (Fed. Cir. Apr. 6, 2016) (*nonprecedential*)

¹ It is not. The ’515 Patent expressly describes the preferred Fig. 6D embodiment as one where the “electric rotary motor can be *integrated directly onto* the circuit boards” (*e.g.*, by affixing stator elements to a circuit board “using an adhesive”). *See* Ex. 1001, 30:5-20 (emphasis added).

also fails. There, the Federal Circuit explained “[i]t goes beyond the plain meaning of ‘coupled’ to say that a sub-component (e.g., an engine in a car) is ‘coupled to’ the component as a whole (e.g., the car).” *Id.*, *3. While this would not preclude one sub-component of a car (or, here, a circuit board) from being coupled to another subcomponent of the car (or circuit board), it nevertheless precludes a car (or circuit board) from being “coupled to” one of the car’s (or circuit board’s) subcomponents—the relevant dispute here. *See* Section III.D.

Thus limitations 1(g) and 14(h) must be construed to require that the “stator assembly” be a distinct element from the stator circuit board, and —not part of the stator circuit board itself. *See* POR, 9-10, 28-30.

B. “each of the plurality of stator elements including a coil wound around a magnetic core” (Limitation 1(g))

Challenged claims 1-2, 4-9, and 11-13 recite that each stator element must include “a coil wound around a magnetic core” (*i.e.*, a coil and its magnetic core are components of each stator element). Because it cannot locate a prior art reference with these features, Hesai effectively asks the Board to ignore the plain claim language as well as the specification’s description and depiction of each stator element having a coil wound around a magnetic core. In doing so, Hesai

seeks to remove the requirement of a magnetic core from each of the stator elements, effectively broadening the claims.

Hesai's proposal is in direct conflict with the specification, which explains, with reference to Figure 6D, that "[e]ach stator element 644(i) can include a solenoid coil 644a wound around a core 644b of magnetic material." Ex. 1001, 30:24-26. It is undisputed that Figure 6D shows each coil wound around its own core. Reply, 2-3; Ex. 2004, ¶145. This is the only passage from the specification that describes a stator element including a coil wound around a magnetic core. Not only does the plain language of the claim require that each stator element include a coil wrapped around its magnetic core, but the specification confirms the plain meaning of the claim language as written.

III. CLAIMS 1 AND 14 ARE PATENTABLE

A. Petitioner Provides No Rational Underpinning for Modifying Pacala with Johnson

Hesai's "motivations" for modifying the primary reference, Pacala, with Johnson are in conflict with Hesai's third reference in the combination, Pardhan. POR, 15-17, 21-22. Hesai does not dispute that its Pacala-Johnson-Pardhan-Zhang combination places Johnson's PCB motor entirely within the voluminous heat sink of Pardhan. Its claim that Johnson would improve Pacala by providing "a more compact design and/or efficient use of space" is contradicted by Pardhan's

teaching that a larger volume design is beneficial to prevent overheating. *Compare* Ex. 1003, ¶152 and Ex. 2004, ¶¶107-109, Ex. 1006, 4:63-67.²

The Petition's only other rationale for modifying Pacala with Johnson is the bizarre assertion that because Johnson is a Waymo reference, it must therefore provide the details for how to implement the structure of Pacala—a Quanergy reference. Pet., 17; POR, 21-22. Because the Petition fails to supply any valid motivation to modify Pacala (or Pacala-2017)³ with Johnson in view of Pardhan, it fails to render any of the challenged claims unpatentable.⁴

² Hesai relies on an irrelevant comparison of not-to-scale patent figures to photographs of real vehicles to deny that Pardhan teaches use of large volume designs. Ex. 1050, ¶¶5-6. A POSITA would understand Pardhan's written description contradicts Hesai's arguments. Ex. 2004, ¶112; Ex. 1006, 8:66-9:4, 9:54-60, 10:29-31.

³ Petitioner relies on the same motivation to combine arguments for Pacala and Pacala-2017. *See* Pet., 98, 100, 104-105; POR, 65. However, Ouster has established that Pacala-2017 is not prior art; Hesai has not disagreed. POR, 66-69.

⁴ Hesai does not dispute that if the independent claims are found patentable, their dependent claims are also patentable, nor does it dispute that Ouster's arguments in

B. A POSITA Would Not Combine Pacala-Johnson with Pardhan

i. Pardhan Does Not Teach Use of Its Thermal Rotary Links with Low-Power Devices

Hesai does not dispute the well-established trend in decreased power levels for compact LIDAR designs at the time of the invention. *See* POR, 19 (citing Ex. 2004, ¶114) and Reply, 7. Rather, Hesai contends (i) that Pardhan discloses use of its thermal rotary link for devices operating below the threshold power level and (ii) that devices from Pacala using a multichannel TDC approach utilize stationary heat sinks. Reply, 7. Neither argument rebuts Ouster’s arguments or Dr. Janét’s testimony. POR, 18-19 (citing Ex. 2004, ¶¶96, 111-112).

Hesai’s first argument relies on Pardhan’s teaching that “[t]he example thermal rotary links herein described may be used to transfer excess heat away from the LIDAR device to maintain the LIDAR device at stable operating temperatures even when the LIDAR device is operating above the threshold power level.” Hesai alleges Pardhan teaches its use for LIDAR devices operating *below* the threshold power level. This argument ignores the preceding sentence, which

Sections III-VI apply with equal force to claim 22 and its dependent claims. Reply, 26-27; POR, 53-54, 59-64.

explains that “operating the LIDAR device *above the threshold power level* may generate excess heat that the LIDAR device might not be able to dissipate at a rate sufficient to maintain the LIDAR device within a safe operating temperature range.” *See* Reply, 7; *see also* Ex. 1006, 4:59-64; Ex. 2004, ¶111.

A POSITA would have known that low power, compact LIDAR designs like the one disclosed in Pacala would not be improved by Pardhan’s rotating heat sink. Ex. 2004, ¶114. Rather, a POSITA would have recognized that Pardhan would introduce undesirable complications without any countervailing benefit. *Id.*, ¶115.

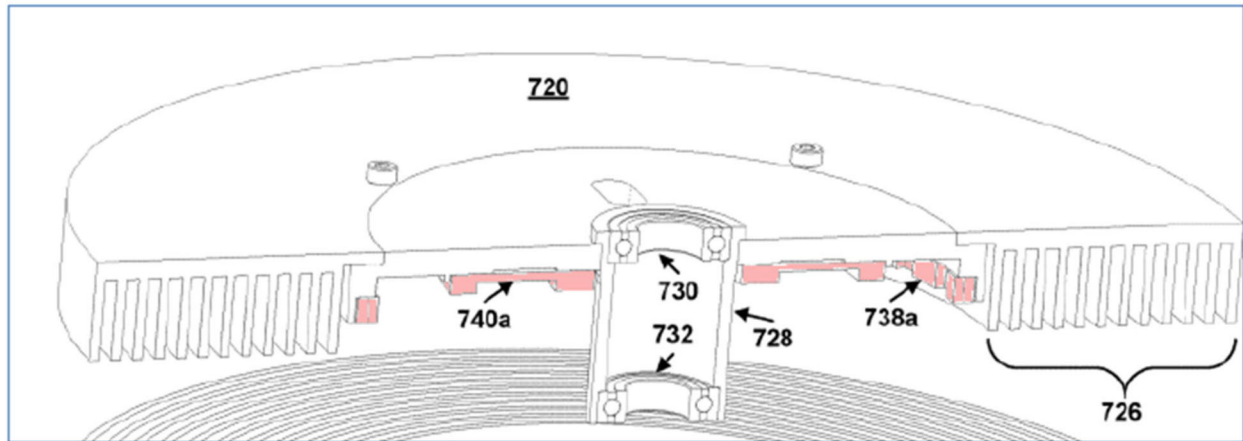
Hesai’s second argument about the use of stationary heat sinks supports Ouster not Hesai. Even with a second declaration, Dr. Lebby was unable to find a single example of *any* LIDAR device (let alone a Pacala LIDAR) having ever implemented anything like Pardhan’s rotating heat sink. Indeed, Dr. Lebby’s admission that Quanergy’s M8 sensor (*i.e.*, the device described by the Pacala reference) utilizes a simple, external base plate that “provides a platform for the sensor and dissipates heat produced by the sensor’s electronics and motor” further proves the disparity between an actual device a POSITA would have built at the time of the invention and Dr. Lebby’s misguided attempt at a hindsight reconstruction. *See* Ex. 1053, 22.

Dr. Lebby's failure to understand the disadvantages posed by Pardhan's ill-advised rotating heat sink—as opposed to stationary fins on the housing—further confirms his inability to provide expert testimony from the perspective of a POSITA. *See* Section VIII *infra*; *see also* POR, 19-21.

ii. Pardhan Teaches Away from a Compact Design

Hesai disputes that Pardhan teaches away from its combination with a compact design. Reply, 5-6. Faced with concrete examples identified by Dr. Janét regarding disadvantages of Pardhan being combined with the compact design of Johnson, Hesai resorts to surface level, and inaccurate, analysis of the references. POR, 19-21 (citing Ex. 2004, ¶¶115-123).

It is indisputable that Pardhan teaches a POSITA to use a device of great volume for improved cooling. *See* Ex. 1006, 8:66-9:4, 9:54-60 (explaining Pardhan's LIDAR uses two optical lenses each having “dimensions of approximately 10 cm x 5 cm”); POR, 6; Ex. 2004, ¶¶109, 112 (explaining how even a single one of Pardhan's two optical lenses would have been far too large to fit into a “compact” system at the time of the invention).



Hesai's assertion that a POSITA "would have scaled components to meet any size objectives" ignores the simple truth that because of their *relative* sizes, Pardhan's heat sink will always negate any compactness that could result from modifying Pacala to use Johnson's PCBs. Reply, 5. This is illustrated by the Petition's figure (above) showing where Johnson's PCB would purportedly be seated within Pardhan's heat sink. POR, 15-16; Ex. 2004, ¶¶109, 112.

Hesai also asserts, *for the first time in Reply*, that Pardhan discloses a motivation to combine its thermal rotary link with "densely packaged devices" to fill the gap in its Petition. Reply, 6. As explained above, there was no such motivation since compact LIDAR designs were known to operate at low power. *See* Section III.B.i. Moreover, the Petition must "identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim.'" New rationales to combine that are raised in Hesai's Reply must be disregarded.

Intelligent BioSystems, Inc. v. Illumina Cambridge, Ltd., 821 F.3d 1359, 1369-70 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)); *Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1330-31 (Fed. Cir. 2019) (same); 37 C.F.R. § 42.23(b).

iii. Petitioner’s Reply Confirms the Petition’s Proposed Combination Was a Hindsight Reconstruction

Hesai fails to explain in the Petition, as required, “*how* specific references could be combined” and “*how* [each] specific combination would operate.” *ActiveVideo Networks, Inc. v. Verizon Commc’ns, Inc.*, 694 F. 3d 1312, 1327 (Fed. Cir. 2012); *Intuitive Surgical, Inc. v. Ethicon LLC*, No. 2020-1480, 2022 WL 421189, at *4 (Fed. Cir. Feb. 11, 2022) (affirming patentability because the “Board correctly found that [Petitioner] failed to explain *how* a person of ordinary skill in the art would have modified” a primary reference in view of secondary reference *in the original petition*.) (emphasis added).

Ouster identified numerous disadvantages and complications when combining the references as Hesai proposes, including, increases in waste heat, power losses, mechanical complexity, cost, torque issues, and failure points. POR, 24-27; Ex. 2004, ¶¶116-120, 131-134. When pressed regarding what a POSITA would do during the design process, Dr. Lebby admitted he “really can’t predict how a POSITA would like to design a system.” Ex. 2005, 103:15-16. As to what a

POSITA could do, Dr. Lebby originally asserted it's a "simple substitution" to "combine Johnson's rotor circuit board and position that on the underside of Pardhan's support component." *Id.*, 90:16-25. But, that stemmed from his erroneous belief that Pardhan (like Johnson) used an axial flux design. *See id.*, 83:4-84:4; *see also* POR, 23-28. This error underscores Dr. Lebby's lack of qualifications as a POSITA and his cursory and oversimplified view.

In Reply, Hesai does not dispute Dr. Janét's testimony that Pardhan teaches a *radial flux* (not *axial flux*) motor such that the proposed combination of Pardhan and Johnson would be more complicated and less desirable than the Petition claimed. Ex. 2004, ¶¶128-129; POR, 23-24. Contrary to Hesai's assertions, Federal Circuit precedent requires the Board weigh the disadvantages of a proposed combination (such as additional "complexity" and "decreased efficiency") against the purported benefits. *Henny Penny*, 938 F.3d at 1332.

Continuing its oversimplification, Hesai attempts to minimize the severity of the drawbacks posed by its combination with new testimony. Indeed, Hesai relies on bald testimony from Dr. Lebby—who could not tell the difference between an axial flux and radial flux motor at his deposition—to assert "the functional equivalence of radial and axial flux motors." Reply, 9 (citing Ex. 1050, ¶21).

In addition to lacking the expertise to opine on this issue, Dr. Lebby applies a legally irrelevant standard. No one disputes that an axial flux motor and a radial flux motor are functionally equivalent in the sense of causing a spindle to rotate (so too is the gas engine of a leaf blower). What matters legally is whether a POSITA would have been dissuaded from combining Johnson and Pardhan by the obstacles arising from the differences between the axial flux motor of Johnson and the radial flux motor of Pardhan. Not understanding the difference between the two, Dr. Lebby can hardly offer a credible opinion on this subject. *See* Section VIII *infra*; *see also* POR, 7-8, 12-13, 22-23, 25-26. Dr. Janét’s opinion stands effectively un rebutted.

Faced with similar facts, in *Medtronic* the Federal Circuit affirmed the Board’s finding of no motivation to combine references precisely “because of [the] significant problems it would create” to implement the combinations of the petition “as proposed.” *Medtronic, Inc. v. Teleflex Innovations S.a.r.l.*, 70 F.4th 1331, 1346-47 (Fed. Cir. 2023). Even Hesai’s case citations found that “evidence that the teachings and concepts of the prior art were (either actually or apparently) incompatible such that a skilled artisan would not have reasonably expected to succeed in combining those teachings is relevant to the obviousness analysis.” *See Intel Corp. v. PACT XPP Schweiz AG*, 2023 WL 2198649 (Fed. Cir. 2023).

In Reply, Hesai makes untimely allegations that a POSITA would have further modified the Pacala-Johnson-Pardhan combination by, for example, adding additional structures – with no reference to where or how they would be added – to prevent the eddy currents induced by Johnson’s axial flux motor from turning Pardhan’s heat sink into a heat source. Reply, 9. *See e.g., Intuitive Surgical*, 2022 WL 421189, at *4 (“Petitioners may not use reply briefs to cure deficiencies in their petitions.”). Hesai’s untimely acknowledgement of additional necessary modifications in Reply is both improper and “indicative of hindsight.” *Medtronic*, 70 F.4th at 1347.

Again oversimplifying the technology, Hesai also, for the first time in Reply, invokes design software as a panacea for overcoming the complications stemming from its proposed combination; complications the Petition ignored. *See e.g., Ex. 1050*, ¶23. Dr. Lebby asserts, for example, that “a POSITA would have used their engineering knowledge and software tools . . . to design a suitable LIDAR device that accounts for” the complexities raised by Dr. Janét. *Id.* Aside from being untimely, Hesai still fails to explain “how” Pardhan and Johnson “could be combined” despite the issues raised by Dr. Janét. Additionally, Dr. Lebby fails to show that software available *at the time of the invention* could have addressed Dr. Janét’s concerns. In fact, Dr. Lebby asserts only that “mechanical modeling design

tools *today*” could overcome Dr. Janét’s concerns – an argument that is irrelevant to assessing the obviousness of the challenged claims in 2018. *See id.*, ¶37 (emphasis added).

Dr. Lebby’s reliance upon automated design tools to fix the problems in Hesai’s combination highlights how the combination results purely from hindsight. Positing that AI will solve the problems in the combination skips the preliminary question of whether AI would have generated such a combination in the first place without the benefit of the challenged claims as a roadmap. Unless instructed to recreate the specific structure of the claims, neither a machine nor a POSITA would have proposed the combination on which Hesai relies.

Finally, Hesai distances itself from the Petition’s contention that the combination of Pacala-Johnson-Pardhan-Zhang would have used Pardhan’s fins. *See e.g.*, Pet., 53 (“Pardhan, like Johnson, teaches a rotor-stator structure, but further *adds a support component which includes a rotor plate 720 (with fins)* made from a ‘metallic material with high thermal conductivity’ to avoid overheating.”) (emphasis added). Hesai’s admission that a POSITA would not have found Pardhan’s fins desirable but instead would purportedly “use their engineering judgment to identify those aspects of Pardhan to utilize in the combined design” further confirms that the Petition’s vague combination was

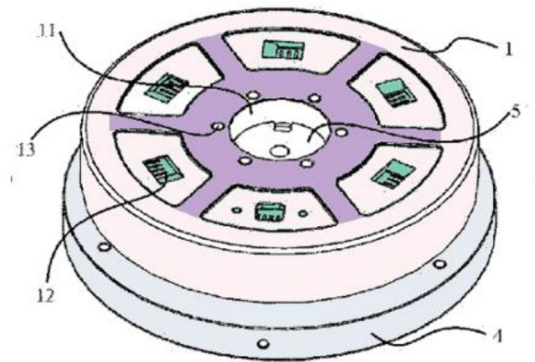
“based on a hindsight desire to recreate the claimed invention, as opposed to a known need in the art.” *Medtronic*, 70 F.4th at 1347; *see also Intelligent BioSystems*, 821 F.3d at 1368.

Faced with Ouster’s well-reasoned and expert-supported identification of the incompatibilities and complexities of Hesai’s combination, Hesai now tries to frame Ouster’s arguments as requiring “bodily incorporation” of the references. Hesai is wrong. The Federal Circuit has explained it is *not* requiring “physical incorporation” of references when one considers incompatibilities in designs. *See e.g., Medtronic*, 70 F.4th at 1348-49.

C. The Petition Failed to Show it Was Obvious to Modify Pardhan to Include Zhang’s “Arms”

For the first time in Reply, Hesai argues that a POSITA would utilize “one of various prior art bearing assembly designs that included arms” such as the ones depicted in Exhibit 1033 and 1042. Reply, 10-11. However, the Petition expressly relied upon a proposed combination utilizing “Zhang’s arms,” specifically. Pet., 26-27. Hesai’s reliance on Exhibits 1033 and 1042 as “prior art” for use in some new combination is untimely; the Petition failed to even *allege* that these exhibits were analogous art.

Moreover, Dr. Janét's explanation of why a bearing housing with arms would not hold the shaft in position more firmly or minimize vibration and movements more than Pardhan's rotor plate 720 without the modification, stands un rebutted. POR, 31-34 (citing Ex. 2004, ¶¶150–151). Hesai's attempt to draw a parallel between its support component with arms and Zhang's rotor plate with heat dissipation structures fails. Zhang's rotor plate is a single structure consisting of both the pink-and purple-colored regions in its figure below. While Zhang teaches thinning out some holes (green) in its rotor plate, it has no teachings pertinent to arms. Ex. 2004, ¶¶148-149.



Moreover, the record is clear that contrary to Hesai's claims, Zhang and Pardhan's heat dissipation schemes are not complementary, so Hesai's proposal to implement Zhang's heat dissipation structures onto Pardhan's rotor plate through thinning the Pardhan plate would carry significant drawbacks without any benefits. POR, 35-38 (citing Ex. 2004, ¶¶153-158 and Ex. 2005, 80:13-21).

D. Petitioner’s Proposed Combination Does Not Disclose or Render Obvious the Required “Stator Assembly . . . Coupled to the Stator Circuit Board”

The Petition maps the “stator assembly” of claim limitation (1(g)/14(h)) to subcomponents of Johnson’s “stator circuit board.” *See* POR, 28-30; Pet., 21-23, 31-33, 36-37; Ex. 2004, ¶138. This mapping ignores the plain language of the ’515 patent’s claims and specification. *See* Section II.A.

Hesai’s Reply asserts “the stator assembly is distinct from the *mounting surface* of the circuit board and both are coupled.” Reply, 14 (emphasis added). The assertion is irrelevant since the claims do not recite a “stator assembly coupled to the mounting surface of the stator circuit board;” they require the “stator assembly” to be “coupled to” and thus distinct from the “stator circuit board.” *See Cutsforth*, 2016 WL 1358628, at *3.

Hesai alternatively asserts there are other embodiments of Johnson “where the stator assembly is comprised of wires wound around a magnetic core, rather than interconnected conductive structures built onto a multi-layer circuit board.” Reply, 14-15. Beyond being untimely, this contradicts the Petition’s express assertion that the PCB-motor embodiment of Johnson relied upon for its proposed combination met this limitation “under any proposed construction.” Pet., 32. Finally, this argument still fails since Johnson’s PCB-less embodiment would not

satisfy the “stator circuit board” limitation and Hesai fails to provide *any rationale* for using the alternative, PCB-less embodiment with the other references.

E. Limitation 1(g) Is Not Met

Hesai does not dispute that claims 1-2, 4-9, and 11-13 have not been shown to be unpatentable if Ouster’s proposed construction of limitation 1(g) is adopted. *See* Section II.B above; POR, 30-31; Reply, 15.

IV. DEPENDENT CLAIM 4 IS PATENTABLE

Hesai’s Reply concedes that, contrary to its arguments in the Petition, Johnson does not disclose four circuit boards. *Compare* POR 40-41 and Reply 16. Hesai maintains only the argument (based on Nubling (Ex. 1043)), that a POSITA would purportedly recognize that additional circuit boards may be needed for LIDAR electronics. Pet., 42; POR, 42-45; Reply, 16-18.

However, both Nubling and Hall teach additional circuit boards above the rotor platform should be perpendicular to the stator platform, not parallel to it as claimed. POR, 42; Ex. 2004, ¶177; Ex. 1043, 5:50-52, Fig. 3; Ex. 1009, Fig. 4, 7:3-9. Moreover, Hesai fails to explain why a POSITA would rely on Hall to achieve the claimed invention of claim 6 but then ignore Hall’s teachings for claim 4.

Hesai does not dispute that its proposed combination places the fourth circuit board precisely where Pardhan expressly teaches placement of its low-thermal-

impedance coupling 410 or that Pardhan's heat sink depends upon on heat "flow from heat source 406, *through coupling 410*, to rotor 400". POR, 44 (citing Ex. 1006, 18:60-19:6) (emphasis added); *see also* Ex. 2005, 69:22-25. Rather, Hesai denies Ouster explained why this would disrupt heat flow through Pardhan's heat sink. Reply, 18-19. In fact, Dr. Janét explained the fourth circuit board is another heat source, which "would arrest heat flow from heat source 406 to heat sink, likely resulting in heat source 406 overheating." Ex. 2004, ¶179; POR, 43. Cai does not overcome this incompatibility, and Hesai's assertion that because Johnson and Cai each teach two circuit boards with a communications interface, a POSITA would have utilized those redundancies to invent a new system with four circuit boards is pure hindsight. POR, 54-55.

Hesai points to Yan's control board to assert the claimed configuration was known without confronting the fact that Yan's low-power robot consumed only 2W or less. POR 62-63; Ex. 1016, [0027]. Yan, like Pacala, had low-power requirements and would not have been utilized in a system requiring Pardhan's rotary thermal link, which is needed only when a LIDAR device is operated "above a threshold power level" utilized by large LIDAR systems at that time. *Compare* POR, 62-63 and Reply, 17; *see also* Ex. 2004, ¶¶225-227.

V. DEPENDENT CLAIM 17 IS PATENTABLE

Hesai's Reply admits Johnson fails to disclose transformer coils outside the rotor and stator elements. Reply, 21. Hesai does not dispute that Pardhan, Zhang, and Johnson all teach away from transformer coils positioned outside the rotor and stator elements, as claimed. PO, 46-51 (citing e.g., Ex. 2004, ¶¶183, 187). Indeed, “*continuing to include the magnets and transformer coils in the same position*” shown in Johnson and Pardhan was a key element of the proposed combination. POR, 49 (citing Ex. 1003, ¶173) (emphasis in original).

Nonetheless, Hesai's Reply insists a POSITA would be motivated to modify Johnson to arrive at the challenged claim “because it would result in greater power and transfer distances.” Reply, 22. Hesai never explains why a POSITA would have believed Johnson's transformer coils needed greater power and transfer distances, and thus have been motivated to modify it specifically to move the coils outside the rotor and stator elements. Hesai provides no explanation because there is no evidence Johnson's transformer coils needed greater power and transfer distances. Instead, as Pardhan explains, utilizing coils on the stator rather than the rotor is advantageous because it allows for a smaller rotary transformer since the energy to power the motor need not be transferred through the transformer coils. Ex. 1006, 21:9-13; Ex. 2004, ¶183. Johnson, like Pardhan, utilized magnets on the

rotor and coils on the stator and reaped the benefits in the form of a smaller rotary transformer, enabling larger rotor and stator elements to maximize torque. Ex. 2004, ¶187.

Hesai's Reply also insists that larger transformer coils were necessary "due to limited space in the center region." Reply, 22. Johnson's rotor and stator circuit boards, however, do not lack space for transformer coils in their center region. POR, 51. Johnson, Pardhan, and Zhang all demonstrate that when the motor coils are on the stator and the permanent magnetic poles are on the rotor, as claimed, then there will be space in the center region for the transformer coils. POR, 46-49. Indeed, Dr. Lebby's first declaration stated only that "*certain LIDAR systems* may not be able to fit transformer coils within the center region of the circuit board (which has limited space)" without opining that Johnson or the proposed combination would lack such space. Ex. 1003, ¶280 (emphasis added).

Hesai's arguments vaguely alleging that the Pacala-Johnson-Pardhan-Zhang combination *could* be modified to include larger transformer coils based on a POSITA's "engineering judgment" are untimely and oversimplified; they also do not speak to what a POSITA *would* have been motivated to do. POR, 52-53.

Hesai's glib contention that there were only two design choices (inside or outside) is contrary to the facts. *See id.*; *see also* POR, 57 (explaining Cai teaches

placement of transformer coils outside of the motor entirely). It is also contrary to law. *See* POR, 50; *see also Samsung Electronics Co. v. Neonode Smartphone LLC*, No. 223-1464, 2024 WL 3451828, at *3 (Fed. Cir. July 18, 2024) (*nonprecedential*) (rejecting propriety of “design choice” argument contending “two possible choices” of “relocating” a feature or “not relocating” it).

Finally, Cai neither teaches the limitation of claim 17, which requires the transformer coils to be both (i) on the rotor and stator circuit boards and (ii) outside the rotor and stator elements, nor does it supply any motivation to modify Johnson to meet the claim. *See* Ex. 1001, Claim 17; POR, 55-57.

Hesai’s Reply claims to rely on Cai “only” for transformer coils “positioned outside of the perimeter of the rotor-stator elements” even though the Petition admitted Cai actually teaches vertically-extended transformer coils positioned “outside the motor.” Pet., 64; Reply, 23. The record makes clear that the prior art, as a whole, teaches away from claim 17. POR, 45-53, 55-57. *Arctic Cat, Inc. v. Bombardier Recreational Prods., Inc.* 876 F.3d 1350, 1360 (Fed. Cir. 2017) (“it is error to fail to consider the entirety of the art”)(citation omitted).

VI. DEPENDENT CLAIMS 13 AND 21 ARE PATENTABLE

The Petition provided only a conclusory assertion that a POSITA would have been motivated to modify the combination of Ground 5 in view of Droz with

a reasonable expectation of success in achieving claims 13 and 21. *See* Pet., 79, 81. Hesai now acknowledges that Droz’s waveguides would be required by its proposed combination but disputes their characteristics. *See* Reply, 25-26. The Petition made no effort to show Droz’s waveguides were usable with a spinning LIDAR. Pet., 80-81; POR, 57-58; Reply, 25-26. And Droz makes no reference to the use of its waveguides for any applications involving scanning or rotation (e.g., a rotating LIDAR). *See generally*, Ex. 1011; *see also* Ex. 2004, ¶101; Reply, 26. This is because Droz’s waveguides were designed solely for stationary applications. POR, 57-58; Ex. 2004, ¶205. The Petition’s conclusory assertions on motivation to combine and reasonable expectation of success fail to carry Hesai’s burden these issues. *See* Ex. 2004, ¶¶210-214. Hesai’s untimely hole-plugging in Reply is inadequate and untimely. *See* Section III.B.iii (above).

VII. DEPENDENT CLAIM 23 IS PATENTABLE

Hesai’s Reply fails to rebut Ouster’s argument that the Petition does not establish claim 23 is obvious because the plurality of stator elements the Petition identified in Johnson for Ground 6 are not “each disposed between a surface of the second circuit board and a surface of the third circuit board” as they are entirely within Johnson’s alleged “second circuit board.” POR, 64-65; Ex. 2004, ¶235. Thus, dependent claim 23 is patentable.

VIII. DR. LEBBY’S TESTIMONY MERITS NO WEIGHT

Hesai does not dispute that if Dr. Lebbby lacks ordinary skill in the art, his testimony from the perspective of a POSITA is irrelevant and unreliable. *Kyocera Senco Indus. Tools Inc. v. Int’l Trade Comm’n*, 22 F.4th 1369, 1376–77 (Fed. Cir. 2022). Hesai asserts that Dr. Lebbby is qualified here because he provided expert testimony in a 2017 and 2018 lawsuit prior to *Kyocera*, but this claim fails both logically and factually. Reply, 27. Dr. Lebbby admitted at his deposition that he has been a full-time employee of Lightwave Logic,⁵ seven days a week, since 2017. Ex. 2005, 20:15-22. This work as a witness in LIDAR cases—even if it weren’t irrelevant—adds up to less than one year of experience. Ex. 1050, ¶63; Ex. 2005, 20:15-22. Although Dr. Lebbby has a Ph.D., there is no evidence that his education involved courses related to LIDAR design. Accordingly, his testimony merits no weight because he is not an expert or a POSITA. *Kyocera*, 22 F.4th at 1377.

⁵ Lightwave Logic has no connection to LIDAR. Its “About Us” page explains its focus on Electro-Optic polymers for “internet infrastructure.”

<https://www.lightwavelogic.com/about-us/>

IX. NO REASONABLE EXPECTATION OF SUCCESS

The Reply does not address Ouster’s contention that the Petition failed to meet its burden to establish a reasonable expectation of success based on its “obviousness grounds in the way presented in the Petition.” POR, 72 (*quoting Samsung Elecs. Co. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373, 1380-83 (Fed. Cir. 2019)).

X. SECONDARY CONSIDERATIONS REBUT ANY CASE OF OBVIOUSNESS

A. Hesai’s Copying

Hesai’s Reply does not deny that its Pandar QT product practices every limitation of claims 1, 4, 14, and 17 of the ’515 patent. Compare POR, 74-77 and Reply, 28-29.

Hesai asserts there is no evidence that it was aware of the ’515 patent. But it had *access* to the Fig. 8A embodiment of the ’515 patent through the January 23, 2020 patent publication, and no “direct evidence” of copying is required. POR, 77. *Medtronic*, F. 4th at 1340.

Hesai asserts immaterial differences between Ouster’s commercial embodiment and Hesai’s, but the two are substantially similar when considered as a whole. Reply, 28-29. And even if some features were in the prior art, that would not absolve the copying because Hesai’s product “reproduced the entire

combination of features that were assembled for the first time by the [Patent Owner's] products.” *Medtronic*, 70 F. 4th at 1338, n.6 (internal quotations omitted); *see also id.*, 1340 (finding copying established where the parties’ products “when considered as a whole” were “substantially similar in design”); *see also Diamond Rubber Co. of N.Y. v. Consol. Rubber Tire Co.*, 220 U.S. 428, 441 (1911).

B. Industry Praise

Hesai disputes the nexus between the industry praise for Ouster’s OS sensor and the ’515 patent. But Ouster’s OS sensor, which has been praised in the industry because it enabled drones to be used for airplane inspections, **is** the ’515 patent (*i.e.*, it is not merely a subcomponent). POR, 77-78. Nothing more is required to show nexus. *See e.g., Quanergy Sys., Inc. v. Velodyne Lidar USA, Inc.*, 24 F. 4th 1406, 1419 (Fed. Cir. 2022).

Ouster also showed that the industry praise was the direct result of the lightweight and compact design achieved by the claimed invention, so the nexus was doubly proved. POR, 77-78 (citing Ex. 2004, ¶¶263–269 and Ex. 2018).

XI. CONCLUSION

For at least the reasons set forth above, the challenged claims are patentable.

IPR 2023-01422
US Patent 11,287,515

Respectfully submitted,

Dated: October 30, 2024

By: /s/ Megan Bussey
Megan Bussey
Registration No. 63,789
*Lead Attorney for Patent Owner
Ouster, Inc.*

**KILPATRICK, TOWNSEND &
STOCKTON, LLP**
3 TIMES SQUARE
NEW YORK, NY 10036
TEL: (212) 775-8708
mbussey@kilpatricktownsend.com

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Patent Owner's Sur-Reply contains 5,600 words, as measured by the word-processing system used to prepare this paper. This word count does not include the items excluded by 37 C.F.R. § 42.24 as not counting towards the word limit.

Respectfully submitted,

Dated: October 30, 2024

By: /s/ Megan Bussey
Megan Bussey
Registration No. 63,789

CERTIFICATE OF SERVICE

I hereby certify that on October 30, 2024, I caused a true and correct copy of the foregoing Patent Owner's Sur-Reply to be served electronically on Petitioner at the following email addresses:

Jared W. Newton
James M. Glass
Nima Hefazi
QUINN EMANUEL URQUHART & SULLIVAN, LLP
jarednewton@quinnemanuel.com
jimglass@quinnemanuel.com
nimahefazi@quinnemanuel.com

By: /s/ Megan Bussey
Megan Bussey
Registration No. 63,789