

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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HESAI TECHNOLOGY CO. LTD.,	)	
	)	
Petitioner,	)	
	)	Case No.
vs.	)	IPR2023-01422
	)	
	)	Patent No. 11,287,515 B2
OUSTER, INC.,	)	
	)	
Patent Owner.	)	

DEPOSITION OF
MICHAEL STEPHEN LEBBY, Ph.D.

Thursday, May 23, 2024
San Francisco, California

Page 1

Reported By: JANE GROSSMAN, CSR No. 5225

Job No. 10142500

I N D E X

DEPOSITION OF MICHAEL STEPHEN LEBBY, Ph.D.

THURSDAY, MAY 23, 2024

	PAGE
MORNING SESSION	7
AFTERNOON SESSION	82
EXAMINATION BY: MR. MEYER	7

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E X H I B I T S

DEPOSITION EXHIBITS MARKED FOR IDENTIFICATION

EXHIBIT NO.	DESCRIPTION	PAGE
Exhibit 1003	Multipage document titled "EXHIBIT 1003 DECLARATION OF DR. MICHAEL LEBBY, PH.D." (Hesai Exhibit 1003, page 1 - Hesai Exhibit 1003, page 349)	18
Exhibit 1007	Multipage document, the substantive document titled "(12) International Application Publicized Under the Patent Cooperation Treaty...WO 2018/201567 A1" (Hesai Exhibit 1007, page 1 - Hesai Exhibit 1007, page 20)	76
Exhibit 1043	Multipage document titled "United States Patent, Nubling; Patent No.: US 9,606,230 B2, Date of Patent: Mar. 28, 2017" (Hesai Exhibit 1043, page 1 - Hesai Exhibit 1043, page 8)	106

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Page 2

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QUESTION NOT ANSWERED

PER INSTRUCTION OF COUNSEL

[Designated in the transcript by (QNA)]

PAGE LINE

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Proceedings Commenced: 9:20 a.m.

RECESSES

10:27 a.m. until 10:43 a.m.

Pause in the proceedings due to technical difficulties:
10:56 a.m. until 11:00 a.m.

Luncheon Recess: 12:20 p.m. until 1:01 p.m.

2:06 p.m. until 2:23 p.m.

Proceedings Concluded: 2:53 p.m.

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	)	
Patent Owner.	)	
	)	

BE IT REMEMBERED that, pursuant to Notice of Taking Deposition, and on Thursday, May 23, 2024, commencing at the hour of 9:20 a.m., and ending at the hour of 2:53 p.m., at the Law Offices of KILPATRICK TOWNSEND & STOCKTON LLP, Two Embarcadero Center, Suite 1900, Telegraph Conference Room, San Francisco, California 94111, before me, JANE GROSSMAN, a Certified Shorthand Reporter of the State of California, personally appeared

MICHAEL STEPHEN LEBBY, Ph.D.,
produced as a witness in said action, who, being first
duly sworn by the Certified Shorthand Reporter, was
thereupon examined as a witness in said cause.

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A P P E A R A N C E S

---oOo---

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Page 5

A P P E A R A N C E S

(Continued)

FOR PATENT OWNER OUSTER, INC.:

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BY: NICOLETTA KENNEDY, Attorney at Law
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ALSO PRESENT:

TRE EVANS

LORENZO FERNANDEZ-KOPEC,
Videoconference Technician

---oOo---

1 MORNING SESSION 9:20 A.M.
2 THURSDAY, MAY 23, 2024
3 SAN FRANCISCO, CALIFORNIA
4 ---000---
5 P R O C E E D I N G S
6 ---000---
7 MICHAEL STEPHEN LEBBY, Ph.D.,
8 called as a witness herein,
9 having been first duly sworn by the Certified Shorthand
10 Reporter, was thereupon examined and testified as
11 hereinafter set forth.
12 ---000---
13 THE REPORTER: Please begin.
14 ---000---
15 EXAMINATION BY MR. MEYER
16 BY MR. MEYER:
17 Q. Okay. Dr. Lebby, can you please state your
18 full name for the record?
19 A. It's Michael Stephen, with a -p-h, Lebby,
20 L-e-b-b-y.
21 Q. Dr. Lebby, have you been deposed before?
22 A. I have.
23 Q. Okay. About how many times? Page 7
24 A. At least 60 times.
25 Q. And have you been involved in an inter-parties

1 review proceeding before?

2 A. Yes, I have.

3 VIDEOCONFERENCE TECHNICIAN: It looks like
4 Gail Jefferson has joined.

5 MR. MEYER: Gail Jefferson is an associate
6 with Kilpatrick Townsend. She's in the Menlo Park
7 office.

8 Q. Okay. So you've done this before, but I'll go
9 through some ground rules again just as a refresher.
10 I'm sure you don't need it, but I'm going to do it.

11 So, Dr. Lebby, if you do not understand one
12 of my questions today, just please let me know, and I
13 will rephrase it. Okay?

14 A. I will.

15 Q. Also, please speak slowly and clearly, so the
16 court reporter can record your testimony.

17 Please wait until my questions are completed
18 before answering. Okay?

19 A. That is fine.

20 Q. Now, this deposition constitutes your formal
21 inter-parties review, or IPR, testimony.

22 Do you understand?

23 A. Yes, I do. www.aplusCR.com

Page 8

24 Q. Now, Dr. Lebby, your counsel may object from
25 time to time, but unless you are instructed not to

1 answer, you may answer the question.

2 Do you understand?

3 A. I understand.

4 Q. Dr. Lebby, let me know if you need a break at
5 any point.

6 A. I will.

7 Q. Keep in mind you may not consult or confer
8 with your attorney during any break regarding the
9 deposition, including any questions or answers.

10 Do you understand?

11 A. I understand.

12 Q. Dr. Lebby, is there anything that will impact
13 your ability to understand and answer questions today?

14 A. No.

15 Q. Are you on any medications?

16 A. Nothing that would affect this deposition.

17 MR. HEFAZI: Everyone always asks that.

18 I've never seen that ever actually have any
19 impact.

20 MR. MEYER: I know.

21 Q. Dr. Lebby, is there any reason that you are
22 unable to give complete, honest, and truthful testimony
23 today?

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Page 9

24 A. No.

25 Q. I will refer to U.S. Patent Number 11,287,515

1 as the "'515 patent" today.

2 Do you understand that nomenclature?

3 A. That is fine.

4 Q. Dr. Lebby, you prepared a declaration in this
5 proceeding; right?

6 A. That is correct.

7 Q. Did you perform any prior art search in
8 preparing your declaration?

9 A. I don't recall. It was close to a year ago,
10 so I don't have any details to answer that question.

11 Q. Did you consider any claim charts comparing
12 the patent claims to alleged prior art references prior
13 to signing your declaration?

14 A. I don't recall that level of detail.

15 I do recall a list of publications and patents
16 that I used for the declaration, and that's somewhere in
17 my declaration.

18 Q. Okay. And who came up with the combinations
19 of prior art discussed in your declaration?

20 A. I did.

21 Q. (QNA) Did Hesai's lawyers propose them to you
22 before you suggested these prior art references?

23 MR. HEFAZI: ^{Page 10}~~www.aprusCR.com~~ So, objection, you know, to the
24 extent that -- I guess that's starting to call into
25 question the drafting process. So I think that

1 implicates, like, attorney-client-privileged
2 communications in kind of the drafting process.

3 Under the Federal Rules, I'm going to instruct
4 the witness not to answer.

5 BY MR. MEYER:

6 Q. Okay. Dr. Lebby, did you determine that any
7 reference or combination of references that Hesai's
8 attorneys provided to you did not render any of the
9 challenged claims obvious?

10 MR. HEFAZI: I object to form. Assumes facts.

11 MR. MEYER: But you will allow him to answer?

12 MR. HEFAZI: Can you restate the question?

13 MR. MEYER: Yes.

14 Q. Dr. Lebby, did you determine any reference
15 or combination of references that Hesai's attorneys
16 provided to you did not render any of the challenged
17 claims obvious?

18 MR. HEFAZI: So I'm going to object.

19 You can answer that question.

20 THE WITNESS: I don't understand what you mean
21 by "Hesai's attorneys."

22 BY MR. MEYER:

23 Q. Well, you -- ^{www.aptusCP.com} in preparing your declaration,
24 you worked with attorneys for Hesai; right?

25 A. Oh, the name Hesai. Sorry. Now I understand

Page 11

1 what you're saying.

2 I completed the first draft of this
3 declaration, and then I worked with counsel to improve
4 upon it.

5 Q. Okay. We'll come back to this.

6 Dr. Lebby, in preparing your declaration, did
7 you review any articles?

8 A. I don't recall the details.

9 I mean, I know I have a list of documents
10 that I used for the declaration, and that's in my
11 declaration.

12 But given I did this nine months ago, I don't
13 recall any details.

14 Q. Okay. And do you -- did you do any research
15 in preparing your declaration?

16 A. As I've already indicated on record, I don't
17 recall that level of detail when the declaration was
18 assembled.

19 Q. And since providing your declaration, have you
20 reviewed any documents written by the Board in this
21 proceeding?

22 A. What -- I didn't understand that word.

23 Lord [sic]?

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Page 12

24 Q. Board, the Patent Trial and Appeal Board.

25 A. No, I have not.

1 **Q. Okay. You did not review the institution**
2 **decision in this proceeding?**

3 A. I did review the patent owner's response.
4 And I also reviewed an institutional decision.
5 That is all I've reviewed, I believe.

6 **Q. Okay. And who did you speak with in preparing**
7 **your declaration in this proceeding?**

8 MR. HEFAZI: I'll just caution the witness not
9 to reveal the substance. You can identify names.

10 THE WITNESS: I conversed with counsel, who is
11 present today.

12 BY MR. MEYER:

13 **Q. Okay. And how many attorneys did you speak**
14 **with in preparing your declaration?**

15 A. Just the one.

16 **Q. Did you speak with any non-attorneys in the**
17 **course of preparing your declaration?**

18 A. I don't recall any detailed communications
19 nine months ago.

20 I do recall conversing with Nima, who is
21 present today as part of counsel.

22 I don't recall if there was anybody else.

23 **Q. Dr. Lebby, do you have any financial interests**
24 **in any LiDAR companies?**

25 A. No, I do not.

Page 13

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1 Q. I understand you are the CEO -- CEO of
2 Lightwave Logic. Correct?

3 A. That is correct.

4 Q. And is that company related to internet
5 infrastructure?

6 A. Yes, from a fiber-optic standpoint.

7 Q. Okay. It's not a LiDAR company; right?

8 A. That is correct.

9 Q. And you are also the CEO and CTO of
10 GenusTechnik, Incorporated; right?

11 A. That is correct.

12 Q. And that is a consulting company relating
13 to the provision of expert witness services in IP
14 litigation; correct?

15 A. That is correct.

16 Q. And do you have any financial interests in the
17 outcome of this matter?

18 A. No, I do not.

19 Q. Dr. Lebby, when was the last time that you
20 read through your declaration in this matter?

21 A. Last night.

22 Q. And since reviewing your declaration, did you
23 see any errors that you wanted to correct?

24 A. I believe a couple of the citations are not
25 correct, but I don't recall which ones they are.

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Page 14

1 **Q. Other than correcting those citations, is**
2 **there anything else that you would change about your**
3 **declaration?**

4 A. I think I changed the formula for the time of
5 flight; there's a typographical error there.

6 But other than that -- I think that's it.

7 **Q. All right. So you are aware of some citations**
8 **you would change, the time-of-flight formula, and**
9 **nothing else in your declaration that you would change?**

10 A. As far as I'm aware.

11 **Q. Dr. Lebby, you disclosed all of the underlying**
12 **facts and data on which your opinions are based; right?**

13 A. I'm not sure I understand the question.

14 **Q. Well, did you consider any data, for example,**
15 **when forming the opinions in your declaration?**

16 A. I still don't understand what you mean by
17 "data."

18 I certainly reviewed the citations I listed in
19 my declaration.

20 And I used prior art to formulate my opinions,
21 if that's your question.

22 **Q. Did you conduct any independent**
23 **experimentation to confirm any of your opinions?**

Page 15

24 A. I don't believe I did any laboratory work, if
25 that's your question.

25	Q. Other than reviewing your declaration last
----	---

1 night and meeting with counsel five times, did you do
2 anything else to prepare for today's deposition?

3 A. I read some of the documents I cited in my
4 declaration. And that's it.

5 Q. Okay. So, Dr. Lebby, I have a clean copy of
6 your declaration for your reference.

7 THE REPORTER: Shall I mark this?

8 MR. MEYER: Sure.

9 MR. HEFAZI: Are we going to mark them with
10 the same exhibit numbers --

11 MR. MEYER: She'll mark them.

12 MR. HEFAZI: -- like, 1003?

13 MR. MEYER: I was going to mark it as
14 Exhibit 1 to the deposition, because this is
15 Exhibit 1003 already.

16 MR. HEFAZI: So I'll leave it to you.

17 I mean, I think it gets a little bit
18 confusing.

19 What I've done in the past -- and it's
20 completely up to you -- is to mark it with the exhibit
21 numbers in the IPR proceedings, and then any new
22 exhibits wherever you guys left off, 2004, 2005, so
23 that's not two separate exhibit numbers. Page 17

24 MR. MEYER: That's fine.

25 If you want to, just review and make sure that

1 you agree that this is a full Exhibit 1003 and not -- as
2 far as you can tell, I'm not pulling any tricks.

3 MR. HEFAZI: I think there are 700 pages, but
4 I trust you didn't doctor it.

5 (Deposition Exhibit 1003 was marked for
6 identification.)

7 (Discussion off the record.)

8 BY MR. MEYER:

9 Q. And, Dr. Lebby, I also have a binder with all
10 of the prior art references of the grounds in it.

11 So I'll ask that you don't open the binder
12 unless I ask you to look at it.

13 THE REPORTER: Do you need me to mark that?

14 MR. MEYER: Nima, so this is all just -- it's,
15 you know, Exhibit 1001, 1004, and so on.

16 MR. HEFAZI: I guess you're going to introduce
17 them, right, and you'll mark them once you introduce
18 them?

19 MR. MEYER: I suppose we can do it that way.

20 If I ask him to look at one of them, then
21 I'll -- we'll have it marked.

22 MR. HEFAZI: Yes. But you're instructing him
23 not to look at it right now, so I don't know if you've
24 introduced it.

25 MR. MEYER: Yes.

1 MR. HEFAZI: Okay.

2 BY MR. MEYER:

3 Q. So, Dr. Lebby, earlier we discussed your work
4 in providing expert witness services.

5 So turning to page 233 of your declaration,
6 your CV -- I'll give you a minute to get there.

7 So turning to page 233 of your declaration,
8 your CV lists 164 total litigation matters that you have
9 worked on as an expert witness; right?

10 A. Yes, it does.

11 Q. And the first seven of those litigation
12 matters were more than 10 years ago.

13 Putting those first seven matters aside, you
14 have worked on 157 litigation matters in the last
15 10 years; right?

16 A. If you say so.

17 Q. So how many hours have you devoted to this
18 litigation matter?

19 A. I don't recall hours or invoices from last
20 year, so I have no idea.

21 Q. Are you able to give any sort of rough
22 estimate for how many hours you've worked on your
23 declaration? Page 19
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24 A. Not really.

25 Typically, an expert report is in the

1 50-to-100-hour range.

2 Q. And how much time would you estimate that you
3 spent preparing for your deposition today?

4 A. I haven't really totaled it up. I haven't
5 really thought about it.

6 I really only started looking at it on my
7 first call with counsel last Thursday.

8 I certainly haven't totaled the number of
9 hours I've spent going through the prior art and some of
10 the citations. So I don't have a number for you.

11 Q. Dr. Lebby, would you agree that over the last
12 10 years your primary professional activity has been
13 providing expert opinions?

14 A. I disagree.

15 Q. Okay. What would you consider to be your
16 primary professional activity over the last 10 years?

17 A. Since 2017, I've been a full-time employee of
18 Lightwave Logic.

19 Q. And how much time per week do you devote to
20 Lightwave Logic?

21 A. I do a full-time job, and I work typically
22 seven days a week.

23 Q. So turning to ~~www.artusCP.com~~ ^{Page 20} of your declaration which
24 is page 8 of the Exhibit 1003, in the "QUALIFICATION"
25 section of your declaration, the first specifics you

1 provide about your experience with LiDAR technology is
2 your work as an expert witness on the two litigation
3 matters listed in Paragraph 5.

4 Do you see that?

5 A. I do see that.

6 Q. Okay. And based on the civil case numbers you
7 provided, those two litigation matters match up to
8 Litigation Matters 39 and 41 in your CV.

9 So your Litigation Matters No. 62 of 164 on
10 page 239 of your Exhibit 103 -- 1003 -- I'll hold on.
11 I'll let you catch up.

12 So that's saying that the LiDAR cases you
13 identified were Nos. 39 and 41; right?

14 A. They were certainly LiDAR-orientated matters.
15 I would agree with you.

16 Q. Okay. Then Matter No. 62 on page 239 is --
17 would you agree that is a LiDAR matter as well?

18 A. No. 62 on page 13 of my CV is a LiDAR matter.
19 I would agree with you.

20 Q. And, also, Matter No. 107 on page 245 of your
21 declaration, you also identify the pertinent technology
22 as LiDAR; right?

23 A. That is correct. ^{Page 21}
24 is a LiDAR matter.

25 Q. And do you recall any other LiDAR litigation

1 matters that you have worked on?

2 A. I don't recall anything.

3 I'll have to go through the list, if you wish
4 me to do that.

5 Q. But sitting here today, other than the present
6 litigation between Ouster and Hesai, you don't recall
7 working on any LiDAR matters as an expert witness other
8 than the four prior litigation matters we just
9 discussed?

10 A. Well, like I just gave you, if you want me to
11 review the list -- I don't recall 150, 160 patent
12 litigation matters, off the top of my head. But I'm
13 happy to go through the list.

14 Q. Turning to Paragraph 3 of your declaration,
15 you refer to "a person of ordinary skill in the art," or
16 "POSITA," P-O-S-I-T-A; right?

17 A. So I'm on page 7, I'm looking at Paragraph 3
18 of Exhibit 1003.

19 Q. Right. So in Paragraph 3 you refer to a
20 person of ordinary skill in the art or POSITA; right?

21 A. Paragraph 3 is certainly to do with a person
22 of ordinary skill in the art, or POSITA, so I would
23 agree with you. www.apetusCR.com **Page 22**

24 Q. So if I use the term "POSITA" or "POSA" today,
25 you'll understand that I am referring to a person of

1 ordinary skill in the art at the time of the invention;
2 right?

3 A. That is right.

4 Q. And you have assumed the priority date of the
5 '515 patent is December 4th, 2018; right?

6 A. That's what it says in Paragraph 3 of
7 Exhibit 1003. That is correct.

8 Q. Okay. Are you aware that Ouster has filed a
9 Certificate of Correction addressing its claim to a
10 December 2017 priority date?

11 MR. HEFAZI: Objection; form.

12 THE WITNESS: I'm not aware of this.

13 BY MR. MEYER:

14 Q. Okay. So you have been providing expert
15 testimony at a prodigious pace since before 2018;
16 right?

17 MR. HEFAZI: What was that word?

18 MR. MEYER: Prodigious.

19 THE WITNESS: I would not phrase it that way.

20 But certainly I get a lot of referrals. And
21 it's a lumpy business. So I would agree with you some
22 months and weeks can be busy, and other months there's
23 nothing at all. www.apтусCR.com

Page 23

24 BY MR. MEYER:

25 Q. About 97 percent of that testimony has not

1 related to LiDAR; right?

2 MR. HEFAZI: Objection; form.

3 THE WITNESS: I believe that's incorrect.

4 BY MR. MEYER:

5 Q. And why do you think that that is incorrect?

6 A. LiDAR is an electronics and opto-electronics
7 and electro-mechanical system.

8 So my experience base in my career, plus all
9 these litigations, really helps address LiDAR-based
10 technology.

11 Q. But you would agree that about 97 percent of
12 the litigation matters that you've worked on did not
13 involve LiDAR products; right?

14 A. I cannot answer that categorically, because I
15 haven't reviewed all those cases to see if there were
16 LiDAR products associated with the litigations. So that
17 analysis has not been done.

18 But certainly, as I gave in my previous
19 answer, the 97 percent, or whatever number you came up
20 with, certainly has to do with electronics,
21 electro-mechanical systems, opto-electronics, printed
22 circuit boards, and then things that would be utilized
23 in LiDAR systems. www.apetusCR.com

Page 24

24 Q. Okay. Putting aside litigations and turning
25 to Paragraph 6 of your declaration, you also describe

1 being an invited panelist at the 6th Photonic Integrated
2 Circuits International Conference for the panel titled
3 "PICs for LIDAR"; right?

4 A. That's what it says in Paragraph 6. You read
5 that correctly.

6 Q. And there are no other references to LiDAR in
7 your "QUALIFICATION" section; right?

8 A. I will agree with you to the point that the
9 word "LiDAR" is not called out in my "QUALIFICATION"
10 section, Paragraphs 4 to 16 in Exhibit 1003, but that
11 doesn't take away from my experience base of
12 electronics, opto-electronics, as well as
13 electro-mechanical systems, all of which are utilized
14 in LiDAR systems.

15 Q. So, Dr. Lebby, I searched your CV.

16 And outside of the prior litigation matters
17 relating to LiDAR that we've already discussed, the only
18 other mention of LiDAR in your CV is as part of a list
19 of product types that you understand.

20 Does that sound right to you?

21 A. I have no idea how to answer that question.

22 I don't really understand where your question
23 is coming from. www.apetusCR.com **Page 25**

24 Q. Well, you would agree that your CV doesn't
25 emphasize your prior experience with LiDAR products;

1 right?

2 MR. HEFAZI: Objection; form.

3 THE WITNESS: Do you want me to continue
4 reviewing my CV, because there are another 80 pages to
5 go?

6 But I can give you an answer to your question.

7 LiDAR comes up a number of times.

8 I don't have a computer. I can't do a word
9 search.

10 But a lot of the work in my CV contributes to
11 LiDAR systems in the fields of electronics,
12 opto-electronics, electro-mechanical systems, packaging,
13 printed circuit boards. So there's a whole bunch of
14 things that fold into LiDAR in itself.

15 But if you want me to continue reviewing my
16 CV, I'm happy to do that.

17 BY MR. MEYER:

18 Q. So where has LiDAR come up in your CV that you
19 found in this latest review?

20 A. Like I just indicated, the components and the
21 technologies that go into LiDAR systems I've worked on
22 for the last 40 years.

23 So if you want me to go through my CV line by
24 line to answer that question, I'm happy to do that, but
25 it's probably going to take us, two, three hours.

Page 26

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1 Q. Can we stick with just the first six pages of
2 your CV, which are the pages prior to getting to your
3 expert witness experience? You reviewed those pages
4 just now; right?

5 A. Not really. I just did a scan. I didn't
6 really read it at all.

7 MR. HEFAZI: So let me just object to the
8 characterization of the CV to the extent it suggests
9 that everything that follows is just expert-witness
10 work.

11 BY MR. MEYER:

12 Q. So would you agree that in the first six pages
13 of your CV, LiDAR is not called out with any level of
14 particularity as a technology that you have worked with
15 extensively in your career?

16 A. I disagree.

17 Q. And where is LiDAR called out in the first six
18 pages of your CV?

19 A. Like I've already indicated on record, I have
20 experience in the last 40 years in electronics,
21 opto-electronics, and electro-mechanical systems, all of
22 which have a bearing in the design of LiDAR systems.

23 Q. Dr. Lebby, you have hundreds of patents to
24 your name; right?

25 A. That is correct.

Page 27

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1 **Q. None of those patents are directed to or**
2 **discuss LiDAR; right?**

3 MR. HEFAZI: Objection; form.

4 THE WITNESS: Like I've already indicated
5 on record, there is 123 pages of details in my CV,
6 which covers my 40-year career in electronics,
7 opto-electronics, and electro-mechanical systems, all
8 of which play a role in LiDAR systems.

9 BY MR. MEYER:

10 **Q. You have no patents on electric motors;**
11 **right?**

12 A. I'd have to double-check. There's not a lot
13 of detail of my patents. I don't recall some of my
14 earlier patents.

15 But I believe that could be correct, although
16 some of the patents may have played a role.

17 **Q. So turning to Paragraph 39 of your**
18 **declaration, in your opinion, a POSITA for the '515**
19 **patent need not have any experience with LiDAR systems;**
20 **right?**

21 A. In Paragraph 39 of my declaration, which is
22 Exhibit 1003, I indicate what my opinion of a POSITA
23 is. I indicate that that person as of -- as of the
24 priority date of the '515 patent, which is the 4th of
25 December, 2018, would have an undergraduate degree in

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Page 28

1 mechanical or electrical engineering and two to
2 three years of work experience with electro-optical, and
3 electro-mechanical devices or systems, all of which play
4 a role in LiDAR systems.

5 **Q. Right.**

6 **But under your definition of a "POSITA,"**
7 **someone could qualify despite having never worked with a**
8 **LiDAR system before in their career; right?**

9 **A. I believe that's incorrect.**

10 As I indicated in Paragraph 39 of my
11 declaration, Exhibit 1003, Chapter IV, which is entitled
12 "LEVEL OF ORDINARY SKILL IN THE ART," my opinion of a
13 POSITA, as of the priority date of the '515 patent,
14 which is the 4th of December, 2018, would have had an
15 undergraduate degree in mechanical or electrical
16 engineering, two or three years of work experience with
17 electrical -- electro-optical and electro-mechanical
18 devices or systems, all of which play a role in LiDAR
19 systems.

20 **Q. So in your opinion, a POSITA would need to**
21 **have two to three years of experience working on LiDAR**
22 **systems; right?**

Page 29

23 MR. HEFAZI: ~~www.aptusCR.com~~ objection, form.

24 THE WITNESS: That's incorrect.

25 As I indicate in Paragraph 39, Chapter IV of

1 my declaration, which is entitled "LEVEL OF ORDINARY
2 SKILL IN THE ART," as of the priority date of the
3 '515 patent, which is the 4th of December, 2018, a
4 person of ordinary skill in the art would have had an
5 undergraduate degree in mechanical or electrical
6 engineering, two or three years' work experience in
7 electro -- electro-optical and electro-mechanical
8 devices or systems, all of which play a role in the
9 design of LiDAR systems.

10 BY MR. MEYER:

11 Q. Okay. So in your opinion, a POSITA would not
12 need two to three years of experience working with LiDAR
13 systems; right?

14 A. As I've just indicated to your last three
15 questions, a person of ordinary skill in the art as of
16 the time of the priority date of the '515 patent, which
17 is the 4th of December, 2018, would have had an
18 undergraduate degree in mechanical or electrical
19 engineering and two or three years of work experience
20 with electro-optical and electro-mechanical devices or
21 systems, all of which play a role in the design of LiDAR
22 systems.

23 Q. Okay. So you ~~disagree~~ ^{www.artusCP.com} with me; right?

24 MR. HEFAZI: Objection. Asked and answered.

25 THE WITNESS: I'm not agreeing or disagreeing.

Page 30

1 I'm just giving you my interpretation and my
2 opinion of a person of ordinary skill in the art.

3 You're just trying to change the words around.

4 But it is very clearly put down in
5 Paragraph 39 of Exhibit 1003 under Chapter IV, which is
6 entitled "LEVEL OF ORDINARY SKILL IN THE ART," what my
7 opinion of a person of ordinary skill is.

8 You keep changing the words around, trying to
9 make complicated questions.

10 But it's very clearly put down in Paragraph 39
11 that that person, as of the priority date of the
12 '515 patent, which is the 4th of December, 2018, would
13 have had an undergraduate degree in mechanical or
14 electrical engineering, two to three years of work
15 experience with electro-optical and electro-mechanical
16 devices or systems. And that experience would be
17 sufficient to design LiDAR systems.

18 BY MR. MEYER:

19 Q. In your opinion, the two to three years of
20 work experience with electro-optical and electro-
21 mechanical devices or systems that you've described
22 would need to include experience working directly on
23 LiDAR systems; right? www.apetusCR.com Page 31

24 A. As you can see from what I've written down in
25 Paragraph 39 of my declaration, Exhibit 1003, the words

1 that I've written, in my opinion, as you can see there
2 in Paragraph 39, as of the priority date of the 4th of
3 December, 2018, they would have had an undergraduate
4 degree, which is a bachelor's degree, in mechanical or
5 electrical engineering and two to three years of work
6 experience.

7 And when I use the term "work experience,"
8 that's experience in industry, not at university, with
9 electro-optical or electro-mechanical devices and
10 systems.

11 As I've already indicated on record, if you've
12 got experience with electronics, opto-electronics,
13 electro-mechanical experience, you can design LiDAR
14 systems.

15 **Q. So this is a case about LiDAR; right?**

16 MR. HEFAZI: Objection; form.

17 THE WITNESS: So this is a case that concerns
18 the '515 patent. And the title of that patent is,
19 quote, "Rotating Compact Light Ranging System Comprising
20 A Stator Driver Circuit Imparting An Electromagnetic
21 Force On A Rotor Assembly," end quote.

22 So I would agree with you that LiDAR is
23 certainly utilized in this litigation case. **Page 32**

24 But even the '515 patent doesn't use the word
25 "LiDAR" in its title.

1 It's just like your previous question about
2 searching for the word "LiDAR" in my CV.

3 So I would agree with you that, yes, certainly
4 LiDAR is utilized in this case, but even the title of
5 the '515 patent doesn't even use the word "LiDAR."

6 BY MR. MEYER:

7 **Q. Dr. Lebby, would you agree that the**
8 **'515 patent claims are directed at a rotor-stator**
9 **structure that includes an integrated PCB motor for**
10 **rotating a LiDAR device mounted on a rotor relative to a**
11 **stator?**

12 MR. HEFAZI: Objection; form, to the extent it
13 mischaracterizes the claims.

14 THE WITNESS: Can you show me where you're
15 reading?

16 BY MR. MEYER:

17 **Q. I'm reading from my outline. So, no, I cannot**
18 **show that to you. I'm sorry.**

19 A. I don't know how to answer the question.

20 Certainly, I would agree with you to the
21 extent that the '515 patent does involve the use of
22 LiDAR and LiDAR systems, but also utilizes skills and
23 knowledge and experience in the electronics,
24 opto-electronics and electro-mechanical field.

25 **Q. So, then, you agree with me that the**

1 '515 patent claims are directed at a rotor-stator
2 structure that includes an integrated PCB motor for
3 rotating a LiDAR device mounted on a rotor relative to a
4 stator?

5 MR. HEFAZI: And just for the record, I'll
6 note that the '515 claims are not in front of Dr. Lebby
7 right now.

8 THE WITNESS: So I haven't had a chance to
9 really map out exactly the words that you described in
10 the '515 patent in terms of what the claims are directed
11 to.

12 However, in my declaration, I certainly, in
13 Chapter VII, give an overview of the '515 patent
14 beginning on Paragraph 65. And that continues to the
15 end of Paragraph 72 on page 49 of my declaration, where
16 I do detail what I see as my understanding of the
17 overview of the '515 patent.

18 And certainly within that section, I do opine
19 on what I see as the claims.

20 BY MR. MEYER:

21 Q. Dr. Lebby, turning to Paragraph 40 of your
22 declaration, you have opined that:

23 "The claims of the '515 patent are
24 directed at a rotor-stator structure that
25 includes an integrated PCB motor for

Page 34

www.artusCR.com

1 rotating a LiDAR device mounted on a
2 rotor relative to a stator, as well as
3 conventional electronics..."

4 Right?

5 A. I do write that sentence in Paragraph 40 of my
6 declaration, Chapter IV, under "LEVEL OF ORDINARY SKILL
7 IN THE ART."

8 Q. So what I'm trying to ask you is whether, in
9 your opinion, a POSITA would have had experience with
10 LiDAR.

11 Do you understand?

12 A. I understand the question.

13 Q. And so in your opinion, would a POSITA have
14 needed to have experience with LiDAR devices to qualify
15 as a POSITA?

16 A. As I indicate in Chapter IV, which is entitled
17 "LEVEL OF ORDINARY SKILL IN THE ART," in my declaration,
18 Exhibit 1003, not only in Paragraph 39, which I've
19 opined upon a number of times earlier in this
20 deposition, but also in Paragraph 40 -- you've read out
21 the first sentence, which says, quote:

22 "The claims of the '515 patent are
23 directed at a www.apatusCR.com stator structure that
24 includes an integrated PCB motor for
25 rotating a LiDAR device mounted on a

Page 35

1 rotor relative to a stator, as well as
2 conventional electronics," full stop.

3 I then go on in this paragraph, and I talk
4 about the types of folks, persons of ordinary skill in
5 the art, POSITAs, working on these types of devices.

6 And I reiterate, from Paragraph 39 to
7 Paragraph 40, that they typically hold undergraduate
8 degrees in mechanical or electrical engineering.

9 I also reiterate that two or three years
10 of work experience with electro-optical and
11 electro-mechanical devices would provide an engineer
12 with more specialized focus on the mechanical and
13 electrical technologies of underlying motors,
14 communication power electronics, as well as the optics
15 principles and devices that go into underlying LiDAR
16 technologies, which is exactly the same answer as I've
17 given half an hour ago to all your questions on this
18 subject.

19 **Q. Dr. Lebby, what experience do you have in**
20 **designing systems with rotor-stator structures that**
21 **include an integrated PCB motor for rotating a LiDAR**
22 **device mounted on a rotor relative to a stator?**

Page 36

23 A. I don't believe I've worked on a completed
24 LiDAR system as a product development, but I've
25 certainly worked on various components of LiDAR systems

1 that include the conventional electronics.

2 I've worked on rotors and stators; I've worked
3 on opto-electronics; I've worked on fiber optics; I've
4 worked on optics principles; I've worked on power
5 electronics; I've worked on photodetectors; I've worked
6 on lasers. So I've worked on many of the component
7 technologies that go into LiDAR systems.

8 But if your question is pertaining to have I
9 worked on a LiDAR product as a completed system, I think
10 the answer to that is no.

11 **Q. So what experience do you have in designing**
12 **systems that use rotor-stator structures?**

13 A. I certainly have experience in work in that
14 field in the British Government in the UK, as well as at
15 Motorola, when I was working in corporate research.

16 **Q. And what was that experience that you had**
17 **working on designing systems that use rotor-stator**
18 **structures while you were working for the British**
19 **Government?**

20 A. My work in the British Government was in the
21 '70s and '80s, so I don't recall all the details.

22 **Q. Do you recall the types of products that you**
23 **were working on that included rotor-stator structures?**

24 A. Defense-related, so I don't recall any
25 details. And if I did, I probably wouldn't be allowed

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Page 37

1 to say so.

2 Q. And what role did you play in that work for
3 the British Government in the '70s and '80s related to
4 rotor-stator structures?

5 A. I was an electronic engineer.

6 Q. Did you also work with mechanical engineers in
7 that work?

8 A. The answer is yes. But I don't recall a lot
9 of details.

10 Q. And so as the electronic engineer, what
11 responsibilities did you have in working with those
12 rotor-stator structures?

13 A. I don't recall any of the details.

14 I remember some of the fields I was in.

15 But if you want to find out more, I suggest
16 you call the British Government.

17 Q. You also discussed your experience in
18 designing systems that use rotor-stator structures when
19 you were working for Motorola; is that right?

20 A. That is correct.

21 Q. And what was that experience that you had
22 working at Motorola?

23 A. I don't recall those details, because that was
24 over 30 years ago.

25 Q. Do you recall the types of products that you

Page 38

www.aprusCR.com

1 were working on at Motorola when your work involved
2 rotor-stator structures?

3 A. Not really. I was involved in a whole
4 portfolio of corporate research products, but I don't
5 recall many details tonight -- today.

6 Q. Do you recall any of the activities that you
7 performed at Motorola on rotor-stator structures?

8 A. Well, today I can't -- today I can't recall
9 any of those details.

10 Q. As far as your experience in designing systems
11 that use rotor-stator structures, you mentioned the
12 British Government and Motorola.

13 Did you have any other experience in designing
14 systems that used rotor-stator structures?

15 A. I don't believe I've been involved in the
16 design of those types of rotor-stator systems, but
17 I've certainly been privy to those types of systems
18 in a number of my roles during my career. So if you
19 take away the word "design," certainly I've been
20 privy to different types of technologies in various
21 roles.

22 Q. So when you say that you didn't work
23 specifically on designing systems that use rotor-stator
24 structures, were you referring to your entire career or
25 your entire career excluding work for the British

Page 39

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1 **Government and Motorola?**

2 A. I haven't really thought about that answer, so
3 it was just a general statement.

4 But in terms of -- first of all, I've already
5 indicated on record I don't believe I've designed a
6 LiDAR system.

7 But I've certainly worked on all of the
8 different components that go into a LiDAR system. And
9 I've certainly worked in various roles over my career
10 that review and look at different technologies that
11 include rotating systems and non-rotating systems that
12 involve opto-electronics.

13 **Q. Can you recall any specific systems that you**
14 **designed that utilize rotor-stator structures at any**
15 **point in your career?**

16 A. I can't recall anything today.

17 But, then again, I haven't really thought
18 about going through my CV in great detail as preparation
19 for this deposition.

20 But if you'd like me to do that, I can
21 certainly do that and add a report or something
22 afterwards.

23 **Q. Dr. Lebby, do you have any experience in**
24 **modifying the motor assemblies in existing products that**
25 **use rotor-stator structures?**

Page 40

1 A. Can you define "existing products"?

2 Q. It would just be a design or a product or some
3 sort of physical device that already exists.

4 A. That doesn't give me any clarification of my
5 question.

6 Q. So I'm asking if you have experience in
7 modifying motor assemblies that already exist for use in
8 a new rotor-stator structure.

9 Do you understand that question?

10 A. What do you mean by "new rotor-stator
11 structure"? What's "new"?

12 Q. Well, it would be new because there's a
13 modification made to the existing structure that you're
14 looking at as a reference.

15 A. Is "new" 1970, or is "new" 1990, or is "new"
16 2010?

17 Q. New relative to the fact that there was an
18 existing device, and now you've modified it to create a
19 different device.

20 A. And what do you mean by "modified"?

21 Q. Changed.

22 A. So what's changed?

23 Q. I suppose it ~~could be~~ anything.

24 If you change anything about the device,
25 you've -- you've changed it; right?

Page 41

1 A. I still don't understand your question.

2 MR. HEFAZI: Just to be clear, you're not
3 asking about, like, novelty or inventive change or
4 anything like that?

5 MR. MEYER: No.

6 I'm asking about his work experience. But,
7 yes, correct, I'm not asking anything about novelty.

8 **Q. As far as inventiveness goes, I'm not asking**
9 **about inventiveness.**

10 I'm just asking about your work experience and
11 whether you have any experience in your 40-year career
12 in looking at a motor assembly and modifying it.

13 A. I certainly think I have that experience in
14 my work at the UK British Government and at Motorola's
15 corporate research.

16 **Q. And what motor assemblies at Motorola did you**
17 **modify?**

18 A. I worked on a number of different projects.
19 I don't recall many of the details now.

20 **Q. Do you recall the size of the devices?**

21 A. Not really.

22 **Q. What do you recall about that work at**
23 **Motorola?**

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Page 42

24 A. I don't recall much at all because it's 30,
25 35 years ago.

1 Whatever is written in my CV is -- is the only
2 stuff I ever see, and I haven't even read that for a
3 long time.

4 **Q. Do you recall if that work for Motorola was on**
5 **DC motors?**

6 A. I don't recall that level of detail.

7 But certainly that would be something that
8 I'm sure that we would have reviewed and covered at some
9 point.

10 **Q. Turning to Paragraph 41 of your declaration,**
11 **the sixth line down, you mention, quote, "work on**
12 **rotating motors," unquote.**

13 **What was that work?**

14 A. Like I just indicated on record, I don't
15 recall many details.

16 **Q. Do you recall having any experience with**
17 **brushless DC axial flow motors?**

18 A. If I can't remember at a high level what I did
19 at Motorola, then I certainly can't remember some of the
20 technical details you just indicated in your question.

21 So I don't know the answer.

22 MR. HEFAZI: And, Counsel, we've been going
23 for about an hour, so whenever ^{Page 43} ~~www.aptusCP.com~~ is a good stopping
24 point...

25 / / / / /

1 BY MR. MEYER:

2 Q. Dr. Lebby, would you like a break?

3 A. Yes.

4 Q. Okay. Let's take a break.

5 THE REPORTER: Off the record?

6 MR. MEYER: Yes.

7 (Recess taken: 10:27 a.m. until 10:43 a.m.)

8 BY MR. MEYER:

9 Q. Dr. Lebby, what were the issues facing a
10 POSITA in the field of the '515 patent at the time of
11 the invention?

12 MR. HEFAZI: I'm just going to object to form
13 to the extent it assumes facts.

14 THE WITNESS: So the question pertains to what
15 were the issues around the '515 patent at the priority
16 date of the 4th of December, 2018.

17 I don't have the patent in front of me.

18 But certainly these types of answers are given
19 in the background of the patent, which is usually in
20 Column 1.

21 But I can't recall that from memory.

22 What I have done in my expert declaration,
23 which is Exhibit 1003, www.apetusCR.com **Page 44** given an overview of the
24 '515 patent, at least from my standpoint. And we can
25 see that I've covered some of the basic functional

1 things that a LiDAR system would need to incorporate.

2 So the high-level answer to your question is,
3 you know, a competitive LiDAR system that will be
4 suitable to be able to be sold in the marketplace.

5 BY MR. MEYER:

6 Q. Dr. Lebby, what technological problems was the
7 LiDAR industry facing at the time of the invention?

8 MR. HEFAZI: Objection, again, to form. It
9 assumes facts.

10 THE WITNESS: On a very high level, the LiDAR
11 industry is still suffering the same problems today as
12 it did at the priority date of the '515 patent, which is
13 the 4th of December, 2018, which is a cost-competitive
14 LiDAR system that is -- that can perform for different
15 types of market applications.

16 BY MR. MEYER:

17 Q. So in Paragraph 5 of your declaration -- you
18 don't have to turn to it -- you cited your work on
19 litigation between Waymo and Uber in 2017.

20 Does that sound right to you?

21 A. It does sound correct.

22 Q. Okay. I'm not asking about any intellectual-
23 property issues. www.apтусCR.com Page 45

24 I'm just wondering if you recall what
25 technological problems companies like Waymo and Uber

1 **were facing in 2017.**

2 A. In 2017 and the priority date of the
3 '515 patent, which is 4th of December, 2018 -- so in
4 that period, LiDAR systems were suddenly functional
5 technologically.

6 But your question pertains to what problems.

7 Well, first of all, these things are still too
8 expensive, and they're still too expensive today.

9 But certainly they involve electronics; they
10 involve opto-electronics; they involve electro-mechanical
11 system.

12 And coming with the use of opto-electronics
13 and electronics are issues of electronic power
14 consumption, heat, optical systems, accuracy of these
15 LiDAR systems.

16 And even in 2017 and 2018, those technological
17 issues that were important then are still important
18 today.

19 **Q. In your opinion, what kinds of forces would**
20 **the POSITA of the '515 patent consider when modifying a**
21 **prior art design for rotating a LiDAR device mounted on**
22 **a rotor relative to a stator?**

Page 46

23 MR. HEFAZI: www.aptusCR.com That's a mouthful.

24 Objection; form.

25 THE WITNESS: What do you mean by "forces"?

1 BY MR. MEYER:

2 Q. Say, for example, would a -- would the POSITA
3 for the '515 patent have considered gyroscopic forces
4 when making a modification to a prior art design for a
5 rotor-stator structure?

6 A. In the time frame of 2017 and 2018, which is
7 the priority date of the '515 patent, a POSITA certainly
8 would look at a number of issues to, as you put it,
9 modify or design or optimize or hone a LiDAR system,
10 depending on what the specifications would be.

11 Gyroscopic forces are certainly something
12 that a POSITA may have reviewed, as well as vibrational
13 forces, electromagnetic forces, stability forces,
14 temperature forces -- or temperature effects is what is
15 more commonly used in the industry -- and certainly
16 rotational effects.

17 There's plenty of different electro-mechanical
18 issues a POSITA would look at in addition to gyroscopic
19 forces.

20 Q. So in addition to vibration, stability,
21 electromagnetic forces, temperature effects, rotational
22 effects, and gyroscopic forces, is there anything else
23 you can think of that a POSITA for the '515 patent would
24 have considered when modifying or optimizing the design
25 for a rotor-stator structure?

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Page 47

1 A. So, for the record, my previous answer was not
2 exhaustive. It was illustrative.

3 And so I wasn't there to give you a complete
4 list of things that a POSITA would think about.

5 But there's plenty of other things a POSITA
6 would think about, including some of the opinions that
7 I've created in my declaration. It could well be the
8 design of wires and coils. It could be the design of
9 windings. It could be the design of the weight. It
10 could be the design of the size. It could be the
11 design of the power.

12 So I think even this list is not exhaustive.

13 But we can certainly turn to my declaration,
14 where I have given some opinions on some of these.

15 **Q. Would it be fair to say that any issues you**
16 **thought were pertinent you discussed in your**
17 **declaration?**

18 A. Well, the answer to that question is, it
19 depends. It depends what I was looking at in the '515,
20 what I was looking at in terms of the prior art that I
21 put together in terms of a different range of grounds,
22 and what the '515 draws its claims to.

Page 48

23 So certainly, www.apptusCR.com as you look through my opinions
24 in my declaration, you'll see that I've made my opinions
25 in relation to claimed elements for both the independent

1 and the dependent claims.

2 And so it just depends.

3 **Q. When a LiDAR is mounted to a rotor platform,**
4 **undesirable vibrations could be caused by any imbalance**
5 **or misalignment; right?**

6 A. Well, as is generally known in rotating
7 structures, depending on the rotation speed, because
8 that will have an affect, yes, vibration and balance is
9 certainly an issue.

10 Just look at your washing machine at home. If
11 you put your clothes on one side of your washing
12 machine, you're going to get that thing to rock and hit
13 the wall.

14 So balance and vibration are certainly issues
15 to be dealt with when you have motion.

16 **Q. What dynamic forces during operation could**
17 **cause vibrations in a rotating system with a LiDAR**
18 **mounted to a rotor platform?**

19 MR. HEFAZI: Objection. Incomplete
20 hypothetical.

21 (Pause in the proceedings due to technical
22 difficulties: 10:56 a.m. until 11:00 a.m.)

23 MR. MEYER: www.aatusCR.com (Addressing the reporter) Please
24 repeat the question for him.

25 THE WITNESS: That will be useful.

Page 49

1 Thank you.

2 (Whereupon, the record was read as follows:

3 "Question: What dynamic forces during
4 operation could cause vibrations in a
5 rotating system with a LiDAR mounted to a
6 rotor platform?")

7 THE WITNESS: So I give various answers in my
8 declaration, Exhibit 1003.

9 For example, beginning at Paragraph 253, which
10 is in the Section 12, "Motivation to Combine." And the
11 Paragraph 253 begins with my fifth reason for motivation
12 to combine.

13 But within that section, I do address my
14 opinions of the issues of vibrations in rotating systems
15 that can arise from various different issues, especially
16 in relation to the attachment between the rotor and the
17 stator.

18 For example, there could be oscillation there;
19 there could be vibration there; there could be excessive
20 movement there.

21 And these types and effects can cause
22 significant wear and tear. They can certainly produce
23 something that would be imbalanced. They could
24 certainly produce something that could wear out more
25 quickly than expected, i.e., reduce the lifetime. And

1 certainly they could affect the integrity of the system
2 as a whole.

3 In that Paragraph 253, I go on to explain a
4 little bit more.

5 But that's the high-level answer to your
6 question.

7 BY MR. MEYER:

8 Q. So in your Paragraph 253, at one point you
9 state -- you describe "vibrations caused by any
10 imbalance, misalignment, or other dynamic forces during
11 operation."

12 So I'm wondering what other dynamic forces
13 during operation you were contemplating in this
14 paragraph.

15 MR. HEFAZI: Are you looking at Paragraph 253?

16 I was having trouble finding the sentence that
17 you had read off, but I think it's on the next page.
18 253 is a long paragraph.

19 THE WITNESS: So Paragraph 253 of my expert
20 report, Exhibit 1003, certainly, as part of the
21 "Motivation to Combine" section, as part of the first
22 ground, which is Pacala, P-a-c-a-l-a, Johnson, Pardhan,
23 P-a-r-d-h-a-n, and Zhang, Z-h-a-n-g, certainly does
24 detail a number of issues that could affect a rotating
25 system with a rotor and a stator.

1 The question pertains to what other dynamic
2 forces that could affect this that I haven't actually
3 expressly called out, at least in this paragraph.

4 I have expressly called out, for example, heat
5 in other parts of my declaration.

6 I don't believe I've expressly called out
7 moisture.

8 Moisture, for example, can have an effect on a
9 rotating LiDAR system that is mounted on the top of a
10 vehicle that's exposed to the environment.

11 So to answer your question, heat and moisture
12 are two other dynamic forces that could affect the
13 long-term operation of a LiDAR system. So, that was my
14 answer.

15 **Q. What about fluid dynamics; is that something a**
16 **POSITA of the '515 patent would have considered as one**
17 **of these dynamic forces during operation that could**
18 **cause vibrations in a rotating system?**

19 MR. HEFAZI: Objection; form. Incomplete
20 hypothetical.

21 THE WITNESS: So I believe I qualify as a
22 POSITA, as indicated in my declaration. I believe that
23 was Paragraphs 39 to 42. www.aptusCR.com **Page 52**

24 And within that section, I indicated that a
25 POSITA would certainly have experience with electronics,

1 opto-electronic, and electromechanical systems.

2 I certainly did not expressly call out fluid
3 dynamics.

4 But even in my experience over my career, I've
5 certainly dealt with fluid dynamics in a number of
6 different situations, especially for cooling-type
7 situations, because, as we all know, the turret of a
8 LiDAR system that is mounted on top of a motor vehicle
9 gets very hot in the environment. And so there will be
10 innovative ways to try and figure out how to keep the
11 heat under control, because excessive heat can actually
12 affect the lifetime and operation of a LiDAR system.

13 BY MR. MEYER:

14 Q. So turning to page 21 of your declaration, you
15 considered nine grounds in this proceeding; right?

16 A. I did.

17 Q. And Ground 1, as I believe you said earlier,
18 is based on the combination of Pacala, Johnson, Pardhan,
19 and Zhang; right?

20 A. That is correct. It is a four-based prior art
21 ground for Ground 1.

22 MR. HEFAZI: I've been calling it Zhang, but I
23 guess it's Chang (phonetic) ^{Page 53} ~~www.aprusCR.com~~ is what we were going
24 with.

25 MR. MEYER: It could be Chang (phonetic).

1 I think, technically, it's more like Chung
2 (phonetic), but people say Zhang, so I'm comfortable
3 with that. If we want to call it Zhang, we'll call it
4 Zhang.

5 So when we say Zhang, that's Z-h-a-n-g.

6 Q. Okay. And Grounds 2 through 7 utilize the
7 same combination of Ground 1 in further combination with
8 one to four additional references; right?

9 A. That is correct.

10 Q. And whereas Grounds 1 through 7 utilize Pacala
11 as the first reference, Grounds 9 and 8 utilize
12 "Pacala-2017" as the first reference; right?

13 A. That is correct.

14 Q. So why did you feel the need to add in
15 Pacala-2017 for Grounds 8 and 9, if the same claims are
16 already rendered obvious in view of Pacala in Grounds 1
17 through 7?

18 A. As I indicate in subsection 10 of my
19 declaration, Exhibit 1003, on -- starting on page 75, I
20 give an overview of Pacala-'17.

21 And in that overview, I detail the --
22 expressly what Pacala teaches.

23 And it teaches, www.apptusCR.com at a very high level, a lot
24 more in detail, than my first prior art which I used,
25 which is -- which is -- which I call in my expert report

Page 54

1 "Pacala," which is the 194.

2 The detail in Pacala-'17 is quite useful for
3 being a key component of a ground with some of the other
4 prior art I have because of the detail it gives in its
5 LiDAR design. And, also, it qualifies as prior art as
6 per the '515 priority date of the 4th of December, 2018.

7 **Q. Ground 2 utilizes the same references as**
8 **Ground 1, but adds the Cai reference; right?**

9 A. I agree. I've brought in an additional prior
10 art reference, Inventor Cai, to Ground 2, in addition to
11 Ground 1. So that creates a second ground.

12 **Q. And you opine that Ground 2 renders obvious**
13 **Claims 2, 4 through 6, and 17; right?**

14 A. That's what I've noted on page 21, if that's
15 the question.

16 **Q. Okay. But you also opine that Ground 1**
17 **renders those same claims obvious without Cai; right?**

18 A. I believe the answer to that is true, yes,
19 I've added Cai to Ground 2, as opposed to not using Cai
20 in Ground 1.

21 **Q. And why did you feel the need to modify the**
22 **combination of Ground 1 with Cai if Ground 1, in your**
23 **opinion, already renders Claims 2, 4 through 6, and 17**
24 **obvious?**

25 MR. HEFAZI: Objection. Vague and ambiguous.

1 Are you asking why he has alternative grounds?

2 MR. MEYER: No speaking objections, Nima.

3 MR. HEFAZI: Objection; form.

4 THE WITNESS: So as I indicate in my expert
5 declaration, Exhibit 1003, in Paragraph 260, where I
6 give a short introduction to Ground 2, I comment that,
7 quote:

8 "To the extent Ouster argues otherwise,
9 these claims are also obvious in further
10 view of Cai, as I discuss below," end
11 quote.

12 And so I put that in really at a high level,
13 because I felt some belts and suspenders were needed to
14 really support my prior art that I put together for
15 Ground 1. I wanted to do the same thing for a second
16 ground, because Cai has design features that directly
17 invalidate some of the claims.

18 BY MR. MEYER:

19 **Q. I have a similar question as to Ground 3.**
20 **Ground 3 utilizes the same references as**
21 **Ground 2, but adds Hall; right?**

22 A. So the reason I created a third ground with
23 the addition of Hall is because Hall really is a simple
24 addition in terms of components of a LiDAR system.

25 And you can see I indicate in Paragraph 283

1 to -- that I say, quote -- in 283 of my expert report,
2 Exhibit 1003, I say, quote (as read):

3 "To the extent Ouster contends that
4 Pacala-Johnson-Pardhan-Zhang-Cai does not
5 render obvious claims 5 to 6, these claims
6 are at least obvious in further view of
7 Hall, as I discuss below," end quote.

8 But at a high level, I'm using Hall and the
9 teachings of Hall specifically for Claim 5, where I
10 detail in the following two or three pages Hall's
11 system, as well as Claim 6, where I detail the
12 construction and layout and the design of the Hall
13 LiDAR system.

14 **Q. Doctor, as we have discussed before, you have**
15 **assumed the priority date of the '515 patent is**
16 **December 4th, 2018; right?**

17 A. That is correct.

18 I believe I've noted that a number of times
19 this morning.

20 **Q. I will represent to you that Ouster is**
21 **asserting the correct priority date is actually December**
22 **of 2017, based on a provisional patent application.**

23 I will also represent to you that if the
24 December 2017 priority date were accepted by the Patent
25 Office, that would mean Pacala-2017 would not qualify as

Page 57

www.artusCR.com

1 prior art.

2 Putting aside Grounds 8 and 9, if the '515
3 patent's priority date were December 2017, rather than
4 December 2018, would that change any of your opinions as
5 to Grounds 1 through 7?

6 MR. HEFAZI: So I'm just going to object.
7 That was a very long narrative. So I'm objecting to the
8 narrative and the representations.

9 Obviously, we disagree, you know, that there's
10 been any earlier priority date established.

11 But with that, if you understand the question,
12 feel free to answer.

13 THE WITNESS: So I think my answer will come
14 in two parts.

15 The first part is, as I look through my
16 exhibit list, which is pages 3, 4, 5, and 6 of my
17 declaration, Exhibit 1003 -- I don't know the
18 provisional number off the top of my head, but as I scan
19 through -- the provisional to the '515, off the top of
20 my head.

21 But as I scan through the exhibit list, I
22 don't believe I've reviewed that. If I have reviewed
23 it, it should be in my list. **www.aptusCR.com** **Page 58**

24 So that's the first answer to your question.

25 The second answer to the question is I've got

1 to look at the priority dates of both these patents.

2 Now, I believe I have the Pacala priority date
3 on Paragraph 128. And it seems that I've written here
4 that it was filed on the 26th of December, 2016.

5 But I don't know any information about the
6 '515 provisional, at least right now.

7 So I don't believe I can answer your
8 question, because I have no idea of any of the details
9 at this point.

10 BY MR. MEYER:

11 Q. So you're looking at Paragraph 128 of your
12 declaration; right?

13 A. Yes, I am.

14 Q. Okay. And per my question, I want you to put
15 aside Grounds 8 and 9 that use Pacala-2017. You don't
16 need to think about it.

17 I was just asking, if the priority date of
18 the '515 patent were December 2017, rather than
19 December 2018, would that change any of your opinions as
20 to Grounds 1 through 7, which utilize Pacala as the
21 first reference?

22 A. So I think -- I think the right answer is, I
23 don't know. www.apetusCR.com **Page 59**

24 I think what I have to do -- and I certainly
25 haven't given any opinions that I'm aware of in this

1 report on the '515 provisional.

2 I think what I'd have to do is go look at
3 what -- what it is, because you're asking me to give an
4 opinion whether Grounds 8 and 9 would be applicable.
5 And I don't know.

6 I would -- you know, typically what I do in
7 these situations is, I look at the file wrapper; I look
8 at the prosecution history; I see what the examiners
9 have said and what the applicants have said; and I look
10 at the priority dates. And then I can make an opinion.

11 But I certainly haven't done that in this
12 case.

13 So the answer is, I don't know.

14 But I think if you gave me an opportunity to
15 do that, I could certainly -- I don't know what the
16 procedure is here -- you know, submit a report or submit
17 some type of document, declaration. But I'm happy to do
18 that if that's what you would like me to do.

19 **Q. Well, again, I think you are misunderstanding**
20 **the question because I'm not asking about Grounds 8**
21 **and 9.**

22 **I'm only asking about Grounds 1 through 7;**
23 **okay?** Page 60
www.apptusCR.com

24 A. Okay.

25 **Q. So this isn't a question of whether any of the**

1 references in Grounds 1 through 7 would still qualify as
2 prior art.

3 I'm just asking if you can think of any
4 reason, sitting here today, why a December 2017 priority
5 date for the '515 patent would change any of your
6 opinions as to Grounds 1 through 7.

7 MR. HEFAZI: So I'm going to object to form.
8 I personally don't understand the question.
9 But if you understand --

10 MR. MEYER: No speaking objections, Nima.

11 THE WITNESS: So could you just repeat the --
12 the priority date that you're suggesting again? What
13 date was that?

14 BY MR. MEYER:

15 Q. It would be December 2017, rather than
16 December 2018.

17 A. So as I review my overview of prior art
18 references that I've used to create Grounds 1 to 7, and
19 those references are -- those references are Pacala,
20 Johnson, Pardhan, Zhang, Cai, Hall, Spector -- that's
21 S-p-e-c-t-o-r -- Droz, D-r-o-z, Yan, Y-a-n. And I
22 reviewed Chapter VIII, which is entitled "OVERVIEW OF
23 PRIOR ART REFERENCES," www.aprusCR.com 1003. **Page 61**

24 The first one, Pacala, has a priority date of
25 2014.

1 Johnson has a priority date of 2016.
2 Pardhan has a priority date of 2016.
3 Zhang has a priority date of 2017, that is,
4 June 2017.
5 Cai has a priority date of 2015.
6 Hall has a priority date of January 2017.
7 Spector has a priority date of June 2017.
8 Droz has a priority date of 2016.
9 Yan has a priority date of April 2017.
10 And so, in conclusion, I see all of the prior
11 art I've used in the first seven grounds to predate the
12 date you just indicated in your question, which I
13 believe was December 2017.

14 **Q. So does that mean that, in your opinion, a**
15 **December 2017 priority date would not change any of your**
16 **opinions as to Grounds 1 through 7?**

17 A. So as I just indicated on record, as I came
18 into this deposition, I gave you my declaration, and I
19 indicated to you these were my opinions.

20 Now you're asking me to create more opinions
21 on the fly.

22 I think I've just indicated to you that I've
23 quickly looked at the priority dates of the prior art I
24 used for the first seven grounds, and they predate.

25 But I also need to fully understand the legal

1 implications and the legal understandings of whether
2 it's just an earlier date or it needs to be a certain
3 time frame.

4 And so I don't know if I can expressly answer
5 that question right now, but certainly I'll be happy to
6 do that.

7 But right now, you have my opinions.

8 And I'm happy to give you more opinions if you
9 need that post-deposition.

10 **Q. And to be clear, I'm not asking you for any**
11 **legal determinations to bind you in that manner.**

12 **I'm just asking whether you think the one-year**
13 **difference between December 2017, rather than 2018,**
14 **would impact the knowledge of the POSITA.**

15 A. As -- as we've already indicated on record,
16 the knowledge of a POSITA that I'm imagining in this
17 particular litigation is indicated in Exhibit 1003,
18 Paragraphs 39 to 41, where I indicate in reasonable
19 detail what I expect the experience pace of this POSITA
20 to be.

21 I certainly haven't thought about an earlier
22 priority date, as you suggest.

23 I have just taken a quick look at the prior
24 art that I put together for the first seven grounds.
25 And I can see very quickly that the priority dates of

Page 63

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1 these pieces of prior art predate the -- let's call it
2 the "alleged priority date" that you've indicated in
3 your question.

4 But I certainly haven't really thought about
5 it.

6 I would like to think about it.

7 But I don't believe the qualifications for the
8 POSITA would change that much, given the criteria I've
9 outlined in Paragraphs 39 to 41 of my declaration.

10 **Q. Dr. Lebby, all of the Grounds 1 through 9**
11 **that you discuss in your declaration include the Pardhan**
12 **reference; right?**

13 A. That is correct.

14 **Q. I believe you describe the Pardhan reference**
15 **starting at Paragraph 93 in your declaration.**

16 **Please describe Pardhan to me at a high level.**

17 A. So I'm not sure what you mean by "at a high
18 level."

19 As we can see from my declaration,
20 Exhibit 1003, on page 58, I do spend two or three pages
21 to give an overview of the '308 piece of prior art.

22 And I also indicate that it is Exhibit 1006,
23 and it's entitled a "thermal rotary link."
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Page 64

24 I also indicate from Paragraphs 93 to 99 a
25 little bit of an overview of what Pardhan is.

1 But the question pertains to a high level, and
2 I believe the comment I made in Paragraph 99 addresses
3 the question. Quote:

4 "Pardhan is analogous art to the '515
5 patent because it is in the same field of
6 endeavor, i.e., structures and components
7 for rotating ranging systems," end quote.

8 So I believe that's a high-level comment,
9 which I think addresses your question.

10 **Q. That is a high-level comment.**

11 **It's more legalistic than I was hoping for.**

12 **Can you turn to -- let's see -- the top of**
13 **page 59 of your declaration, where you have provided an**
14 **annotated version of Pardhan's Figure 4?**

15 **Do you see that?**

16 **A. I do see that.**

17 **Q. Okay. So what is the green component in that**
18 **figure?**

19 **A. Well, as I indicate in Paragraph 96, which is**
20 **when I discuss Figure 4 from the Pardhan reference,**
21 **Figure 4 is the figure that I've annotated. Pardhan**
22 **calls it "HEAT SOURCE 406."**

23 **But in Paragraph 96 of my Exhibit 1003 of my**
24 **expert declaration, I call it a "'rotating LIDAR**
25 **device,'" end quote.**

Page 65

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1 Q. Okay. For reference, you also discuss this
2 figure in Paragraph 95, which is -- unfortunately, it's
3 the page before the figure, but that's okay.

4 So a LiDAR unit is an example of a heat source
5 in Pardhan; is that correct?

6 A. So Figure 4, as shown in, I guess,
7 Paragraph 95 of my declaration, is the figure that I've
8 annotated.

9 And I've annotated the heat source for 6 in my
10 prior answer. In my previous answer, I indicated that
11 was a rotating LiDAR device.

12 It certainly is part of a rotating LiDAR
13 device, but that's where the sensor is. That's where
14 the LiDAR sensor is.

15 And Figure 4 indicates that where the LiDAR
16 sensor is is a source of heat.

17 And on the right-hand side of that figure,
18 there's a -- I guess there's two boxes and an arrow
19 that shows that heat travels from the heat source down
20 through the rotor-stator plates of the LiDAR device
21 down to a cooling device, which is annotated in yellow,
22 numbered 408.

23 Q. That Cooling Device 408, what form can that
24 cooling device take?

25 MR. HEFAZI: Just for the record, the Pardhan

Page 66

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1 patent is not in front of Dr. Lebby.

2 THE WITNESS: So Cooling Device 408 is part of
3 the figure I've included in Paragraph 95 that I've
4 annotated.

5 I do not detail exactly what Pardhan has
6 specified in Pardhan's '308 patent.

7 But typically -- from the figure, you can see
8 that the heat generated from Heat Source 406, which is
9 the LiDAR sensor, generally travels in the downward
10 direction towards Cooling Device 408, which is indicated
11 by the arrow on the right-hand side for it to be cold.

12 A cooling device is typically, what I would
13 term in the engineering field, a thermal heat sink.

14 Typical thermal heat sinks are metallic.

15 But given I don't have the Pardhan reference
16 in front of me, I don't know if Pardhan teaches that a
17 cooling device could be other techniques for absorbing
18 heat and redirecting heat away from Heat Source 406 as
19 it travels down through Rotor 400 and Stator 402 towards
20 Cooling Device 408. So I don't have a lot of detailed
21 information in front of me.

22 But at a very high level, heat sinks are --
23 can be typically metallic, but they can also be designed
24 using other technologies as well.

25 / / / / /

Page 67

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1 BY MR. MEYER:

2 Q. With reference to your annotated version of
3 Pardhan's Figure 4 on page 59 of your declaration, you
4 have colored this component 410 purple.

5 Do you see that?

6 A. I do see that.

7 Q. And what is the purple component in your
8 annotated version of Pardhan's Figure 4?

9 MR. HEFAZI: Do you want him to look at the
10 Pardhan reference?

11 MR. MEYER: No.

12 MR. HEFAZI: Okay. I'll just object to form
13 to the extent he's not being allowed to view the Pardhan
14 reference.

15 THE VIDEOGRAPHER: An iPhone joined. I'm not
16 sure who that is.

17 THE REPORTER: Do you want to ask, or is it
18 not necessary?

19 MR. HEFAZI: Yes, I think we should know who
20 joined.

21 MR. MEYER: Whoever joined from their iPhone,
22 can you please state your name?

23 MS. BUSSEY: www.artusCR.com Megan Bussey, co-counsel. **Page 68**

24 MR. MEYER: Hello, Megan. Welcome back.

25 THE WITNESS: So the question pertains to

1 what is 410, which is what I've annotated in purple on
2 Paragraph 95 of Exhibit 1003.

3 I've indicated in Paragraph 96 that, quote:
4 "Pardhan teaches that the heat source
5 device may be a 'rotating LIDAR [sic]
6 device' that is directly coupled to the
7 rotor or coupled by way of coupling 410,"
8 brackets, "(purple)," which is the color
9 I've annotated in Figure 4, "such as LiDAR
10 on the top of the vehicle," end quote.

11 But I've looked through my report, because I
12 don't have Pardhan in front of me -- at least the
13 reference in front of me, and I can't look at the
14 specification.

15 And so the best way to answer that question of
16 what 410 is, as indicated in Figure 4, it really is a
17 figure that focuses on thermo-impedence.

18 And as indicated by the note to the right-hand
19 side of Figure 4, that shows heat travels in a downward
20 direction towards Cooling Device or Thermal Heat Sink
21 408.

22 So the best answer to your question is that at
23 least the function of 410 is a low-thermal-impedence
24 path that is on the route between Heat Source 406 and
25 Cooling Device 408.

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Page 69

1 BY MR. MEYER:

2 Q. In Paragraph 162 of your declaration, you are
3 discussing Limitation 14[e] of the '515 patent; right?

4 A. That is correct.

5 Q. In Paragraph 162 you state, quote:

6 "Figure 7B of Pardhan shows a support
7 component that comprises a rotor plate
8 (red) and sleeve (grey)...," unquote.
9 Is that correct?

10 A. That is a correct re- -- recite of part of
11 the sentence that I do write in Paragraph 162 of my
12 declaration, Exhibit 1003. I will add that the sentence
13 does continue, though.

14 Q. So the support component is the red part and
15 the grey part in the annotated Figure 7B from Pardhan on
16 page 97 of your declaration; right?

17 A. Well, I disagree with the way you phrase the
18 question.

19 What I've indicated here, that begins at
20 Paragraph 160 and it goes on to Paragraph 166, is how
21 I've used prior art to invalidate this Claim Limitation
22 14[e]. And Claim Limitation 14[e] is, quote:

23 "a support component comprising a sleeve
24 fitting over the shaft and a plurality of
25 arms extending away from the sleeve," end

Page 70

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1 quote.

2 So if you look at Paragraph 163, I indicate
3 the support component of Pardhan's "includes an upper
4 collar...that rests on the rotor plate 720..."

5 And I also indicate in that paragraph that
6 "that support component does not include arms extending
7 away from the sleeve."

8 So it is a subsection of the way I've
9 addressed the Claim Limitation 14[e].

10 **Q. So in your Paragraph 164 you propose that a**
11 **POSITA would have modified Pardhan's support component**
12 **to include arms; right?**

13 **Pardon me. I need to grab some power [sic].**
14 (Discussion off the record.)

15 THE WITNESS: So I do indicate the reasons
16 why I've indicated in Paragraph 164 of my declaration,
17 1003, why I use prior art to add arms to the claim
18 limitation -- to Claim Limitation 14[e] that includes a
19 plurality of articles extended away from the sleeve.

20 As I indicate in Paragraph 164, I give at
21 least a couple of reasons for doing that.

22 One is strengthening the attachment of the
23 sleeve, as well as the ~~www.artusCR.com~~ it houses, to the rotor
24 plate.

25 I also indicate in Paragraphs 248 to 256 in

1 the section on "Motivations to Combine," and especially
2 in Paragraph 253, where I talk about the desire, for
3 example, to minimize vibrations.

4 And I think one of the questions that came up
5 earlier in this deposition that wasn't in Paragraph 253
6 was one of the things that I didn't expressly call out,
7 which is important, is thermal impedance, the
8 direction -- well, one of the effects of the direction
9 of heat flow.

10 BY MR. MEYER:

11 Q. At the bottom of page 99 of your declaration,
12 you opine that including arms would, quote:

13 "...strengthen...the attachment of the
14 sleeve (and the bearings it houses) to the
15 rotor plate," unquote.

16 Is that correct?

17 A. Well, you've read the words correctly for the
18 last -- at least part of the last sentence in
19 Paragraph 164 of my declaration, Exhibit 1003.

20 I don't know if that addresses your question,
21 though.

22 Q. So you do not cite anything in Pardhan as
23 indicating the attachment of the sleeve and the bearings
24 it houses to the rotor plate needs to be strengthened;
25 right?

1 MR. HEFAZI: Objection. Form.

2 THE WITNESS: I will agree with you I didn't
3 cite anything -- well, I do cite in Paragraph 164,
4 Exhibit 1006, 1033.

5 But I don't know if I cited anything that
6 expressly pertains to strengthening the attachment of
7 the sleeve.

8 But as I've indicated from the figures on
9 page 99, this is general knowledge for an engineer in
10 terms of what's been shown in the four figures on the
11 top of page 99, which is part of Paragraph 164.

12 BY MR. MEYER:

13 Q. All right. In that paragraph you say
14 that "different bearing housing designs can be
15 interchangeably used with Pardhan's support
16 component"; right?

17 A. I do indicate in Paragraph 164 of my expert
18 declaration, Exhibit 1003, that a POSITA certainly
19 would have had the capability to interchange different
20 types of bearing-housing designs to be utilized with
21 Pardhan's support component.

22 And certainly I've indicated that in this
23 paragraph to do things such as strengthening the
24 attachment of the sleeve and the associated bearings
25 within the sleeve to the rotor plates.

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Page 73

1 And I don't see any reason why that would be a
2 disadvantage to the rotor plate.

3 Certainly, I see an advantage in both the
4 strengthening of that rotor plate as well as a
5 modification to improve the thermal impedance of that
6 plate in order to extract heat.

7 **Q. Paragraph 165, you propose that a POSITA would**
8 **implement Zhang's support structure on the rotor 720 of**
9 **Pardhan; right?**

10 A. Well, in Paragraph 165 of my expert
11 declaration, Exhibit 1003, I do opine on modifying
12 Pardhan with the use of Zhang and what Zhang teaches
13 in respect to the addition of arms to invalidate
14 Claim Limitation 14[e]. And so, yes, I agree that I've
15 used Zhang to do that.

16 **Q. So in Paragraph 165 you opine, quote:**
17 **"Pardhan's rotor 720 is already shown as**
18 **being a circular surface and thus it would**
19 **have been straightforward to implement**
20 **Zhang's support structure on the rotor 720**
21 **of Pardhan," unquote.**

22 **Did I read that correctly?**

Page 74

23 A. Yes, you read that correctly. www.apptusCR.com

24 **Q. So in this paragraph you rely on Zhang's**
25 **Figure 1; is that right?**

1 A. Well, I certainly use Zhang's Figure 1
2 from Exhibit 1007 for my opinion in Paragraph 165 of
3 my expert declaration, Exhibit 1003, to address
4 Claim Limitation 14[e].

5 But it also says -- there's a page 6 here as
6 well. I do copy one sentence, but I don't recall the
7 context of that sentence, because I don't have Zhang in
8 front of me.

9 But certainly Figure 1 and at least some of
10 the specification of Zhang I've used.

11 **Q. Can you please turn to Zhang in your binder?**

12 THE REPORTER: Am I to mark this?

13 MR. MEYER: Let's see.

14 Nima, we're marking this?

15 MR. HEFAZI: The entire binder?

16 MR. MEYER: No, no. Just, like, Zhang, do I
17 need to mark it or --

18 MR. HEFAZI: Yes, I think we should --

19 THE WITNESS: Take it out?

20 MR. HEFAZI: -- mark it.

21 Yeah, I would mark it.

22 THE WITNESS: Let me just take it out and --

23 MR. HEFAZI: www.vantusCR.com Anything you're introducing I
24 think we should mark.

25 MR. MEYER: Okay.

1 (Deposition Exhibit 1007 was marked for
2 identification.)

3 (Discussion off the record.)

4 BY MR. MEYER:

5 Q. All right. Dr. Lebby, can you turn to page 2
6 of Exhibit 1007?

7 A. I have that in front of me.

8 Q. So the abstract states:

9 "A rotating structure for a laser radar.
10 The structure comprises a stator (4), a
11 motor winding (2), a rotor pressing cover
12 (6), a rotor (1), and a bearing (3)."
13 Right?

14 A. It does say that, yes.

15 Q. If we turn to page 6 of Exhibit 1007, at the
16 top of the page, three technical advantages of Zhang's
17 design are identified.

18 Do you see that?

19 A. I do see that.

20 Q. And looking at the third one, it states,
21 quote:

22 "The present utility model configures
23 the rotor as an outer casing structure,
24 which encases the stator and bearing and
25 their internal signal transmission and

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Page 76

1 electrical power transmission
2 structures..."

3 **Did I read that correctly?**

4 A. It's the first part of the third technical
5 advantage that Zhang gives in Exhibit 1007, but there's
6 still some part of the sentence left to be read.

7 **Q. So Zhang configures the rotor as an outer**
8 **casing structure; right?**

9 A. So I would agree that Zhang does use, on
10 page 6 of Exhibit 1007, in the third technical
11 advantage, quote, "an outer casing structure," end
12 quote.

13 **Q. And that outer casing structure is the rotor;**
14 **right?**

15 A. As indicated in Zhang, page 7 of Exhibit 1007,
16 the outer casing structure is denoted as No. 1 in
17 Figure 2. Number 1 in Figure 2 is referred to as the
18 rotor. So I would agree with you.

19 **Q. Previously, when we were discussing**
20 **Paragraph 165 of your declaration, you pointed to a**
21 **quote from page 6 of Zhang; right?**

22 I will speed you along.

23 I think you were referring to page 6 of Zhang
24 and not page 6 of Exhibit 1007; right? They include --
25 there's Zhang's original numbers, and then there's also

Page 77

www.apetusCP.com

1 the exhibit page numbers.

2 I'll ask a question now.

3 So do you see in Paragraph 165 you have a
4 quote from Zhang that says, quote:

5 "('Preferably, at least one hollowed-out
6 heat dissipation hole is configured on the
7 end face of rotor.')

8 Do you see that?

9 A. I do see that.

10 Q. So if you turn to page 9 of Exhibit 1007,
11 would you agree that that sentence -- that sentence
12 fragment is in the first paragraph on page 9 of
13 Exhibit 1007?

14 A. Yes, I agree with you.

15 Q. And you'd agree that page 9 of Exhibit 1007 is
16 page 6 of the Zhang reference?

17 A. That is correct.

18 Q. Okay. And you would agree that the portion
19 you quoted in your declaration is only part of that
20 paragraph; right?

21 A. I agree I used just part of the first
22 paragraph on page 6 of Exhibit 1007, which is also, I
23 guess, Bates page 9. www.apetusCR.com **Page 78**

24 Q. And what is the -- what does the full
25 paragraph state?

1 A. So I'll read the full paragraph, and then I'll
2 explain. Quote, "In addition" -- and this is from
3 Exhibit 1007, which is the Zhang reference. Quote (as
4 read):

5 "In addition, referring to Figure 1,
6 preferably, where at least one
7 hollowed-out heat dissipation hole (12) is
8 configured on the end face of the rotor
9 (1), the heat generated during an
10 operation of the rotating structure inside
11 it can be released in time, increasing the
12 operating life of the rotating structure,"
13 full stop, end quote.

14 And my interpretation of this is that in any
15 LiDAR system where you have a rotor and a stator and
16 electromagnetic coils for motion, heat will be
17 generated.

18 The question is, what's the direction of that
19 heat, and where would heat dissipate?

20 So we can see from Pardhan, which is
21 Figure -- Figure 4 in Paragraph 95, there's a direction
22 of Heat Source 406 and an arrow pointing to that that's
23 relative warm, to a colder region, which is Cooling
24 Device 408.

25 Although this type of figure is not given in

1 Zhang, Zhang does teach that there is heat generated,
2 and there is a heat dissipation hole, No. 12, where some
3 of the heat will escape.

4 But we also have to think about this in terms
5 of thermal impedance.

6 If you look at Figure 2 of Zhang, we can see
7 that there is a significant amount of metal that
8 surrounds the rotor and the stator.

9 And as we all know from heat conductivity, by
10 using just a simple iron at home to iron your shirt, the
11 heat will conduct much faster and much more quickly in
12 metal than it will in air.

13 And so while there is a heat dissipation hole,
14 some of the heat will go through the hole, but the
15 majority of the heat will conduct through the metal,
16 because, as we know, metal has a much lower thermal
17 impedance for heat transfer.

18 And so I will agree that while the design does
19 allow a little bit of air, heat to escape through those
20 windows, 12, the majority of heat would go downwards, as
21 indicated in Pardhan, towards the metallic base.

22 MR. HEFAZI: And just while we're on that,
23 we're hitting 12:20. www.apetusCR.com **Page 80**

24 I don't know what time you're thinking about
25 breaking for lunch or when you're going to reach a good

1 stopping point for that.

2 BY MR. MEYER:

3 **Q. We could stop now, Dr. Lebby, if you would**
4 **like to have lunch.**

5 A. Yeah, I think that would be good.

6 **Q. Sure.**

7 A. We don't need a long lunch or anything.

8 MR. HEFAZI: Yeah. I think we can do a short
9 lunch.

10 THE REPORTER: May I go off the record?

11 MR. MEYER: Yes, please go off the record.

12 (Whereupon, the luncheon recess was taken at
13 12:20 p.m.)

14 ---o0o---

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Page 81

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1 AFTERNOON SESSION 1:01 P.M.

2 EXAMINATION BY MR. MEYER (Resumed)

3 BY MR. MEYER:

4 Q. Okay. So, Dr. Lebby, I see you put the binder
5 aside again, just for clarity in the transcript.

6 Let's turn to page 97 of your declaration.

7 MR. HEFAZI: Just for the record, the binder
8 are the exhibits other than 1003 that have been
9 introduced?

10 MR. MEYER: Yes.

11 And 1007 has been taken out of the binder.

12 MR. HEFAZI: That's right.

13 THE WITNESS: I'm on page 97.

14 BY MR. MEYER:

15 Q. Okay. So this figure on page 97 of your
16 declaration shows Pardhan's rotor plate in red and its
17 stator plate in blue; right?

18 A. In Figure 7B, which is from the Pardhan prior
19 art reference -- I've annotated in this figure the
20 rotor -- the rotor plate in red or pink and the stator
21 plate in blue. But there are other plates [sic] that
22 I've annotated in this figure.

23 Q. And what are the other plates that you've
24 annotated?

25 A. The other parts.

Page 82

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1 Q. Oh, parts? Okay.

2 A. Is there still a pending question?

3 Q. No pending question.

4 Dr. Lebby, are you able to determine from this
5 figure whether Pardhan's motor is axial flux or radial
6 flux?

7 A. As you can see from my declaration, which is
8 Exhibit 1003, on page 29, Paragraph 55, I show the
9 simple differences between axial flux and radial flux
10 machines in Paragraph 55. The axial flux motor is shown
11 on the right.

12 And if we look at Figure 7B from Pardhan, it
13 certainly resembles an axial flux motor.

14 Q. Dr. Lebby, are you familiar with the term
15 "slotted windings" in the context of brushless DC
16 motors?

17 A. So as I indicate in my expert declaration in
18 Section D, which is brushless DC motors, I do give a
19 background of different types of brushless DC motors,
20 and I even use the term "pancake motors," which is a
21 common term that is used in the field.

22 I do not actually talk about slotted designs.

23 But I do talk about www.apetusCR.com typical designs and how
24 they are physically set up and powered.

25 There's a number of definitions for slotted.

1 And I don't recall the exact definition in
2 this deposition. I certainly didn't prepare for that
3 coming in. But I recall it's probably something to do
4 with the physical design.

5 **Q. Turning to Paragraph 173 of your declaration,**
6 **at the top of page 104 you describe implementing, in**
7 **your words, "Pardhan's support component with Johnson's**
8 **rotor circuit board"; right?**

9 A. I certainly do opine in Paragraph 173 of my
10 declaration, which is Exhibit 1003, on the combination
11 of Pardhan and Johnson. And certainly the first part of
12 this paragraph really addresses thermal issues.

13 **Q. In your opinion, Johnson's rotor circuit**
14 **board should be positioned on the underside of Pardhan's**
15 **support component; right?**

16 A. I do indicate in Paragraph 173 of my expert
17 declaration, Exhibit 1003, what you just said in your
18 question, which is a combined system between Johnson and
19 Pardhan.

20 I would certainly look at the rotor-circuit-
21 board positioning on the underside of Pardhan's support
22 component. And I've certainly discussed this in
23 Paragraph 173. Page 84

24 **Q. And in Paragraph 173 of your declaration, you**
25 **show the location where Johnson's rotor circuit board**

1 should be considered with the red highlighting in the
2 figure at the bottom of page 104; right?

3 A. Well, I do show a combination, if you like, a
4 preferred embodiment of where Johnson's rotor circuit
5 could be positioned on the underside of Pardhan's
6 support component.

7 But as -- as indicated here, I only picked
8 this location because it made a lot of sense.

9 It doesn't have to be the only location.

10 But certainly I do opine in Paragraph 173 that
11 this location would be a reasonable solution to utilize
12 Johnson's rotor circuit with the Pardhan support
13 component.

14 Q. You propose replacing the elements highlighted
15 red in that figure on the bottom of page 104 with
16 Johnson's rotor circuit board; right?

17 A. I do show in Paragraph 173 of my declaration,
18 Exhibit 1003, that I certainly -- that is one solution,
19 at least from my standpoint, that would be a reasonable
20 way to combine Pardhan and Johnson for this claim
21 element, which is 14[g].

22 But as I have just indicated, that doesn't
23 have to be the only solution. ^{Page 85}
24 that I thought was reasonable and obvious to someone
25 like myself.

1 **Q. And when implementing this solution, Pardhan's**
2 **rotor magnets, 738a, would be replaced by Johnson's**
3 **magnets; right?**

4 A. As I indicate in Paragraph 173, certainly
5 Johnson's rotor circuit board should be positioned on
6 the underside of Pardhan's support component.

7 But when it comes down to magnets 738a and
8 transform windings 740a, I've indicated where I think
9 the preferred embodiment or the arrangement -- the
10 arrangement should be on the bottom of page 104 of my
11 declaration.

12 And I've also included, on the top of
13 page 105, that it's not only just magnets, but it's
14 magnets and transformer coils.

15 **Q. In your opinion, in the modified design you**
16 **describe in Paragraph 173 of your declaration, Pardhan's**
17 **support component will continue "to include the magnets**
18 **and transformer coils in the same position"; right?**

19 A. Well, I do indicate that in Paragraph 173,
20 where I'm looking at combining Johnson's rotor circuit
21 board and positioning that on the underside of Pardhan's
22 support component.

23 And, in particular, ^{Page 86}~~www.artusCR.com~~ you're looking at the
24 board, which includes the magnets and the transformer
25 coils.

1 I certainly do indicate that it will be a
2 natural fit and certainly would result in Pardhan's
3 support component continuing to include the magnets and
4 transformer coils in the same position on the underside
5 of the board. So I agree with your observation there.

6 **Q. You used the term "natural fit."**

7 **What do you mean by that?**

8 A. I used the term "natural fit," quote/unquote,
9 in Paragraph 173 of my expert declaration, Exhibit 1003.

10 In this case I thought -- the reason why I've
11 used this in the context that I'm looking at now, as I
12 go through this paragraph, is that it would -- would
13 not require any undue experimentation to go do this
14 combination, and it would be reasonably straightforward
15 for a POSITA to implement it.

16 **Q. Would it be a natural fit because it would**
17 **result in Pardhan's support component continuing to**
18 **include the magnets and transformer coils in the same**
19 **position?**

20 A. So in reference to your question about the
21 position of the magnets and the transformer coils,
22 which the question is really sourced from Paragraph 173
23 of my expert declaration, www.aplusCR.com Exhibit 1003, I do indicate on
24 page 147 in the paragraph that begins on page 146,
25 Paragraph 250, the motivations combined both Johnson and

Page 87

1 Pardhan.

2 And I indicate in this paragraph that one of
3 the reasons why this is a preferred embodiment that I
4 feel is reasonable is because it's providing a more
5 compact design with efficient use of space.

6 I also indicate that Johnson and Pardhan are
7 naturally suited for the -- for one another, given their
8 complementary nature of the rotor-stator structure.

9 I also indicate that the patents are all
10 sourced from the same company, and so I'm expecting some
11 level of alignment and similarity there from the design
12 standpoint.

13 So the combination looks to me reasonably
14 natural because I don't expect to see any undue
15 experimentation to put the two references together in
16 terms of a motivation to combine.

17 **Q. So is it your opinion that when Johnson and**
18 **Pardhan are combined, it results in a more compact**
19 **design?**

20 A. I certainly write those words in my
21 "Motivation to Combine" section that begins Section 12
22 on page 146 of my expert declaration, Exhibit 1003, and
23 this begins in Paragraph 248.
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Page 88

24 And I think your question pertains to my
25 comment on the second reason to motivate and combine

1 these references of Johnson and Pardhan.

2 And I do indicate on the top of page 147 I
3 think there is an opportunity to efficiently use the
4 space inside the LiDAR system with a compact design.

5 And as I look at this as a preferred
6 embodiment, I see good use of the available space that
7 is available in the region of the rotor and the stator.
8 I will also say it may not be the optimum use of space,
9 but certainly it looks to me like a good use of space.

10 **Q. Okay. Please turn to page 97 of your**
11 **declaration.**

12 **We were looking at this before.**

13 **I want to see the full rotor-stator**
14 **combination in Pardhan.**

15 **So the red rotor and blue stator shown on**
16 **page 97 of your declaration fit together and form an**
17 **interspace where Johnson's circuit boards would, in your**
18 **opinion, be placed; right?**

19 **A. Certainly looking at Figure [sic] 162, where**
20 **I've annotated Figure 7B of Pardhan, where the rotor is**
21 **annotated in red and the stator is annotated in blue --**
22 **and this is an exploded diagram where you do have a**
23 **grey sleeve and a green shaft -- I've indicated that**
24 **there would be an efficient use of space if we combine**
25 **the use of Johnson on the underside of the red rotor**

Page 89

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1 and, also, the upper side of the blue stator.

2 Certainly in this particular embodiment that
3 I'm discussing, I see that as an efficient use of space.

4 **Q. How could the combination you propose result**
5 **in a more compact design if Johnson's rotor and stator**
6 **circuit boards fit within Pardhan's rotor plate and**
7 **stator plate?**

8 MR. HEFAZI: I'm going to object to form as
9 vague and ambiguous as to the term "more compact," in
10 this instance, as a term of degree relative to what.

11 THE WITNESS: So as I indicate in the
12 "Motivations to Combine" section, which begins at
13 Paragraph 248, page 146 of my expert declaration,
14 which is Exhibit 1003, and goes on to Paragraph 256 --
15 I certainly indicate in both the second and third
16 reasons in the "Motivation to Combine" that I see a
17 good design opportunity to -- to combine Johnson's rotor
18 circuit board and position that on the underside of
19 Pardhan's support component. And this would include, as
20 I indicate in Paragraph 173, magnets and transformer
21 coils.

22 We can see from Figure 7B from Paragraph 162
23 of Pardhan, that this embodiment -- I could call it a
24 "preferred embodiment" -- would be a simple substitution
25 of parts. It wouldn't actually encompass any undue

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Page 90

1 experimentation. It would actually align very well with
2 the exploded figure of Pardhan in terms of implementing
3 this solution -- Johnson's solution in Pardhan.

4 And while I don't have any quantitative size
5 metrics, I certainly see this to be an efficient
6 solution that certainly would be within the capability
7 of a person of ordinary skill in the art when addressing
8 at least the Claim 14 and Claim Limitations 14[b].

9 BY MR. MEYER:

10 **Q. Turning to page 82 of your declaration --**

11 MR. HEFAZI: Counsel, just so the record is
12 clear, when you say these page numbers, are you
13 referring to the page numbers that are Bates stamped
14 on the bottom right or in the middle so that --

15 MR. MEYER: The bottom middle.

16 MR. HEFAZI: The bottom middle? So not the
17 Bates-stamped ones? They're just different.

18 MR. MEYER: Yes.

19 For Exhibit 1003, I believe Dr. Lebby and I
20 have both been using the pages at the bottom middle.

21 **Q. Is that right, Dr. Lebby?**

22 A. That's right.

23 **Q. Okay. At the top of page 82 of your**
24 **declaration, you provide two annotated figures from**
25 **Johnson; correct?**

Page 91

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1 A. That is correct.

2 Q. On the left you have colored Johnson's rotor
3 platform 310a red; right?

4 A. That is correct.

5 Q. And this is what you opine should be
6 positioned on the underside of Pardhan's support
7 component; right?

8 A. So certainly the Figures 3B and 3C from
9 Johnson are the ones that I'm looking at for the
10 motivation to combine Johnson with Pardhan, as indicated
11 in Paragraph 139 of my expert declaration, Exhibit 1003.

12 I also go on to discuss this in more detail in
13 Paragraphs 140 and 141.

14 Q. In Paragraph 140 of your declaration, you say
15 that Johnson does not expressly disclose the details for
16 assembling the rotating structure because those details
17 are provided by Pardhan; right?

18 A. So in Paragraph 140 -- I think your
19 observation is correct. Johnson does not expressly
20 disclose details for the assembly and mounting of the
21 rotating structure.

22 But certainly Pardhan does provide details of
23 what a support component looks like for assembling this
24 structure and shows clearly that it comprises a sleeve
25 that is positioned to fit over a shaft, 734, as

1 indicated on page 97, Figure 7B.

2 **Q. Is Pardhan incorporated by reference into**
3 **Johnson?**

4 MR. HEFAZI: Sorry. Can you repeat the
5 question?

6 BY MR. MEYER:

7 **Q. The question is --**
8 **Go ahead. The court reporter can repeat it.**
9 (Whereupon, the record was read as follows:
10 "Question: Is Pardhan incorporated by
11 reference into Johnson?")

12 MR. HEFAZI: Okay. So I'm just going to
13 object to the extent that neither reference is in front
14 of the witness and to the extent that it calls for a
15 legal conclusion.

16 THE WITNESS: My answer to that question is
17 that I don't have the patent in front of me, so I can't
18 see if there's anything incorporated by reference or
19 not.

20 Certainly I looked through my declaration,
21 Exhibit 1003, and I don't see any -- any mention to that
22 effect, but I can't confirm or deny whether it is there
23 or not. Page 93

24 BY MR. MEYER:

25 **Q. Dr. Lebby, do you state in your declaration**

1 what exactly, in your opinion, would have led one of
2 ordinary skill to the conclusion that the details for
3 assembling the rotating structure in Johnson are
4 provided by Pardhan?

5 A. I don't believe I detail any details on
6 assembly in my expert report.

7 But I also don't recall what's written in the
8 spec by either one of these references. I'm just going
9 on memory by now.

10 But looking at what I've written in
11 Paragraph 140 of my expert declaration, Exhibit 1003,
12 I don't have much other information to answer your
13 question with.

14 Q. On page 83 of your declaration, you explain
15 that, quote:

16 "Pardhan teaches that its support
17 component can be made of a 'metallic
18 material with a high thermal conductivity'
19 that transfers excess heat away from the
20 LiDAR sensor."

21 Correct?

22 A. Certainly your question reads what I have
23 written in Paragraph 140 of my expert declaration,
24 Exhibit 1003.

25 And certainly I have no reason to disbelieve

1 that metallic material with high-thermal conductivity is
2 normal, because we all know metals conduct heat much,
3 much better than heat being conducted through the air.
4 And I've already given an example of a home iron, where
5 the metal part of the iron really heats up much quicker
6 than the air around it.

7 I do indicate that Pardhan teaches that its
8 support component can be made of a metallic material.

9 But I don't have a specification in front of
10 me. So I believe that's shown in Figure 7B, for
11 example, 726 and 724, but I can't confirm that right
12 now.

13 **Q. Would you agree that aluminum and copper are**
14 **two examples of metallic material with a high thermal**
15 **conductivity?**

16 A. Generally speaking, depending on application
17 and the material structure of both copper and aluminium,
18 they are certainly metals that are considered high-
19 thermal-conductivity metals for a majority of
20 applications.

21 I'm sure there are certain situations where
22 they are not, but certainly, generally speaking, they're
23 considered metals that are utilized in some applications
24 to conduct heat.

25 **Q. Both copper and aluminium are highly**

1 **susceptible to eddy currents, e-d-d-y?**

2 MR. HEFAZI: Objection; form. Incomplete
3 hypothetical.

4 THE WITNESS: I believe both these metals,
5 depending on their material condition and quality, can
6 be susceptible to eddy currents.

7 Although I did not prepare myself coming into
8 this deposition to opine on eddy currents, I believe the
9 observation is correct for the general types of
10 materials you see in these types of applications.

11 BY MR. MEYER:

12 **Q. Turning back to page 82 of your declaration,**
13 **in Figure 3B of Johnson, which is shown on the left on**
14 **page 82 of your declaration, Johnson's magnets are**
15 **placed on the outer perimeter of the rotor platform;**
16 **correct?**

17 A. I've forgotten which page we were on.

18 **Q. We were on page 82 of your declaration.**

19 A. So as I look at Figure 3B and 3C from Johnson
20 on Paragraph 139 of my expert report, Exhibit 1003, I am
21 showing figures from Johnson that detail the arrangement
22 of the rotor and stator elements on circuit boards of
23 the structure. Page 96

24 I have annotated Figure 3B for the underside
25 of 310 to show the position of magnets.

1 Magnets are positioned on the outside of the
2 circuit board or the periphery of the circuit board and
3 are positioned at the perimeter. It looks like they're
4 slightly back from the perimeter. But they are
5 certainly positioned at the periphery in an arrangement
6 of north/south, north/south that continues 360 degrees.

7 **Q. The amount of torque provided by a brushless**
8 **DC motor generally depends on how close or far away the**
9 **magnets are from the central rotating axis; right?**

10 A. So as I indicate in Paragraphs 246, 247 of my
11 expert declaration, pages 144 and 145, Exhibit 1003, I
12 do indicate there is a relationship between the
13 positioning of the magnets from the central rotating
14 axis, versus the amount of torque that can be provided
15 by a motor. So there is a relationship there.

16 And depending on the design, then there are
17 different conditions or performances that can be
18 achieved by a motor in certain different preferred
19 embodiment designs.

20 **Q. So if less torque had been needed for**
21 **Johnson's motor, Johnson could have placed the magnets**
22 **closer to the central rotating axis; right?**

Page 97

23 A. Well, I think ~~that~~ www.apptusCR.com depends.

24 I mean, you're -- you're talking about simple
25 design choices here.

1 A POSITA would have understood that the
2 position of the magnets and the size of the LiDAR
3 system would have dictated some simple design choices
4 that would have allowed a POSITA to design whether the
5 system needed more or less torque or how the magnets
6 would be positioned.

12 Q. Turning to page 144 of your declaration, in
13 the figure at the top of the page, you added a red
14 circle to identify the location of the transformer coil
15 on Johnson's rotor; right?

18	Are we looking at page 144?
----	-----------------------------

20 THE WITNESS: So Johnson certainly, from the
21 figures shown on page 144, which is Paragraph 245 of
22 my expert declaration, Exhibit 1003, I've actually
23 annotated 310b -- 310b in a red ring in Figure 3B.

1 arranged around a center region in Figure 3B and
2 opposite to corresponding transforming coils within that
3 platform.

4 And I've certainly indicated in Paragraph 247
5 this is just one embodiment.

6 There are other embodiments, as Johnson
7 teaches.

8 So I'm just showing one potential embodiment
9 to address Claim 17, but I also give another reference
10 called Cai to also address Claim 17 as well.

11 BY MR. MEYER:

12 **Q. So on page 144 of your declaration, that**
13 **transformer coil you annotated in red is positioned**
14 **inside the perimeter of the magnets on Johnson's rotor;**
15 **right?**

16 A. As I indicated in my last answer to your
17 question, Paragraphs 245, 246, and 247 do opine that
18 I've annotated Figure 3B on the top of page 144 to show
19 that the transformer coils are within the magnets of
20 Stator Platform 330.

21 So I will agree with you. I have shown that
22 in Figure 3B, through the red annotation of the ring.
23 And I also discussed that www.apetusCR.com on the top of page 145. **Page 99**

24 But in Paragraph 147, I also indicate this is
25 just one preferred embodiment.

1 And Johnson does teach other configurations,
2 like Cai, where it has the transformer coils outside of
3 the magnets, is possible.

4 So there are other preferred embodiments that
5 a POSITA would certainly look to and, indeed, that would
6 be a simple design choice for a POSITA.

7 **Q. On page 104 of your declaration, just above**
8 **the figure at the bottom, you refer to Pardhan's magnet**
9 **738a and transform windings 740a.**

10 **Do you see that reference to magnets 738a and**
11 **transform windings 740a?**

12 A. Yes, I do.

13 **Q. In the figure from Pardhan at the bottom of**
14 **page 104 of your declaration, Pardhan also positions its**
15 **transformer coil inside the perimeter of the magnets on**
16 **its rotor platform; right?**

17 A. I would agree with you, looking at page 104,
18 your observation in Paragraph 173, that Pardhan does
19 teach that the rotor elements, i.e., magnet 738a and
20 transform windings 740a, are positioned around the
21 center shaft of the rotor-stator assembly.

22 But as I indicate further on in Paragraph 173,
23 a POSITA would have understood this to be a reasonable
24 design choice when looking at the overall specifications
25 that would be required to design a LiDAR system -- or

1 let's call it an operational LiDAR system for market
2 application, and could have certainly designed another
3 embodiment where the magnets and transform windings
4 would have been outside the coils.

5 But certainly I agree with you, this figure
6 does show them inside the coils.

7 **Q. With reference to Paragraph 173 of your**
8 **declaration, in your opinion, the fact that Johnson's**
9 **and Pardhan's transformer coils are, quote, "in the same**
10 **position," unquote, makes the two references a, quote,**
11 **"natural fit," unquote; right?**

12 A. Well, I do indicate it would be a natural fit.

13 But as I indicate in Paragraph 250 of my
14 declaration, Exhibit 1003, that -- you know, the term
15 "naturally suited" or "naturally fit" -- "fitted" are
16 simple design choices for the POSITA.

17 And I've indicated in that paragraph a POSITA
18 would be looking at compact designs, would be looking at
19 efficient use of space. A POSITA would be looking at
20 the complementary nature of the rotor-stator structure,
21 would look at, you know, the source of where the prior
22 art is coming from. In this case, I mean, it's -- it's
23 a singular company. www.apetusCR.com It's the same company.

Page 101

24 And, also, some of the other, you know,
25 elements a POSITA would look at would be the

1 electrical-mechanical performance.

2 And so as a procedure, I see this as a natural
3 framework, because -- I have just simply written that in
4 because this is a simple design of known components to
5 achieve a solution, which, to me, is an effective
6 embodiment of our LiDAR design.

7 Q. In your Paragraph 254 [sic], you explain that,
8 quote:

9 "...larger coils allow for a larger
10 separation distance between the primary
11 and secondary coils while maintaining a
12 reasonable power transfer efficiency."
13 Right?

14 A. I'm still trying to find it.

15 Q. Okay.

16 A. Oh, it's on 255. I see it now.

17 Q. Yes. My mistake.

18 A. So could you rephrase the question?

19 Q. Yes.

20 So in Paragraph 255 of your declaration, you
21 explain that, quote:

22 "...larger coils allow for a larger
23 separation distance between the primary
24 and secondary coils while maintaining a
25 reasonable power transfer efficiency,"

Page 102

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1 unquote.

2 Right?

3 A. I do see that in Paragraph 255 of my expert
4 declaration, Exhibit 1003.

5 The context of this is giving the POSITA some
6 simple design choices in how to configure the design
7 of the LiDAR system in reference to the physical
8 positioning and design of the primary and secondary
9 transformer coils.

10 And so the issue I'm addressing is that
11 Pardhan and Johnson have these magnets and coils closer
12 to the access of rotation for the LiDAR system, where a
13 POSITA can actually see there are design choices in
14 positioning, just like the Cai reference.

15 And I really can't predict how a POSITA would
16 like to design a system.

17 But it wouldn't take a lot of engineering to
18 actually design a system where the coils were physically
19 placed in a different part of the system, as well as in
20 terms of separation distance between primary and
21 secondary coils, and also design for what type of
22 power-transfer efficiency would be required for the
23 system specification. www.apetusCR.com I don't have those details at
24 hand.

25 But a POSITA would -- clearly has a number of

Page 103

1 knobs here that can be turned for design considerations.

2 **Q. The use of larger transformer coils would**
3 **allow the rotor and stator to be spaced at greater**
4 **distances from one another; right?**

5 A. Certainly within the design space, this is
6 certainly one solution that can occur.

7 I don't believe it's the only solution.

8 I believe there's other solutions where the
9 separation distance may not be larger, depending on the
10 design.

11 But certainly for a POSITA looking to
12 implement Johnson and Pardhan together, this certainly
13 would have been one of the design choices.

14 **Q. In a compact system where the rotor and**
15 **stator are not spaced at great distances, small**
16 **transformer coils could be used; right?**

17 A. From a POSITA's perspective, as I look at
18 Paragraph 254 and 255, where we're talking about the
19 potential design of a LiDAR system with respect to
20 primary and secondary coils, certainly there is a large
21 design space.

22 And certainly I'm sure there are situations
23 where, depending on where www.apptusCP.com coils are placed, the
24 performance would change.

25 So I haven't done simulations of different

1 LiDAR systems.

2 But I would agree with you, depending on the
3 position of these things and the design of these coils,
4 you're going to get different levels of specification
5 and performance. And those are really simple design
6 choices.

7 **Q. Turning to Paragraph 223 in your**
8 **declaration --**

9 MR. HEFAZI: Counsel, we've been going for
10 about an hour. When it is a good breaking point --

11 BY MR. MEYER:

12 **Q. This is a good breaking point, if you would**
13 **like a break, Dr. Lebby.**

14 A. I would.

15 Can we go off the record?

16 **Q. Yes.**

17 (Recess taken: 2:06 p.m. until 2:23 p.m.)

18 BY MR. MEYER:

19 **Q. Okay. Dr. Lebby, in your Paragraph 223,**
20 **which I see you have turned to, you refer to "U.S.**
21 **Patent No. 9,606,230 ('Nubling')."**

22 (Clarification requested by the reporter.)

23 MR. MEYER: ~~www.aatusCR.com~~ **Page 105** I have been calling it "Nubling"
24 or Nubbling (phonetic), N-u-b-l-i-n-g. It's Nubling.
25 That's most likely correct.

1 Q. I included it in your binder.

2 Can you please take it out now?

3 (Deposition Exhibit 1043 was marked for
4 identification.)

5 (Discussion off the record.)

6 BY MR. MEYER:

7 Q. Okay. Dr. Lebby, in Column 2 of Nubling --

8 I'll give you a chance to review the reference.

9 A. Okay. Column 2?

10 Q. Yes. So in Column 2 of Nubling -- and I'm
11 looking around Lines 10 to 13 -- it describes its
12 system as being designed in two parts, a base unit and a
13 sampling unit; right?

14 A. It certainly says that. I would agree with
15 you.

16 Q. And Nubling's sampling unit rotates relative
17 to the base unit; right?

18 A. That is my understanding. That is correct.

19 Q. Nubling states of its invention, beginning at
20 Column 2, line 22, that:

21 "The invention then starts from the basic
22 idea of setting the sampling unit into
23 rotation via a first circuit board of the
24 sampling unit."

25 Did I read that correctly?

Page 106

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1 A. You read it correctly.

2 Q. And then Nubling's Column 2 continues on by
3 describing the elements of the sampling unit.

4 And then at line 55 it states:

5 "These elements are supported by the first
6 circuit board so that the coupling between
7 the base unit and the sampling unit is
8 provided solely by the outwardly supported
9 first circuit board."

10 Right?

11 A. You read that correctly in Nubling '230,
12 Column 2.

13 Q. So Nubling's opto-electronics are supported
14 solely by the first circuit board; right?

15 A. Could you state the question again?

16 THE REPORTER: Do you want me to read it?

17 THE WITNESS: Yes, please.

18 MR. MEYER: Yes, please.

19 (Whereupon, the record was read as follows:

20 "Question: So Nubling's opto-electronics
21 are supported solely by the first circuit
22 board; right?")

23 MR. HEFAZI: www.aatusCR.com Page 107
I'm going to object to form.

24 THE WITNESS: So on review of Nubling '230,
25 certainly Nubling actually teaches that the

1 opto-electronics are mounted on the first circuit
2 board, 34, with -- with a photo-receiver 32 and a
3 photo-transmitter -- photo-transmitter 22.

4 And the photo-transmitter and photo-receiver
5 are part of a larger package which is mounted on the
6 first circuit board.

7 BY MR. MEYER:

8 Q. Nubling's rotor circuit board is not mounted
9 on the underside of a separate rotor plate, like the one
10 in Pardhan; right?

11 A. So the embodiment that I'm looking at for
12 Nubling, at least the preferred embodiment that is
13 called out in the patent, certainly shows the
14 opto-electronics mounting on the top side of the
15 circuit board, at least in this embodiment.

16 But Nubling does indicate that there is a
17 degree of flexibility in terms of the embodiments and
18 how to design the printed circuit boards and clearly
19 teaches that there is flexibility for designing extra
20 circuit boards as the need arises.

21 Q. Turning to Column 3 of Nubling at lines 14 to
22 21, Nubling teaches that because its first circuit board
23 is the rotor and a second circuit board forms the
24 stator, quote:

25 "The motor becomes extremely compact and

1 flat in this manner," unquote.

2 Correct?

3 A. So I would agree with your reading of lines 14
4 to 21 in Column 3 of Nubling '230.

5 I would also add, from a POSITA's perspective,
6 it's not clear to me exactly what "extremely compact and
7 flat" is for a LiDAR design.

8 But certainly Nubling is teaching that from
9 his perspective that the design -- the preferred
10 embodiment design that is shown in Figure 1 of Nubling
11 is compact and flat in its design.

12 But from my standpoint, from a POSITA
13 standpoint, I haven't seen any quantifiable metrics
14 that define what "compact" is.

15 However, Nubling does indicate in his
16 teachings that other printed circuit boards could be
17 utilized for other preferred embodiments as part of the
18 overall design and invention of the '230 patent.

19 **Q. Nubling does not teach the use of a central**
20 **shaft; right?**

21 A. In the preferred embodiment of Nubling '230 --
22 I'm looking at Figure 1 -- certainly what I've annotated
23 on page 130 of my expert report, www.artusCP.com Exhibit 1003, what I've
24 annotated in red is the rotor. And the rotor rotates,
25 as we've just indicated, about number 16, which denotes

Page 109

1 the axis of rotation.

2 The question pertains to a center shaft.

3 While a center shaft -- it just depends on how
4 you define a "center shaft."

5 The bearings for Nubling's Design 40 are
6 positioned centrally about the axis.

7 It depends on how you define "centrally."

8 We could argue it's a shaft. We could argue
9 it may not be a shaft.

10 But certainly it rotates about the bearings,
11 and that is a centrally located set of bearings.

12 Although I will admit it depends on the
13 definition of "shaft," but when I look at the shaft as
14 indicated in Pardhan, Pardhan has a Shaft 734, where one
15 could look at Nubling and say, "The shaft is between
16 Bearings 40." But that is something I haven't looked
17 into. But certainly it could be viewed from that
18 perspective.

19 **Q. Nubling teaches at Column 2, line 36:**

20 "...the first circuit board can be used
21 over its full area because no part of its
22 surface is required for the coupling to a
23 shaft." www.aplusCR.com **Page 110**

24 **Right?**

25 **A. I will agree with you that Nubling teaches in**

1 Column 2, lines 37 to 38 that, quote:

2 "...the first circuit board can be used
3 over its full area because no part of its
4 surface is required for the coupling to a
5 shaft," end quote.

6 So Nubling is teaching that his design is
7 different -- or at least his preferred embodiment is
8 different than a classic shaft-type scenario that we've
9 seen in Pardhan.

10 But the previous answer I gave was it depends
11 how you want to define a "shaft."

12 I indicated in my previous answer if you
13 wanted to define it as the outside or the perimeter of
14 the Printed Circuit Board 34, then possibly that could
15 be considered a shaft. But that's not something I've
16 opined upon. It's just an observation I am making.

17 **Q. In your opinion, Johnson teaches a similar**
18 **compact design using a PCB rotor and PCB stator; right?**

19 A. So when I look at the Johnson reference, I see
20 this as a classic PCB motor.

21 I would tend to agree with you, if you look at
22 the design of Nubling, it certainly looks like it's a
23 PCB rotor in a similar design-type feature, although
24 some of the component parts may be designed differently.
25 But I would put it into the category of a PCB motor.

Page 111

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1 **Q. In your opinion, one of ordinary skill in the**
2 **art considering Johnson would also look to Nubling;**
3 **right?**

4 A. So a person of ordinary skill in the arts
5 looking at Johnson certainly would consider Nubling in
6 the same field of endeavor because it is also a LiDAR
7 system.

8 **Q. Okay. Dr. Lebby, in Paragraph 33 of your**
9 **declaration, you list "objective factors" referred to as**
10 **"secondary considerations."**

11 **Do you see that?**

12 A. I do see that.

13 **Q. Did you consider any of these factors when**
14 **rendering the opinions in your declaration?**

15 A. So in my declaration, Exhibit 1003, I do
16 write in Section D, Paragraph 33 to 38, "Secondary
17 Consideration...", but as I did not call out a specific
18 chapter on secondary considerations, I have no opinions
19 to give on that.

20 **Q. So you did not consider whether the**
21 **petitioner, Hesai, copied an Ouster product that**
22 **practices the claims of the '515 patent; right?**

Page 112

23 A. I don't believe ~~there's~~ ^{www.aprusCP.com} anywhere in this
24 expert declaration, Exhibit 1003, where I've addressed
25 that question, but if that question is something that

1 needs to be addressed, I will be happy to do it.

2 Q. You also did not consider whether Hesai copied
3 the preferred embodiment shown in Figure 8A of the '515
4 patent; right?

5 MR. HEFAZI: Objection; form, to the extent it
6 assumes facts.

7 THE WITNESS: I don't recall what Figure 8A
8 is, off the top of my head, from the '515 patent,
9 because I don't have it in front of me.

10 But I certainly did not opine on the secondary
11 consideration that relates to the question being asked.

12 But I'm happy to do so, if that is required.

13 BY MR. MEYER:

14 Q. Okay. Dr. Lebby, we touched on this at the
15 beginning of the deposition.

16 I'm not asking for any privileged discussions
17 you may have had with counsel, but please answer the
18 following question to the extent that you can without
19 revealing any privileged information.

20 Did you determine that any reference or
21 combination of references that Hesai provided to you did
22 not render one or more of the challenged claims obvious?

Page 113

23 MR. HEFAZI: ~~www.aptusCR.com~~ Objection to form to the extent
24 it assumes facts.

25 And, also, there's a lot of negatives in

1 there, so it's vague and ambiguous.

2 But go ahead, if you can answer without
3 revealing privileged communications.

4 THE WITNESS: I am trying to unpack the
5 question. It's a complex question.

6 Is there any way you can simplify the
7 question, so I can try to answer it?

8 MR. HEFAZI: Are you just asking him whether
9 certain combinations he concluded didn't meet the
10 claims? Is that what you're asking about?

11 MR. MEYER: Yes.

12 MR. HEFAZI: If you can, rephrase it. There
13 were just a lot of negatives, so it's kind of...

14 THE WITNESS: So I certainly reviewed the
15 prior art, and I certainly aligned the prior art into
16 grounds, which I felt were reasonable to address all the
17 claim elements that I was addressing.

18 As you can tell, there are some common themes
19 with the prior art in some of the claims.

20 But, generally, my perspective of putting the
21 grounds together was that a lot of the references are
22 standard components that could be added to a system.

23 And so I looked at ~~www.apetusCR.com~~ **Page 114**
24 those components. And then I saw it wouldn't take a
25 lot of experimental research or experimentation to --

1 for a POSITA to put some of those components together to
2 create a ground that would certainly create a LiDAR
3 system, and that LiDAR system would align with what I
4 saw as the claim elements in the '515.

5 So I did create a number of different grounds
6 with the prior art, but I also had some common themes
7 there, too.

8 BY MR. MEYER:

9 Q. Okay. Dr. Lebby, I have no further questions.

10 MR. MEYER: I pass the witness.

11 MR. HEFAZI: I have no questions at this time.

12 Thank you, Dr. Lebby.

13 We can close this deposition.

14 THE REPORTER: Would you like a copy of the
15 transcript?

16 MR. HEFAZI: So I would like one. I think
17 regular delivery is fine for us.

18 THE REPORTER: You would like yours by
19 Thursday; right?

20 MR. MEYER: Yes.

21 (Discussion off the record.)

22 (Whereupon, the deposition was concluded at

23 2:53 p.m.) www.apetusCR.com **Page 115**

24 ---o0o---

25

CERTIFICATE OF REPORTER

I, JANE GROSSMAN, a Certified Shorthand Reporter, hereby certify that the witness in the foregoing deposition was by me duly sworn, to tell the truth, the whole truth, and nothing but the truth in the within-titled cause;

That said deposition is a true record and was taken in shorthand by me, a disinterested person, at the time and place therein stated, and that the testimony of said witness was thereafter reduced to typewriting, by computer, under my direction and supervision;

That before completion of the deposition, review of the transcript [] was [X] was not requested. If requested, any changes made by the deponent (and provided to the reporter) during the period allowed are appended hereto.

I further certify that I am not of counsel or attorney for any of the parties to said deposition, nor in any way interested in the events of this cause, and that I am not related to any of the parties thereto.

Dated: May 29, 2024


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Page 116

JANE GROSSMAN, CSR No. 5225

DECLARATION UNDER PENALTY OF PERJURY

Case Name: Hesai Technology Co. LTD. vs. Ouster, Inc.

Date of Deposition: 05/23/2024

Job No.: 10142500

I, MICHAEL STEPHEN LEBBY, PH.D., hereby certify
under penalty of perjury under the laws of the State of
_____ that the foregoing is true and correct.

Executed this _____ day of
_____, 2024, at _____.

MICHAEL STEPHEN LEBBY, PH.D.

NOTARIZATION (If Required)

State of _____

County of _____

Subscribed and sworn to (or affirmed) before me on
this _____ day of _____, 20____,

by _____, proved to me on the
basis of satisfactory evidence to be the person

who appeared before me. www.apusCR.com

Page 117

Signature: _____ (Seal)

1 DEPOSITION ERRATA SHEET

2 Case Name: Hesai Technology Co. LTD. vs. Ouster, Inc.
3 Name of Witness: Michael Stephen Lebby, Ph.D.
4 Date of Deposition: 05/23/2024
5 Job No.: 10142500
6 Reason Codes: 1. To clarify the record.
7 2. To conform to the facts.
8 3. To correct transcription errors.

9 Page _____ Line _____ Reason _____
10 From _____ to _____

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20 From _____ to _____

21 Page _____ Line _____ Reason _____
22 From _____ to _____

23 Page _____ Line _____ Reason _____
24 From _____ to _____

25 Page _____ Line _____ Reason _____
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Page 118

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2 Page _____ Line _____ Reason _____

3 From _____ to _____

4 Page _____ Line _____ Reason _____

5 From _____ to _____

6 Page _____ Line _____ Reason _____

7 From _____ to _____

8 Page _____ Line _____ Reason _____

9 From _____ to _____

10 Page _____ Line _____ Reason _____

11 From _____ to _____

12 Page _____ Line _____ Reason _____

13 From _____ to _____

14 Page _____ Line _____ Reason _____

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transcript is true and correct **Page 119**

23 _____ No changes have been made. I certify that the
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	51:20 54:19 56:5	13 21:18 106:11	175 5:9
	57:2 58:17 61:23	130 109:23	19 21:23
'nubling' 105:21	63:17 64:20 65:23	139 92:11 96:20	1900 4:16
'preferably' 78:5	69:2 70:12 71:17	14 91:8 108:21 109:3	194 55:1
	72:19 73:18 74:11	140 92:13,14,18	1970 41:15
	75:3 82:8 83:8	94:11,23	1990 41:15
	84:10,17 85:18 87:9,	141 92:13	1:01 82:1
(	23 88:22 90:14	144 97:11 98:12,18,	
	91:19 92:11 93:21	21 99:12,18	2
(1) 76:12 79:9	94:11,24 96:20	145 97:11 99:23	
(12) 79:7	97:11 98:22 101:14	146 87:24 88:22	2 54:6 55:7,10,12,13,
(2) 76:11	103:4 109:23	90:13	19,23 56:6,21 76:5
(3) 76:12	112:15,24	147 87:24 89:2 99:24	77:17 80:6 106:7,9,
(4) 76:10	10036-7703 5:19	14[b 91:8	10,20 107:2,12
(6) 76:12	1004 18:15	14[e 70:3,22 71:9,18	110:19 111:1
	1006 64:22 73:4	74:14 75:4	200 6:5
	1007 75:2 76:1,6,15	14[g 85:21	20004 6:6
-	77:5,10,15,24 78:10,	150 22:11	2004 17:22
	13,15,22 79:3 82:11	157 19:14	2005 17:22
—ooo— 4:3,24 5:2	103 21:10	16 25:10 109:25	2010 41:16
6:14 7:4,6,12,14	1033 73:4	160 22:11 70:20	2014 61:25
81:14 115:24	104 84:6 85:2,15	162 70:2,5,11 89:19	2015 62:5
-p-h 7:19	86:10 100:7,14,17	90:22	2016 59:4 62:1,2,8
1	1043 106:3	163 71:2	2017 20:17 23:10
	105 86:13	164 19:8 21:9 71:10,	45:19 46:1,2,16 47:6
1 17:14 44:20 53:17,	107 21:20,23	16,20 72:19 73:3,11,	57:22,24 58:3 59:18
21 54:7,10,16 55:8,	10:27 44:7	17	61:4,15 62:3,4,6,7,9,
11,16,20,22 56:15	10:43 44:7	165 74:7,10,16 75:2	13,15 63:13
58:5 59:20 60:22	10:56 49:22	77:20 78:3	2018 23:5,15 28:25
61:1,6,18 62:16	10th 5:4	166 70:20	29:14 30:3,17 31:12
64:10 74:25 75:1,9	11,287,515 4:7 9:25	17 55:13,23 99:9,10	32:3 44:16 45:13
77:16,17 79:5	11:00 49:22	173 84:5,9,16,23,24	46:3,16 47:6 55:6
109:10,22	12 50:10 80:2,20	85:10,17 86:4,16,19	57:16 58:4 59:19
10 19:12,15 20:12,16	88:21	87:9,22 90:20	61:16 63:13
54:18 106:11	123 28:5	100:18,22 101:7	2024 4:12 7:2
1001 18:15	128 59:3,11		21 53:14 55:14
1003 16:11 17:12,15	12:20 80:23 81:13		108:22 109:4
18:1,5 20:24 21:10			
22:18 23:7 25:10			
28:22 29:11 31:5,25			
35:18 44:23 50:8			
			Index: 'nubling'—21
	www.apetusCR.com		

22 106:20 108:3	310 96:25	41 21:8,13 43:10	65 34:14
223 105:7,19	310a 92:3	63:18 64:9	6th 25:1
23 4:12 7:2	310b 98:23	410 68:4 69:1,7,16,23	
230 107:11,24 109:4 18,21	32 108:2	42 52:23	7
233 19:5,7	33 112:8,16	49 34:15	7 20:23 22:17 54:6, 10,17 58:5 59:20 60:22 61:1,6,18 62:16 77:15
239 21:10,16	330 99:20	4th 23:5 28:24 29:14 30:3,17 31:12 32:2 44:16 45:13 46:3 55:6 57:16	700 18:3
245 21:20 98:21 99:17	34 108:2 111:14	5	70s 37:21 38:3
246 97:10 99:17	35 42:25		72 34:15
247 97:10 99:4,17	36 110:19		720 71:4 74:8,17,20
248 71:25 88:23 90:13	360 97:6		724 95:11
250 87:25 101:13	37 111:1	5 21:3 45:17 57:5,9 58:16	726 95:11
253 50:9,11 51:3,8, 15,18,19 72:2,5	38 111:1 112:16	50-to-100-hour 20:1	734 92:25 110:14
254 102:7 104:18	39 21:8,13 28:17,21 29:10,25 31:5,10,25 32:2 35:18 36:6 52:23 63:18 64:9	515 10:1 23:5 28:18, 24 29:13 30:3,16 31:12 32:18,24 33:5, 8,21 34:1,6,10,13, 17,23 35:22 44:10, 15,24 45:12 46:3,20 47:3,7,23 48:19,22 52:16 55:6 57:15 58:2,19 59:6,18 60:1 61:5 65:4 70:3 112:22 113:3,8 115:4	738a 86:2,7 100:9,10, 19
255 102:16,20 103:3 104:18	3B 92:8 96:13,19,24 98:23 99:1,18,22	55 83:8,10 107:4	740a 86:8 100:9,11, 20
256 71:25 90:14	3C 92:8 96:19	58 64:20	75 54:19
260 56:5	4	59 65:13 68:3	7B 70:6,15 82:18 83:12 89:20 90:22 93:1 95:10
26th 59:4	4 25:10 55:13,23 58:16 65:14,20,21 66:6,15 68:3,8 69:9, 16,19 79:21	6	8
283 56:25 57:1	40 26:22 27:20 34:21 35:5,20 36:7 110:5, 16		8 20:24 54:11,15 58:2 59:15 60:4,20
29 83:8	40-year 28:6 42:11		80 26:4
2:06 105:17	400 67:19	6 24:25 25:4 55:13,23 57:5,11 58:16 66:9 75:5 76:15 77:10,21, 23,24 78:16,22	80s 37:21 38:3
2:23 105:17	402 67:19	60 7:24	82 91:10,23 96:12,14, 18
2:53 4:14 115:23	406 65:22 67:8,18 69:24 79:22	62 21:9,16,18	83 94:14
3	408 66:22,23 67:2,10, 20 69:21,25 79:24		8A 113:3,7
3 22:14,17,19,21 23:6 56:19,20 58:16 108:21 109:4			
30 38:24 42:24			
308 64:21 67:6			
www.apetusCR.com		Index: 22-8A	

	activity 20:12,16	111:21	24,25 59:7,22 60:13
9	add 40:21 54:14	agreeing 30:25	63:4 66:10 69:15,22
	70:12 71:17 109:5	ahead 93:8 114:2	93:16 94:12 98:7
9 54:11,15 58:2 59:15	added 55:19 98:13	air 80:12,19 95:3,6	99:16 111:10,12
60:4,21 64:10 78:10,	114:22	align 91:1 115:3	113:17 114:2,7
12,15,23	addition 47:18,20	alignment 88:11	answered 30:24
9,606,230 105:21	55:10 56:23,24	aligned 114:15	answering 8:18
90017 5:5	74:13 79:2,5	alignment 88:11	answers 9:9 44:18
93 64:15,24	additional 54:8 55:9	alleged 10:12 64:2	50:7
94025 5:10	address 24:9 50:13	allow 11:11 80:19	anybody 13:22
94111 4:17	75:3 99:9,10 114:16	102:9,22 104:3	Appeal 4:2 12:24
95 66:2,7 67:3 69:2	addressed 71:9	allowed 37:25 68:13	appeared 4:19
79:21	112:24 113:1	98:4	applicable 60:4
96 65:19,23 69:3	addresses 65:2,9	alternative 56:1	applicants 60:9
97 23:25 24:11,19	72:20 84:12	aluminium 95:17,25	application 57:22
70:16 82:6,13,15	addressing 23:9	aluminum 95:13	95:16 101:2
89:10,16 93:1	49:23 91:7 103:10	ambiguous 55:25	applications 45:15
99 64:24 65:2 72:11	114:17	90:9 114:1	95:20,23 96:10
73:9,11	adds 55:8 56:21	Americas 5:18	April 62:9
9:20 4:13 7:1	admit 110:12	amount 80:7 97:7,14	area 110:21 111:3
A	advantage 74:3 77:5,	analogous 65:4	argue 110:8
	11	analysis 24:17	argues 56:8
a.m. 4:13 7:1 44:7	advantages 76:16	Angeles 5:5	arises 108:20
49:22	affect 9:16 49:8 51:1,	annotated 65:14,21	arms 70:25 71:6,12,
ability 9:13	24 52:2,12 53:12	66:8,9,21 67:4 68:2,	17 72:12 74:13
able 19:21 45:4 83:4	AFTERNOON 82:1	8 69:1,9 70:15	arranged 99:1
absorbing 67:17	ago 10:9 12:12 13:19	82:19,22,24 89:20,	arrangement 86:9,10
abstract 76:8	19:12 36:17 38:24	21 91:24 96:24	96:21 97:5
accepted 57:24	42:25	98:23 99:13,18	arrow 66:18 67:11
access 103:12	agree 18:1 20:11	109:22,24	79:22
accuracy 46:14	21:15,17,19 22:23	annotation 99:22	art 10:7,12,19,22
achieve 102:5	23:21 24:11 25:8,24	answer 9:1,13 10:10	15:20 18:10 20:9
achieved 97:18	27:12 32:22 33:3,7,	11:4,11,19 24:14,19	22:15,20,22 23:1
action 4:21	20,25 55:9 73:2	25:21 26:6,24 33:19	29:12 30:2,4,15
activities 39:6	74:14 77:9,18 78:11,	36:16 37:10 38:8	31:2,6 35:7,17 36:5
	14,15,18,21 80:18	40:2 43:21 45:2	46:21 47:4 48:20
	87:5 95:13 99:21	48:1,18 51:5 52:11,	53:20 54:24 55:4,5,
	100:17 101:5 105:2	14 55:18 58:12,13,	
	106:14 109:3 110:25		
			Index: 9-art
		www.apetusCR.com	

10 56:14 58:1 61:2, 17:23 62:11,23 63:24 64:1,21 65:4 70:21 71:17 82:19 91:7 101:22 112:2 114:15,19,23 115:6	attorney-client- privileged 11:1 16:18 attorneys 11:8,15,21, 24 13:13 available 89:6,7 Avenue 5:18 6:5 aware 15:7,10 23:8, 12 59:25 axial 43:17 83:5,9,10, 13 axis 97:9,14,22 110:1,6 B B2 4:7 bachelor's 32:4 back 12:5 68:24 96:12 97:4 background 44:19 83:19 balance 49:8,14 base 24:8 25:11 80:21 106:12,17 107:7 based 15:12 21:6 53:18 57:22 basic 44:25 106:21 Bates 78:23 91:13 Bates-stamped 91:17 bearing 27:22 73:14 76:12,24 bearing-housing 73:20 bearings 71:23 72:14,23 73:24 110:5,10,11,16	beginning 34:14 50:9 106:19 113:15 begins 50:11 70:19 87:24 88:21,23 90:12 believe 13:5 14:24 15:24 16:5,7 24:3 28:15 29:9 36:23 39:15 40:5 52:6,21, 22 53:17 55:18 57:18 58:22 59:2,7 62:13 64:7,14 65:2,8 91:19 94:5 95:10 96:4,8 104:7,8 112:23 belts 56:13 best 16:1 69:15,22 better 95:3 bind 63:11 binder 18:9,11 75:11, 15 82:4,7,11 106:1 bit 17:17 51:4 64:25 80:19 blue 82:17,21 89:15, 21 90:1 board 4:2 12:20,24 84:8,14,21,25 85:16 86:5,21,24 87:5 90:18 97:2 106:23 107:6,9,14,22 108:2, 6,8,15,22,23 110:20 111:2,14 boards 24:22 26:13 89:17 90:6 96:22 108:18,20 109:16 bottom 72:11 85:2,15 86:10 91:14,15,16, 20 100:8,13 boxes 66:18	brackets 69:8 break 9:4,8 44:2,4 105:13 breaking 80:25 105:10,12 British 37:14,18,20 38:3,16 39:12,25 42:14 brought 55:9 brushless 43:17 83:15,18,19 97:7 Building 5:18 bunch 26:13 business 23:21 Bussey 5:20 68:23 busy 23:22 C Cal 55:8,10,17,19,22 56:10,16 61:20 62:5 99:10 100:2 103:14 California 4:17,18 5:5,10 7:3 call 10:24 16:21,22, 23 20:7 38:16 53:2 54:3,25 64:1 65:24 72:6 90:23 101:1 112:17 called 7:8 25:9 27:13, 17 52:3,4,6 99:10 108:13 calling 53:22 105:23 calls 65:22 93:14 Camino 5:9 capability 73:19 91:6 career 24:8 27:15 28:6 29:8 39:18,24, Index: articles-career
www.apetusCR.com			

25 40:9,15 42:11 53:4 case 4:5 16:9 21:6 32:15,17,23 33:4 60:12 87:10 101:22 cases 21:12 24:15 casing 76:23 77:8,11, 13,16 catch 21:11 categorically 24:14 category 111:25 cause 4:23 49:17 50:4,21 52:18 caused 49:4 51:9 caution 13:8 16:17 center 4:15 99:1 100:21 110:2,3,4 central 97:9,13,22 109:19 centrally 110:6,7,11 CEO 14:1,9 certain 63:2 95:21 97:18 114:9 certainly 15:18 20:8 21:14 22:21 23:20 24:18,20 32:23 33:3, 20 34:12,18 36:25 37:13 39:17,19 40:7, 9,21 42:13 43:7,19 44:18 46:9 47:7,11, 15 48:13,23 49:9,14 50:22,24 51:1,20,23 52:25 53:2,5 59:24 60:11,15 63:5,21 64:4 66:12 73:18,22 74:3 75:1,9 83:13 84:2,9,11,20,22 85:10,18 86:4 87:1,2 88:20 89:9,19 90:2,	15 91:5,6 92:8,22 93:20 94:22,25 95:18,22 97:5 98:20, 24 99:4 100:5 101:2, 5 104:5,6,11,12,20, 22 106:14 107:25 108:13 109:8,22 110:10,17 111:22 112:5 113:10 114:14,15 115:2 Certificate 23:9 Certified 4:17,22 7:9 challenged 11:9,16 113:22 chance 34:8 106:8 Chang 53:23,25 change 15:2,8,9 31:3 41:24 42:3 58:4 59:19 61:5 62:15 64:8 104:24 changed 15:4 41:21, 22,25 changing 31:8 chapter 29:11,25 31:5 34:13 35:6,16 61:22 112:18 characterization 27:8 charts 10:11 choice 100:6,24 choices 97:25 98:3 101:16 103:6,13 104:13 105:6 Chung 54:1 circle 98:14 circuit 24:22 26:13 32:20 84:8,13,25 85:4,12,16 86:5,20 89:17 90:6,18 96:22 97:2 106:23 107:6,9,	14,21 108:1,6,8,15, 18,20,22,23 109:16 110:20 111:2,14 Circuits 25:2 circular 74:18 citations 14:24 15:1, 7,18 20:10 cite 72:22 73:3 cited 17:3 45:18 73:5 civil 21:6 claim 10:11 23:9 57:9,11 70:21,22 71:9,17,18 74:14 75:4 85:20 91:8 99:9,10 114:17 115:4 claimed 48:25 claims 10:12 11:9,17 33:8,13 34:1,6,10, 19,23 35:22 48:22 49:1 54:15 55:13,17, 23 56:9,17 57:5 112:22 113:22 114:10,19 clarification 41:4 105:22 clarity 82:5 classic 111:8,20 clean 17:5 clear 42:2 63:10 91:12 109:6 clearly 8:15 31:4,10 92:24 103:25 108:18 close 10:9 97:8 115:13 closer 97:22 103:11 clothes 49:11	co-counsel 68:23 coil 98:14,16 99:13 100:15 coils 48:8 79:16 86:14,18,25 87:4,18, 21 90:21 98:25 99:2, 19 100:2 101:4,6,9 102:9,11,22,24 103:9,11,18,21 104:2,16,20,23 105:3 cold 67:11 colder 79:23 collar...that 71:4 color 69:8 colored 68:4 92:2 Column 44:20 106:7, 9,10,20 107:2,12 108:21 109:4 110:19 111:1 combination 11:7,15 53:18 54:7 55:22 84:10 85:3 87:14 88:13 89:14 90:4 113:21 combinations 10:18 114:9 combine 50:10,12 51:21 72:1 85:20 88:16,21,25 89:24 90:12,16,17 92:10 combined 84:18 87:25 88:18 combining 86:20 come 12:5 26:18 58:13 comes 26:7 86:7 comfortable 54:2
		Index: case-comfortable	
		www.apetusCR.com	

Hesai v. Ouster, IPR2023-01422
Ouster Ex. 2005 - Page 125 of 143

covers 28:6	16 62:13,15 63:13	degrees 36:8 97:6	design-type 111:23
create 41:18 61:18 62:20 115:2,5	decision 13:2,4	delivery 115:17	designed 40:5,14 67:23 101:2 106:12 111:24
created 48:7 56:22	declaration 10:4,8, 13,16,17,19 11:23 12:3,6,10,11,15,17, 19 13:7,14,17 14:20, 22 15:3,9,15,19 16:3,6,10,25 17:4,6 19:5,7,23 20:23,25 21:21 22:14 24:25 28:18,21 29:11 30:1 31:25 34:12,15,22 35:6,17 43:10 44:22 45:17 48:7,13,17,24 50:8 52:5,22 53:14 54:19 56:5 58:17 59:12 60:17 62:18 64:9,11,15,19 65:13, 24 66:7 68:3 70:2, 12,16 71:16 72:11, 19 73:18 74:11 75:3 77:20 78:19 82:6,16 83:7,17 84:5,10,17, 24 85:17 86:11,16 87:9,23 88:22 89:11, 16 90:13 91:10,24 92:11,14 93:20,25 94:11,14,23 96:12, 14,18 97:11 98:12, 22 99:12 100:7,14 101:8,14 102:20 103:4 105:8 112:9, 14,15,24	denoted 77:16	designing 36:20 37:11,17 38:18 39:10,13,23 108:19
creates 55:11		denotes 109:25	
criteria 64:8		deny 93:22	
CTO 14:9		dependent 49:1	
currents 96:1,6,8		depending 47:10 49:7 95:16 96:5 97:16 104:9,23 105:2	designs 73:14,20 83:22,23 97:19 101:18
CV 19:6,8 21:8,18,23 25:15,18,24 26:4,10, 16,18,23 27:2,8,13, 18 28:5 33:2 40:18 43:1		depends 48:19 49:2 97:8,23 110:3,7,12 111:10	desire 72:2
D		deposited 7:21	despite 29:7
D-R-O-Z 61:21		deposition 4:12 8:20 9:9,16 16:16 17:2,14 18:5 20:3 35:20 40:19 62:18 72:5 76:1 84:2 96:8 106:3 113:15 115:13,22	detail 10:14 12:17 28:13 34:16 40:18 43:6 51:24 54:21,24 55:2,4 57:10,11 63:19 67:5 92:12 94:5 96:21
D.C. 6:6		describe 24:25 51:9 64:14,16 84:6 86:16	detailed 13:18 67:20
data 15:12,14,17		described 31:21 34:9	details 10:10 12:8,13 28:5 37:21,25 38:9, 13,23 39:5,9 42:19 43:15,20 59:8 92:15, 16,20,22 94:2,5 103:23
date 23:4,10 28:24 29:13 30:2,16 31:11 32:2 44:16 45:12 46:2 47:7 55:6 57:15,21,24 58:3,10 59:2,17 61:5,12,13, 24 62:1,2,3,5,6,7,8, 9,12,15 63:2,22 64:2		describes 106:11	determinations 63:11
dates 59:1 60:10 62:23 63:25		describing 107:3	determine 11:6,14 83:4 113:20
days 20:22	Defense-related 37:24	design 27:22 30:9,21 31:17 32:13 39:16, 19 41:2 46:21 47:4, 9,24 48:8,9,10,11 55:5 56:16 57:12 76:17 80:18 84:4 86:15 88:5,11,19 89:4 90:5,17 97:16, 25 98:3,4 100:6,24, 25 101:16 102:4,6 103:6,8,13,16,18,21 104:1,5,10,13,19,21 105:3,5 108:18 109:7,9,10,11,18 110:5 111:6,18,22	development 36:24
DC 43:5,17 83:15,18, 19 97:8	define 41:1 109:14 110:4,7 111:11,13		device 33:10 34:3 35:1,25 36:22 41:3, 18,19,24 46:21 66:11,13,20,21,23, 24 67:2,10,12,17,20 69:5,20,25 79:24
dealt 49:15 53:5	definition 29:6 84:1 110:13		device' 69:6
December 23:5,10 28:25 29:14 30:3,17 31:12 32:3 44:16 45:13 46:3 55:6 57:16,21,24 58:3,4 59:4,18,19 61:4,15,	definitions 83:25		device,' 65:25
	degree 28:25 29:15 30:5,18 31:13 32:4 90:10 108:17		devices 29:3,18 30:8, 20 31:16,21 32:9
			Index: covers-devices
		www.apetusCR.com	

35:14 36:5,11,15 42:20 devote 20:19 devoted 19:17 diagram 89:22 dictated 98:3 difference 63:13 differences 83:9 different 39:20 40:8, 10 41:19 42:18 45:14 47:17 48:21 50:15 53:6 73:14,19 83:19 91:17 97:17, 18 103:19 104:25 105:4 111:7,8 114:23 115:5 differently 111:24 difficulties 49:22 directed 28:1 33:8 34:1,10,24 35:23 direction 67:10 69:20 72:8 79:18,21 directly 31:22 56:16 69:6 disadvantage 74:2 disagree 20:14 27:16 30:23 58:9 70:17 disagreeing 30:25 disbelieve 94:25 disclose 92:15,20 disclosed 15:11 16:3, 5 discuss 28:2 56:10 57:7 64:11 65:20 66:1 92:12 discussed 10:19 19:3 22:9 25:17 38:17	48:16 57:14 84:22 99:23 discussing 16:12 70:3 77:19 90:3 discussion 18:7 71:14 76:3 106:5 115:21 discussions 113:16 dissipate 79:19 dissipation 78:6 79:7 80:2,13 distance 102:10,23 103:20 104:9 distances 104:4,15 doctor 18:4 57:14 document 60:17 documents 12:9,20 17:3 doing 71:21 double-check 28:12 downward 67:9 69:19 downwards 80:20 Dr 7:17,21 8:11,24 9:4,12,21 10:4 11:6, 14 12:6 13:23 14:19 15:11 17:5 18:9 19:3 20:11 25:15 27:23 33:7 34:6,21 36:19 40:23 44:2,9 45:6 64:10 67:1 76:5 81:3 82:4 83:4,14 91:19, 21 93:25 105:13,19 106:7 112:8 113:14 115:9,12 draft 12:2 drafting 10:25 11:2 draws 48:22	Driver 32:20 Droz 61:21 62:8 due 49:21 duly 4:22 7:9 dynamic 49:16 50:3 51:10,12 52:1,12,17 dynamics 52:15 53:3, 5 E e-d-d-y 96:1 earlier 19:3 28:14 35:19 53:17 58:10 63:2,21 72:5 easily 98:10 eddy 96:1,6,8 effect 52:8 93:22 effective 102:5 effects 47:14,16,21, 22 50:21 72:8 efficiency 102:12,25 103:22 efficient 88:5 89:24 90:3 91:5 101:19 efficiently 89:3 either 94:8 EI 5:9 electo-mechanical 46:10 electric 28:10 electrical 29:1,15,17 30:5,18 31:14 32:5 36:8,13 77:1 electrical-mechanical 102:1	electro- 30:7 electro- 31:20 electro-mechanical 24:7,21 25:13 26:12 27:21 28:7 29:3,17 30:7,20 31:15 32:9, 13 33:24 36:11 47:17 electro-optical 29:2, 17 30:7,20 31:15,20 32:9 36:10 electromagnetic 32:20 47:13,21 79:16 electromechanical 53:1 electronic 38:5,10 46:13 electronics 24:6,20 25:12 26:11 27:20 28:6 32:12 33:23 35:3 36:2,14 37:1,5 46:9,13 52:25 element 85:21 elements 48:25 85:14 96:22 100:19 101:25 107:3,5 114:17 115:4 EMANUEL 5:4 Embarcadero 4:15 embodiment 85:4 86:9 88:3 89:6 90:2, 23,24 97:19 98:24 99:5,8,25 101:3 102:6 108:11,12,15 109:10,21 111:7 113:3 embodiments 99:6 100:4 108:17 109:17
---	--	---	--

www.apetusCR.com

Index: devote-embodiments

www.aplusCR.com

Index: emphasize–figure

15:74:25 75:1,9	flow 43:17 72:9	fragment 78:12	given 12:12 36:17
77:17 79:5,21,25	fluid 52:15 53:2,5	frame 47:6 63:3	44:18,23 48:14
80:6 82:15,18,19,22	flux 83:5,6,9,10,13	framework 102:3	59:25 64:8 67:15
83:5,12 85:2,15	fly 62:21	Francisco 4:16 7:3	79:25 88:7 95:4
89:19,20 90:22 91:2	focus 36:12	free 58:12	gives 55:4 77:5
93:1 95:10 96:13,19,	focuses 69:17	Friday 16:21	giving 31:1 103:5
24 98:13,23 99:1,18,	fold 26:14	front 34:6 44:17 67:1,	gjefferson@ktslaw.
22 100:8,13 101:5	folks 36:4	16,21 69:12,13 75:8	com 5:13
109:10,22 113:3,7	following 57:10	76:7 93:13,17 95:9	go 8:8 22:3,13 26:5,
figures 73:8,10 91:24	113:18	113:9	21,23 36:3,15 37:7
92:8 96:21 98:21	follows 27:9 50:2	full 7:18 18:1 36:2	40:8 51:3 60:2
file 60:7	93:9 107:19	78:24 79:1,13 89:13	80:14,20 81:10,11
filed 23:8 59:4	Force 32:21	110:21 111:3	87:12,13 92:12 93:8
financial 13:23 14:16	forces 46:19,25 47:3,	full-time 20:17,21	105:15 114:2
find 38:15 102:14	11,13,14,19,21,22	fully 62:25	goes 42:8 70:20
finding 51:16	49:16 50:3 51:10,12	function 69:23	90:14
fine 8:19 10:3 17:24	52:2,12,17	functional 44:25 46:4	going 8:10 11:3,18
115:17	forgotten 96:17	further 54:7 56:9 57:6	17:9,13 18:16 20:9
first 4:21 7:9 12:2	form 11:10 23:11	100:22 115:9	26:25 40:18 43:22
19:11,13 20:7,25	24:2 26:2 28:3 29:23		44:12 49:12 53:23
27:1,12,17 35:21	32:16 33:12 44:12	G	58:6 61:7 80:25 90:8
40:4 46:7 51:21	45:8 46:24 52:19		93:12 94:8 105:4,9
54:11,12,24 58:15,	56:3 61:7 66:23	Gall 5:12 8:4,5	107:23
24 59:21 61:24	68:12 73:1 89:16	general 40:3 73:9	good 43:23 80:25
62:11,24 63:24 77:4	90:8 96:2 107:23	96:9	81:5 89:6,9 90:17
78:12,21 84:11	113:5,23	generally 49:6 67:9	105:10,12
106:23 107:5,9,14,	formal 8:20	95:16,22 97:8	Government 37:14,
21 108:1,6,22	forming 15:15 16:2	114:20	19,20 38:3,16 39:12
110:20 111:2	forms 108:23	generated 67:8 79:9,	40:1 42:14
fit 87:2,6,8,16 89:16	formula 15:4,8	17 80:1	grab 71:13
90:6 92:25 101:11,	formulate 15:20	Genustechnik 14:10	Grace 5:18
12,15	forth 7:11	getting 27:2	great 40:18 104:15
fitted 101:15	found 26:19	give 9:22 19:6,21	greater 104:3
fitting 70:24	four 16:19 22:8 54:8	26:6 34:13 41:4 48:3	green 65:17 89:23
five 16:20 17:1	73:10	50:7 54:20 56:6 60:3	grey 70:8,15 89:23
flat 109:1,7,11	four-based 53:20	63:8 64:21 71:20	GROSSMAN 4:17
flexibility 108:17,19		83:18 99:9 106:8	ground 8:9 51:22
flight 15:5		112:19	53:17,21 54:7 55:3,
Floor 5:4			7,8,10,11,12,16,19,
			Index: figures-ground
	www.apetusCR.com		

20,22 56:6,15,16,19, 20,21,22 115:2	23:11,17 24:2 26:2 27:7 28:3 29:23 30:24 32:16 33:12 34:5 42:2 43:22 44:12 45:8 46:23 49:19 51:15 52:19 53:22 55:25 56:3 58:6 61:7 66:25 68:9,12,19 73:1 75:15,18,20,23 80:22 81:8 82:7,12 90:8 91:11,16 93:4, 12 96:2 98:16 105:9 107:23 113:5,23 114:8,12 115:11,16	hole 78:6 79:7 80:2, 13,14 hollowed-out 78:5 79:7 home 49:10 80:10 95:4 hone 47:9 honest 9:22 hoping 65:11 hot 53:9 hour 4:13,14 36:17 43:23 105:10 hours 19:17,19,22 20:9 26:25 houses 71:23 72:14, 24 housing 73:14 hundreds 27:23 hypothetical 49:20 52:20 96:3	impact 9:12,19 63:14 Imparting 32:20 impedence 72:7 74:5 80:5,17 implement 74:8,19 87:15 104:12 implementation 98:25 implementing 84:6 86:1 91:2 implicates 11:1 implications 63:1 important 46:17 72:7 improve 12:3 74:5 include 31:22 36:21 37:1 40:11 64:11 71:6,12 77:24 86:17 87:3,18 90:19 included 37:23 67:3 86:12 106:1 includes 33:9 34:2,25 35:24 71:3,18 86:24 including 9:9 48:6 72:12 Incomplete 49:19 52:19 96:2 incorporate 45:1 incorporated 14:10 93:2,10,18 incorrect 24:3,5 29:9, 24 increasing 79:11 independent 15:22 48:25 indicate 28:22,23 29:25 35:16 54:18 56:4,25 63:18 64:22,
guess 10:24 18:16 53:23 66:6,18 78:23 guys 17:22 gyroscopic 47:3,11, 18,22	23:11,17 24:2 26:2 27:7 28:3 29:23 30:24 32:16 33:12 34:5 42:2 43:22 44:12 45:8 46:23 49:19 51:15 52:19 53:22 55:25 56:3 58:6 61:7 66:25 68:9,12,19 73:1 75:15,18,20,23 80:22 81:8 82:7,12 90:8 91:11,16 93:4, 12 96:2 98:16 105:9 107:23 113:5,23 114:8,12 115:11,16	hours 19:17,19,22 20:9 26:25 houses 71:23 72:14, 24 housing 73:14 hundreds 27:23 hypothetical 49:20 52:20 96:3	important 46:17 72:7 improve 12:3 74:5 include 31:22 36:21 37:1 40:11 64:11 71:6,12 77:24 86:17 87:3,18 90:19 included 37:23 67:3 86:12 106:1 includes 33:9 34:2,25 35:24 71:3,18 86:24 including 9:9 48:6 72:12 Incomplete 49:19 52:19 96:2 incorporate 45:1 incorporated 14:10 93:2,10,18 incorrect 24:3,5 29:9, 24 increasing 79:11 independent 15:22 48:25 indicate 28:22,23 29:25 35:16 54:18 56:4,25 63:18 64:22,
H	hello 68:24 helps 24:9 hereinafter 7:11 Hesai 4:4 5:3 11:24, 25 22:6 112:21 113:2,21 Hesai's 10:21 11:7, 15,21 high 43:18 45:10 54:23 56:12 57:8 64:16,17 65:1 67:22 94:18 95:14 high- 95:18 high-level 45:2 51:5 65:8,10 high-thermal 95:1 highlighted 85:14 highlighting 85:1 highly 95:25 history 60:8 hit 49:12 hitting 80:23 hold 21:10 36:7	hours 19:17,19,22 20:9 26:25 houses 71:23 72:14, 24 housing 73:14 hundreds 27:23 hypothetical 49:20 52:20 96:3 I I.e. 50:25 65:6 100:19 idea 19:20 25:21 59:8 106:22 identification 18:6 76:2 106:4 identified 21:13 76:17 identify 13:9 21:21 98:14 illustrative 48:2 imagining 63:16 imbalance 49:4 51:10 imbalanced 50:23	important 46:17 72:7 improve 12:3 74:5 include 31:22 36:21 37:1 40:11 64:11 71:6,12 77:24 86:17 87:3,18 90:19 included 37:23 67:3 86:12 106:1 includes 33:9 34:2,25 35:24 71:3,18 86:24 including 9:9 48:6 72:12 Incomplete 49:19 52:19 96:2 incorporate 45:1 incorporated 14:10 93:2,10,18 incorrect 24:3,5 29:9, 24 increasing 79:11 independent 15:22 48:25 indicate 28:22,23 29:25 35:16 54:18 56:4,25 63:18 64:22,
half 36:17 Hall 56:21,23 57:7,8, 9,12 61:20 62:6 Hall's 57:10 hand 103:24 happy 22:13 26:16,24 60:17 63:5,8 113:1, 12 head 22:12 58:18,20 113:8 heat 46:14 52:4,11 53:11 65:22 66:4,9, 16,19 67:8,13,14,18, 22 69:4,19,20,24 72:9 74:6 78:6 79:7, 9,16,19,22 80:1,2,3, 9,11,13,14,15,17,19, 20 94:19 95:2,3,24 heats 95:5 HEFAZI 5:6 9:17 10:23 11:10,12,18 13:8 16:17 17:9,12, 16 18:3,16,22 19:1	hello 68:24 helps 24:9 hereinafter 7:11 Hesai 4:4 5:3 11:24, 25 22:6 112:21 113:2,21 Hesai's 10:21 11:7, 15,21 high 43:18 45:10 54:23 56:12 57:8 64:16,17 65:1 67:22 94:18 95:14 high- 95:18 high-level 45:2 51:5 65:8,10 high-thermal 95:1 highlighted 85:14 highlighting 85:1 highly 95:25 history 60:8 hit 49:12 hitting 80:23 hold 21:10 36:7	www.ap ~~tus~~ CR.com	Index: grounds-indicate

24 65:19 71:2,5,15, 20,25 73:17 83:17 84:16 86:4,19 87:1, 23 88:2,6,9 89:2 90:11,15,20 95:7 97:10,12 99:24 100:22 101:12,13 108:16 109:15	integrity 51:1	IPR 8:21 16:11,13 17:21	K
indicated 12:16 16:7 26:20 27:19 28:4 29:10 30:14 32:11 40:5 43:14,20 52:22, 24 62:12,17,19,22 63:15,17 64:2 66:10 67:10 69:3,16,18 70:19 71:16 73:8,22 77:15 80:21 85:7,22 86:8 89:23 92:10 93:1 99:4,16 101:17 109:25 110:14 111:12	intellectual- 45:22	IPR2023-01422 4:6	keep 9:7 31:8 53:10
indicates 66:15	inter-parties 7:25 8:21	iron 80:10 95:4,5	KENNEDY 6:7
indicating 72:23	interchange 73:19	issue 49:9 98:9 103:10	key 55:3
industry 32:8 45:7,11 47:15	interchangeably 73:15	issues 44:9,15 45:23 46:13,17 47:8,18 48:15 49:14 50:14, 15 51:24 84:12	Kilpatrick 4:14 5:9,17 6:5 8:6
information 59:5 67:21 94:12 113:19	interests 13:23 14:16	IV 29:11,25 31:5 35:6, 16	kind 11:2 114:13
infrastructure 14:5	internal 76:25	J	kinds 46:19
innovative 53:10	international 25:2	JANE 4:17	knobs 104:1
inside 79:10 89:4 99:14 100:15 101:6	internet 14:4	January 62:6	know 8:12 9:4,20 10:23 12:9 18:15,23 33:19 43:21 45:3 53:7 58:9,17 59:5,23 60:5,6,13,15,16 63:4 67:16 68:19 72:20 73:5 80:9,16,24 95:2 98:7 101:14,21,24
instance 90:10	interpretation 31:1 79:14	Jefferson 5:12 8:4,5	knowledge 16:1 33:23 63:14,16 73:9
institution 13:1	interspace 89:17	job 20:21	known 49:6 102:4
institutional 13:4	introduce 18:16,17	Johnson 51:22 53:18 61:20 62:1 84:11,18 85:20 87:25 88:6,17 89:1,25 91:25 92:9, 10,15,19 93:3,11 94:3 96:13,19,21 97:21 98:20 99:6 100:1 103:11 104:12 111:17,19 112:2,5	L
instruct 11:3	invalidate 56:17 70:21 74:13	Johnson's 84:7,13, 25 85:4,12,16 86:2, 5,20 89:17 90:5,17 91:3 92:2 96:14 97:21 98:15 99:14 101:8	L-E-B-B-Y 7:20
instructed 8:25	invention 23:1 44:11 45:7 106:19,21 109:18	joined 8:4 68:15,20, 21	laboratory 15:24 16:8
instructing 18:22	inventive 42:3	June 62:4,7	large 104:20
integrated 25:1 33:9 34:2,25 35:24 36:21	inventiveness 42:8,9		larger 102:9,22 104:2,9 108:5
	inventor 55:10		laser 76:9
	invited 25:1		lasers 37:6
	invoices 19:19		latest 26:19
	involve 24:13 33:21 40:12 46:9,10		Law 4:14 5:6,11,12, 20 6:7
	involved 7:25 39:1,3, 15		lawyers 10:21
	IP 14:13		layout 57:12
	iphone 68:15,21		
			Index: indicated-layout
		www.apetusCR.com	

leave 17:16	15,21 47:9 49:3,17	LLP 4:15 5:4,9,17 6:5	lower 80:16
Lebby 4:20 7:7,17,19, 21 8:11,24 9:4,12,21 10:4 11:6,14 12:6 13:23 14:19 15:11 17:5 18:9 19:3 20:11 25:15 27:23 33:7 34:6,21 36:19 40:23 44:2,9 45:6 64:10 67:1 76:5 81:3 82:4 83:4,14 91:19,21 93:25 105:13,19 106:7 112:8 113:14 115:9,12	50:5 52:9,13 53:8,12 55:5 56:24 57:13 65:24 66:4,11,12,14, 15,20 67:9 69:5,9 79:15 89:4 94:20 98:2 100:25 101:1 102:6 103:7,12 104:19 105:1 109:7 112:6 115:2,3	located 110:11 location 84:25 85:8,9, 11 98:14 Logic 14:2 20:18,20 long 43:3 51:18 58:7 81:7 long-term 52:13 look 18:12,20,23 40:10 47:8,18 48:23 49:10 58:15 59:1 60:2,7,9 63:23 68:9 69:13 71:2 80:6 83:12 84:20 89:5 96:19 100:5 101:21, 25 104:17 110:13,15 111:19,21 112:2 looked 62:23 69:11 93:20 110:16 114:23 looking 20:6 22:17 41:14 42:12 48:19, 20 51:15 59:11 76:20 86:20,23 87:11 89:12,19 92:9 94:10 98:18 100:17, 24 101:18,19 104:11 106:11 108:11 109:22 112:5 looks 8:3 88:13 89:9 92:23 97:3 111:22 Lord 12:23 LORENZO 6:12 Los 5:5 lot 23:20 26:10 28:12 38:8 54:23 67:20 85:8 103:17 113:25 114:13,21,25 low-thermal- impedence 69:23	lumpy 23:21 lunch 80:25 81:4,7,9 luncheon 81:12 M machine 49:10,12 machines 83:10 magnet 100:8,19 magnets 86:2,3,7,13, 14,17,24 87:3,18,21 90:20 96:14,25 97:1, 9,13,21 98:2,5 99:14,19 100:3,10, 15 101:3 103:11 maintaining 102:11, 24 major 98:9 majority 80:15,20 95:19 making 47:4 111:16 manner 63:11 109:1 map 34:9 mark 17:7,9,11,13,20 18:13,17 75:12,17, 20,21,24 marked 18:5,21 76:1 106:3 market 45:15 101:1 marketplace 45:4 marking 75:14 match 21:7 material 94:18 95:1,8, 14,17 96:5 materials 96:10
led 94:1	life 79:12		
left 17:22 77:6 92:2 96:13	lifetime 50:25 53:12		
legal 62:25 63:1,11 93:15	Light 32:19		
legalistic 65:11	Lightwave 14:2 20:18,20		
let's 44:4 64:1 65:12 75:13 82:6 101:1	limitation 70:3,21,22 71:9,18 74:14 75:4		
level 10:14 12:17 27:13 29:12 30:1 31:6 35:6,17 43:6,18 45:10 54:23 56:12 57:8 64:16,18 65:1 67:22 88:11	Limitations 91:8		
levels 105:4	line 26:23,24 43:11 106:20 107:4 110:19		
Lidar 13:24 14:7 21:1, 12,17,18,22,24,25 22:7 24:1,6,13,16,23 25:3,6,9,14,17,18,25 26:7,11,14,18,21 27:13,17,22 28:2,8, 19 29:4,8,18,21 30:9,12,21 31:17,23 32:13,15,22,25 33:2, 4,5,10,22 34:3 35:1, 10,14,25 36:15,21, 24,25 37:7,9 40:6,8 45:1,3,7,10,14 46:4,	lines 106:11 108:21 109:3 111:1 link 64:23 list 10:15 12:9 22:3, 11,13 25:18 48:4,12 58:16,21,23 112:9 listed 15:18 21:3 lists 19:8 litigation 14:14 19:8, 11,14,18 21:2,7,8,9, 25 22:6,8,12 24:12 25:16 32:23 45:19 63:17 litigations 24:9,16,24 little 17:17 51:4 64:25 80:19		
			Index: leave--materials
	www.apetusCR.com		

Index: matter-nimahefazi@quinneman
R.com

nine 12:12 13:19 53:15 nkennedy@ktslaw. com 6:8 nomenclature 10:2 non-attorneys 13:16 non-rotating 40:11 normal 95:2 north/south 97:6 Nos 21:13 note 34:6 69:18 noted 55:14 57:18 Notice 4:11 novelty 42:3,7 Nubbling 105:24 Nubling 105:23,24 106:7,10,19 107:11, 24,25 108:12,16,21, 22 109:4,8,10,15,19, 21 110:15,19,25 111:6,22 112:2,5 Nubling's 106:16 107:2,13,20 108:8 110:5 number 9:25 20:8,10 24:19 26:7 35:19 39:18 42:18 47:8 51:24 53:5 57:18 58:18 77:17 83:25 103:25 109:25 115:5 numbered 66:22 numbers 17:10,21,23 21:6 77:25 78:1 91:12,13 NW 6:5	O object 8:24 11:10,18 27:7 44:12 58:6 61:7 68:12 90:8 93:13 107:23 objecting 58:7 objection 10:23 23:11 24:2 26:2 28:3 29:23 30:24 32:16 33:12 45:8 46:24 49:19 52:19 55:25 56:3 73:1 96:2 113:5,23 objections 56:2 61:10 objective 112:9 observation 87:5 92:19 96:9 100:18 111:16 obvious 11:9,17 54:16 55:12,17,24 56:9 57:5,6 85:24 113:22 Obviously 58:9 occur 104:6 offering 16:13 office 4:1 8:7 57:25 Offices 4:14 Oh 11:25 83:1 102:16 okay 7:17,23 8:8,13, 18 10:18 11:6 12:5, 14 13:1,6,13 14:7 17:5 19:1 20:15 21:6,16 23:8,14 24:24 30:11,23 44:4 45:22 54:6 55:16 59:14 60:23,24 65:17 66:1,3 68:12	75:25 78:18 82:4,15 83:1 89:10 91:23 93:12 102:15 105:19 106:7,9 112:8 113:14 115:9 once 18:17 one-year 63:12 ones 14:25 91:17 92:9 open 18:11 operating 79:12 operation 49:16 50:4 51:11,13 52:13,17 53:12 79:10 operational 101:1 opine 34:18 55:12,16 72:12 74:11,16 84:9 85:10 92:5 96:8 99:17 113:10 opined 34:22 35:19 111:16 opinion 28:18,22 29:12,20 30:11 31:2, 7,19 32:1 35:9,13 46:19 55:23 60:4,10 62:14 75:2 84:13 86:15 88:17 89:18 94:1 101:8 111:17 112:1 opinions 15:12,15, 20,23 16:2,6,13 20:13 48:6,14,23,24 50:14 58:4 59:19,25 61:6 62:16,19,20 63:7,8 112:14,18 opportunity 60:14 89:3 90:17 opposed 55:19 opposite 99:2	optical 46:14 optics 36:14 37:3,4 optimize 47:9 optimizing 47:24 optimum 89:8 opto-electronic 53:1 opto-electronics 24:6,21 25:12 26:12 27:21 28:7 32:12 33:24 37:3 40:12 46:10,12 107:13,20 108:1,14 order 74:6 ordinary 22:15,20,22 23:1 29:12 30:1,4,15 31:2,6,7 35:6,17 36:4 91:7 94:2 112:1,4 original 77:25 oscillation 50:18 Ouster 4:7 5:8,16 6:4 22:6 23:8 56:8 57:3, 20 112:21 outcome 14:17 outer 76:23 77:7,11, 13,16 96:15 outline 33:17 outlined 64:9 outside 25:16 97:1 100:2 101:4 111:13 outwardly 107:8 overall 100:24 109:18 overview 34:13,17 44:23 54:20,21 61:17,22 64:21,25 Owner 4:8 5:8,16 6:4 owner's 13:3 Index: nine-owner's
www.apetusCR.com			

Hesai v. Ouster, IPR2023-01422
Ouster Ex. 2005 - Page 135 of 143

pertaining 37:8	play 28:8 29:3,18 30:8,21 38:2	97:1,3,5 98:6 99:13 100:20 110:6	pressing 76:11
pertains 44:14 46:6 52:1 65:1 68:25 73:6 88:24 110:2	played 28:16	positioning 84:21 86:21 97:13 103:8, 14	previous 24:18 33:1 48:1 66:10 111:10, 12
pertinent 21:21 48:16	please 7:13,17 8:12, 15,17 49:23 64:16 68:22 75:11 81:11 89:10 106:2 107:17, 18 113:17	positions 100:14	Previously 77:19
petitioner 4:5 5:3 112:21	plenty 47:17 48:5	possible 100:3	primary 20:12,16 102:10,23 103:8,20 104:20
Ph.d. 4:20 7:7	plurality 70:24 71:19	possibly 111:14	principles 36:15 37:4
phonetic 53:23,25 54:2 105:24	plus 24:8	post-deposition 63:9	printed 24:21 26:13 108:18 109:16 111:14
photo-receiver 108:2,4	point 9:5 25:8 40:15 43:9,24 51:8 59:9 81:1 105:10,12	power 36:14 37:4 46:13 48:11 71:13 77:1 98:17 102:12, 25	prior 10:7,12,19,22 15:20 18:10 20:9 22:8 25:16,25 27:2 46:21 47:4 48:20 53:20 54:24 55:4,5,9 56:14 58:1 61:2,17, 23 62:10,23 63:23 64:1,21 66:10 70:21 71:17 82:18 101:21 114:15,19,23 115:6
photo-transmitter 108:3,4	pointed 77:20	power-transfer 103:22	priority 23:4,10 28:24 29:13 30:2,16 31:11 32:2 44:15 45:12 46:2 47:7 55:6 57:15,21,24 58:3,10 59:1,2,17 60:10 61:4,12,24 62:1,2,3, 5,6,7,8,9,15,23 63:22,25 64:2
photodetectors 37:5	pointing 79:22	powered 83:24	privileged 113:16,19 114:3
Photonic 25:1	portfolio 39:4	practices 112:22	privy 39:17,20
phrase 23:19 70:17	portion 78:18	practise 62:11,24 64:1	probably 26:25 37:25 84:3
physical 41:3 84:4 103:7	POSA 22:24	predate 62:11,24 64:1	problems 45:6,11,25 46:6
physically 83:24 103:18	POSITA 22:16,20,22, 24 28:18,22 29:6,13, 20 30:11 35:9,13,15 44:10 46:20 47:2,7, 12,18,23 48:4,5 52:16,22,25 63:14, 16,19 64:8 71:11 73:18 74:7 87:15 98:1,4 100:5,6,23 101:16,17,19,25 103:5,13,15,25 104:11 109:12 115:1	predict 103:15	procedure 60:16 102:2
picked 85:7	POSITA's 98:11 104:17 109:5	preferably 79:6	
PICS 25:3	POSITAS 36:5	preferred 85:4 86:9 88:3 89:5 90:24 97:18 98:24 99:25 100:4 108:12 109:9, 17,21 111:7 113:3	
piece 64:21	position 86:18 87:4, 19,21 90:18 96:25 98:2 101:10 105:3	preparation 40:18	
pieces 64:1	positioned 84:14 85:5 86:5 92:6,25	prepare 16:15 17:2 84:2 96:7	
pink 82:20		prepared 10:4	
placed 89:18 96:15 97:21 103:19 104:23		preparing 10:8 11:23 12:6,15 13:6,14,17 20:3	
plate 70:7 71:4,24 72:15,24 74:2,4,6 82:16,17,20,21 90:6, 7 108:9		present 5:13,20 6:7, 10 13:11,21 22:5 76:22	
plates 66:20 73:25 82:21,23			
platform 49:3,18 50:6 92:3 96:15 99:3,20 100:16			

www.apetusCR.com

Index: pertaining-procedure

proceeding 8:1 10:5 12:21 13:2,7 16:11, 13 53:15	put 31:4,10 47:8 48:21 49:11 56:12, 14 59:14 63:24 82:4 88:15 111:25 115:1	questions 8:12,17 9:9,13 30:15 31:9 36:17 72:4 115:9,11	Real 5:9 really 19:24 20:4,5,6 24:9 25:22 27:5,6 34:9 39:3 40:2,17 42:21 56:12,14,23 64:4 69:16 84:12 87:22 95:5 103:15 105:5
proceedings 17:21 49:21	putting 19:13 24:24 58:2 114:20	quick 63:23 quicker 95:5 quickly 50:25 62:23 63:25 80:11	reason 9:21 50:11 56:22 61:4 74:1 87:10 88:25 94:25
process 10:25 11:2	Q	QUINN 5:4	reasonable 63:18 85:11,19,24 88:4 100:23 102:12,25 114:16
prodigious 23:15,18	QIANG 5:14	quite 55:2 98:10	reasonably 87:14 88:13
produce 50:22,24	QNA 10:21	quote 32:19,21 35:21 43:11 56:7,11 57:1, 2,7 65:3,7,25 69:3, 10 70:5,22 71:1 72:12 74:16 76:21 77:11,12,21 78:4 79:2,3,13 94:15 101:9,10 102:8,21 108:24 111:1,5	recall 10:9,14,15 12:8,13,17 13:18,20, 22 14:25 19:19 21:25 22:2,6,11 28:13 37:21,22,24 38:8,13,23,25 39:5, 6,8 40:13,16 42:19, 20,22,24 43:4,6,15, 16 44:21 45:24 75:6 84:1,3 94:7 113:7
produced 4:21	QUALIFICATION 20:24 25:7,9	quote/unquote 87:8	recess 44:7 81:12 105:17
product 25:19 36:24 37:9 41:2 112:21	qualifications 64:7	quoted 78:19	recite 70:10
products 24:13,16 25:25 37:22 38:25 39:4 40:24 41:1	qualifies 55:5	radar 76:9	record 7:18 8:16 12:16 16:7,12 18:7 27:19 28:5 32:11 34:5 40:5 43:14 44:5 48:1 50:2 62:17 63:15 66:25 71:14 76:3 81:10,11 82:7 91:11 93:9 105:15 106:5 107:19 115:21
professional 20:12, 16	qualify 29:7 35:14 52:21 57:25 61:1	radial 83:5,9	
projects 42:18	quality 96:5	range 20:1 48:21	
property 45:23	quantifiable 109:13	ranging 32:19 65:7	
propose 10:21 71:10 74:7 85:14 90:4	quantitative 91:4	re- 70:10	
prosecution 60:8	question 9:1 10:10, 25 11:12,19 15:13, 21,25 25:21,22 26:6, 24 33:1,19 35:12 37:8 41:5,9 42:1 43:20 44:14 45:2 46:6 48:18 49:24 50:3 51:6 52:1,11 55:15 56:19 58:11, 24,25 59:8,14 60:20, 25 61:8 62:12 63:5 64:3 65:1,3,9 68:25 69:15,22 70:18 72:20 78:2 79:18 83:2,3 84:18 87:20, 22 88:24 93:5,7,10, 16 94:13,22 98:8 99:17 102:18 107:15,20 110:2 112:25 113:11,18 114:5,7	reach 80:25	
provide 21:1 36:11 91:24 92:22		read 14:20 17:3 25:4 27:6 35:20 43:2 50:2 51:17 57:2 72:17 74:22,23 77:3,6 79:1,4 93:9 106:25 107:1,11,16,19	
provided 11:8,16 21:7 65:13 92:17 94:4 97:7,14 107:8 113:21		reading 33:15,17 109:3	
providing 12:19 19:4 20:13 23:14 88:4		reads 94:22	
provision 14:13			
provisional 57:22 58:18,19 59:6 60:1			
publications 10:15			
pulling 18:2			
purple 68:4,7 69:1,8			
pursuant 4:11			

www.apetusCR.com

Index: proceeding-record

red 70:8,14 82:16,20 85:1,15 89:15,21,25 92:3 98:13,23 99:13, 22 109:24 redirecting 67:18 reduce 50:25 refer 9:25 22:15,19 100:8 105:20 reference 11:7,14 17:6 41:14 54:11,12 55:8,10 59:21 64:12, 14 65:20 66:1 67:15 68:2,10,14 69:13 78:16 79:3 82:19 87:20 93:2,11,13,18 99:9 100:10 101:7 103:7,14 106:8 111:19 113:20 references 10:12,22 11:7,15 18:10 25:6 54:8 55:7 56:20 61:1,18,19,23 88:15 89:1 94:8 101:10 113:21 114:21 referrals 23:20 referred 77:17 112:9 referring 22:25 39:24 77:23 79:5 91:13 refresher 8:9 regarding 9:8 region 79:23 89:7 99:1 regular 115:17 reiterate 36:6,9 related 14:4 24:1 38:3 relates 113:11 relating 14:12 25:17 relation 48:25 50:16	relationship 97:12,15 relative 33:10 34:3 35:2 36:1,22 41:17 46:22 79:23 90:10 106:16 released 79:11 rely 74:24 remember 38:14 43:18,19 REMEMBERED 4:11 render 11:8,16 57:5 113:22 rendered 54:16 rendering 112:14 renders 55:12,17,23 repeat 49:24 61:11 93:4,8 rephrase 8:13 102:18 114:12 replaced 86:2 replacing 85:14 report 19:25 40:21 51:20 54:25 57:1 60:1,16 69:11 94:6 96:20 109:23 reporter 4:18,22 7:10, 13 8:16 17:7 18:13 44:5 49:23 68:17 75:12 81:10 93:8 105:22 107:16 115:14,18 represent 57:20,23 representations 58:8 requested 105:22 require 87:13 required 100:25 103:22 110:22 111:4	research 12:14 37:15 39:4 42:15 114:25 resembles 83:13 respect 74:13 104:19 response 13:3 responsibilities 38:11 restate 11:12 rests 71:4 result 87:2,17 90:4 results 88:18 Resumed 82:2 reveal 13:9 16:18 revealing 113:19 114:3 reverse 16:8 review 8:1,21 12:7 13:1,3 17:25 22:11 26:19 40:10 61:17 106:8 107:24 reviewed 12:20 13:4, 5 15:18 24:15 27:3 43:8 47:12 58:22 61:22 114:14 reviewing 14:22 16:25 26:4,15 right 10:5 11:24 14:7, 10 15:7,12 16:4 18:17,23 19:9,15 21:13,22 22:16,19, 20 23:2,3,5,16 24:1, 13 25:3,7,20 26:1 27:4,24 28:2,11,20 29:5,8,22 30:13,23 31:23 32:15 34:7 35:4 38:19 41:25 45:20 49:5 53:15,19 54:8,12 55:8,13,17	56:21 57:16 59:6,12, 22 63:5,7 64:12 70:3,16 71:12 72:25 73:13,16 74:9,25 76:5,13 77:8,14,21, 24 78:20 82:12,17 83:11 84:8,15 85:2, 16 86:3,18 89:18 91:14,21,22 92:3,7, 17 95:11 97:9,22 98:15 99:15 100:16 101:11 102:13 103:2 104:4,16 106:13,17 107:10,14,22 108:10 109:20 110:24 111:18 112:3,22 113:4 115:19 right-hand 66:17 67:11 69:18 ring 98:23 99:22 rock 49:12 role 28:8,16 29:4,18 30:8,21 38:2 roles 39:18,21 40:9 Room 4:16 rotary 64:23 rotates 106:16 109:24 110:10 rotating 32:19 33:10 34:3 35:1,25 36:21 40:11 43:12 46:21 49:6,17 50:5,14 51:24 52:9,18 65:7, 24 66:11,12 69:5 76:9 79:10,12 92:16, 21 94:3 97:9,13,22 rotation 49:7 103:12 106:23 110:1 rotational 47:16,21 rotor 32:21 33:10 34:3 35:2 36:1,22
www.apetusCR.com			
Index: red-rotor			

46:22 49:3,18 50:6, 16 51:25 67:19 69:7 70:7 71:4,23 72:15, 24 73:25 74:2,4,8, 17,20 76:11,12,23 77:7,13,18 79:8,15 80:8 82:16,20 84:8, 13,25 85:4,12,16 86:2,5,20 89:7,15, 20,25 90:5,6,17 92:2 96:15,22 98:15,16 99:14 100:16,19 104:3,14 108:8,9,23 109:24 111:18,23	scan 27:5 58:18,21 scenario 111:8 search 10:7 26:9 searched 25:15 searching 33:2 second 55:11 56:15 58:25 88:25 90:15 108:23 secondary 102:11,24 103:8,21 104:20 112:10,16,18 113:10 section 20:25 25:7,10 34:18 50:10,13 51:21 52:24 72:1 83:18 88:21 90:12 112:16 see 14:23 21:4,5 24:15 31:24 32:1 34:16,19 43:2 44:25 48:24 56:25 60:8 62:10 63:25 64:19 65:12,15,16 67:7 68:5,6 74:1,3 75:13 76:18,19 78:3,8,9 79:20 80:6 82:4 83:7 88:14 89:6,13 90:3, 16,22 91:5 93:18,21 96:10 100:10 102:2, 16 103:3,13 105:20 111:19 112:11,12 seen 9:18 109:13 111:9 sense 85:8 sensor 66:13,14,16 67:9 94:20 sentence 35:5,21 51:16 70:11,12 72:18 75:6,7 77:6 78:11 separate 17:23 108:9	separation 102:10,23 103:20 104:9 services 14:13 19:4 SESSION 7:1 82:1 set 7:11 83:24 110:11 setting 106:22 seven 19:11,13 20:22 62:11,24 63:24 shaft 70:24 89:23 92:25 100:21 109:20 110:2,3,4,8,9,13,14, 15,23 111:5,11,15 shaft-type 111:8 She'll 17:11 shirt 80:10 short 16:20,21,22,23 56:6 81:8 Shorthand 4:18,22 7:9 show 33:14,18 83:8 84:25 85:3,17 96:25 99:18 101:6 showed 98:24 showing 96:21 99:8 shown 66:6 73:10 74:17 83:10 89:15 95:10 96:13 98:21 99:21 109:10 113:3 shows 66:19 69:19 70:6 82:16 92:24 108:13 sic 12:23 69:5 71:13 82:21 89:19 102:7 side 49:11 66:17 67:11 69:19 90:1 108:14 signal 76:25	significant 50:22 80:7 signing 10:13 similar 56:19 111:17, 23 similarity 88:11 simple 56:23 80:10 83:9 90:24 97:24 98:3 100:6 101:16 102:4 103:6 105:5 simplify 114:6 simply 102:3 simulation 98:9 simulations 104:25 singular 101:23 sink 67:13 69:20 sinks 67:14,22 sitting 22:5 61:4 situations 53:6,7 60:7 95:21 104:22 six 27:1,12,17 sixth 43:11 size 42:20 48:10 91:4 98:2 skill 22:15,20,22 23:1 29:12 30:2,4,15 31:2,6,7 35:6,17 36:4 91:7 94:2 112:1,4 skills 33:22 sleeve 70:8,23,25 71:7,19,23 72:14,23 73:7,24,25 89:23 92:24 slightly 97:4 slotted 83:15,22,25
rotor-circuit- 84:20 rotor-stator 33:8 34:1,24 35:23 36:20 37:12,17,23 38:4,12, 18 39:2,7,11,14,16, 23 40:14,25 41:8,10 47:5,25 66:20 88:8 89:13 100:21 101:20 rotor.' 78:7 rotors 37:2 rough 19:21 route 69:24 rules 8:9 11:3 S S-P-E-C-T-O-R 61:21 sampling 106:13,16 22,24 107:3,7 San 4:16 7:3 Saturday 16:21 saw 114:24 115:4 saying 12:1 21:12 says 23:6 25:4 35:21 75:5 78:4 106:14			

www.apetusCR.com

Index: rotor-circuit--slotted

slowly 8:15	specified 67:6	straightforward	suited 88:7 101:15
small 104:15	Spector 61:20 62:7	74:19 87:14	SULLIVAN 5:4
sold 45:4	speed 49:7 77:22	Street 5:4	Summer 5:14
solely 107:8,14,21	spend 64:20	strengthen...the	Sunday 16:22
solution 85:11,18,23	spent 20:3,9	72:13	support 16:5 56:14
86:1 91:3,6 102:5	stability 47:13,20	strengthened 72:24	70:6,14,23 71:3,6,11
104:6,7	stamped 91:13	strengthening 71:22	73:15,21 74:8,20
solutions 104:8	standard 114:22	73:6,23 74:4	84:7,15,21 85:6,12
sorry 11:25 33:18	standpoint 14:6	structure 33:9 34:2,	86:6,17,22 87:3,17
93:4 98:16	44:24 85:19 88:12	24 35:23 41:8,11,13	90:19 92:6,23 94:16
sort 19:21 41:3	109:12,13	47:5,25 74:8,20	95:8
sound 25:20 45:20,21	started 20:6	76:9,10,23 77:8,11,	supported 107:5,8,
source 65:22 66:4,9,	starting 10:24 54:19	13,16 79:10,12 88:8	13,21
16,19 67:8,18 69:4,	64:15	92:16,21,24 94:3	suppose 18:19 41:23
24 79:22 101:21	starts 106:21	95:17 96:23 101:20	sure 8:10 15:13 17:8,
sourced 87:22 88:10	state 4:18 7:17 51:9	structures 36:20	25 43:8 64:17 68:16
South 5:4	68:22 70:5 78:25	37:12,18,23 38:4,12,	81:6 95:21 104:22
space 88:5 89:4,6,8,	93:25 107:15	18 39:2,7,11,14,24	surface 74:18 110:22
9,24 90:3 101:19	statement 40:3	40:14,25 49:7 65:6	111:4
104:5,21	states 4:1 76:8,20	77:2	surrounds 80:8
spaced 104:3,15	106:19 107:4	stuff 43:2	susceptible 96:1,6
speak 8:15 13:6,13,	stator 32:20 33:11	subject 36:18	suspenders 56:13
16	34:4 35:2 36:1,22	submit 60:16	sworn 4:22 7:9
speaking 56:2 61:10	46:22 50:17 51:25	subsection 54:18	system 24:7 29:8
95:16,22	67:19 76:10,24	71:8	32:19 36:24 37:9
spec 94:8	79:15 80:8 82:17,20	substance 13:9	40:6,8 45:1,3,14
specialized 36:12	89:7,15,21 90:1,5,7	substitution 90:24	46:11 47:9 49:17
specific 40:13 112:17	96:22 99:20 104:3,	suddenly 46:4	50:5 51:1,25 52:9,
specifically 39:23	15 108:24 111:18	suffering 45:11	13,18 53:8,12 56:24
57:9	stators 37:2	sufficient 31:17	57:11,13 79:15
specification 69:14	Stephen 4:20 7:7,19	suggest 38:15 63:22	84:18 89:4 98:3,5
75:10 95:9 103:23	stick 27:1	suggested 10:22	100:25 101:1 103:7,
105:4	STOCKTON 4:15 5:9,	suggesting 61:12	12,16,18,19,23
specifications 47:10	17 6:5	suggests 27:8	104:14,19 106:12
100:24	stop 36:2 79:13 81:3	suitable 45:4	112:7 114:22 115:3
specifics 20:25	stopping 43:23 81:1	Suite 4:16 5:9 6:5	systems 24:21,23
			25:13,14 26:11,12,
			21 27:21,22 28:7,8,
			19 29:3,4,18,19,22
			30:8,9,13,21,22
			Index: slowly—systems
		www.apetusCR.com	

Hesai v. Ouster, IPR2023-01422
Ouster Ex. 2005 - Page 141 of 143

Hesai v. Ouster, IPR2023-01422
Ouster Ex. 2005 - Page 142 of 143

~~windings 48:9 83:15~~	~~42:18~~	~~79:3 80:1,6~~	
86:8 100:9,11,20 101:3	working 22:7 29:21 30:12 31:22 36:5 37:15,17,18,23 38:11,19,22 39:1	Zhang's 74:8,20,24 75:1 76:16 77:25	
windows 80:20			
wires 48:8	wouldn't 37:25 90:25 98:9 103:17 114:24		
wish 22:3	wqiang@ktslaw.com 5:15		
witness 4:21,23 7:8 11:4,20 13:8,10 14:13 16:17,19 19:4, 9 21:2 22:7 23:12,19 24:3 26:3 27:3 28:4 29:24 30:25 32:17 33:14 34:8 44:14 45:10 46:25 49:25 50:7 51:19 52:21 56:4 58:13 61:11 67:2 68:25 71:15 73:2 75:19,22 82:13 90:11 93:14,16 96:4 98:20 107:17,24 113:7 114:4,14 115:10	wrapper 60:7 write 35:5 70:11 88:20 112:16 written 12:20 31:24 32:1 43:1 59:3 94:7, 10,23 102:3		
	Y		
wondering 45:24 51:12	Y-A-N 61:21 Yan 61:21 62:9 Yeah 75:21 81:5,8 year 10:9 19:20		
word 12:22 23:17 25:9 26:8 32:24 33:2,5 39:19	years 19:12,15 20:12, 16 26:22 27:20 29:2, 16,21 30:12,19 31:14,19 32:5 36:9 38:24 42:25		
words 31:3,8,25 34:9 72:17 84:7 88:20	years' 30:6 yellow 66:21 York 5:19		
work 15:24 16:8 19:3 20:21 21:2 26:10 27:10 29:2,16 30:6, 19 31:14,20 32:5,7 36:10 37:13,20 38:2, 6,7 39:1,22,25 42:6, 10,14,22 43:4,11,13 45:18	Z		
worked 11:24 12:3 19:9,14,22 22:1 24:12 26:21 27:14 29:7 36:23,25 37:2, 3,4,5,6,9 40:7,9	Z-H-A-N-G 51:23 54:5 Zhang 51:23 53:19,22 54:2,3,4,5 61:20 62:3 74:12,15 75:7, 10,11,16 77:5,7,9, 15,21,23 78:4,16		
	www.apetusCR.com	Index: windings-Zhang's	