

RECORD OF ORAL HEARING
U.S. PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HESAI TECHNOLOGY Co., LTD.,
Petitioner,
v.

OUSTER, INC.,
Patent Owner.

IPR2023-01422
Patent 11,287,515B2

Held: December 17, 2024

Before JON M. JURGOVAN, MEREDITH C. PETRAVICK, and
KEVIN W. CHERRY, Administrative Patent Judges.

APPEARANCES:

ON BEHALF OF THE PETITIONER:

NIMA HEFAZI, ESQUIRE
JARED M. NEWTON, ESQUIRE
Quinn Emanuel Urquhart & Sullivan, LLP
1300 I Street Northwest
Washington, D.C. 20005
(202) 538-8000

IPR 2023-01422
Patent 11,287,515 B2

ON BEHALF OF THE PATENT OWNER:

MEGAN BUSSEY, ESQUIRE
MATTHEW MEYER, ESQUIRE
Kilpatrick Townsend & Stockton LLP
701 Pennsylvania Avenue Northwest
Suite 200
Washington, D.C. 20004
(202) 639-4711

PATRICK LAUPPE, ESQUIRE (LEAP practitioner)
Cooley LLP
1299 Pennsylvania Avenue Northwest
Suite 700
Washington, D.C. 20221
(202) 842-7800

The above-entitled matter came on for hearing on Tuesday,
December 17, 2024, commencing at 1:00 p.m., at the U.S. Patent and
Trademark Office, 600 Dulany Street, Alexandria, Virginia.

P R O C E E D I N G S

- - - - -

JUDGE JURGOVAN: Okay. Let's go on the record. This is the hearing for IPR 2023-01422, concerning U.S. Patent Number 11,287,515 B2. It's December 17, 2024, 1:00 p.m. Eastern. On the panel today are Judge Petravick, Judge Cherry, and myself, Judge Jurgovan. Would the parties please enter their appearances, starting with the petitioner, please?

MR. NEWTON: Good afternoon. This is Jared Newton from Quinn Emanuel Urquhart and Sullivan, on behalf of the petitioner. And with me today is my colleague, Nima Hefazi. And Mr. Hefazi is going to be handling the argument for us.

JUDGE JURGOVAN: Okay. Thank you. Patent Owner?

MS. BUSSEY: Hi, Your Honor. This is Megan Bussey for Patent Owner, with Kilpatrick Townsend. And with me is my colleague, Mr. Meyer. Also with me are two representatives from Patent Owner, Megan Chung and James Isbester.

JUDGE JURGOVAN: Thank you. Each party will have up to 60 minutes to present their arguments. Patent Owner filed a LEAP request in this case. So Patent Owner will be afforded an additional 15 minutes of presentation time. Since Petitioner bears the burden of proof by preponderance of evidence, the petitioner starts first, followed by the patent owner. Each of you can reserve time for rebuttal and surrebuttal.

You can share your demonstratives on the screen, so that we can see them, or if you don't, you can -- we can follow along. We

1 have the record available to us. As you speak, please identify the
2 demonstratives and exhibits and page numbers and paragraph
3 numbers, so that the record -- the transcript of this hearing will be
4 clear, and we can follow that along after the fact. Please identify
5 yourselves as you begin speaking, so that the court reporter will know
6 who you are. After the hearing, please remain on the line, in case the
7 court reporter has any questions to ask you, matters that may have
8 been understood, or spellings that were not understandable.

9 This is a public hearing. Third parties may be listening on the
10 line. No information in this case has been designated as confidential.
11 So we don't expect that you're going to discuss any confidential
12 information, but if for some reason you need to, please let us know in
13 advance, so that we can close the public line. If at any point you have
14 any difficulties that impair your ability to represent your client, please
15 alert us and call the number given you to resolve the issue, and we'll
16 observe a pause until you're able to get back online again. Do the
17 parties have any questions before we begin?

18 MR. HEFAZI: None from Petitioner, Your Honor.

19 JUDGE JURGOVAN: Okay. Patent Owner?

20 MS. BUSSEY: No, Your Honor.

21 JUDGE JURGOVAN: Okay. Petitioner, how much time
22 would you like to reserve for rebuttal?

23 MR. HEFAZI: May I reserve 20 minutes, Your Honor?

24 JUDGE JURGOVAN: You may. Patent Owner, how much
25 time would you like to reserve for surrebuttal?

26 MS. BUSSEY: 20 minutes, please, Your Honor.

1 JUDGE JURGOVAN: Okay. Petitioner, you may begin when
2 ready.

3 MR. HEFAZI: So Your Honor, I would like to start with just a
4 quote from the Circuit Court decision in KSR. "The combination of
5 familiar elements according to known methods, is likely to be obvious
6 when it does no more than yield predictable results." That is precisely
7 the scenario here. The '515 patent, if we pass our limitations related
8 to standard components of a LiDAR system, there is nothing non-
9 obvious about it. And I will share my screen. Let me know if you're
10 able to see Slide 4 of Petitioner's --

11 JUDGE JURGOVAN: Yes, we can.

12 MR. HEFAZI: Okay. Awesome. So this is Petitioner's
13 Demonstrative Slide 4. You can see on the right the basic structure of
14 the light ranging device in the '515 patent. Very conventional. You
15 have a light ranging system that sits atop a rotor-stator structure. The
16 rotor here in red, also referred to as a ranging circuit board. And then
17 there's a blue stator circuit board and a rotational coupler that couples
18 the two-board assembly.

19 The patent doesn't purport to have invented any of these
20 elements. With the rotational coupler, you can see here in the callout
21 at Line -- or Column 16, Line 12 through 50 of the '515 patent that the
22 benefit "can be implemented in a number of different ways", bearing
23 structures in a shaft being one example. And the same is true with the
24 rotor circuit board and the stator circuit board. Throughout the patent,
25 it says it could be one circuit board, it could be multiple circuit

1 boards. There is nothing that is inventive about this. Just a
2 combination of familiar elements.

3 If we move to Slide 5, this again shows the general kind of
4 sense of the claim's invention. You have a light ranging device in
5 orange, that sits atop a rotor board, and then you have a stator board
6 underneath, and the two are assembled together with the bearing
7 housing that's shown in 626.

8 Now, if we turn to Slide 7, here we see Claim 1. And there are
9 three independent claims in the '515 patent. Claim 1, 14, and 22. PO
10 -- Patent Owner, that is -- raises three arguments, which I'll walk
11 through in a moment. There's a, you know, argument that's
12 highlighted here in red, related to a support component, in purple,
13 related to a stator assembly, and then in blue, there's a limitation about
14 a coil being wound around a magnetic core.

15 Now, just to orient us on the claims, I'll be focusing on Claim 1
16 today. But Claim 14 is materially the same as Claim 1. The only
17 distinction that matters for this proceeding is that the argument there,
18 that third argument, in blue, doesn't apply to Claim 14. That
19 limitation about the coil being wound around a magnetic core doesn't
20 exist. Otherwise, it's the same issue as Claim 1.

21 The other independent claim, Claim 22, that incorporates a
22 number of limitations from Dependent Claims 4, 13, and 17, which
23 are also challenged by their PO, and I'll be addressing today. And so
24 Claim 22 really rises and falls with the dependent claims issue.
25 Otherwise, everything is materially the same there.

1 Let me next move to Slide 13. Turning to Claim 1, to orient us,
2 we presented in the petition two theories. Ground 1 was based on a
3 2014 reference to Pacala. Angus Pacala is the inventor of the '515
4 patent. And he filed a patent nearly a decade ago, or over a decade
5 ago, which I'll call the Pacala reference. In Ground 8, we substitute in
6 a 2017 Pacala reference. And Patent Owner, PO, raised some
7 arguments about whether that reference, the 2017 reference, is prior
8 art. But the PO, the patent owner, hasn't raised any unique arguments
9 with respect to Pacala or Ground 1 versus Ground 8. So the Board
10 doesn't really even need to address Ground 8. I think Ground 1 will
11 suffice.

12 So if we look at the combination in Ground 1, it's pretty
13 straightforward. We start with Pacala. Pacala disclosed the overall
14 structure of a LiDAR device. You have the LiDAR in orange. You
15 have a spinning turret or the rotor, in red. And then you have the
16 static base or the stator in blue, similar to what we saw in the '515
17 patent.

18 Because Pacala doesn't disclose the details of its rotational
19 structure, we look to two Waymo patents, Johnson and Pardhan, that
20 disclose those details. And Waymo, you know, I think they're now
21 lodging in D.C., where you guys may be. They've been around for a
22 long time, and you can see their cars driving around cities like
23 Phoenix and Los Angeles. So this technology is quite mature.

24 With regard to Johnson, Johnson discloses the overall kind of
25 structure of the rotor and the stator, and this rotor rotates around the,
26 you know, axis and has various communications component coupled

1 thereon. But Johnson doesn't say how to assemble the rotors and
2 stator. Pardhan, which is another Waymo patent, and is directed as an
3 improvement for a thermal link like what is shown here -- it's an
4 improvement for Johnson, in that it has a heat sink for dissipating
5 heat. It teaches the set of components for assembling a rotor in red
6 and a stator in blue. For example, it teaches a bearing housing, this
7 grey component, that's fitted over a sleeve here.

8 And we saw a moment ago that the bearing housing was one
9 example that the '515 patent states, and in fact it's an example that the
10 patent owner has pointed to, that bearing and housing, as the quote-
11 unquote support component in the claims. It does so throughout its
12 Patent Owner response and its expert declaration.

13 I'm going to come back to some other references, but before I
14 do, with regard to the support component and the Pacala-Johnson-
15 Pardhan combination, Patent Owner doesn't dispute that it discloses a
16 support component, nor can it. That bearing housing is what they
17 point to, and that's not -- in fact, they raise a number of motivation to
18 combine them. And so it gives a motivation to combine. None of
19 them are supported by the evidentiary record. In fact, they're
20 contradicted by the evidentiary record.

21 And so let me turn -- just want to go briefly -- so the first
22 argument they raise -- first in terms of the order they present them in
23 their briefing -- is that Pardhan somehow teaches away from the
24 combination with Johnson. They label Pardhan -- their expert calls it
25 an oversize LiDAR design, and says that Johnson is a compact design.

1 The problem with that is, number one, the '515 patent claims do
2 not include any size restrictions. And then the second issue is, when
3 you look at the evidence in the record, Pardhan, Johnson, the '515
4 patent, all of these disclose LiDAR devices of the same size. So if
5 you look at Pardhan and Johnson, these are the two Waymo patents.
6 And when you look at Pardhan, you see, it provides an example of its
7 LiDAR sitting on a car, much like a Waymo LiDAR would sit on the
8 car. And this is what their expert, Dr. Janet, points to when he says
9 it's oversize. He references Pardhan's Figure 3, as illustrating the size
10 of the LiDAR device.

11 Now, what Dr. Lebby did to try to provide evidentiary support
12 for his opinion is, he looked at other Waymo patents. There is a
13 reference called Karplus. Karplus incorporates the disclosures of
14 Johnson, the same rotor-stator structure. If you look at Karplus
15 Figures 4(b) and 4(d), you'll see them there. And Karplus includes
16 additional disclosures, including, you know, an image of how that
17 LiDAR, that Johnson structure, would sit on the top of, you know, a
18 vehicle, which looks to be a very similar size.

19 And so when you look at the '515 patent, Figure 1, which
20 discloses a LiDAR that sits on a vehicle, when you look at Pardhan,
21 when you look at Karplus, and Johnson, which is incorporated into the
22 disclosures of Karplus, and you look at Waymo, you can see that all
23 of these are describing devices that are of similar size. There's no
24 teaching away here whatsoever.

25 The next argument that PO's expert makes is, he provides an
26 unsupported assertion that Pardhan deals with dissipating excess heat

1 from a LiDAR device. And he says, look, in the proposed
2 combination, you're using Pacala, and Pacala -- for the LiDAR device,
3 and Pacala is a, you know, low-power device that, quote, generates
4 "no excess heat." So he says, look, you don't need any -- or you
5 wouldn't even look to Pardhan, because Pacala doesn't have any issues
6 with heat dissipation.

7 Again, the record doesn't reflect that. So Dr. Lebby explained
8 that, first of all, the power levels at which Pacala operates are not the
9 only source of heat that exists in the device, and a POSITA would
10 understand that there are various other components or reasons that you
11 would need heat dissipation techniques, and you would look to
12 references of that source. And in fact, Pardhan says, one of these
13 examples is the packaging of the components in the device. It will
14 generate a lot of heat and may need heat dissipation.

15 If we look at Slide 34 of Petitioner's demonstrative, this shows
16 callouts from a manual from Quanergy. Quanergy is the assignee of
17 the Pacala reference for LiDAR. And you can see, not just once but
18 multiple times, a big exclamation mark, the warnings. They talk
19 about the need to dissipate heat and remove heat from the sensor,
20 including with a heat sink, in order to prevent the sensor from
21 overheating. If we move to the next slide, Ouster and, you know, the
22 more recent Pacala references, they also describe the need for a heat
23 sink and heat dissipation techniques like those disclosed in Pardhan.

24 Just one more here. This is Ouster's own website. It talks about
25 the need for heat dissipation. And in fact, in their site they talk about
26 how they need to dissipate heat, and they have structures that dissipate

1 it upward, towards the cap, and downwards, towards the sensor base.
2 So you dissipate in both directions. And they say you can do that with
3 the standard heat sinks that come with their devices, or you could
4 create your own custom heat sink.

5 So the notion that Pacala somehow teaches away from the
6 combination with the Waymo patents, due to the, you know, fact that
7 it quote-unquote "doesn't generate any extra heat", there's no support
8 for that, and it's contradicted by the record.

9 The other argument that PO raises is one that, strictly, is legally
10 irrelevant. They make a number of bodily incorporation arguments.
11 They say, look, if you were to jam Pardhan, or implement --
12 physically combine Pardhan, unmodified, into Pacala-Johnson, it
13 would lead to some quote-unquote issues, alleged issues, that would
14 need to be dealt with during the design.

15 The Federal Circuit, however, has repeatedly rejected this
16 argument. In Allied Erecting, the Federal Circuit explains, "The test
17 for obviousness is not whether the features of a secondary reference
18 may be bodily incorporated into the structure of the primary
19 reference."

20 Here, we have another case from the Federal Circuit, in which
21 the patent owner, "Elbrus argued that, combining Lu with Sukegawa
22 would lead to an inoperable circuit absent significant additional
23 design work." And the Federal Circuit explained, "It is not necessary
24 that" -- these two references -- "be physically combinable to render a
25 claim obvious, because the test for obviousness is not whether the
26 features of a secondary reference may be bodily incorporated into the

1 structure of the primary reference." And they said, "Elbrus's argument
2 that combining Sukegawa and Lu could lead to an unworkable circuit
3 is basically irrelevant."

4 So, you know, the primary argument that, you know, that Patent
5 Owner makes here is, that it's merely issues related to gyroscopic
6 forces and, you know, the weight of the device, and whether you need
7 to scale them. These arguments are all basically irrelevant. They're
8 the same issue that we see the Federal Circuit has rejected in Elbrus
9 and other cases that we cite throughout our brief. I have more cases,
10 but truthfully, I think our brief does a good job of addressing that. So
11 --

12 JUDGE CHERRY: Yeah. Mr. Hefazi, can you come closer to
13 your screen, please, or pull it towards you? Your sound is a little
14 hollow -- so we can all hear you a lot better. Thank you.

15 MR. HEFAZI: I see. Okay. I apologize. I think I just walked
16 over my -- just a moment. Can you hear me better now? Or I can
17 switch over to another audio source, if it's a problem.

18 JUDGE CHERRY: Yes, sir, I hear you better now. Thank you
19 very much.

20 MR. HEFAZI: Okay. So let me move -- even though -- I
21 guess, two other points on the -- why the bodily incorporation
22 arguments should be dismissed. Number one, a POSITA would not
23 just try and jam in the thermal rotary link in Pardhan with Johnson.
24 There's a design process, and a POSITA can adjust the number, size,
25 position, materials of the thing, when designing, to combine. So that's
26 one.

1 Number two, there's no dispute that Pardhan disclosed the
2 bearing housing, and in Patent Owner's Patent Owner response, they
3 came back, in order to try to argue that their claims had written
4 description support to an earlier application, they said, look, the
5 support component, that's disclosed by "bearing housing" in the '515
6 patent. And so Pardhan teaches that you can assemble a rotor and
7 stator structure, like that in Johnson, like that in Pacala, using a
8 bearing housing. And that's the teaching a POSITA would use their
9 engineering judgment and their design expertise to kind of work and
10 design a system that would do that.

11 And even though this bodily incorporation argument is legally
12 irrelevant, Dr. Lebby went through, and he addressed the various
13 quote-unquote issues that Dr. Janet raised, and explained how and
14 why they are not merit -- they lack merit. And so in the interest of
15 time, I'm going to skip over that for right now, because I think they're
16 in Dr. Lebby's declaration, and I think the argument as a whole is
17 irrelevant.

18 Let me next move to a related issue. Now, the claim recites, the
19 support component must have arms extending away from a sleeve.
20 And so in Pardhan, the bearing housing includes this circular portion,
21 but it doesn't include arms. We acknowledge that. But what we
22 explained -- we presented two arguments here for the arms. Number
23 one, and this is on Page 25 of our petition, which I put in the callout at
24 Slide 53 of our demonstrative, there are numerous bearing housing
25 designs that were known at the time for strengthening the attachment
26 of the sleeve to the rotor plate. We provided a number of them here. I

1 mean, there are others. The '515 patent doesn't purport to have
2 invented a new bearing housing. And we saw earlier today that a
3 rotational coupler, they think, could be implemented in many different
4 ways.

5 And so it's simple substitution to swap out one bearing housing
6 for another. Dr. Lebby, in our petition, included a number of
7 motivations for making this modification. The bearing housings -- it
8 was understood, there are different designs that could be used in a
9 rotor-stator structure interchangeably. We also explained that when
10 mounting a LiDAR device to a rotor platform, it's really important that
11 you minimize movement and vibration. So you want to have a really
12 firm attachment to the rotor, and those arms will help do that. We
13 cited corroborating evidence for that. So the motivation to combine,
14 that's all there. And that's the first theory. It's pretty straightforward.
15 Move one bearing housing and place another one in.

16 The other argument we made is that you could also make the
17 arm obvious, in view of Zhang. And Zhang is a reference which
18 teaches that you can basically take the rotor plate and carve out and
19 use arms to form these heat dissipation holes that will further dissipate
20 heat. And so you can see, Pardhan and Zhang, they're both similar
21 kind of subject matter, LiDAR devices, they're directed at similar
22 problems. You know, heat dissipation.

23 And so a POSITA would've found it obvious to implement the
24 arms in this manner, as well, either along with Pardhan's heat sink, or
25 on its own. I mean, that's all part of the design choice. But these two
26 are two similar devices, directed at similar subject matter, and the

1 overall teaching that you could assemble a rotor and stator structure
2 with arms, that is well-known and obvious, and there are multiple
3 reasons to combine. Here's Slide 57.

4 JUDGE JURGOVAN: Can I interrupt you for a second?

5 MR. HEFAZI: Yes.

6 JUDGE JURGOVAN: Going back to the previous slide here,
7 in the petition, what is the purpose of the arms?

8 MR. HEFAZI: So in the petition, there's multiple purposes. So
9 if you look at Slide 56, with Zhang, I think what Zhang teaches is that
10 you can form arms that heat dissipation -- you form kind of these gaps
11 within the rotor plate that then allow for heat dissipation, and also it
12 minimizes weight. If you see the -- if you have a fully enclosed rotor
13 plate, that would minimize weight of the device, and volume.

14 And so I think those are the two basic things, the thermal heat
15 dissipation, and the minimization of weight. And that's for if you
16 wanted the implemented arms through the rotor plate. And then with
17 respect to the bearing housing, I think with that one, the argument can
18 be made where it would strengthen the attachment of the shaft to the
19 rotor. You can see we cited to a textbook about bearing design, and
20 the importance of avoiding axial movement.

21 JUDGE JURGOVAN: Okay. On the first point -- if we go
22 back to the Zhang drawing again, please? Yeah. So the arms are not
23 defining the opening here. Is that correct? What you're calling the
24 arms.

25 MR. HEFAZI: So the -- which --

1 JUDGE JURGOVAN: The arms aren't really -- the arms are
2 not really defining, you know, open spaces that allow the device to be
3 cooled. Is that correct?

4 MR. HEFAZI: Well, so the arms, in the sense that -- yes. The
5 open spaces are these green dissipation holes. But these -- Zhang
6 teaches forming kind of these larger gaps. So there is a space here,
7 and then a dissipation hole within there.

8 JUDGE JURGOVAN: Okay. But you're not saying that the
9 arms strengthen the assembly that results from the combination.

10 MR. HEFAZI: So for the Zhang reference, I don't think the
11 argument was that it strengthens the assembly. I think that argument
12 was presented with regards to the bearing housing. If you look in our
13 petition on Page 25 and 26, we present a first set of arguments for the
14 bearing housing theory, and then present a second one for Zhang. So
15 with regard --

16 JUDGE JURGOVAN: Go ahead. I think you answered my
17 question. Thank you.

18 MR. HEFAZI: Okay. And I guess I'll also say, in terms of -- I
19 think there was some dispute as to whether Zhang discloses arms.
20 And I think the easiest way to address that is just to point out what
21 they're accusing of being the support component and arms in the
22 accused products. There was the co-pending ITC litigation, and it
23 appears on the right what they accused. You can see it's very similar
24 to what you have in Zhang, what you have in some of the other prior
25 art, where you have kind of open spaces, and then you are able to, you
26 know, have these arms.

1 And I guess to just address your prior point, I mean, I do think
2 the arms here, when you take them out, you get a lot of weight saving,
3 and then, you know, the fact that you have them connected to the rotor
4 plate as a whole helps stabilize it, as well.

5 But let me -- in the interest of time, let me move on to another
6 argument here, that they raised. So they also argue -- Claim 1 has that
7 requirement that each of the plurality of stator elements, including a
8 coil wound around a magnetic core. This applies to Claim 1. Claim
9 14 doesn't have that same limitation. But for this one, there's no
10 dispute that Johnson discloses a plurality of coil-winding. So you
11 have the stator assembly, the stator elements that form these coil-
12 winding. And in the preferred embodiment, there are three of them.
13 And they're wound around a single ring-shaped core.

14 Here on the left, we can see, on the left of Slide 60, we can see
15 testimony from Patent Owner's expert, Dr. Janet. And he
16 acknowledged that there was no dispute that Johnson discloses a
17 plurality of coil-winding wound around a single ring-shaped core. So
18 what's the dispute? Well, Patent Owner raises an argument that the
19 claims don't -- the claims prohibit winding these coils -- each of the
20 coils around a shared magnetic core. But that limitation is not found
21 in the claims. The claims simply say, a coil wound around a magnetic
22 core. Patent Owner is trying to rewrite the claim to add in, that is not
23 the shared magnetic core. The limitation in red here. And there is no
24 support for that in the --

25 JUDGE JURGOVAN: Hold on. On that point, it says each of
26 the plurality of stator elements, including a coil wound around a

1 magnetic core. So wouldn't each of the stator elements have a coil
2 and a magnetic core?

3 MR. HEFAZI: So --

4 JUDGE JURGOVAN: Am I reading that right?

5 MR. HEFAZI: Yeah. And I think that's absolutely -- that's
6 what Johnson discloses. So here's an example of one stator element,
7 including a coil. There is a lead-to-lead -- there's these leads, and
8 then, you know, that forms these coils. And there would be three of
9 them. So that's a plurality of stator elements. That part's not disputed.

10 And they're each wound around a core. They're wound around
11 a shared ring-like core here that exists between the coil that's
12 underneath this. So each of these stator elements, each of these coils,
13 is wound around a core. It's just that the three of them are wound
14 around the same kind of magnetic core. And there's nothing that
15 excludes that. The claims don't say that it needs to be wound around a
16 coil that's not used for any of the other stator elements. Does that
17 answer the question? Or any follow-up?

18 JUDGE JURGOVAN: Yes, I understand your view. Thanks.

19 MR. HEFAZI: Okay. So let me move on to the last argument
20 that they raised, with regards to Claim 1. So the claim also requires
21 stator assembly coupled to the stator circuit board. Now, in the
22 related ITC litigation, Patent Owner proposed a construction of
23 "coupled to", this limitation here, as allowing for direct or indirect
24 connection. I think the exact language was, "is directly or indirectly
25 connected". So that's the construction we applied. And then we
26 showed that that was meant.

1 And then in their Patent Owner response, they came back with
2 a new claim interpretation, and argued that the coil can't be built
3 directly onto the circuit board. Now, that interpretation runs afoul of -
4 - the claim language runs afoul of the specification. The term
5 coupling simply means joining together, pairing. We cite to Webster's
6 Dictionary as one example of that, here on Slide 64.

7 And if you look at the '515 patent, it repeatedly talks about the
8 advantage or -- advantage of being a compact design. So the stator
9 elements being built onto the circuit boards themselves, being
10 integrated onto there, I mean, allowing for that more compact design.
11 And that's what Johnson discloses. So Johnson discloses two
12 implementations. And so in one implementation, you can have the
13 coil wound around the magnetic core, that we talked about, that
14 shared magnetic core. Or in another implementation, you can form
15 these interconnected structures that do interconnect onto the PCB.

16 In both cases, you would have a stator -- the stator element and
17 the stator assembly coupled to the circuit board, the wires, these coils
18 and the lead-to-leads, those things are mounted, and then connected
19 to, in this first embodiment, in green, the circuit board. And then in
20 the second embodiment, these interconnected structures, these are
21 connected or coupled to circuits of the circuit board. So they are
22 joined in, they are paired, they are coupled, they are built on, in the
23 language of the specification and the plain language.

24 Let me move to -- given the time, I'm going to move to some of
25 the dependent claims. So there are a couple of dependent claims
26 being challenged. Dependent Claim 4 recites that you have a third

1 circuit board as part of the stator, and a fourth circuit board that's part
2 of the rotor. And our expert, Dr. Lebby, you can see here on Slide 69,
3 he explained that this is a straightforward design choice that's dictated
4 by the electronics and the space that you have. If the electronics don't
5 fit within the space provided by a single stator board, well, you might
6 provide additional circuit boards, to mount those electronics.

7 And if we look at Slide 70, Dr. Lebby supported his opinion
8 with corroborating evidence. So here's a reference, for example.
9 Nubling, Exhibit 1043. And Nubling says exactly what Dr. Lebby
10 opined, that the number of circuit boards can be more, or it could be
11 less, depending on the electronics that you need to mount. And it's
12 just a design choice that you can -- you can see, the second one here --
13 almost any desired function can be distributed over the first circuit
14 board, the second board, and further circuit boards in the sampling
15 unit -- that's the rotor -- or the base unit. That's the stator.

16 Now, in response, Patent Owner has come back and says, look,
17 Nubling discloses an example, shown here on the right, this image
18 here, of the fourth circuit board design. And look, it places one of the
19 circuit boards vertically, rather than horizontally. But Nubling says,
20 and you can see this quote right below, down on Slide 70, that this is
21 just an example of the additional circuit boards. The orientation,
22 vertical or horizontal, that's a straightforward design choice. I mean,
23 Johnson already discloses it. His rotor and stator are positioned --
24 those circuit boards are positioned in kind of parallel. Pardhan does
25 the same. So it would be kind of a natural fit to just place additional
26 circuit boards for mounting electronics in a parallel configuration.

1 JUDGE JURGOVAN: Counsel, is this Nubling part of any of
2 the grounds?

3 MR. HEFAZI: So Nubling is used to support the knowledge of
4 a POSITA. So this is evidence corroborating Dr. Lebby's opinion that
5 it would be obvious, based on the knowledge of a POSITA. Now,
6 Your Honor, we did also provide an express ground, an additional
7 Ground 2, where we combined the prior art with an additional
8 reference, Cai. Cai discloses that it's advantageous to have an
9 additional circuit board above and below your motor.

10 So that motor that has the rotor and stator circuit boards, Cai
11 says, by implementing an additional circuit board above and below,
12 you can place these transceivers centrally, in the middle, around the
13 shaft, such that you can form a communication channel through there.
14 And they say the benefit of that is that when you -- when you rotate
15 the device, you know, if it's on the side here, on Slide 72, this -- really,
16 the position of the -- of the transceiver is going to move.

17 So they say by having a separate and additional circuit board on
18 the top and the bottom, you can have this thing directly in the middle,
19 and you can avoid that issue, and it leads to a more reliable signal
20 transmission. So Cai discloses that you can also add a third and fourth
21 circuit board above and below the rotor and stator circuit boards of the
22 motor, in order to form this reliable communication channel that helps
23 avoid interference.

24 JUDGE JURGOVAN: Thank you.

25 MR. HEFAZI: With the time that I have left, just hitting on the
26 remaining dependent claim -- so Claim 17, this relates to the

1 positioning of the wired power transformer. These LiDAR devices,
2 they typically have wired power transformers, and that's disclosed in
3 Johnson, that's disclosed in Pardhan. And you can position these
4 things either on the inside perimeter of the motor, or you can position
5 them on the outside perimeter of the motor. And in Johnson, their
6 preferred embodiment teaches that it's in the inside of the motor, but it
7 says other configurations are possible, as well.

8 And Cai, the reference we were just talking about, discloses one
9 of those other -- well, really the only other configuration, which is
10 outside the motor's perimeter. And you can see here, there's the
11 motor, and you can see that the transformer coils are on the outside.
12 And so Cai teaches to a POSITA that positioning the motor coils on
13 the outside, moving them from the inside to the outside perimeter,
14 that's an obvious design choice.

15 And the reasons for doing that, Dr. Lebby explains, are pretty
16 straightforward. It's dictated by the design. You might have the room
17 -- you might have less space in the center region and, you know, you
18 need, for example, a motor -- a motor with a smaller -- a smaller
19 motor might have kind of a smaller amount of space in the center
20 region. A larger motor might have more. And so that might dictate
21 where you put those transformer coils.

22 On the flip side, the transformer coils, their size -- you know,
23 bigger transformer coils will give you a larger radius, with more
24 power transfer and distance, and so some outer regions might need
25 more power, more power and distance, depending on the positioning
26 of rotor-stator -- and so that's, again, a design choice about how big

1 you make these transformer coils, and whether you position them
2 inside or outside. And again, we saw, Johnson discloses one example,
3 inside, says that other configurations are possible, and Cai teaches us
4 that one of those other configurations is on the outside of the motor.

5 I've got about two minutes left, and that's perfect, in the sense
6 that the last challenge dependent claim is Claim 13, here. Claim 13
7 has a requirement of a plurality of SPADs. And if you look at Pacala
8 itself, it discloses that you can have an integrated detector array with
9 SPADs. And when you look at Droz, Droz teaches that you can have
10 these multiple light detector arrays that correspond each to an image
11 pixel, and that the light arrays can have a plurality of these SPADs.

12 The petitioner, really quickly, the -- or, I'm sorry, the patent
13 owner raises some, again, bodily incorporation arguments about
14 whether it would be, you know -- whether you could just blindly
15 incorporate Droz, based on its weight, based on some of these other
16 things. They say there is a -- design choice does not overcome -- I
17 think those all relate to bodily incorporation arguments. If Your
18 Honors have any questions, I'm happy to take it. Otherwise, I wanted
19 to end on this last point.

20 The patent owner has made, you know, some secondary, you
21 know, consideration arguments focused on copying. And that is just, I
22 think, completely untrue. If you take a look at the two items that --
23 you know, Claim 1, that Patent Owner is arguing and trying to
24 distinguish the prior art based on, one of them is the support
25 component, its bearing housing.

1 And you can see the device in the -- Patent Owner's product and
2 the pictured product are very different. In fact, our device looks very
3 similar, like Zhang's. It looks very similar, like some of those bearing
4 housing devices, we've -- designs we've seen. And so that's a very
5 different design. Same thing with the stator assembly. I guess this is
6 a little bit of a blurry picture but, you know, the direction of the
7 magnetic field, the orientation of these coils, all of this stuff is quite
8 different.

9 The only real similarities that Patent Owner has pointed to are
10 very generic similarities, like both of them have rotors, both of them
11 have stators, both of them rotate. I mean, these are -- I don't think you
12 can build any LiDAR without these components. With that, I'll
13 reserve the remainder of my time, unless Your Honor has any
14 questions.

15 JUDGE JURGOVAN: Thank you. Let's have a pause to see if
16 there's any questions. Okay. Thank you. You have 19 minutes left
17 for rebuttal. Patent Owner, ready when you are.

18 MS. BUSSEY: Thank you. Okay. Thank you, Your Honors,
19 and may it please the Board, you've heard a high-level and overly
20 simplified argument from Hesai here today. But if you look at the
21 references and the record, it's clear, Hesai's arguments are based on
22 improper claim construction, generic motivations to combine the
23 references, and rely heavily on keyword searching, not the disclosures
24 as a whole. Moreover, their arguments are supported only by
25 conclusory testimony from a purported expert, who's never actually
26 designed a rotating LiDAR system. But before diving into the

1 numerous deficiencies of the petition, I'd like to briefly address the
2 technology at issue in the '515 patent.

3 Turning to Slide 4. Early in their development, LiDAR were
4 large, bucket-size systems. For example, the HCL-64E reference,
5 shown to the left, from Exhibit 2004, Paragraph 74 and 112, was the
6 size of a KFC or Kentucky Fried Chicken bucket, and operated at a
7 high power level. Later system, such as the VLS-128, had two times
8 as many lasers, and ten times the resolution, as the HCL-64E, but was
9 the size of a large coffee mug, and operated at a much lower power
10 level. Now, the '515 patent reduced the form factor for LiDAR
11 systems even further, to smaller than that of a coffee mug. And this
12 opened up new uses for LiDAR, including using them in unmanned
13 aerial vehicles, or drones.

14 Turning to Slide 6. The '515 patent achieved this by integrating
15 the architecture of the very functional components into the rotor and
16 stator circuit boards of the system, thereby reducing the overall size
17 and weight of the system. Now, these design changes were not
18 obvious, as every element within the system has to be positioned so
19 that not only does it function as intended, but all the other respective
20 mechanical, electrical, optical systems can all function as intended,
21 even when the system is rotating at a high speed.

22 Turning to Slide 8, looking now at the petition, Hesai argues it
23 would've been obvious to combine Pacala's LiDAR with Johnson's
24 PCB motor, also adding in Pardhan's finned rotating heat sink, and
25 then further modifying Pardhan's heat sink to include Zhang's heat
26 dissipation structure, all to arrive at the claimed invention of the '515

1 patent. Now, even with those four varied references, Hesai fails to
2 locate every element of Independent Claims 1 and 14, nor do they
3 provide any consistent or coherent motivation for combining all of
4 these references.

5 Turning to the first issue, on Slide 11, when properly construed,
6 Johnson does not disclose a stator assembly coupled to the stator
7 circuit board, as required by Independent Claims 1 and 14. Under the
8 plain meaning of "coupled to", the stator assembly cannot be a
9 subcomponent of the stator circuit board. This is consistent with the
10 Federal Circuit's holding in Cutsforth and in Wi-LAN. In particular,
11 in Cutsforth, the court specifically held that it goes beyond the plain
12 meaning of "coupled" to say that a subcomponent is coupled to the
13 component as a whole.

14 Turning to Slide 13. Hesai's reliance on Dicar here is
15 nonsensical, because that case does not relate to the plain meaning of
16 "coupled to". Instead, there, the patent at issue expressly used
17 "coupled" to refer to joining subcomponents of the same structural
18 element. That case is directly opposite the facts here, where the '515
19 patent uses "coupled to" consistent with its plain and ordinary
20 meaning to refer to distinct elements.

21 For example, in the '515's written description, it references a
22 bearing system coupled to the hollow shaft, or a second circuit board
23 assembly, rotationally coupled to the shaft. These are distinct
24 elements. They are not using -- the patent is not using "coupled to" to
25 describe a subcomponent being coupled to the component as a whole.

1 Hesai has made some arguments that the '515 patent discloses
2 some other embodiment, where the stator assembly is not coupled to
3 the stator circuit board, but that's just wrong. There's no such
4 embodiment. Even if there was, the claims recite "coupled to". And
5 as shown here on Slide 15, the Federal Circuit in Comcast has already
6 told us that the choice -- that the selection to use "coupled to" in the
7 claims must be given weight, even if it excludes an embodiment. So
8 based on the plain meaning of "coupled to", and consistent with its use
9 in the '515 patent, the stator assembly may not be a subcomponent of
10 the stator circuit board. And under that proper construction, Johnson
11 does not disclose this element of Claims 1 and 14.

12 Turning to Slide 17. Now, why doesn't Johnson disclose this?
13 Well, Johnson discloses a rotor platform, 310, shown in red, and a
14 stator platform, 330, shown in blue. Johnson further discloses that a
15 printed circuit board, or a PCB motor, should be incorporated into the
16 platform. That motor includes the magnets on the rotor platform and
17 the coil windings on the stator platform.

18 Now, the top circuits, 330A of that stator platform 330, is
19 shown in the image to the right, from the petition at Page 32. It shows
20 these coiled windings formed by the conductive structures. Those are
21 the Structures 340 and 350, highlighted there. Now, the petition maps
22 Johnson's stator platform 330, this blue element, to the stator circuit
23 board. And it maps the conductive structures to the claimed stator
24 assembly.

25 Now, contrary to the language of Claims 1 and 14, these
26 conductive structures are not coupled to the stator circuit board.

1 Instead, they are patterned on the printed circuit board of Johnson.
2 They are a part of, or a subcomponent of, the printed circuit board. In
3 essence, they're what makes the printed circuit board a circuit board.
4 Without them, it's just a board.

5 Turning to Slide 18. This is very clear in Johnson. Johnson
6 specifically describes that the electrically conductive materials that
7 correspond to those conductive structures are patterned along the
8 layers of the PCB, as conductive tracks, as shown in Column 12,
9 Lines 8 through 17 of Johnson, and Column 12, Line 57 through 59.
10 Now, these conductive structures, again, are what Hesai asserts are the
11 stator assembly. And they're clearly subcomponents of the circuit
12 board itself.

13 In the face of this evidence, because these structures are clearly
14 not coupled to the stator circuit board, on reply, Hesai rewrites the
15 claims entirely, and they try to argue that the stator assembly's distinct
16 from the mounting surface of the circuit board. But beyond being
17 untimely, this is irrelevant. The claims require the stator assembly be
18 coupled to the stator circuit board. Not a mounting surface of the
19 circuit board.

20 In addition, Hesai also made an argument on reply, and
21 discussed it earlier today, that there was another embodiment in
22 Johnson that uses wires. However, that too must fail, turning to Slide
23 24, because Hesai cannot use their reply brief to cure the deficiencies
24 in their petition. And they provide no motivation for combining those
25 PCB-less design with the other references. And they don't address
26 how this other embodiment would meet the other claim limitations

1 that they rely on Johnson for. It's clear, this element is not disclosed
2 by Johnson. Your Honor?

3 JUDGE JURGOVAN: Counsel, wasn't there a mention of
4 some other embodiment of Johnson that does involve wires wrapped
5 around a magnetic core?

6 MS. BUSSEY: (No audible response.)

7 JUDGE JURGOVAN: I think we might've lost Counsel.

8 THE COURT REPORTER: Yes, Your Honor, you're right.
9 She dropped out. So she has to sign back in.

10 MS. BUSSEY: I am not sure if I was muted on my end. Are
11 you able to hear me?

12 JUDGE JURGOVAN: We can hear you now. Thank you.

13 MS. BUSSEY: Okay. I'm not sure how that happened. I
14 apologize, Your Honor. Yes. To your -- to your question, Your
15 Honor, that's addressed here. I'm on Slide 24. Hesai does point to this
16 other embodiment of Johnson. However, they do so in their reply
17 brief, and they cannot use their reply brief to cure the deficiencies of
18 the petition. In addition, they don't provide any motivation for
19 combining this other design in Johnson with the other references, and
20 they don't address how this other embodiment would meet the other
21 claim limitations that Johnson is relied upon for.

22 JUDGE JURGOVAN: Okay. So on this other embodiment,
23 though, if they were -- let's say it isn't in the -- just for purposes of
24 argument here, let's say it is not a new argument. Would this meet the
25 limitations of the claim?

1 MS. BUSSEY: Even if it were to meet the limitations of the
2 claim, Hesai still has to provide a motivation to combine Johnson with
3 the other references, and they haven't done so. They've made a
4 throwaway argument that this embodiment, which -- I believe the
5 figure, even, that they use in their -- in their slide isn't even from -- I'm
6 not even sure that's from Johnson. They provide no motivation for
7 combining that embodiment with the other references. And Johnson's
8 relied upon for more than just this claim element, and they haven't
9 addressed how this other embodiment would still satisfy the other
10 claim element.

11 JUDGE JURGOVAN: Okay. Thank you. And one further
12 question is, part of your argument, it seems to me, deals with, you
13 know, they haven't shown A coupled to B, a stator assembly coupled
14 to a circuit board. So what is a circuit board? What are we supposed
15 to consider a circuit board to be? For example, if you attached a
16 capacitor to a circuit board, is that capacitor part of the circuit board?

17 MS. BUSSEY: The issue here, Your Honor, is that the
18 language of the claims -- and I hope you can still hear me -- is that --

19 JUDGE JURGOVAN: Yes, I can.

20 MS. BUSSEY: -- all right, excellent -- requires that the stator
21 assembly be coupled to the stator circuit board. And here, with
22 Johnson, what they rely on in the petition is the embodiment of
23 Johnson that is a PCB -- is implemented at Platform 330. That PCB
24 has these patterned conductive elements on it that they point to as the
25 stator circuit board. That is part of the circuit board. That is what
26 makes the circuit board a circuit board. And it's clear from the case

1 law in Cutsforth and Wi-LAN that you simply cannot read "coupled
2 to" to allow for a subcomponent to be coupled to the component as a
3 whole. It's --

4 JUDGE JURGOVAN: So if I attach a motor to the --

5 MS. BUSSEY: Yes, that's a -- pardon me, Your Honor. I was
6 trying to address your specific hypothetical.

7 JUDGE JURGOVAN: Yeah, go ahead.

8 MS. BUSSEY: And if the capacitor is soldered to the circuit
9 board, then I would say that is coupled to the circuit board. It is not a
10 subcomponent of the circuit board. It is distinct from the circuit
11 board.

12 JUDGE JURGOVAN: So if I take a motor, for example, or
13 half of a motor, and I attach it to the circuit board, is it part of the
14 circuit board, or separate?

15 MS. BUSSEY: It's not part of the circuit -- I would say it's
16 coupled to the circuit board, Your Honor.

17 JUDGE JURGOVAN: I see. Okay. Thank you.

18 MS. BUSSEY: Turning to Slide 8, Hesai provides no coherent
19 motivation for anything combining these references -- oh, pardon me,
20 Your Honor. I did want to address, very briefly, there was one other
21 claim-construction-related issue. I don't think we need to spend time
22 on it here, regarding the, each of the plurality of stator elements,
23 including a coil wound around a magnetic core. You know, Hesai's
24 argument is trying to rewrite this claim. And this is found in Claim 1.
25 The coupled-to argument we just discussed already addresses Claim 1.
26 So I don't believe we need to go there in our argument today. I prefer

1 to focus on the issue of Hesai's failure to provide a sufficient
2 motivation for combining the references.

3 JUDGE JURGOVAN: Before you go to that, I have one more
4 question about Johnson. And that is, I think I heard Petitioner say that
5 this core element here actually has three parts to it. Is that correct in
6 your view? Or is that one unitary coil in the form of an annular ring?

7 MS. BUSSEY: The disclosure in Johnson is a single ring-
8 shaped core.

9 JUDGE JURGOVAN: Thank you.

10 MS. BUSSEY: So moving on to the issue of obviousness,
11 Hesai replies only generic motivations for combining various subsets
12 of these references. They have not provided evidence sufficient to
13 demonstrate that there's a motivation to combine Pacala's LiDAR with
14 Johnson's PCB motor with Pardhan's finned rotating heat sink, and
15 then further modifying it to add those heat dissipation structures from
16 Zhang. And I will be addressing the proposed combination of Pacala,
17 Johnson and Pardhan. My colleague, Mr. Meyer, will address the lack
18 of motivation to modify Pardhan with the heat dissipation structures
19 of Zhang.

20 Now, in an attempt to manufacture a motivation to combine
21 these references, Hesai actually ends up highlighting that their
22 proposed combinations are driven by hindsight. For example, looking
23 even at the very first proposed combination of Pacala and Johnson,
24 even if you were to accept Hesai's position that a person of ordinary
25 skill in the art would use Johnson's PCB motor with Pacala's LiDAR

1 because of compactness, Hesai then immediately turns around and
2 argues to add a new part in.

3 Looking at Slide 32, Hesai proposes putting that PCB motor in
4 the area shown here in red, within Pardhan's finned heat sink. This is
5 from the Patent Owner response, Page 15. Now, it's obvious from
6 looking at this figure that any alleged compactness benefit has now
7 been destroyed by putting it within this much larger device. Beyond
8 identifying an inconsistent motivation to combine these references, a
9 person of ordinary skill in the art wouldn't look to combine Pacala,
10 Johnson and Pardhan, because the Pacala and -- Pacala-Johnson
11 device doesn't need Pardhan's heat sink, and using that finned rotating
12 heat sink would just introduce a host of complexities and problems
13 into the design, without any corresponding benefits.

14 Hesai -- I would like to try -- if technology will work for me --
15 does make an argument -- well, it does not seem to want to work for
16 me, so I will just reference Hesai's Slide 30. They try to make an
17 argument about this image from Pardhan, in comparison to the image
18 from Karplus.

19 But all that comparison between Pardhan and Karplus shows us
20 -- once, again, this is Hesai's Slide 30 -- is that the Karplus patent,
21 which does not use Pardhan's heat sink, thereby results in a smaller,
22 more compact design. It's just further evidence that Pardhan makes
23 for a large LiDAR, not a smaller one. And that's in direct contrast to
24 the goals of the '515 patent, the purported motivation to combine the
25 references at the outset. I'd like to move -- pardon. I'd like to move --
26 are you still able -- still with me on the audio? Excellent. Thank you.

1 JUDGE JURGOVAN: Yes, we can hear you.

2 MS. BUSSEY: My apologies. Nowhere is that motivation to
3 add Pardhan's thermal rotary link to Pacala-Johnson LiDAR in any
4 event, because Hesai argues that a person of ordinary skill would look
5 to Pardhan's thermal rotary link to dissipate heat, to prevent the
6 Pacala-Johnson device from overheating. But there's no teaching or
7 motivation to do so.

8 Turning to Slide 41. We know this because Pardhan's
9 disclosure, again, if you go beyond word-searching, and you read the
10 disclosure, it tells you that the LiDAR generates excess heat that
11 needs to be dissipated when the system operates above a threshold
12 power level. That's what that thermal rotary link is for in Pardhan, to
13 dissipate the excess heat generated when it's operating above a
14 threshold power level.

15 Turning to Slide 43. We also note from Pardhan that the
16 system is operating above this threshold power level to improve the
17 signal-to-noise ratio. So Pardhan is solving an excess heat generation
18 issue caused by ramping up power to try and fix a signal issue. It's
19 that excess heat that it's trying to dissipate with its rotating heat sink.

20 However -- now I'm turning to Slide 46, Your Honor -- Pacala
21 in comparison addresses this signal-to-noise ratio issue in an entirely
22 different way. It doesn't ramp up the power. It uses a timed digital
23 converter. And a person of ordinary skill in the art would recognize
24 there's no need to combine the references here, because Pacala isn't
25 ramping up the power to try and address the signal issue, so it's not

1 generating this excess heat requiring Pardhan's finned rotating heat
2 sink.

3 Now, I will admit, generally, electronic devices do generate
4 some heat. But if some heat dissipation is needed, a person of
5 ordinary skill in the art would go with something simple. A person of
6 ordinary skill in the art would address this issue using something like
7 a static heat sink. Indeed, that's what was done in the Quanergy's M8
8 sensor. It utilizes a simple, external base plate that provides a
9 platform for the sensor and also dissipates heat produced by the
10 sensor's electronics and motor.

11 Hesai doesn't show any reference, other than Pardhan, that uses
12 a complicated rotating heat sink in the LiDAR. And that's because a
13 person of ordinary skill in the art would use a simple, stationary heat
14 sink. They would not look to use an overly complicated finned
15 rotating heat sink, because doing so introduced a host of problems.
16 And those are problems that Hesai and its purported experts ignore
17 entirely.

18 Turning to Slide 52. Dr. Janet walks through in his testimony
19 in great detail the numerous unnecessary complexities and problems
20 that a person of ordinary skill in the art would recognize would flow
21 from this proposed combination. The fins themselves would add
22 mechanical complexities to the design. It would introduce multiple
23 potential failure points.

24 In addition, adding Pardhan's substantial weight from those
25 fins, far from the central rotating axis, would cause motor
26 inefficiencies and increase the risk of catastrophic failure. There

1 would be increased stresses and more pronounced gyroscopic effects.
2 There would be increased risk of warping and collisions between the
3 rotor and stator fins. All of these issues would lead to reduced to
4 performance, while increasing the wear and tear and increasing the
5 risk of catastrophic failure of the system.

6 In sum, Pardhan's rotating heat sink would be a major
7 additional complication without any countervailing benefit. And the
8 Federal Circuit is clear. Problems, including increased complexities,
9 must be considered when determining if there's a motivation to
10 combine the references. Your Honors, this is not bodily
11 incorporation. The Board must weigh the benefits both lost and
12 gained in consideration of whether a motivation to combine has been
13 established.

14 Now, Hesai's response in the face of all of this evidence is
15 essentially to attempt to backpedal from its original identification of
16 Pardhan's fins as being part of the support component. But this
17 conflicts with the plain language of the petition, which specifically
18 identifies Pardhan's rotor plate with fins as corresponding to the
19 support component. And indeed, this just highlights that this was a
20 hindsight motivation they proposed, because a person of ordinary skill
21 wouldn't look to Pardhan, which is, again, about dissipating excess
22 heat using these fins, and then remove the fins.

23 That renders Pardhan unsuitable for its intended purpose, and
24 the only reason for doing so would be an attempt to reconstruct the
25 claims of '515 patent using impermissible hindsight. On this issue,
26 Dr. Janet's testimony stands essentially un rebutted. And when

1 weighing his testimony against that of Dr. Lebby, who has no
2 experience designing rotating LiDARs, and who provides no
3 substantive responses to Dr. Janet's testimony, the Board should give
4 Dr. Lebby's opinion little to no weight.

5 Moving to Slide 63, Your Honor. This relates to Hesai's
6 proposal to replace Pardhan's motor with Johnson's. On this issue,
7 Hesai and Dr. Lebby get it wrong in a few ways. At the outset,
8 Pardhan and -- pardon me -- Pardhan and Johnson teach different
9 systems. They do not teach a singular rotor-stator structure. In
10 addition, Dr. Lebby didn't recognize that they also taught different
11 motor types.

12 Now, that error contributed to Dr. Lebby erroneously asserting
13 that replacing Pardhan's motor with Johnson's would be a simple
14 substitution, and also resulted in his failure to identify the significant
15 complications that would flow from this proposed combination.
16 Complications that would scare a person of ordinary skill away from
17 combining the references.

18 Turning to Slide 64. This is just a diagram showing the
19 Johnson motor is an axial-flux design. The rotor and stator elements
20 are vertically aligned with one another. Now, Pardhan's motor, on the
21 other hand, is a radial-flux design. When the rotor and stator are
22 assembled in the direction shown by the red arrows, the rotor magnets
23 378A in pink are positioned laterally from the slotted motor winding,
24 738B, in gold.

25 Now, why does this matter? Well, because as Dr. Janet has told
26 us, replacing Pardhan's motor with Johnson's motor is far from a

1 simple substitution. There are numerous problems and complications
2 that someone would face in trying to make this combination.
3 Johnson's windings and ring-shaped core would not produce a strong
4 magnetic flux density in the air gap without also producing strong
5 magnetic flux around the rotor and stator generally.

6 Now, this is critical, because remember, Pardhan surrounds its
7 rotor magnets and stator coils with those rotor and stator plates and
8 fins. And those rotor and stator plates have high thermal and electric
9 conductivity. So those plates and fins are then susceptible to eddy
10 currents from the moving magnetic fields. That would generate
11 significant waste heat.

12 Now, in layman's terms, all that is to say, Pardhan's heat sink
13 would become a heat source. In addition, Pardhan's substantial mass
14 is greater than that of the compact design of Johnson. And we know
15 it's greater because Pardhan gives us measurements. We can see that
16 Pardhan is not a -- is not a compact design. It is a large design. And
17 this results in difficulties in generating sufficient torque from
18 Johnson's PCB motor to rotate Pardhan's large heat sink. Plus, you
19 still have all the same complexities that I discussed earlier, as a result
20 of these increased masses of fins. You have mechanical complexity,
21 increased costs, failure points, warping, an increased wear and tear,
22 and reduced performance.

23 Now, Hesai and Dr. Lebby failed to even recognize the
24 existence of these significant issues. And when faced with them, they
25 simply wave their hands and say that design and engineering fixed the
26 issues. That's not enough. That merely highlights their failure to

1 articulate a well-reasoned and factually supported motivation in their
2 petition. Indeed, any argument that this could be addressed from
3 using design and engineering merely highlights that it's not a simple
4 substitution.

5 Again, Dr. Janet's testimony here stands essentially unrebutted,
6 and establishes a person of ordinary skill in the art would not be
7 motivated to replace Pardhan's motor with Johnson's motor, nor would
8 they have a reasonable likelihood of success in achieving the claimed
9 invention with the proposed combination, in light of all these issues
10 that would flow from it. Hesai's conclusory motivations continue with
11 the proposed modification of Pardhan to include Zhang's heat
12 dissipation structure, which my colleague, Mr. Meyer, will now
13 address.

14 MR. MEYER: Thank you, Ms. Bussey. This is Matthew
15 Meyer for Patent Owner. So I will be covering several issues that we
16 do not believe you will even need to reach in order to find all of the
17 challenge claims patentable. First, each independent claim requires a
18 support component, with a plurality of arms extending away from the
19 sleeve. That support component also comprises additional elements,
20 depending on the particular claim, such as upper and lower surfaces
21 and alignment posts. But for Zhang, we're concerned with the
22 plurality of arms extending away from the sleeve.

23 The petition admitted this is not disclosed in the three-reference
24 combination of Pacala, Johnson and Pardhan. So Petitioner relies on a
25 fourth reference, Zhang, for this limitation. But Zhang does not teach

1 this limitation. And one of ordinary skill would not have been
2 motivated to add arms to Pardhan's design.

3 Turning to Slide 74. The petition asserts that one of ordinary
4 skill would have combined Pardhan's support component that includes
5 Sleeve 728 and Bearings 730, 732, with Zhang's arms. It cites three
6 additional exhibits as supporting that motivation to combine, but
7 ultimately relies on combining Zhang's arms with Pardhan's support
8 components. Zhang's disclosure, however, does not mention arms.

9 Zhang, like Pardhan, teaches a rotor plate. Petitioner has
10 colored the rotor plate from Zhang's Figure 1 two colors, pink and
11 purple, to misrepresent that heat dissipation structures, in green, create
12 arms. Now, even if the green heat dissipation structures were
13 implemented on Pardhan, the rotor plate would still simply be a plate
14 with some holes in it.

15 Now, Zhang never mentions arms or has any teachings related
16 to them. So I put up this excerpt here. And don't think I'm asking you
17 to review this to see if I'm wrong about this. But I'm putting this up to
18 show you just how extensive Zhang's disclosure was in other respects.
19 Zhang's purported technical advantages center on its shaft system, and
20 the positioning of its electrical power transmission structure -- it's a
21 pair of transformer coils -- within its shaft, interior to the rotor and
22 stator elements.

23 Turning to Slide 77. Now, without the benefit of a complete
24 record, the Institution Decision took Hesai's argument at face value,
25 read the figure from Zhang's very literally, and cited the relative
26 thickness of the plate in the figure as appearing to be arms.

1 However, Ouster's expert, Dr. Janet, has explained that the
2 alleged arms that emerged from the board from viewing Zhang's
3 annotated Figure 1 would not offer the benefits claimed by Hesai.
4 Namely, they would not strengthen attachment of the sleeve to the
5 rotor plate, nor would they minimize vibration. I believe during oral
6 argument, Hesai has said that the petition claimed that implementation
7 of the heat dissipation structures would minimize weight. I'm not
8 aware of that being in the petition, and I did not hear any citation to
9 the petition indicating that was the case.

10 Now, as Dr. Janet has explained, because the arms -- the
11 "arms", in quotations -- would be formed through thinning of the end-
12 face of the rotor, they would not make Pardhan's rotor plate thicker
13 and thus stronger. It would be made thinner, and thus weaker. Dr.
14 Janet further explained that if anything, these thin arms would induce
15 flutter and vibrations, like a flapping membrane, leading to structural
16 fatigue over time.

17 Dr. Janet thus explains that implementing the heat dissipation
18 structures of Zhang onto Pardhan's rotor plate would add more stress
19 and vibration to the system, further decreasing its operating life. This
20 is due, for example, to fluid dynamics issues relating to airflow
21 through those windows into the rotor. If I understand what Dr. Janet
22 describes, they would create a low-pressure area under the rotor,
23 which would then recover and reform, much like a car driving down a
24 freeway with a single window open. The result is a noticeable
25 thumping within the car, from a similar effect.

1 Not only would Zhang's heat dissipation structure introduce
2 mechanical issues if incorporated onto Pardhan's rotor plate, it would
3 also counteract Pardhan's heat dissipation scheme. Zhang's heat
4 dissipation structures are provided to release heat from inside the
5 motor, upwards and out of the motor. In contrast, that's shown on
6 Slide 81, Pardhan's design holds heat downward, from the LiDAR's
7 heat source, shown in orange, into the motor.

8 Dr. Lebby has acknowledged this discrepancy at his deposition,
9 but has asserted that the majority of the heat flow will still be
10 downwards, via conduction through the metal of Pardhan's heat sink.

11 But that does not provide a rationale for implementing Zhang's
12 heat dissipation structures onto Pardhan's rotor plate. Even if Dr.
13 Lebby were correct that Pardhan's heat dissipation pathway would
14 overcome Zhang's opposing pathway, that still does not support
15 motivation to combine Zhang with Pardhan in the first place, since the
16 combination would be counterproductive. As with Hesai's other
17 proposals, there are no benefits to the combination, only drawbacks.

18 Now, recognizing the flaws with its Zhang arguments, in its
19 reply, Hesai makes an untimely pivot to relying on Exhibits 1033 and
20 1042 as purported prior art. But the petition never even alleged that
21 those exhibits were analogous art, so they cannot form a part of any
22 combination.

23 Moreover, turning to Hesai's Slide 53 -- all right, I will just
24 mention it, since I'm unable to pull it up. Hesai's argument about
25 these exhibits relies on all bearing housings being interchangeable.
26 Now, Dr. Janet explained, in Paragraph 221 of his declaration, that

1 one of ordinary skill would not understand that all bearing designs are
2 interchangeable, as Dr. Lebby -- Dr. Lebby believed, despite having
3 no evidentiary support or explanation for that belief.

4 Now, one of ordinary skill would not have found the bearing
5 designs in Exhibits 1033 or 1042 to either disclose arms or to be
6 desirable for implementation on Pardhan's rotor plate. Exhibit 1033
7 shows bearing housings with flanges, not arms, and as Dr. Janet
8 explained in his Paragraph 221, they are, quote, not meant to provide
9 stability, as to a rotor. They are meant to be affixed to something
10 stable, such as a wall, and provide sufficient radial support for a shaft
11 to rotate within them. For Exhibit 1042, that is for an entirely
12 different type of system, with a stator that is sandwiched between an
13 upper rotor and a lower rotor, where a truss is formed around the two
14 rotors. This truss system has no applicability to the LiDAR systems at
15 issue here.

16 As a final matter, Petitioner's only evidence that the claimed
17 arms would allegedly reduce vibration is Petitioner's Exhibit 1031.
18 The exhibit discusses the prevention of bearing axial movement. And
19 tellingly, none of the methodologies taught in Exhibit 1031 include
20 arms extending away from a sleeve, as claimed. There's simply no
21 evidentiary support for Hesai's arguments.

22 Now, for the reasons discussed thus far, all of the independent
23 claims are patentable. There are additional reasons Dependent Claim
24 4 is patentable. Claim 4 recites, third and fourth circuit boards, and
25 Independent Claim 22 does, as well. The following arguments apply
26 to both claims. The petition had two theories on how Johnson, which

1 discloses only a single rotor PCB and a single multilayered stator PCB
2 could disclose four circuit boards.

3 First, the petition asserted each layer of a multilayered PCB is a
4 separate circuit board. That's what Dr. Lebby believes. Alternatively,
5 the petition argued it would have been obvious to use multiple
6 separate circuit boards instead of a single multi-layered PCB. As to
7 the first theory, the Institution Decision was not persuaded that a layer
8 of a PCB is its own printed circuit board. And so Hesai is now
9 asserting only the Johnson's disclosure of two circuit boards renders
10 obvious the claimed four circuit boards.

11 Turning to Slide 88. The petition's alternative argument also
12 fails. For the required third circuit board of Claim 4, one of ordinary
13 skill in the art would not have had a reasonable expectation of success
14 in distributing Johnson's stator assembly, which is patterned within a
15 multilayered PCB amongst multiple single-layer PCBs, as contended
16 by the petition.

17 Dr. Janet has explained that this wouldn't work. And when you
18 think about it, it wouldn't work. How could you implement those coil
19 windings on different boards? Dr. Lebby had never provided any
20 explanation, and the reply never touches Hesai's failure to show a
21 reasonable expectation of success in its petition.

22 Turning to Slide 90. Because the four references Hesai uses for
23 Independent Claim 1 are not enough, Hesai now relies on an
24 additional reference, Nubling, to assert that Johnson renders obvious
25 placing one, a third circuit board beneath the stator circuit board, and

1 two, a fourth circuit board parallel to the stator circuit board, in the
2 position shown to the right, here, in this figure from the petition.

3 Now, turning to Slide 91. Well, Nubling teaches that additional
4 circuit boards may be needed, if the rotor and stator circuit boards run
5 out of space. It also teaches that the rotor and stator circuit boards are
6 to be, quote, used over their full area, because no part of its surface is
7 required for the coupling to a shaft. This is in Nubling's Column 2,
8 Line 34 to 38. Nubling also disparages prior art designs using shafts,
9 because the shafts require construction space and additional effort.

10 As evident in this figure from Hesai's reply, the rotor circuit
11 board here in pink is held in place by Bearings 40 on its rim, with no
12 central shaft, contrary to Hesai's proposed combinations and the
13 challenged claims. Hesai does not explain why one of ordinary skill
14 would favor Nubling's teachings about optional additional circuit
15 boards, without first implementing Nubling's mandatory teaching to
16 eliminate the central shaft.

17 Additionally, as to the fourth circuit board of Claim 4, while
18 Nubling does teach a Circuit Board 50, annotated grey by Hesai in
19 this figure, above the rotor circuit board in pink, it is not parallel to the
20 stator circuit board, as required by Claim 4. So this additional circuit
21 board is perpendicular to the stator and rotor circuit boards, in order to
22 provide mechanical support for Nubling's optics, as explained by Dr.
23 Janet. And another of Hesai's references, Hall, teaches the same
24 principle, that circuit boards above the rotor should provide
25 mechanical support for the optics of the system.

1 Hesai relies on two of all three circuit boards above the rotor,
2 Circuit Boards 121, colored pink, and 123, colored blue, as the
3 claimed fifth and sixth circuit boards of Challenge Claim 6. However,
4 Hesai has selectively disregarded Hall's teachings when it comes to
5 Claim 4, even though Hall teaches another vertical circuit board, 122,
6 in white, here, in the -- I mean, in the petition's figure, which could be
7 used for additional electronics. Now, the petition disregards this
8 teaching from Hall, in favor of placing that fourth circuit board
9 parallel to the rotor and stator, for no reason whatsoever.

10 Now, Hesai's proposal -- turning to Slide 93. Hesai's proposal
11 to, without any prior art support, place a fourth circuit board here,
12 precisely where Pardhan teaches placing its low-thermal impedance
13 coupling, 410, also conflicts with Pardhan. Pardhan teaches that this
14 coupling, 410, is to enable heat flow from the LiDAR heat source,
15 406, in orange, downwards to the heat sink.

16 Dr. Janet has explained that the additional fourth circuit board,
17 placed here, is an additional source of heat, and the placement of that
18 additional heat source between the LiDAR heat source, 406, and the
19 heat sink would arrest the heat flow from the heat source to the heat
20 sink, and result in the LiDAR heat source, 406, overheating. This is
21 not something a skilled artisan, utilizing Pardhan's heat sink, would
22 do, since maintaining the LiDAR at a stable operating temperature is
23 Pardhan's primary concern. Now --

24 JUDGE JURGOVAN: Counsel, I have an issue with sort of
25 thermal insulation, as well, caused by the circuit board.

26 MR. MEYER: Yes.

1 JUDGE JURGOVAN: That the heat couldn't get through there.

2 MR. MEYER: Right. My understanding, I think the circuit
3 board is made out of an insulating material called G10. And so that is
4 a thermal insulator. And so yes, it would prevent the heat flow.
5 Thermal Coupling 410 is meant to be made of a material with high
6 thermal conductivity.

7 JUDGE JURGOVAN: Thank you.

8 MR. MEYER: Now, Hesai alternatively relies on Cai as
9 teaching four circuit boards. However, Cai teaches only two circuit
10 boards, as shown in this figure from the petition, of Cai's two circuit
11 boards, annotated red and blue by Hesai. Moreover, Hesai's proposal
12 based on Cai's fails, because Cai has no teachings that would
13 overcome the incompatibility with Pardhan's overheating concerns,
14 which are necessarily accepted as valid for Claim 1, if Claim 4 is even
15 being considered.

16 Hesai's reply also points to the Yan reference. Yan also does
17 not teach four circuit boards. Yan does show a circuit board beneath
18 its optics, but it is an automatic sweeping robot operating at two watts
19 of power consumption or less. Consistent with that low power usage,
20 Yan has no discussion of overheating risks. One of ordinary skill
21 would've recognized that Yan's circuit board was capable of being
22 placed under its low power detecting device, without the risk of
23 overheating. However, the claimed four circuit boards could not be
24 placed under Pardhan's overheating LiDAR device, since it would
25 disrupt Pardhan's heat dissipation scheme, which necessitated
26 Pardhan's overly complicated rotary thermal link in the first place.

1 The prior art as a whole teaches away from Claim 4 and 22. Both are
2 patentable.

3 Now, additionally, even if Independent Claim 14 were found
4 unpatentable, Dependent Claim 17 would still be patentable. Claim
5 17 requires transformer coils that are both integrated directly onto the
6 stator and rotor circuit boards, and positioned outside an outer
7 perimeter of the rotor and stator elements.

8 Hesai's arguments for Dependent Claim 17 fails for numerous
9 reasons, beginning with the fact that Pardhan, Zhang and Johnson,
10 which are present in all grounds, all teach away from transformer coils
11 positioned outside the rotor and stator elements. Pardhan teaches
12 transformer coils at 740A and 740B, colored purple in this figure here,
13 are inside the perimeter of the rotor magnet, 738A, in pink, and the
14 stator element, 738B, in gold.

15 Pardhan explains this is an advantage of its design. Because
16 Pardhan places its coil windings, 738B, on the stator, as opposed to
17 the rotor, the energy to power the motor need not be transferred
18 through the rotary transformer, thus allowing for a smaller rotary
19 transformer.

20 Zhang also teaches it is a technical advantage of its design to
21 install the transformer coils inside the perimeter of the rotor and stator
22 elements. In fact, Zhang goes so far as to teach that they should be on
23 the inner side of the shaft itself, to ensure the smoothness of the
24 rotating shaft, and prevent interference with the power transmission.

25 Now, if you look at Slide 73, Hesai and Dr. Lebby quote Zhang
26 at Page 1, for the proposition that having space in the hollow shaft to

1 accommodate a signal transmission structure prevents mutual
2 interference of signal transmission systems as a part of a convoluted
3 explanation for why there would be four circuit boards, as to Claim 4.

4 Now, the ellipses that are in that quote are selectively placed to
5 read out the full teaching from Zhang, regarding the need for space to
6 accommodate signal transmission structure and an electrical power
7 transmission structure. This ensures stability of the rotating shaft,
8 improves shock resistance of the rotating structure, and prevents
9 neutral interference. Hesai cannot rely on this teaching from Zhang
10 for Claim 4, but then disregard it for Claim 17.

11 Like Pardhan and Zhang, Johnson also teaches coil windings on
12 the stator rather than the rotor. This is in Slide 103. So this
13 configuration allows for a small rotary transformer. This is colored
14 red in the annotated figure from the petition here. Dr. Janet has
15 explained that one of ordinary skill would understand that Johnson has
16 positioned its rotor and stator elements on the outermost portion of the
17 rotor and stator platforms, around here, to maximize torque while
18 maintaining a compact design.

19 The motor coils and transformer coils cannot occupy the same
20 space. There is a tradeoff between torque and power transfer.
21 Johnson, Pardhan and Zhang all teach that for motors like theirs,
22 torque is favored. The rotor and stator elements should be
23 maximized, and the transformer coils should be minimized, contrary
24 to Claim 17.

25 Now, Cai teaches a different rotor configuration, wherein
26 vertically elongated transformer coils, purple and blue in the figure,

1 extend side by side outside a taller motor, shown in red. Because the
2 transformer coils are outside of the motor, they are not directly
3 integrated onto the stator and rotor circuit boards, as claimed. So Cai
4 also does not teach or suggest configuration of Claim 17, nor does
5 anything in Cai indicate one of ordinary skill, working with the
6 Pacala-Johnson-Pardhan-Zhang combination, would even look to
7 Cai's very different design for any reason.

8 Hesai asserts that it is relying on Cai only for its positioning of
9 transformer coils outside of the perimeter of the rotor-stator elements,
10 as claimed in Claim 17, but as the Federal Circuit has explained, it is
11 error to fail to consider the entirety of the art. Petitioners cannot
12 surgically cherry-pick select teachings from the prior art, to the
13 exclusion of its teachings as a whole. As a whole, the prior art teaches
14 that in motors like Johnson's and Pardhan's and Zhang's, the
15 transformer coil should be positioned within the outer perimeter of the
16 rotor and stator elements.

17 Since the prior art teaches away from Claim 17, turning to Slide
18 106, Hesai resorts to arguing that the claimed placement of the
19 transformer coil is one of two design choices. Now, factually, this is
20 not true. There are many ways to get power to the rotor. Wireless
21 transformer coils can be inside the motor, as in Johnson, Pardhan and
22 Zhang, or as in Cai, they can be outside of the motor. Additionally,
23 Johnson, Pardhan and Zhang also teach alternative wired power
24 transfer configurations, where no transformer coils are used at all.

25 Now, legally, the trick of alleging that there are only two design
26 choices is because, hey, it either is or it isn't, was rejected by the

1 Federal Circuit earlier this year as a matter of law in Samsung v.
2 Neonode. Even though, turning to Slide 107, even though the prior
3 art as a whole teaches away from Claim 17, the petition provides
4 conjecture that in other unidentified systems, one of ordinary skill in
5 the art may want larger transformer coils. This can be seen in Hesai's
6 Slides 78 and 79, where Dr. Lebby asserts, for example, that a
7 POSITA would've understood that in certain LiDAR systems, there
8 could be insufficient space for the transformer coils.

9 That is not the case that the Pacala-Johnson-Pardhan-Zhang
10 combination proposed by Hesai. There is sufficient space. Dr. Lebby
11 asserts that certain LiDAR applications may need to use larger
12 transformer coils, but Petitioner has not made any showing that the
13 Pacala-Johnson-Pardhan-Zhang combination needed larger
14 transformer coils. The evidence shows that they did not -- it did not
15 need larger transformer coils. All of those references teach away from
16 Claim 17. Claim 17 is patentable.

17 Hitting upon Dependent Claims 13 and 21, quickly, as with the
18 405 patent, also being challenged by Hesai, which you heard about
19 this morning, Hesai proposes that the Droz reference teaches a light-
20 ranging system wherein each pixel within the plurality of pixels
21 comprises a plurality of single-photon avalanche diodes, SPADs. The
22 petition, however, did not demonstrate a reasonable expectation of
23 success for Grounds 5 through 7, which rely on combination with the
24 Droz reference.

25 Hesai admits that Droz's waveguides would be required in the
26 combination. Droz makes no reference to the use of its waveguides

1 for any applications involving scanning or rotation. Droz's
2 waveguides were designed solely for stationary use. Hesai's reply
3 points out that Droz's inventors describe spinning LiDAR systems in
4 patents other than Droz, yet ensures that Droz itself includes no
5 mention of rotating LiDAR. This further proves the point that Droz's
6 waveguides are not considered suitable for use with a spinning
7 LiDAR system. Now, Hesai has also failed to show if Dependent
8 Claim 23 is patentable -- that it's unpatentable.

9 Turning to Slide 111. Claim 23 requires the plurality of stator
10 elements to be between a surface of the second circuit board, and a
11 surface of the third circuit board. In Claims 22 and 23, the circuit
12 boards are numbered from the bottommost to topmost, so that the
13 stator circuit board is the second circuit board of four, and the rotor
14 circuit board is the third circuit board.

15 Now, in Johnson, the stator elements are coiled, patterned into
16 the second, i.e., the stator, circuit board, and are not between the stator
17 circuit board and rotor circuit board. The petition completely failed to
18 show Claim 23 is obvious. The petition, at Page 94, merely points to
19 Sections 14(b)(1)(e) and 14(b)(1)(i), without any explanation as to
20 how Dependent Claim 23 could possibly be disclosed.

21 Turning to Slide 113. Finally, we do not believe the Board
22 needs to reach secondary considerations to find all challenged claims
23 are patentable. Nevertheless, the secondary considerations in this
24 matter are compelling evidence of the non-obviousness of the claimed
25 invention of the '515 patent. Ouster has provided evidence of both
26 industry praise tied to Ouster's products embodying the '515 patent, as

1 well as evidence of Hesai's copying of the Figure 8A embodiment of
2 the '515 patent.

3 Turning to Slide 115. First, Dr. Janet analyzed Ouster's product
4 and determined that all elements of Claims 1, 4, 14 and 17 were
5 practiced. As he explained, before the '515 patent, bulkier LiDAR
6 sensors were used with large drones to perform functions such as
7 surveying of power lines from a large distance. The claimed
8 invention of the '515 patent has opened new frontiers for drones, and
9 enabled them to perform new tasks, such as detailed, up-close airplane
10 inspections, something that was impossible prior to the '515 patent.

11 Hesai has challenged the nexus between the industry praise and
12 the claimed invention of the '515 patent. However, because Ouster's
13 OS sensor is the '515 patent, it is not a subcomponent, it is presumed
14 that praise for the Ouster's OS sensor is presumed to be praise for the
15 '515 patent itself. Moreover, the industry praise for Ouster's OS
16 sensor and airplane inspection drones using it was the result of the
17 lightweight and compact design of Ouster's OS sensor, which is
18 achieved by the claimed invention, so the required nexus is present for
19 that reason, as well.

20 Additionally, Dr. Janet also assessed Hesai's PandarQT product,
21 and concluded that all elements of Claims 1, 4, 14 and 17 are
22 practiced by Hesai's product. This is not disputed. Dr. Janet further
23 concluded that Hesai's PandarQT product bears such striking
24 similarities to the Figure 8A embodiment of the '515 patent that
25 copying can be inferred.

1 In response to Ouster's allegations, in its Patent Owner response
2 that Hesai copied its claimed invention, Hesai, rather than denying it
3 copied Ouster's invention, responded first that there is no evidence
4 that Hesai was aware of the '515 patent, and second, that its product
5 has differences from Ouster's commercial embodiment of the '515
6 patent. Specifically, Hesai points to the number of arms and the
7 specific shape of the stator assembly and stator circuit board.

8 Turning to Slide 119. It is well-established that circumstantial
9 evidence is sufficient to prove copying. Patent owners are not
10 expected to have smoking-gun evidence, like photographs of a
11 product being torn down, in order to prove copying. The Federal
12 Circuit considered this recently in *Medtronic v. Teleflex*. The Federal
13 Circuit explained that the Board may infer copying, based on the
14 substantial similarity between Petitioner's and Patent Owner's
15 products.

16 Hesai claimed that some features of its products are similar to
17 the prior art. Now, first of all, we disagree with their comparison
18 between the Zhang rotor plate and their own product, since their
19 product clearly has arms formed on its product, and Zhang heat
20 dissipation structures are just small green holes within a plate.

21 Putting that aside, the argument that features are in the prior art
22 is unavailing, says the Federal Circuit. The problem is the Petitioner
23 reproduced the entire combination of features that were assembled for
24 the first time by Ouster. It does not matter that individual elements
25 were in the prior art. Rather, there is sufficient circumstantial
26 evidence of copying where the two parties' products, when they're

1 considered as a whole, are substantially similar in design. That is the
2 case here.

3 JUDGE JURGOVAN: We're out of time. If you could wrap up
4 what you're speaking to right now, that would be good, and we'll turn
5 to Petitioner's rebuttal.

6 MR. MEYER: Okay. Sounds good. So there's sufficient
7 circumstantial evidence of copying, where the two parties' products,
8 when considered as a whole, are substantially similar in design.
9 That's the case here, as explained by Dr. Janet. So one of ordinary
10 skill in LiDAR design, viewing these products, would infer, based on
11 the substantial similarity, that Hesai copied that Figure 8A
12 embodiment of the '515 patent. I will stop there, and we reserve the
13 remainder of our time for surrebuttal.

14 JUDGE JURGOVAN: Thank you, Counsel. We'll go back to
15 Petitioner for rebuttal. 19 minutes remaining. And you may be
16 muted.

17 MR. HEFAZI: Can you hear me now? Can you hear me?

18 JUDGE JURGOVAN: Yes, we can.

19 MR. HEFAZI: Yeah. Okay. Thank you, Your Honor. I want
20 to start with the arms issue. Counsel for Patent Owner said there is no
21 arms, because it is -- they were referring to Zhang -- a rotor plate, or --
22 and then, is it, quote, a plate with some holes in it. But that's literally
23 what they have called the support component with arms in the accused
24 product. And that's why our petition presented two theories.

25 First, you know, substitution of bearing housing. That's a very
26 straightforward, simple substitution of one bearing housing for

1 another. And then second, you know, precisely according to your
2 allegation, your infringement allegations, Patent Owner's, where
3 you're claiming it's a rotor plate with gaps in the middle, that's what
4 Zhang teaches. That's exactly what Zhang teaches.

5 And we provided multiple motivations for that. We say that,
6 you know, Zhang's rotor plate, by forming those arms, in creating
7 those heat dissipation holes, provides sufficient heat dissipation,
8 ventilation, and increased operating life. And then second, you can
9 see here, a POSITA would understand that compared with solid or
10 fully enclosed plates, a rotor plate with arms that are realized by
11 featuring bases or gaps between the arms, such as in Zhang, can
12 reduce the volume of the material used, thus reduce the weight.

13 So what we have here is a very clear motivation to combine
14 multiple of them. And, you know, the two are related. You won't get
15 the benefit of heat dissipation or the reduced materials cost without
16 the arms of Zhang. Those are kind of part and parcel with one
17 another. And it's very much like what they achieve.

18 Now, independently from their infringement allegation,
19 independently from their reading of the claim, we also presented this,
20 you know, argument based on the knowledge of a POSITA. Now,
21 there's a ton of bearing housings designed with arms. I think that's
22 undisputed here. And we've provided some examples of them. We
23 clearly provided various motivations for combining the arms. These
24 are two independent bases for finding the arms limitation met. And
25 I'll say, in their Patent Owner response, in order to overcome Ground
26 8, which is the ground where they're challenging the priority date of

1 the Pacala 2017 reference, what they clearly said is that the support
2 component -- that the disclosure in the patent that teaches the support
3 component is simply this grey bearing housing with arms.

4 The patent has literally just a couple of -- maybe like a
5 paragraph describing these bearing housings with arms. Not much
6 more than that. And elsewhere, where it talks about the bearing
7 housing and arms being able to be -- with the bearing housing and
8 coupling being able to be implemented in various ways -- so there is
9 nothing novel. This was not the inventive aspect of this invention. So
10 just to recap, even before you get to the Zhang reference, which --
11 again, tracked there intrinsically, there were no benefits of -- there
12 were no benefits of arms extending from a bearing housing. And so
13 Zhang and these bearing housing device -- they both provided reasons
14 for finding the arms limitations obvious.

15 Turning to the issue regarding multiple coils, I think Your
16 Honor asked whether Johnson's coils are a single coil or multiple coil,
17 and Counsel, I think, said that they were a single coil. That's wrong.
18 And, you know, it's demonstrated by the Karplus reference, again. So
19 if you look at Karplus, Karplus shows that Zhang incorporates -- this
20 is another Waymo patent. And you know, there are four references
21 here, but really, the vast majority of them are -- sorry, two of them are
22 Waymo patents.

23 So here's another one, Karplus, that discloses and incorporates
24 the Johnson figures in disclosures. And if you look at the way it
25 describes this coil, throughout, consistently -- I'll give you two
26 examples, but there's more. So here, when they're talking about --

1 they say, further, second coil can be interleaved with the first coil by
2 electrically coupling another subset of the conductive structures. So
3 it's referring to each of these windings as a coil, as a first coil winding,
4 a second coil winding, a third coil winding.

5 And if we go to Column 19 -- Column 19, Line 57 through 60
6 of this Karplus reference is describing Figures 4C and 4D of Karplus.
7 And Figures 4C and 4D, in the description of these figures, that's
8 Johnson. That's -- 4 is pointing to Johnson. If you look at 4C and 4D,
9 you'll see it's the same as Figures 3C and 3D in Johnson. And the way
10 it describes these conductive paths, it talks about them as a first coil
11 and a second coil. So they talk about these two as two separate coils.
12 So you see, thus, the first conductive path may form a first coil that
13 extends around Axis 406 and the second conductive path may form a
14 second coil that extends around Axis 406. And Johnson also saw that
15 they can form a third coil, as well.

16 JUDGE JURGOVAN: Counsel, but this disclosure's not in
17 Johnson. Is that correct? What you're pointing to here in Karplus.

18 MR. HEFAZI: This disclosure is describing Figures 3C -- I'm
19 sorry, 4C and 4D, which is in Johnson. So I would not agree with
20 that. If you look at Figures 4C and 4D of Karplus, and the
21 descriptions of these figures, they are -- let me just pull up --

22 JUDGE JURGOVAN: I'm not understanding the connection
23 between Karplus and Johnson. Why is what's in Karplus informing
24 what's in Johnson? Why not refer to Johnson itself?

25 MR. HEFAZI: So the reason is the following. So here's the
26 connection. So Johnson is a Waymo patent, and here's Figure 3C and

1 Figure 3D of Johnson. And the description of the Figure 3C -- well,
2 let me start with, Figure 3C and 3D appear in Karplus, another
3 Waymo patent, identically. In fact, a lot of the figures in Johnson
4 appear identically in Karplus. So here's Karplus, Figure 4B and -- so
5 discloses the same structure, and when describing it, there would be a
6 dispute about whether those coils, each of those individual coils, can
7 be called their own coil.

8 The purpose that I'm using or pointing to Karplus for is,
9 Karplus expressly refers to them as a first coil and second coil. So it's
10 confirmed that a POSITA would understand that each of these coils is
11 its own coil winding, such that you have multiple coil windings.

12 JUDGE JURGOVAN: Okay. Let's say that's correct. Are you
13 saying that these coil windings are wrapped around more than one
14 core? Or is there just one annular core there?

15 MR. HEFAZI: So there are three coil windings, and they are
16 wound around a single ring-shaped core. That is correct. However --

17 JUDGE JURGOVAN: Thank you.

18 MR. HEFAZI: -- if we look at the claim language, Your
19 Honor, that is 100 percent permitted by the claim. So let's take a look
20 at the claim language. Each stator element, including a coil wound
21 around a magnetic core. The claim language does not say that each of
22 these pluralities of stator elements, including a coil, is wound around a
23 dedicated or individual magnetic core.

24 That is not claimed. The claim drafter knew how to use the
25 term plurality as appropriate. And nothing in the claim language says
26 there has to be a plurality of magnetic cores. It talks about one or

1 more magnetic cores. And so here, there's no dispute that each of the
2 plurality of stator elements includes a coil wound around a magnetic
3 core. The fact that there's not a dedicated or individual magnetic core,
4 that's irrelevant to the claim language.

5 JUDGE JURGOVAN: So are you saying the stator element
6 just includes a coil and not the core?

7 MR. HEFAZI: So the stator element does not include the
8 magnetic core, as I read it. As I read it, it says each of the plurality of
9 stator elements -- so in Johnson, what you see is, you see a number of
10 stator elements that include a lead-to-lead kind of coil. There is a --
11 there is a lead on one end, and a lead on the other end, and you wrap
12 these three coils around this shared magnetic core. The magnetic core
13 is not one of the stator elements. The coil is the stator element, and
14 it's wound around a magnetic core. The fact that all three of them are
15 wound around the same magnetic core doesn't mean that you have to -
16 - that the claim's not met.

17 JUDGE JURGOVAN: I understand your argument. Thank
18 you.

19 MR. HEFAZI: Okay. And then I think with bodily
20 incorporation -- we heard a ton of bodily incorporation arguments
21 from Counsel. And of course, the Board should address the
22 advantages and disadvantages of the proposed combination. But the
23 disadvantages can't stem from a bodily incorporation of one reference
24 to another. That's confirmed by the Federal Circuit, and taking that
25 approach would conflict with that Federal Circuit guidance. Under
26 Patent Owner's view of obviousness, a POSITA would rigidly grasp at

1 the exact embodiment of different references without exercising any
2 creativity or general skill. And KSR rejected that. You just don't say,
3 oh, you can't jam this one into this one, and therefore, this claim is not
4 obvious.

5 I'll also note, the '515 patent says nothing about overcoming the
6 alleged disadvantages they rely on. They didn't point about -- point to
7 the '515 patent and say, oh, look, here's how we overcome eddy
8 currents, here's how we overcome gyroscopic forces, any of that. And
9 that's because those would be addressed as part of the design process,
10 and they only arise if you just try to jam these two references together,
11 bodily incorporation, without kind of the expertise and kind of straight
12 engineering judgment that you would bring during the design process.
13 I mean, essentially, their view would require, you know, Petitioner to
14 do full on kind of CAD and ANSYS and MATLAB modeling to show
15 -- to show obviousness, because any design is going to have
16 gyroscopic forces, it's going to have, you know, eddy currents. And
17 those are things that you deal with as part of the design process.

18 But the Federal Circuit has made clear that that that question of
19 whether you can physically substitute and combine these things is
20 legally irrelevant. The question is whether Pardhan teaches to a
21 POSITA, motivates a POSITA, that you can couple a rotor and stator
22 board together with a rotational coupler, such as a bearing housing, or
23 a bearing housing with arms. And we've shown that it does. It shows
24 exactly that. You can couple a rotor and stator together with a bearing
25 housing. You could also include a heat sink for further heat
26 dissipation. And then, you know, there are different types of bearing

1 housings, and there's also different ways to form the rotors, like -- on
2 the bodily incorporation --

3 JUDGE JURGOVAN: Before you get away, I want to ask you
4 one question. And Patent Owner has brought the issue up that -- is
5 your declarant really an expert in LiDAR technology? How do you
6 address that?

7 MR. HEFAZI: So I think the best way to look at that is, he's
8 been -- served as an expert on exactly these type of cases. Let me --
9 let me give you -- so he has years and years of experience, we put in
10 our declaration, on the devices that relates to LiDAR, the components
11 of LiDAR, with motors and all of these items.

12 He's served as expert on multiple LiDAR cases, including the --
13 you know, many of the patents here are from Waymo. He was the
14 expert in the Uber-Waymo case. That case involved, you know,
15 similar devices, same devices. It was a trade secret in patent cases. In
16 both, I think some of the same inventors appear. And so not only is
17 he an expert, he's, like, a recognized expert that's been kind of -- been
18 approved in other kind of federal cases involving LiDAR.

19 JUDGE JURGOVAN: But he doesn't have actual experience in
20 designing and building these things. Is that correct?

21 MR. HEFAZI: I disagree with that. I mean, he has actual -- I
22 think the testimony that they point to is that he hasn't built, end to end,
23 a LiDAR device. And I don't think that's the requirement of a
24 POSITA, that you be part of a commercial company that has built --
25 so he hasn't worked for Waymo directly, been employed by them, but
26 I don't think that there's any requirement in the law or that the

1 standard, the level of skill, as presented here, requires that a POSITA
2 be someone who worked at a company and built a LiDAR end to end.

3 He certainly spent 30, 40 years working with the components
4 that are in these LiDAR devices. Motors, lasers, transmitters, optical
5 components. That's all in there. And you know, the level of skill here
6 also contemplates that more experience in the kind of balance with
7 more education -- and Dr. Lebby here has a PhD. He's been doing this
8 stuff for 20, 30 years. So you know, I think the idea that you need to
9 work for a commercial company and have built, end to end, a LiDAR
10 device, that seems like a very rigid standard.

11 JUDGE JURGOVAN: Thank you. I understand your
12 argument. You have a few minutes left.

13 MR. HEFAZI: Thank you. Okay. So a couple of final points
14 here. With regards to their bodily incorporation arguments, which
15 again I think are irrelevant -- but they made a claim that their
16 testimony stands un rebutted. That's inaccurate. Dr. Lebby went
17 through and even though it's irrelevant, he went through and talked
18 about each one of these items that their expert mentioned. You know,
19 talked about the moment of inertia, and how, you know, these devices
20 have approximately the same size of LiDAR devices from Waymo,
21 which are, you know, operating down the street without catastrophic
22 failure.

23 I think eddy currents was another one that Counsel mentioned.
24 And he explained that again, you're not just going to blindly jam
25 Johnson into Pardhan. There's numerous techniques for addressing
26 eddy currents. Eddy currents appear in any design. And he gives

1 examples. For example, you can shield. There's shielding for
2 magnetic fields from surrounding areas to minimize negative
3 consequences. Now, again, they've raised a smattering of bodily
4 incorporation arguments. But there's too many to go through here.
5 But you know, if you walked through each of these and provided a
6 response to all of them -- and so that's in his reply declaration at 1050.

7 Couple of other points here. With regards to the coupled-to
8 argument, the cases that they are citing to are inapposite. So Comcast,
9 for example, was a case in which -- if I can just pull it up on -- in
10 Comcast, the petitioner pointed to the same -- they mapped a speech
11 recognition system and wire-line node to a single element. Quote, to a
12 remote server, 108. Here, we're going to two separate structures. The
13 coils and the circuit board that they mount onto.

14 The Cutsforth case that they cite, that actually supports us,
15 because the Federal Circuit found that a subcomponent could not be
16 coupled to the component as a whole, but expressly noted that the
17 subcomponent could be coupled to the -- any remaining -- quote, "the
18 remaining portion of the component, excluding the subcomponent".
19 And then in Wi-LAN, the district court's construction was based on
20 the patent's consistent use of "coupled" to refer to components that are
21 not components of each other. Here, it's the exact opposite. The
22 patent talks about integrating and building these stator components
23 onto one another.

24 JUDGE JURGOVAN: Thank you, Counsel. We're out of time.
25 And we'll move to Patent Owner's surrebuttal.

1 MS. BUSSEY: Thank you, Your Honor. I'll be quite brief. I
2 just have a few points to make.

3 JUDGE JURGOVAN: You have 20 minutes.

4 MS. BUSSEY: I don't plan to use them all. As you heard
5 today, Hesai continuously just pivots as its arguments fall apart.
6 Regarding the POSITA issue, in the IPR you heard this morning,
7 Hesai had actually proposed that a person of ordinary skill requires
8 two to three years of experience in LiDAR design. Here, we proposed
9 merely one year, and the only reason Hesai wouldn't agree to such a
10 requirement that I could imagine is, Dr. Lebby then wouldn't qualify
11 as a person of ordinary skill in the art, because he does not have that
12 experience.

13 In addition, Hesai has leaned heavily into the bodily
14 incorporation argument here, in an effort to remedy its own
15 motivation deficiencies. But that's not what we're arguing. What
16 we're arguing -- and I will share my screen for a moment, so you have
17 the benefit of seeing, on Slide 60 of our presentation, that they have to
18 show a reasoned motivation where a person of ordinary skill in the art
19 has an expectation of success. That's absent here.

20 The court's clear. You have to be considering both the
21 drawbacks and the advantages of the proposed combined combination
22 of references. Design choice is not -- is a convenient non-answer, but
23 it's not the standard for obviousness. Hesai failed to establish that a
24 person of ordinary skill in the art would be motivated to combine the
25 references as proposed in the petition, and all the challenged claims
26 are patentable. Thank you, Your Honors.

1 JUDGE JURGOVAN: Thank you both for your presentations.
2 They'll be very helpful in preparing the final written decision, which
3 we'll issue in due course. As I mentioned earlier, it'd be good if you
4 stay on the line, in case the court reporter has any questions about
5 things that may not have been understood, or need certain spellings
6 and so forth. The judges will now leave. And again, thank you for
7 your presentations today.

8 (Whereupon, the proceedings at 3:10 p.m. were concluded.)
9
10
11

12 FOR PETITIONER:

13
14 Jared W. Newton
15 James M. Glass
16 Nima Hefazi
17 QUINN EMANUEL URQUHART & SULLIVAN, LLP
18 jarednewton@quinnemanuel.com
19 jimglass@quinnemanuel.com
20 nimahefazi@quinnemanuel.com
21

22
23 FOR PATENT OWNER:

24
25 Megan Bussey
26 Nicoletta Kennedy
27 Matthew Meyer
28 KILPATRICK TOWNSEND & STOCKTON LLP
29 mbussey@kilpatricktownsend.com
30 nkennedy@kilpatricktownsend.com
31 mmeyer@ktslaw.com
32
33 Phillip Morton
34 Eamonn Gardner
35 COOLEY LLP
36 pmorton@cooley.com
37 egardner@cooley.com