

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VOLKSWAGEN GROUP OF AMERICA, INC.,

Petitioner,

vs.

YECHEZKAL EVAN SPERO,

Patent Owner.

Case: IPR2023-00315

U.S. Patent No. 9,955,551

Case IPR2023-00318

U.S. Patent No. 9,955,551

DEPOSITION OF MATTHEW TURK, Ph.D.

via videoconference

Friday, November 17, 2023

Job No.: 26890

Pages: 1 - 147

Stenographically Reported By:

Alison C. Webster, CSR-6266, RPR, RMR, CRR, RDR

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2
3 Videoconference deposition of MATTHEW TURK, Ph.D.,
4 Produced as a witness at the instance of the Petitioner, and
5 duly sworn, was taken in the above-styled and numbered cause
6 on Friday, November 17, 2023, from 9:30 a.m. to 4:43 p.m.
7 Eastern Time, before Alison C. Webster, RPR, CRR, RMR, RDR,
8 CSR-6266 (Michigan); License No. 14559 (California); License
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10 (Washington), reported by stenographic method, via
11 videoconference, pursuant to the Federal Rules of Civil
12 Procedure and the provisions stated on the record or
13 attached hereto.

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1 **DEPOSITION OF MATTHEW TURK, Ph.D.**

2 **Friday, November 17, 2023**

3
4 **STENOGRAPHER:** The attorneys participating
5 in this deposition and the witness have verified that
6 he is Matthew Turk, Ph.D. In lieu of an oath
7 administered in person, the witness will visually
8 affirm his testimony in this matter is under penalty
9 of perjury.

10 The parties and their counsel consent to
11 this arrangement and waive any objections to this
12 manner of reporting or admissibility of the
13 transcript.

14 If there are any objections to proceeding
15 in this manner by any party, please state so now.

16 [No objections made]

17 Hearing no objections, Dr. Turk, would you
18 please raise your right hand.

19 Do you swear or affirm the testimony you
20 are about to give in this matter will be the truth,
21 the whole truth, and nothing but the truth?

22 **DR. TURK:** Yes, I do.

23 **STENOGRAPHER:** Thank you.

24 You may proceed.

25 **MR. FITZSIMMONS:** Thanks. Good morning,

1 Dr. Turk.

2 THE WITNESS: Good morning.

3 MR. FITZSIMMONS: Good to see you again.

4 THE WITNESS: Likewise.

5 MATTHEW TURK, Ph.D.,
6 was thereupon called as a witness herein, and after
7 having first been duly sworn to testify to the truth,
8 the whole truth and nothing but the truth, was
9 examined and testified as follows:

10 EXAMINATION

11 BY MR. FITZSIMMONS:

12 Q. Could you please state your full name for the record.

13 A. Matthew Alan Turk.

14 Q. And, Dr. Turk, do you know why you are here at this
15 video deposition today?

16 A. Yes, I do.

17 Q. And what's your understanding of why you're here
18 today?

19 A. I'm here to answer questions about my declarations in
20 this IPR case.

21 Q. And there is actually two IPR proceedings that relate
22 to the patent we're discussing today. It's IPR
23 2023-00315 and IPR 2023-00318. Does that sound
24 familiar to you?

25 A. That sounds right.

1 Q. And is it okay if I refer to these proceedings as the
2 '315 proceeding and the '318 proceeding if I need to
3 distinguish between them?

4 A. Yes.

5 Q. And I'll do my best to direct you to the appropriate
6 exhibits. And both of these proceedings are related
7 to the patent number.

8 9,955,551. Does that sound accurate?

9 A. Yes, it does.

10 Q. And is it okay if I refer to that patent as the '551
11 patent?

12 A. Yes.

13 Q. And you understand that you are under oath today.
14 Correct?

15 A. I do.

16 Q. Is there any reason that would prevent you from
17 providing truthful or accurate testimony today; for
18 example, any medications you may be taking?

19 A. No.

20 Q. Is there anything else that would prevent you from
21 providing truthful and accurate testimony?

22 A. No.

23 Q. And since this is a remote deposition and we're not
24 currently in the same physical location, if you can
25 please just let me know where you're currently sitting

1 for this remote deposition?

2 A. Yes, I'm at home at my desk.

3 Q. And what city and state is that, please?

4 A. It is in Chicago, Illinois.

5 Q. Is there anyone in the room with you?

6 A. My wife is across the way a little bit.

7 Q. Okay. And so there's -- and so there is someone else
8 currently in the room with you?

9 A. She's actually walking out right now.

10 Q. Okay. Do you plan to be alone in the room for the
11 rest of the deposition?

12 A. She may have things to do here and there, but
13 generally will not be around too much. If it's
14 important, I can wear earphones so that I -- only I
15 can hear.

16 Q. If that -- if we think that -- if I think that's
17 necessary, I may do that.

18 Besides the computer that you are using
19 right now, do you have any other electronic devices
20 with you?

21 A. My cell phone is next to me on the desk here.

22 Q. Okay. Do you agree you'll refrain from communicating
23 with anyone with any electronic devices during the
24 deposition?

25 A. I'm sorry, what was the beginning of that?

1 Q. Do you agree that you'll refrain from communicating
2 with anyone with your electronic devices during the
3 deposition?

4 A. Yes, I agree.

5 Q. And you should have a box of documents that we sent to
6 you yesterday. Do you have that with you?

7 A. I do, yes.

8 Q. Okay. Great. And we'll be pulling exhibits from that
9 box as we go along. Other than the documents that we
10 sent to you, do you have any other documents with you
11 there?

12 A. I don't, but I do have a question. Well, I have PDF
13 documents, clean PDFs of these, and I wanted to ask
14 you, do you only want me to use the paper version
15 that you sent me or can I use the PDFs as well?

16 Q. As long as those are clean PDF documents, I'm okay if
17 you use those if that's easier for you, but also feel
18 free to use the hard copies if you prefer that.

19 A. Thank you.

20 Q. And so any of those PDF documents that you have,
21 though, those are clean copies without any notes; is
22 that correct?

23 A. That is correct.

24 Q. Okay. And I know you've done this before, Dr. Turk,
25 so I'll just go briefly through some of the, kind of,

1 ground rules. Right? If you ever need a break,
2 please ask. I just ask that you allow me to finish my
3 line of questioning before we take a break. Is that
4 fair?

5 A. Yes.

6 Q. Okay. And please answer my questions verbally rather
7 than a head nod or a shake. Do you agree to that?

8 A. Yes.

9 Q. And since this is a remote deposition it's sort of
10 especially important that we don't talk over each
11 other so the court reporter can hear. So please just
12 allow me to finish the question before you begin your
13 answer; is that fair?

14 A. Yes, it is.

15 Q. And if you don't understand a question, do you agree
16 that you'll ask me for clarification?

17 A. Yes.

18 Q. So if you don't ask for clarification, I'll assume you
19 understood my question; is that fair?

20 A. I believe so.

21 Q. As soon as --

22 [Technical interruption]

23 (Discussion off the record at 9:36 a.m.)

24 (Back on the record at 9:36 a.m.)

25 BY MR. FITZSIMMONS:

1 Q. All right, Dr. Turk, since your deposition for the
2 '029 patent when we worked together, have you been
3 deposed in any other matters?

4 A. No, not since then.

5 Q. And since that deposition for the '029 patent, have
6 you submitted any reports to a Court -- any -- at any
7 Court or PTAB?

8 A. I don't think I have. It's possible. I forget
9 exactly when the date was and what has gone on since
10 then. It's possible there might be submission
11 related to this family of patents, but I don't think
12 so.

13 Q. Okay. How did you prepare for today's deposition?

14 A. I reviewed my declarations and supporting materials
15 for those declarations and I spoke with the attorneys
16 that I'm working with on this case.

17 Q. And what -- you said you reviewed your "declarations
18 and supporting materials." Can you be more specific
19 on what the supporting materials are?

20 A. I would have to look at my list to remind me. The
21 list that's in my declarations.

22 Q. Okay. So there's a list of references in each of your
23 declarations. Is that the materials you're referring
24 to that you reviewed?

25 A. Yes.

1 Q. Did you review your initial declarations and then your
2 second declarations in each of these proceedings? If
3 you recall, you submitted a declaration in support of
4 the patent owner's preliminary response and then a
5 second declaration in support of the patent owner's
6 response in each of these.

7 A. Yes, I did, yes.

8 Q. And so you -- and so you reviewed four total
9 declarations in preparation for today; is that
10 correct?

11 A. Four of my declarations, yes.

12 Q. Okay. Did you review any documents that are not in
13 your exhibit lists in order to prepare for the
14 deposition today?

15 A. I don't think so. Not that I can recall.

16 Q. About how much time did you spend preparing for
17 today's deposition?

18 A. I would guess about eight hours. It's a very rough
19 estimate, though.

20 Q. And who did you meet with to prepare for today's
21 deposition?

22 A. I met with Mr. Turner, who is here, and Ms. Shaw.

23 Q. Did you meet with anyone else?

24 A. No.

25 Q. And when did those meetings occur?

1 A. We met yesterday and there have been some meetings
2 over the past week. I forget exactly which days.

3 Q. Were those meetings in person or remotely?

4 A. They were all remote.

5 Q. Who is retaining you in these two matters, the '315
6 and the '318 proceedings?

7 A. I believe it's technically Torchlight Technologies.

8 Q. And when were you contacted about potentially working
9 on these two proceedings related to the '551 patent?

10 A. I have not reviewed the timeline recently, though
11 very roughly I would estimate it was a little over a
12 year ago, perhaps.

13 Q. What is your understanding of who the owner of the
14 '551 patent is?

15 A. That's not something that I've looked into in much
16 detail, but my general understanding is that it is
17 Torchlight Technologies.

18 Q. Is Torchlight Technologies an entity that you consider
19 when you were determining whether you had a potential
20 conflict of interest to work on these matters?

21 A. Probably. I don't recall that process at this point,
22 but I think it must have been. It's an entity
23 involved in this.

24 Q. How do you -- how did you go about determining whether
25 you had a potential conflict of interest with

1 Torchlight Technologies?

2 MR. TURNER: Objection. Relevance.

3 A. Again, I don't remember that process in any detail at
4 this point, but in general when looking at potential
5 conflicts I determined if I've had a relationship
6 with the entity of interest. And at the moment I
7 don't recall any prior relationship I've had with
8 Torchlight Technologies.

9 BY MR. FITZSIMMONS:

10 Q. And the inventor on the '551 patent is Yechezkal Evan
11 Spero.

12 MR. FITZSIMMONS: And I'll spell that for
13 the court reporter: Y-e-c-h-e-z-k-a-l; Evan is
14 E-v-a-n; Spero is S-p-e-r-o.

15 BY MR. FITZSIMMONS:

16 Q. And is that accurate, the inventor here, Dr. Turk, is
17 Mr. Spero?

18 A. Yes, I believe so.

19 Q. Have you ever communicated with Mr. Spero?

20 A. Not to my knowledge.

21 Q. I'd like you to please pull out -- well, pull up,
22 Dr. Turk, your exhibits -- excuse me, your
23 declarations in these matters. So for the '315
24 proceeding your first declaration is Exhibit 2001 and
25 your second declaration is Exhibit 2006. And for the

'318 proceeding, your first declaration is
Exhibit 2002 and your second declaration is
Exhibit 2024.

Just let me know when you have those all
available.

A. Okay, I have them up.

Q. So starting with the '315 proceeding, let's go to
Exhibit 2001, your first declaration.

A. Okay.

Q. And can you just confirm that this is your declaration
in -- your first declaration in the '315 proceeding?

A. Yes, it is.

Q. And if you go to the last page, is that your signature
there?

A. Yes, it is.

Q. Okay. And same thing for Exhibit 2006 in the '315
proceeding, is this your second declaration in the
'315 proceeding?

A. Yes.

Q. Okay. And if you go to the last page, is that your
signature there?

A. Yes, it is.

Q. For the '318 proceeding, please go to Exhibit 2002,
your first declaration.

A. Okay.

1 Q. And do you confirm that Exhibit 2002 is your first
2 declaration in the '318 proceeding?

3 A. Yes, it is.

4 Q. And on the last page, is that your signature?

5 A. Yes, it is.

6 Q. Thank you. And in the '318 proceeding, Exhibit 2024
7 should be your second declaration in the '318
8 proceeding, if you can just please confirm that.

9 A. Yes.

10 Q. And on the last page, is that your signature on
11 Exhibit 2024?

12 A. Yes, it is.

13 Q. Good. Thanks. I just wanted to clear all that out of
14 the way so we have those all together.

15 Now, I'm going to first talk about your
16 second exhibit in these proceedings, so that will be
17 Exhibit 2006 in the '315 proceeding and Exhibit 2024
18 in the '318 proceeding.

19 There's significant overlap in your
20 opinions in these two declarations. Correct,
21 Dr. Turk?

22 A. I believe so. I haven't compared them to each other
23 directly lately, but I believe they're similar.

24 Q. To your knowledge, do you take any opinions in these
25 two declarations -- and that's Exhibit 2006 in the

1 '315 and Exhibit 2024 in the '318 -- that are
2 conflicting?

3 A. Not to my knowledge.

4 Q. When did you last review these two declarations?

5 A. To some degree, yesterday.

6 Q. What do you mean, "to some degree"?

7 A. I most recently reviewed them yesterday but didn't
8 review every bit of them yesterday.

9 Q. In preparing for the deposition today, at some point
10 had you reviewed every bit of these declarations?

11 A. Yes.

12 Q. Did you write these declarations?

13 A. What specifically do you mean by "write"?

14 Q. How would you define the term "write"?

15 A. "Write" could mean writing in cursive and by hand;
16 "write" could mean typing a document; "write" can
17 mean different things in different contexts so I'm
18 just wanting to answer your question, so...

19 Q. Sure. What was your -- what was your process for
20 preparing these declarations?

21 A. I had already spoken with the attorneys I'm working
22 with here at great length about this patent and about
23 the issues raised in the petitions. So after
24 significant discussion about these matters and about
25 some of the key points, the attorneys that I'm

1 working with provided a first draft and then we
2 converged to the final version that you see here over
3 a period of time.

4 Q. When you say the attorneys that you're working with,
5 who specifically are you referring to?

6 A. Mr. Turner and Ms. Shaw.

7 Q. Did you work with anyone else in preparing these
8 declarations?

9 A. I've worked with some other people of their
10 colleagues in some of these related IPR matters and I
11 don't always remember which ones ended up with which
12 reports, which declarations. So I think it was just
13 these two, or certainly primarily these two.

14 Q. Okay. About how much time did you spend preparing
15 these declarations?

16 A. I don't know how to estimate that at this point. I'm
17 not sure.

18 Q. All right. Let's turn to your '315 declaration, and
19 that, again, is Exhibit 2006 in that proceeding. Just
20 let me know when you have that document available.

21 A. I have it.

22 Q. Okay. And can you please go to paragraph 98? It's
23 page 94 of the -- at the bottom of the PDF.

24 A. Yes, I'm there.

25 Q. Okay. And there's a heading before paragraph 98. Can

1 you please read that heading for me?

2 A. It says Claims 32, 33, 41, and 48-49: The Complete
3 Omission of Elements Constitutes a Fatal Failure of
4 Proof Under 35 U.S.C. Section 312(a)3 and 37 C.F.R.
5 Section 42.22 (a)2."

6 Q. Did you review 35 U.S.C. Section 312(a)3 prior to
7 submitting your declaration?

8 A. I've read it before. I don't recall when I most
9 recently reviewed it.

10 Q. So you don't know if you reviewed it prior to
11 submitting the declaration; is that correct?

12 A. I'm sure I did read it prior to submitting the
13 declaration. I don't recall how recently.

14 Q. Do you recall what Section 312 is about?

15 A. At the moment, I don't recall for sure.

16 Q. And what about 37 C.F.R. Section 42.22(a)2, did you
17 review that regulation prior to submitting your
18 declaration?

19 A. Same thing for that. I have read it before. I don't
20 remember when I would have looked at it most
21 recently.

22 Q. In your '315 and '318 declarations there's a number of
23 paragraphs in each of those that say, "intentionally
24 left blank." Do you recall that?

25 A. Yes.

1 Q. Now, outside of the declarations and the proceedings
2 that you have submitted declarations for on behalf of
3 Mr. Spero, the '029 patent, the '551 patent, and the
4 '531 patent -- just for your recollection -- for other
5 inter partes review declarations, have you used
6 intentionally left blank paragraphs before?

7 A. You're asking for others besides related to these
8 patents you just mentioned?

9 Q. Correct. Outside of those.

10 MR. TURNER: Objection. Relevance.

11 A. I believe that I have, yes.

12 BY MR. FITZSIMMONS:

13 Q. Would it surprise you that we reviewed 28 of your
14 declarations in other proceedings and didn't find a
15 single instance of an intentionally left blank
16 paragraph in an inter partes review declaration?

17 A. That would surprise me, yes.

18 Q. Now, the '315 declaration, there's 15 paragraphs that
19 say, "intentionally left blank," that are paragraphs
20 123, 124, 129, 146, 149, 151, 155, 164, 170, 175, 178,
21 184, 189, 201, and 214.

22 Did you type "intentionally left blank" in
23 your declarations or did someone else?

24 A. I don't recall typing that myself, so I presume it
25 was someone else.

1 Q. Okay. And in the '318 declaration there's 21
2 paragraphs that say "intentionally left blank." Those
3 are paragraphs 102, 103, 109, 113, 117, 125, 131, 135,
4 154, 156, 160, 173, 178, 182, 185, 190, 195, 200, 210,
5 221, and 223.

6 Do you recall if you typed "intentionally
7 left blank" in those paragraphs of your declaration?

8 A. I don't recall typing them myself.

9 Q. So there's 36 instances in these two declarations of
10 intentionally left blank paragraphs. Do you have any
11 recollection of why there's so many intentionally left
12 blank paragraphs in your declarations?

13 A. I don't recall in detail. This is often -- I often
14 see these, and as I said earlier, I thought that I've
15 included those in prior declarations just for
16 housekeeping, bookkeeping reasons. We edit things,
17 we change things, and we add paragraphs, we remove
18 paragraphs, and sometimes it's just easier to keep
19 the numbering consistent, was the only causes that I
20 can recall.

21 Q. All of these paragraphs are at the end of a section,
22 like before a next heading. Do you know if there's a
23 reason for that?

24 A. No, I don't.

25 Q. Were there some sort of conclusion statements that you

1 or someone else removed from those paragraphs?

2 A. Not that I recall, but I'm not sure.

3 Q. Okay. So you're not sure why any of the 36 instances
4 of "intentionally left blank" in these two
5 declarations are there; is that right?

6 A. Not besides what I said already, that for bookkeeping
7 reasons this is frequently done, I believe, or at
8 least has been in my experience, but I don't recall
9 specifically why in these cases.

10 Q. Okay. Let's go in your '315 declaration, so again
11 this is Exhibit 2006, in that proceeding, and let's
12 turn to paragraph 48.

13 A. Okay.

14 Q. And then in paragraph 48, you say, "I understand that
15 Patent Owner accepts Petitioner's proposed level of
16 ordinary skill in the art."

17 Do you see that?

18 A. Yes, I do.

19 Q. And that level of ordinary skill in the art is listed
20 in the preceding paragraph, paragraph 47. Correct?

21 A. Yes.

22 Q. And I'm also going to have you now look at your '318
23 declaration, that's Exhibit 2024, also paragraph 48.

24 A. Okay.

25 Q. And there you also say, "I understand that Patent

Owner accepts Petitioner's proposed level of ordinary skill in the art." Correct?

A. Yes.

Q. And, again, that level of ordinary skill in the art is in the preceding paragraph, paragraph 47. Correct?

A. That's correct.

Q. And so you say that the "Patent Owner accepts" this -- "Petitioner's proposed level of ordinary skill in the art."

Do you also accept Petitioner's level of ordinary skill in the art listed there in paragraph 47?

A. Yes, I do.

Q. Okay. And so you agree that is the level of skill to be applied to analysis or opinions in both of these proceedings. Correct?

A. Yeah, the -- I would say that's a minimum level.

Q. That's the level of ordinary skill. Correct?

A. Yes.

Q. Now let's go to your '315 declaration. And I think we will probably stick to that one for a while, but we'll have both available.

So the '315 declaration again, Exhibit 2006. Now we'll turn to paragraph 35, please. And that starts, I believe, on page 32. Oh, I'm

1 sorry. It starts on page 30 and continues onto the
2 next page.

3 Do you see that paragraph?

4 A. Yes.

5 Q. And then also that same paragraph, since there's a lot
6 of bullet points, it continues onto page 32, 33, and
7 34 actually. Do you see that?

8 A. Yes.

9 Q. I actually want you to go to page 32. And at the top
10 of the page there, you state "An SLM is used by Beam
11 and Karlsson." Correct?

12 A. That's right.

13 Q. And SLM stands for spatial light modulator. Correct?

14 A. That's correct.

15 Q. And at the bottom of page 32 of the last bullet there,
16 you state that, in your opinion, "as would be
17 recognized by a POSA, in view of the redundant
18 functionality there is no reason to use an SLM in
19 combination with individually controllable light
20 sources." Correct?

21 A. That's correct.

22 Q. And is that still your opinion?

23 A. Yes, it is.

24 Q. Thank you. Can you please pull up in front of you the
25 Beam reference, Dr. Turk, and that's Exhibit 1005.

1 A. Yes.

2 Q. And just for the record, that Beam patent is patent --
3 U.S. Patent Number 6,144,158. Correct?

4 A. That's correct.

5 Q. And you have a clean copy of that in front of you?

6 A. I do.

7 Q. Can you please go to column 4, and starting at line 45
8 where it says -- perhaps it's 46, starting, "The
9 angular position." Do you see that?

10 A. Yes.

11 Q. Can you read that sentence for me? So it's Exhibit
12 1005 being referenced, column 4, lines, say, 45 to 48.

13 A. "The angular position or attenuation of each of these
14 microbeams is independently set by the controller
15 108."

16 Q. And you've reviewed the Beam reference, I believe, a
17 number of times now. Correct, Dr. Turk?

18 A. That's correct.

19 Q. All right. What does Beam mean by controlling the
20 angular position of the microbeams?

21 A. It means that the spatial light modulator is either
22 allowing a microbeam to pass out of the device into
23 the world or the angle has changed so that it does
24 not pass out, it gets absorbed inside the device.

25 Q. So one of the functions of Beam system is to control

1 the angle or direction of its microbeams. Correct?

2 A. It's partly correct. To be more specific, it -- for
3 each element of the SLM which can produce -- each one
4 can produce a microbeam, it has a choice of either
5 send it out or not send it out. So that's the level
6 of control, either on or off, essentially.

7 Q. And by sending it out, in your opinion, or not sending
8 it out, as you characterize it, that's controlling the
9 angle or direction of each of the microbeams.

10 Correct?

11 A. Well, it depends on one's definition. If you
12 consider a microbeam what is exiting the headlamp or
13 the lights, the fixture in this case, the headlamp in
14 this case, there's only one angular direction that
15 microbeam can go, but internal to the device there
16 are two directions in which it can be controlled;
17 either kept in or exited.

18 Q. You said "if you consider a microbeam what is exiting
19 the headlamp." Is that what you consider a microbeam
20 to be, something that must exit the headlamp?

21 A. I don't have a general opinion on -- a general
22 definition of it. It depends on the context in which
23 it's being used.

24 Q. So the context here is the Beam reference that we're
25 talking about?

1 A. Right.

2 Q. So in the context of Beam, do you consider a microbeam
3 only what is exiting the headlamp?

4 A. In the sentence here that I read, starting at
5 line 46, it uses -- it has microbeams, and so that is
6 describing the internal directing of the SLM, not all
7 of the beams that exit the device.

8 Q. Sorry, I don't understand what you -- what you mean by
9 that. You said it's "describing the internal
10 directing of the SLM." What do you mean by that?

11 A. The internal directing of the light source that's
12 being directed toward the SLM. And when it uses the
13 word "microbeams" in this context here, it's talking
14 about each light bouncing off, reflecting off each
15 SLM element, and that can be controlled in one of two
16 ways, either to exit into the world or to be diverted
17 internally and not get out of the device.

18 Q. I see. So if that microbeam is diverted internally,
19 it would be directed in a first direction or at a
20 first angle. Correct?

21 A. What do you mean by "first" in this case?

22 Q. By "first," I was then going to compare that. If it,
23 in your characterization, exits the headlamp, that
24 would be a second direction or a second angle.

25 A. I think that describes -- that is a way to describe

1 what I've been saying, that, internal to the device,
2 the light can bounce off an SLM element in one of two
3 ways, and you might want to call those first and
4 second angles. Only one of them, of course, would
5 actually leave and become part of a beam going out
6 into the world.

7 Q. Based on your understanding, how does the Beam
8 reference control that angular direction of the
9 microbeams?

10 A. Using the SLM. That's what the SLM does.

11 Q. Now, in your opinion, when Beam uses LEDs as the light
12 source, you say that there is not an SLM; is that
13 right?

14 A. That's correct. It's a different embodiment in Beam
15 that uses LEDs as light sources.

16 Q. Okay. Based on your understanding, then, how does
17 Beam control the angular direction of those microbeams
18 in that case?

19 A. In that embodiment -- really, in both embodiments,
20 Beam has no control of the light beams exiting the
21 device. They are fixed. No dynamic control of it.
22 They are fixed.

23 Q. So how does Beam switch from the low beam function to
24 a high beam function?

25 A. I don't think that I discuss that in my declaration,

1 unless you'd like to point me to a place that I did.

2 It's not something that I've really thought about.

3 Q. So you haven't thought about whether Beam switches
4 from a low beam function to a high beam function; is
5 that correct?

6 A. Beam might describe that. I don't recall. But,
7 again, I don't think it's something that I opined
8 about in my declarations.

9 Q. Okay. Do you recall opining about how Beam tracks
10 vehicles with a dimmed area to prevent glare?

11 A. I don't believe I used the word "tracking" or
12 "tracks" there. I do recall probably saying some
13 things about Beam's dimming, which I think is what
14 you're talking about.

15 Q. How does Beam provide dimmed areas to prevent glare?

16 A. In the first embodiment with the SLM that we
17 discussed, it's by the process we were talking about,
18 diverting the light using the SLM so that it doesn't
19 exit, and so, therefore, it blanks. In the second
20 embodiment it's essentially turning off the LED that
21 is going out, that would otherwise be going out into
22 the world.

23 Q. You said it's "essentially turning off the LED." What
24 do you mean by that?

25 A. I mean not sending light energy from the LED.

1 Q. Is it your opinion that Beam, the LEDs in Beam, send
2 zero light energy, as you characterize it, when
3 they're providing a dimmed area to prevent glare?

4 A. Can you point me to where in my declaration I discuss
5 this so I can recall all of the details?

6 Q. Let's see. Sure, we can turn to paragraph 107 in your
7 declaration. Again, this is the '315 proceeding, and
8 so that's Exhibit 2006, paragraph 107, you're talking
9 about Beam in this paragraph.

10 A. Paragraph 107?

11 Yeah. So as I -- so I think in response to
12 your question, what is in paragraph 107 is that "Beam
13 discloses darkening areas by blanking microbeams."

14 And then at -- I'm sorry, and then at the
15 bottom, "or LEDs to 'blank' microbeams."

16 Q. And so with respect to the LEDs, you said "it's
17 essentially turning off the LED," which you said, "I
18 mean not sending light energy from the LED."

19 And my question then was, in your opinion,
20 do the LEDs in the Beam reference send zero light
21 energy, as you characterize it, when they are
22 providing the dimmed area to prevent glare?

23 MR. TURNER: Objection. Vague.

24 Mischaracterizes testimony.

25 A. So the LEDs are blanked in those areas for Beam.

1 BY MR. FITZSIMMONS:

2 Q. What do you mean by "blanked"?

3 A. Turned off, not emitting light energy.

4 Q. So is it your opinion that Beam's LEDs are either on
5 or off, there's nothing in between?

6 A. I believe that's true.

7 Q. Okay. Back to paragraph 35 where we were previously
8 in the '315 declaration, Exhibit 2006. And since
9 that's a long paragraph, we'll go to page 33, I
10 believe. I'm sorry, page 34 at the top, the last
11 bullet point of paragraph 35.

12 Do you see where you say, "the generated
13 light beam to provide adaptive headlamp
14 functionality," in that paragraph?

15 A. Yes.

16 Q. In order to generate a light beam to provide adaptive
17 headlamp functionality, does it need directional light
18 sources?

19 MR. TURNER: Objection. Vague.

20 A. Are you talking about Beam specifically or in what
21 context are you asking the question?

22 BY MR. FITZSIMMONS:

23 Q. In order to provide adaptive headlamp functionality,
24 does the headlamp need directional light sources?

25 A. In general -- I'm not sure if I've thought about this

1 as a general question. I imagine there might be
2 other ways to provide that.

3 Q. Is an LED die a directional source?

4 A. Excuse me, you said an "LED die"?

5 Q. Correct, d-i-e.

6 A. I hadn't really thought about that so I'm not sure
7 how to -- how specific I can answer that at the
8 moment.

9 Q. So you don't know whether an LED die is a directional
10 light source; is that correct?

11 A. It's not something that I've thought about or opined
12 about in my declaration, so it would be off the top
13 of my head and just not sure.

14 Q. Have you heard of the term "Lambertian,"
15 L-a-m-b-e-r-t-i-a-n?

16 A. I do know the term "Lambertian."

17 Q. Okay. And can you explain to me your understanding of
18 a Lambertian source?

19 A. Well, I don't think I opined on it in my declaration,
20 so a very out of context general view of Lambertian
21 is that it's -- at least it can be a property of
22 surfaces and how light bounces off surfaces and is
23 perceived by an observer.

24 Q. Is an LED die lamp a Lambertian source?

25 A. It's not something that I've thought about at least

1 lately, so I'm not sure.

2 Q. All right. Let's turn to the Karlsson reference. For
3 the record, that's K-a-r-l-s-s-o-n. So the Karlsson
4 reference is Exhibit 1010 in both of these
5 proceedings.

6 And just let me know when you have that,
7 Dr. Turk.

8 A. I have it.

9 Q. Okay. And the Karlsson reference is PCT International
10 Publication Number W0 98/54030. Correct?

11 A. That's right.

12 Q. Okay. We'll call this the Karlsson reference, if
13 that's okay with you.

14 A. That is.

15 Q. All right. And I'd like you to turn, please, to
16 page 19 of Karlsson.

17 A. Okay.

18 Q. And line 29, starting with "The emitted light beam
19 50," that sentence, page 19, lines 29 to 33, please.

20 A. "The emitted light beam 50 is represented as a window
21 which can shift in the plane of the drawings from"
22 left -- "from the left to the right and from the top
23 to the bottom, if desired, and vice versa, and which
24 may vary in regards its shape and dimension in
25 dependence on the desired pattern and direction of

1 the beam."

2 Q. And so Karlsson discloses controlling the pattern and
3 direction of its light beam. Correct?

4 A. Karlsson describes the light beam in Figure 14, I
5 believe this is referring to, as something that can
6 shift in these -- in this manner.

7 Q. All right. And in what we just read, Karlsson is
8 describing controlling the pattern and direction of
9 the beam. Correct?

10 A. Well, not really. It doesn't say anything there
11 about controlling it. Right here, it just says it
12 can, if desired, do such a thing.

13 Q. Okay. Would you characterize this passage as Karlsson
14 saying that the admitted light beam may vary with its
15 pattern and direction of the beam?

16 A. I would say that this sentence, along with some other
17 discussion in Karlsson about sensors, describes some
18 variation of the light beam in certain contexts.

19 Q. And that variation, as Karlsson says here, can be with
20 respect to the pattern and direction of the beam.
21 Correct?

22 A. Excuse me, did you say "pattern"?

23 Q. Pattern, yeah. As it says here on the page, pattern,
24 p-a-t-t-e-r-n.

25 A. Ah, I see. Okay. Yes. Yes.

1 Q. And one way that Karlsson discloses varying that
2 pattern and direction of the beam is with an SLM, a
3 special light modulator. Correct?

4 A. Karlsson does use spatial light modulator in its
5 first set of embodiments. Karlsson is not specific
6 about how that is used to influence the beam 50 that
7 we're talking about here.

8 Q. Okay. One way that Karlsson discloses sparing the
9 pattern and direction of the beam is with an SLM,
10 though. Correct?

11 A. I don't recall Karlsson discussing that specifically,
12 no.

13 Q. What does the SLM in Karlsson do?

14 A. I think I described it in my declaration. Can we go
15 to that?

16 And, I'm sorry, can you repeat the
17 question?

18 Q. Yeah, my question was, what does the SLM in Karlsson
19 do?

20 A. So I do opine about that on page 32 of my declaration
21 and it says it [as read]: converts a light beam
22 generated by a light source, such as an incandescent
23 halogen bulb, for example, to multiple separate and
24 individually controllable smaller light beams so that
25 the smaller light beams can be individually blanked

1 or blocked and do not exit the headlamp.

2 Q. And you were reading from the first bullet on page 32
3 of your '315 declaration Exhibit 2006; is that
4 correct?

5 A. That's correct.

6 Q. Okay. Can you please turn to Figure 1 of Karlsson?

7 A. Okay.

8 Q. So this is Exhibit 1010. And in Figure 1, what is
9 Reference Number 3?

10 A. Figure 1 is the SLM embodiments, not the LED
11 embodiments. And Element 3, I believe, is the SLM in
12 that embodiment.

13 Q. And in Figure 3, that shows the SLM Reference
14 Number 3. Correct?

15 A. Yes, that's correct.

16 Q. And Figure 4 shows Reference Number 3 of the SLM.
17 Correct?

18 A. Yes. Yeah.

19 Q. Okay. And Figure 7, that shows Reference Number 3 of
20 the SLM. Correct?

21 A. I believe that's still the SLM, that figure.

22 Q. Okay. And Figure 8 also shows Reference Number 3 of
23 the SLM. Correct?

24 A. I believe so.

25 Q. Okay. And just to confirm here, if you go to

1 Karlsson, page 5, lines 11 through 15. So I think
2 Karlsson sometimes calls the Reference Number 3 light
3 modulating or light modulator beams 3. On page 5
4 there, lines 11 through 15, Karlsson says that the
5 light modulator needs to be a spatial light modulator.
6 Correct?

7 A. I think that's what -- that's what that section
8 means, yes.

9 Q. Okay. Can you go, please, to -- back to the figures,
10 to Figure 3 for me, please. And in Figure 3, what is
11 Reference Number 23?

12 A. Let me confirm in my declaration just to make sure I
13 don't get that wrong.

14 Well, I'm pretty sure it's the sensor.

15 Q. 23. So the light sensors -- light sensitive sensor
16 beam 23; is that correct?

17 A. Yeah, I believe so.

18 Q. And so that's -- so in Figure 3, Reference Number 23
19 is the light sensitive sensor beams. Correct?

20 A. I believe so.

21 Q. Okay. And in Figure 7, also shows light sensitive
22 sensor beams 23. Correct?

23 A. I believe so.

24 Q. Okay. Back to Figure 1, please. What is Reference
25 Number 2?

1 A. Sorry, is this Figure 1?
2 Q. Figure 1, what is Reference Number 2, please?
3 A. It's a light source.
4 Q. So Figure 1 shows a light source represented by
5 Reference Number 2. Correct?
6 A. That's correct.
7 Q. Okay. And Figure 2 has Light Source 2. Correct?
8 A. Yes, that's correct.
9 Q. Okay. And Figure 3 has Light Source 2. Correct?
10 A. That's correct.
11 Q. And Figure 4 has Light Source 2. Correct?
12 A. That's correct.
13 Q. Figure 7 has Light Source 2. Correct?
14 A. I believe so.
15 Q. So Figure 7 has Light Source 2. Correct?
16 A. I believe so.
17 Q. You believe so or it has Light Source 2? Are you
18 unsure about that? I just want to make sure because,
19 the others, you agree that they have -- the figures
20 have Light Source 2, but you said "I believe so." So
21 do you mean yes when you say that?
22 A. I'm just checking, to make sure I give you a good
23 answer.
24 Q. Sure.
25 A. And, yes, it is Light Source 2.

1 Q. Okay. So Figure 7 has Light Source 2. Correct?

2 A. That's correct.

3 Q. And Figure 8 has Light Source 2. Correct?

4 A. Yes.

5 Q. Okay. In Karlsson, can you please go to page 14 for
6 me?

7 A. Okay.

8 Q. And at the top of the page there, lines 1 through 4,
9 can you read that section for me, please?

10 A. "The spotlight beams 34 can be obtained, for example,
11 by using a light source 2 which is composed of a grid
12 of separate light sources, such as LEDs, which can
13 preferably be controlled either individually or in
14 groups."

15 Q. And so Karlsson discloses that the Light Source 2 can
16 be LEDs. Correct?

17 MR. TURNER: Objection. Vague.

18 A. I'm sorry, which page was this again? I was looking
19 at a figure.

20 BY MR. FITZSIMMONS:

21 Q. Page 14, lines 1 through 4 that you just read.

22 A. So this says the light source in the context of
23 Figure 6 can be composed -- can be composed of LEDs.

24 Q. Only in the context of Figure 6? Is that what you're
25 saying?

1 A. It is the -- it is discussing this in the context of
2 Figure 6.

3 Q. Okay. What -- so my question again is, Karlsson
4 discloses that Light Source 2 can be LEDs. Correct?

5 MR. TURNER: Objection. Asked and
6 answered.

7 A. It's a little vague here, and also it is vague at
8 times because light -- this is description in the
9 context of Figure 6, but there is no Light Source 2
10 in Figure 6. So it's a little hard to say exactly
11 what Karlsson meant by that.

12 BY MR. FITZSIMMONS:

13 Q. Does Karlsson disclose that the Light Source 2 can be
14 LEDs?

15 A. In this discussion of Figure 6 here, Karlsson
16 mentions a light source which can be LEDs, but it's
17 not necessarily a discussion about the other figures
18 that we've already discussed.

19 Q. At least with respect to Figure 6, Karlsson discloses
20 that a Light Source 2 can be LEDs. Correct?

21 A. Yes. Regarding that figure, yes.

22 Q. Can you go to page 21 for me, please? And can you
23 read lines 14 to 17, please?

24 A. "The lighting means in the lighting device according
25 to the invention may be composed of a plurality of

1 light sources and/or light modulators which are known
2 per se in practice. Examples of light sources are
3 inter alia, filament lamps, gas discharge lamps,
4 halogen lamps, or Light Emitting Diodes (LEDs)."

5 Q. And here again Karlsson is disclosing that the light
6 sources can be light emitting diodes, LEDs. Correct?

7 A. In some contexts, yes.

8 Q. Back to page 14, please. And can you read please for
9 me, on page 14 of Karlsson, lines 22 to 25:

10 A. "In the embodiment in question the light source 2 is
11 comprised of a plurality of separate small light
12 sources, in such a manner that each small light
13 source couples light into one end 38 of a fibre 37,
14 as a result of which spotlight beam 34 is formed at
15 the end 39 thereof."

16 Q. And referring to Figure 7, that has a plurality of
17 separate small light sources. Correct? As disclosed
18 in Karlsson.

19 A. I'm sorry, can you repeat that question, please?

20 Q. I said, and referring to Figure 7, that has a
21 plurality of separate small light sources as you just
22 read here. Correct?

23 A. Yes, that's correct.

24 Q. I want to go back up to the top of page 14 there,
25 lines 1 through 4 which you previously read, and in

1 this passage Karlsson is also disclosing that the LEDs
2 can be controlled either individually or in groups.
3 Correct?

4 MR. TURNER: Objection. Vague.

5 A. The spotlight beams discussed here in the context of
6 Figure 6 can be controlled individually or in groups.

7 MR. FITZSIMMONS: It's been a little more
8 than an hour, so let's take a break here, Dr. Turk.

9 (Back on the record at 10:48 a.m.)

10 (Back on the record at 11:04 a.m.)

11 BY MR. FITZSIMMONS:

12 Q. Okay, welcome back, Doctor. When you developed your
13 opinions in your two declarations, your one CCD in the
14 '315 and '318 proceedings, did you develop an
15 understanding of each of the claim terms in the
16 patent?

17 A. Are you referring to specific claim terms or all the
18 words in the claims?

19 Q. All of the claims. Did you develop an understanding
20 of each of the terms in the claims?

21 A. I did develop an understanding of the claims.

22 Q. Okay. If we go to paragraph 49 of your '315
23 declaration, Exhibit 2006, you say that each of the
24 claims includes terms --

25 A. Excuse me. Excuse me. Excuse me. I just want to

1 get the right one here. Sorry, which --

2 Q. No problem. Exhibit 2006, the '315 declaration.

3 A. Ah, there it is. Okay. Thank you.

4 Q. I believe it's the same in both of them, but we're at
5 paragraph 49, and you say, "each of the claims
6 includes terms that an ordinary artisan would
7 understand according to their plain and ordinary
8 meaning." Correct?

9 A. That's correct.

10 Q. And is it correct then that you applied what you
11 believed to be the plain and ordinary meaning of the
12 claim terms in the '551 patent when analyzing the
13 patent and references here?

14 A. Yes, I believe so.

15 Q. And is it fair to say that's true for both the '315
16 and the '318 proceedings?

17 A. Yes.

18 Q. What was your process for determining the plain and
19 ordinary meaning of the claim terms?

20 A. I don't think there was a special process for that,
21 it was just using their plain and ordinary meanings.

22 Q. So did -- what do you mean by "using their plain and
23 ordinary meanings"?

24 A. I think just what is written here. I think according
25 to their plain and ordinary meaning is a

1 well-understood phrase, so I don't know how else to
2 describe it.

3 Q. How do you understand that phrase "plain and ordinary
4 meaning"?

5 A. I didn't define it here, but off the top of my head,
6 I think it's understanding a term without having to
7 do additional research or investigation to know what
8 it is intended to mean.

9 Q. What do you mean by "additional research or
10 investigation"?

11 A. Well, again, this is just off the top of my head, but
12 I think if an ordinary artisan would understand a
13 term according to their -- terms according to their
14 plain and ordinary meanings, that person would not
15 need to spend additional effort to investigate that
16 term to understand its use in some context.

17 Q. And so you read the claims of the '551 patent.
18 Correct?

19 A. I did, yes.

20 Q. Okay. Did you read all of the claims?

21 A. Yes, I did.

22 Q. And did you read the specification of the '551 patent?

23 A. Yes, I did.

24 Q. Did you read all of the specification of the '551
25 patent?

1 A. Yes, I did.

2 Q. Did you review the prosecution history of the '551
3 patent?

4 A. I have seen -- I have seen it. I probably have not
5 read all of it in detail.

6 Q. Do you know what portion -- parts you read?

7 A. Not offhand.

8 Q. Did you review the re-examination history of the '551
9 patent?

10 A. I reviewed it somewhat. I don't remember in how much
11 detail and which parts I spent more time on, but I
12 have seen it, yes.

13 Q. And you understand what I mean by the re-examination
14 history? You understand, Dr. Turk, that there was a
15 re-examination of the '551 patent. Right?

16 A. I do understand that.

17 Q. Okay. And you understand that there was a proceeding
18 at the U.S. Patent and Trademark Office where the
19 claims of the patent were re-examined before the
20 claims that we're discussing issued. Correct?

21 A. Yes, I believe so.

22 Q. Okay. And so when I say, did you review the
23 re-examination history, that's what I was referring
24 to. Is that what you understood me to mean?

25 A. Yes, I understand that context.

1 Q. Okay. And so with respect to the re-examination
2 history, you said that you "reviewed it somewhat" but
3 "don't remember in how much detail and which parts I
4 spent more time on."

5 That's an accurate statement?

6 A. I think that's what I said.

7 Q. Is it your understanding that when you are determining
8 the plain and ordinary meaning of claim terms, that
9 that is considered from a viewpoint of a person of
10 ordinary skill in the art?

11 A. Yes, I do.

12 Q. Okay. Let's go to your '315 declaration again,
13 Exhibit 2006, that one, and let's go to paragraph 104.
14 And here at paragraph 104 you're referring to Claim 24
15 of the '551 patent. Correct?

16 A. That's correct.

17 Q. And here, paragraph 104, you construed the term
18 "emission" in Claim 24; is that correct?

19 A. That's correct.

20 Q. And you provide two dictionary definitions of the term
21 "emission" in paragraph 104; is that correct?

22 A. Yes.

23 Q. Why did you think it was necessary to turn to
24 dictionaries to define the term "emission"?

25 A. I wanted to clarify for the audience of this

1 declaration what its plain and ordinary meaning is.

2 Q. So was the '551 patent specification not clear about
3 the plain and ordinary meaning of the term "emission"?

4 A. I don't really have a comment about that.

5 Q. You said you wanted to clarify what the plain and
6 ordinary meaning is of the term "emission." Correct?

7 A. Yes, for the audience of my declaration.

8 Q. What needed to be clarified about the term "emission"
9 in Claim 24?

10 A. I don't know if anything did. I wanted to be clear
11 about the term for the purposes of my communication
12 here in my declaration.

13 Q. And in order to do that, you felt it was necessary to
14 provide definitions from the two dictionaries that you
15 cited; is that correct?

16 A. I don't know if I felt it was necessary. I did
17 provide those definitions. I thought it might be
18 helpful.

19 Q. In paragraph 104 here you say that "claim 24 requires
20 an emission (something set forth) from both the
21 selected cluster of LEDs and the other actively
22 emitting LEDs not in the selected cluster (a
23 relativistic comparison)."

24 Is that correct?

25 A. That's what it says, yes.

1 Q. What do you mean by "relativistic comparison"?

2 A. I mean that I believe the claim is discussing the
3 difference between two sets of emissions.

4 Q. Is it possible to compare an emission of light to an
5 emission of zero light?

6 MR. TURNER: Objection. Vague.

7 A. I don't think an "emission of zero light," if that's
8 exactly what you said, is a very meaningful phrase.

9 BY MR. FITZSIMMONS:

10 Q. Why is that not a meaningful phrase to you?

11 A. Well, if we go back to the first dictionary
12 definition here of a deduction and discharge of
13 something, especially gas or radiation, the lack of
14 production or discharge does not fit in that
15 definition and that's what you are asking me to
16 compare, I believe. So I wouldn't call that an
17 emission.

18 Q. So if I have a 100-watt light bulb, okay, and it's
19 emitting -- it's emitting 100 watts; is that fair?

20 A. Sure.

21 Q. I turned it on. I turned the switch on.

22 A. Yes.

23 Q. Okay. And if I turn that switch off and my light bulb
24 is off, it's emitting zero watts. Correct?

25 MR. TURNER: Objection. Vague.

1 A. In general, in the general hypothetical context, I
2 still wouldn't call it emitting zero. I would say
3 it's not emitting is probably the right way to
4 describe that.

5 BY MR. FITZSIMMONS:

6 Q. So in your opinion there's a difference between
7 emitting zero and not emitting?

8 A. Going back to the definition here, I think probably
9 both of the definitions that I provide here,
10 "emitting zero" is not a very meaningful phrase, so I
11 probably wouldn't use that phrase.

12 Q. What phrase would you use?

13 A. For what?

14 Q. For when my light switch is off and --

15 A. I would say -- I would say that it's off.

16 Q. When that light switch is -- of my 100-watt bulb, that
17 difference when it's on and when it's off would be 100
18 watts; is that correct?

19 MR. TURNER: Objection. Vague.

20 A. I would say in one case it's emitting 100 watts. In
21 another case, it's off, it's not emitting anything.
22 I think that's a good description of that situation.

23 BY MR. FITZSIMMONS:

24 Q. And what's the difference in that output? 100.
25 Correct? Watts.

1 A. Not emitted -- not emitting any light energy can be
2 described as, you know, no watts. So in that, sort
3 of, informal description you could do the difference
4 between those two and the difference would be
5 100 watts. But, again, I wouldn't call the light
6 bulb being off emitting anything.

7 Q. And so you said the difference would be 100 watts so
8 you can at least make a relativistic comparison
9 between when that light bulb was on and when you
10 turned the switch off. Correct?

11 A. Well, probably anything can hypothetically be
12 compared. I would say it's not a very meaningful
13 comparison, but you could compare lots of things, so
14 sure.

15 Q. So looking at, again, paragraph 104 related to
16 Claim 24, and the header in that paragraph 104 talks
17 about change emission. Correct?

18 A. That's correct.

19 Q. You didn't provide a definition for the term "change";
20 is that correct?

21 A. I don't think I did.

22 Q. Why not?

23 A. I probably didn't think it would be needed here or
24 useful here.

25 Q. Why didn't you think it would be needed here?

1 A. I don't recall what the particular thought process
2 was in deciding not to define any particular word
3 here, so it's hard to say.

4 Q. But so at a minimum you thought that the term
5 "emission" requires explaining a definition but not
6 the term "change." Correct?

7 A. I don't think I said it requires a definition. I
8 think I said that I thought it would be helpful to
9 provide a definition.

10 Q. Did you assign the term "change" its plain and
11 ordinary meaning?

12 A. I believe I would have.

13 Q. What is the plain and ordinary meaning of "change,"
14 then, in the context of Claim 24?

15 A. It's not something that I, you know, opined on
16 specifically in my declaration or have thought about
17 deeply, so I could, you know, tell you off the top of
18 my head it would probably be some measurable
19 difference.

20 Q. So "some measurable difference," is that the meaning
21 that you have -- the plain and ordinary meaning that
22 you assign to the term "change" in Claim 24?

23 A. That's what I'm telling you what I'm thinking of
24 right now off the top of my head. Again, I don't
25 recall what specific definition I was attributing to

1 that word at the time of making these opinions.

2 Q. Would it have been different than the -- what you just
3 explained to me?

4 A. Well, again, I don't know for sure, but I doubt it
5 would have been substantially different.

6 Q. Okay. Paragraph 104 in the 2006, you cite column 19,
7 lines 26 through 33 of the '551 patent, which is
8 Exhibit 1001. Just for your reference, that's on
9 page 97 of your declaration now. And towards the end
10 of the first paragraph, you see that, you say
11 Exhibit 1001, column 19, lines 26 to 33.

12 A. Yes, let me look at the context here for a moment.
13 Yes, I see that.

14 Q. Okay. Now, let's go to the '551 patent itself, which
15 I don't believe you've formally pulled up yet, so
16 we'll introduce Exhibit 1001, the '551 patent to
17 Spero. That's U.S. Patent 9,955,551.

18 Just let me know when you have that in
19 front of you, Dr. Turk.

20 A. Okay, I do have it.

21 Q. Okay. And so you have Exhibit 1001, the '551 patent.
22 Correct?

23 A. Correct.

24 Q. Thanks. And let's go to that citation, column 19,
25 starting at line 26. Can you read that first sentence

1 there for me, please?

2 A. "The discrete light emitting elements by operating
3 and not operating, at full power or at a fraction of,
4 either partially or in unison, generate light with
5 optimal intensity, spectral distribution and spatial
6 distribution of intensity and spectral distribution
7 for the viewing task at hand."

8 Q. Thanks. And so you cite this passage in paragraph 104
9 of your '315 declaration for the states of the light
10 elements. Correct?

11 A. Yes. I think it goes beyond that a little bit as
12 well, but yes.

13 Q. Okay. In your opinion, there is emission when the
14 LEDs are operating at full power, as it says here in
15 this passage; is that correct?

16 A. I'm sorry, can you repeat that, please?

17 Q. Sure. In your opinion, there is emission as recited
18 in Claim 24 when the LEDs are operating at full power
19 as it says in the passage that you just read; is that
20 correct?

21 A. There is emission then, yes.

22 Q. So there is emission at full power, in your opinion.
23 Correct?

24 A. Yes. And the full phrase here is, "at full power or
25 at a fraction of."

1 Q. That was going to be my next question. So is there
2 also emission, in your opinion, when the LEDs are
3 operating at a fraction of full power?

4 A. If that fraction is greater than zero, yes.

5 Q. Would a fraction of full power be the same thing as
6 dimmed?

7 A. Not the same thing, no.

8 Q. Why not?

9 A. The word "dimmed" can be used to describe completely
10 off as well. It depends on the context. It's not a
11 technical word, necessarily, but in general it's not
12 exactly the same as "at a fraction of."

13 Q. So if I dim the lights in my room, are they operating
14 at a fraction of full power?

15 A. In that hypothetical situation I think those two
16 phrases would both describe that situation, which is,
17 of course, not saying those two phrases are always
18 the same.

19 Q. You said "those two phrases." What two phrases are
20 you referring to?

21 A. I believe the two you are referring to, "at a
22 fraction of," is one, and "dimmed," is the other.

23 Q. And in your opinion those two phrases are not always
24 the same; is that correct?

25 A. Yes, I think that's correct. The context matters.

1 Q. How does the context matter?

2 A. Well, in the example you just gave me, in that
3 hypothetical context, the two phrases are describing
4 the same situation. But in other contexts, they may
5 not.

6 Q. When -- and referring back to this passage here in the
7 '551 claim, column 19, starting at line 26, for your
8 reference, when the light emitting elements are
9 operating at a fraction of full power, are they
10 operating at a reduced intensity?

11 A. That's my understanding, yes.

12 Q. Okay. In this same passage, do you see where it says
13 "generate light with optimal intensity"?

14 A. Passage in the patent?

15 Q. Yes, the same one that we were just talking about,
16 column 19, line 26 through like line 29 or so.

17 A. Yes, I see that.

18 Q. It says "generate light with optimal intensity" in the
19 middle of that.

20 Do you see that?

21 A. Yes.

22 Q. How do you determine "optimal intensity"?

23 A. Are you asking in general or specifically in this
24 passage?

25 Q. Let's start with specifically in this passage if you

1 think there's a difference.

2 A. It's been a while since I've gone through all the
3 details of the spec of this patent, but my
4 recollection at this point is here it's talking about
5 what is desired in the context of the lighting
6 described in this patent.

7 Q. And so for the headlamp scenario, would the lighting
8 that's desired for the road be the same as the
9 lighting that's desired for the shoulder of the --
10 say, to the right side of the road?

11 MR. TURNER: Objection. Vague.

12 A. I don't recall specifically where this patent might
13 discuss that but, in general, there could -- I expect
14 there could be differences in what is considered
15 optimal in those locations.

16 BY MR. FITZSIMMONS:

17 Q. In paragraph 104 of your declaration, again
18 Exhibit 2006 we're still at, you say in the last
19 sentence there, "Per the '551 patent, shutting off a
20 light element is distinct from reducing intensity of
21 light element."

22 Do you see that?

23 A. I do, yes.

24 Q. And you cite the '551 patent in Exhibit 1001 at column
25 65 lines 31 through 35. Let's please go to that

1 passage.

2 A. Okay.

3 Q. I believe it starts with, "Thus the lighting."

4 Can you please read that for me once you're there?

5 A. "Thus the lighting Figure 410 provides illumination
6 in real time only where people need it to carry out
7 visual tasks while the illumination in other areas is
8 off or dimmed to comfortable or aesthetic lighting
9 levels."

10 Q. In the '551 patent here, is it your understanding that
11 "off" and "dimmed" mean the same thing?

12 A. Not necessarily, no.

13 Q. Well, you said -- you said "not necessarily," but the
14 passage says what it says. Is it your understanding
15 that "off" and "dimmed" mean the same thing here
16 that's described in the '551 patent?

17 MR. TURNER: Objection. Asked and
18 answered.

19 A. So you're asking if, in this sentence, "off" and
20 "dimmed" mean exactly the same thing?

21 BY MR. FITZSIMMONS:

22 Q. Correct.

23 A. Yeah, I don't think so. No.

24 Q. Okay. What's the difference?

25 A. They're two different words that can be meaning two

different things in this context.

Q. Okay. And in this context, in the '551 patent, what are those two different -- two different meanings?

A. In this sentence here in the patent it seems to be saying that illumination in other areas could be off or it could be what we earlier called -- and I'm trying to remember what the other phrase was -- not zero, but not 100 percent, somewhere in between. A fraction.

Q. And so, here, "dimmed" would be a fraction or somewhere between zero and 100 percent; is that correct?

A. I think that's a way to read the word here in this context.

Q. Okay. And so the '551 patent here is describing that the illumination can be dimmed. Correct?

A. As it says here, "off or dimmed."

Q. Okay. So the illumination can be dimmed. Correct?

A. In this sentence, in this context here, yes.

Q. Yes. And when the illumination is dimmed, is the illumination by reduced intensity from the maximum intensity?

A. Again, it's been a while since I looked through carefully the -- all of the language in the specification here, but that does seem to be what

1 it's discussing here, off or operating in a fraction
2 of full power.

3 Q. A fraction of full power would be illumination that's
4 reduced in intensity. Correct?

5 A. Those two phrases can describe the same thing, yes.

6 Q. Still in your '315 declaration from the 2006
7 proceeding, let's now go to paragraph 106. And here
8 in paragraph 106, you're discussing Claim 32.
9 Correct?

10 A. Yes.

11 Q. And you discuss the term "diminished illumination."
12 Correct?

13 A. Yes, that's what's there.

14 Q. Okay. Is there a difference between "change
15 emission," as we were discussing in Claim 24 and
16 "diminished illumination" as recited here in Claim 32?

17 A. Sorry, between "diminished illumination" in this
18 claim and what?

19 Q. "Change emission," as we were discussing earlier in
20 Claim 24.

21 A. They are different terms. I'm not sure that I've
22 thought about how exactly they compare. I'd probably
23 have to think about that more. Not sure at the
24 moment.

25 Q. So you're not sure if there's a difference between the

1 term "change emission" in Claim 24 and "diminished
2 illumination" in Claim 32; is that correct?

3 A. I would have to go back to Claim 24 in the context of
4 that, read it again in context and think that through
5 to be able to compare with what's here in Claim 32
6 adequately. I can do that, if you'd like.

7 Q. Yeah, go ahead. Look at Claim 24 of your -- we were
8 just previously discussing, if you want to give that a
9 read again. It's also paragraph 106 of your -- excuse
10 me, 104 of your declaration has that there.

11 A. And to be clear, it's the phrase "change emission" on
12 line 58, paragraph 1 in Claim 24, and "diminished
13 illumination" in Claim 32, you're asking about?

14 Q. Sorry, you said line 58, paragraph 1, in Claim 24.
15 I'm not sure what you're referring to.

16 A. Oh, so I -- I'm looking at the re-examination
17 certificates --

18 Q. I see.

19 A. -- where these claims are listed.

20 Q. So in -- I believe the re-examination certificate is
21 actually, just for the record, Exhibit 1035. It's a
22 little different than the Exhibit 1001, which is the
23 original '551 patent. So in Exhibit 1035, you were
24 saying -- where are you? I'm sorry.

25 A. So I think we're talking about two phrases. The

1 phrase in Claim 24 is "change emission," which is in
2 the last clause, and the phrase in Claim 32 is
3 "diminished illumination," which is also in the last
4 clause.

5 Q. Yes.

6 A. That's what you're asking about.

7 Q. Right.

8 A. Okay.

9 All right. I believe that the phrase in
10 Claim 24, "Change emission of a selected cluster of
11 LEDs relative to the emission of other LEDs" is
12 describing the same thing as the diminished
13 illumination in Claim 32.

14 Q. Okay. Does the '551 patent, to your recollection,
15 define the term "reduced illumination"?

16 A. I don't recall offhand.

17 Q. In paragraph 108 of your '315 declaration,
18 Exhibit 2006, you provide a dictionary definition of
19 the term "illuminate"; is that correct?

20 A. That's right.

21 Q. And why did you turn to a dictionary to define the
22 term "illuminate" in your declaration?

23 A. Because that word or a version of that word is used
24 in the quotes that I -- that follow from the patent
25 and I wanted to help the reader of this declaration

1 to make sure we have a common understanding there.

2 Q. Sorry, I just want to be clear what you meant. You
3 said that there's a "word or a version of that word,"
4 referring to, I believe, "illuminate" or
5 "illumination," and then you used, in "the quotes that
6 follow." What do you mean, from "the quotes that
7 follow"? I'm sorry, I didn't understand that.

8 A. In the rest of this paragraph.

9 Q. Paragraph 108?

10 A. That's right.

11 Q. Okay. And those quotes are from Claim 32 of the '551
12 patent. Is that what you mean?

13 A. I believe that's what's being quoted there, yes.

14 Q. Okay. And you don't cite any passages from the '551
15 patent here in paragraphs 106 through 108 with respect
16 to the terms you discuss for Claim 32; is that
17 correct?

18 A. I believe I do quote the patent claims.

19 Q. Yes. You don't cite the specification anywhere
20 outside of the claims; is that correct?

21 A. I think that's correct.

22 Q. Okay. So you -- at the -- it's actually
23 paragraph 106, but it's the very top of page 99, you
24 say, in quotes, "diminished illumination," unquote,
25 that is still, quote, "illuminating something,"

1 unquote.

2 Do you see that?

3 A. I see that, yes, I do.

4 Q. So in your opinion, "diminished illumination" is still
5 "illuminating something." Is it just illuminating
6 something at a reduced intensity?

7 A. I think that's a reasonable way of characterizing it.
8 The best way is probably what we said before,
9 operating at a fraction of full power, but I think
10 what you said is okay.

11 Q. I want to go to the full -- full sort of part of --
12 full restitution of Claim 32 here, since you only have
13 a couple of exhibits in this section. So if we go to
14 page 46 in Exhibit 2006 here.

15 A. Okay.

16 Q. And I think you want to go back a couple of pages to
17 Claim 44 but I want to talk about a limitation that's
18 actually on page 46. It's labeled as Element 32.8a.
19 Do you see that one?

20 A. Yes, I do.

21 Q. There's a phrase in there, "one or more changes to
22 characteristics of first light of a cluster of the
23 LEDs." Do you see that?

24 A. Yes, I do.

25 Q. Okay. In Claim 32 there, what's your understanding of

1 the term "characteristics of first light"?

2 A. I think in this context it probably means intensity
3 or color of the light.

4 Q. Okay. And so characteristics of first light would at
5 least include intensity for color; is that correct?

6 A. Yeah, I think that seems appropriate.

7 Q. Are there other things that would qualify as
8 characteristics of light?

9 MR. TURNER: Objection. Vague.

10 A. Light has potentially many characteristics, some of
11 which probably wouldn't be relevant here, so at least
12 color and intensity are the ones that seem obvious in
13 this context at the moment.

14 BY MR. FITZSIMMONS:

15 Q. Okay. Also in this same element, 32.8a, you see the
16 term "non-glaring illumination"?

17 A. Yes.

18 Q. How do you determine whether illumination is
19 "non-glaring" as recited here in Claim 32?

20 A. I think in this context it's referring to the parts
21 of the illumination that are intended to reduce
22 driver glare.

23 Q. Have you determined whether illumination reduces
24 driver glare?

25 MR. TURNER: Objection. Vague.

1 A. How do I determine it?

2 BY MR. FITZSIMMONS:

3 Q. How can you determine whether illumination reduces
4 driver glare?

5 A. In general, I suppose you can. For example, in some
6 contexts you could just ask the driver.

7 Q. So then would glare depend on a particular person
8 experiencing the glare?

9 A. In general, in the abstract, I suppose glare could be
10 somewhat subjective and dependent on the person.

11 Q. Is -- do you know if, in the context of automotive
12 headlamps, there is a level of glare that's considered
13 acceptable?

14 MR. TURNER: Objection. Vague.

15 A. I don't know from that question, you know, who's
16 doing the accepting and where that level would be
17 stated or anything, but in general it seems like
18 there are some levels of glare that people find
19 annoying and some levels of illumination that they
20 would not consider being annoying glare.

21 BY MR. FITZSIMMONS:

22 Q. Do you know, in the context of automotive headlamps,
23 if there is any standard that regulates the level of
24 permissible glare to oncoming vehicles?

25 A. I believe there probably are such standards. I don't

1 know them in detail.

2 Q. Would zero illumination create glare to a driver?

3 A. Do you mean zero illumination from a headlamp?

4 Q. Yes.

5 A. I can't imagine a scenario where zero illumination
6 would create glare, so I don't think so.

7 Q. Okay. Let's turn back to your '315 declaration,
8 Exhibit 2006. Now we're going to go to paragraph 109,
9 and there you're discussing Claim 40. Correct?

10 A. Yes.

11 Q. And paragraph 109 and 110, he's referring to here,
12 this is where you're discussing the term "decreased
13 intensity" as it relates to emission in Claim 40.
14 Correct?

15 A. Yes.

16 Q. And is it correct that your position is that decreased
17 intensity of first emission cannot be decreasing to
18 zero intensity?

19 A. I'm sorry, could you repeat that for the -- the
20 phrase in the middle, I forgot what that was.

21 Q. And is it correct that your position is that decreased
22 intensity of first emission cannot be decreasing to
23 zero intensity?

24 A. Cannot in what sense? Are you asking what this claim
25 teaches or... maybe you can explain what you mean by

1 "cannot."

2 Q. Cannot means it cannot. So we'll just look at
3 paragraph 109, the very first sentence there, you say,
4 "Independent Claim 40 is directed to decreasing the
5 intensity of emission from first and second clusters
6 of LEDs to a lower, non-zero intensity."

7 Do you see that?

8 A. I do.

9 Q. Okay. And so maybe seeing that will be helpful.

10 So is it your position, then, that
11 decreasing the intensity means that you are not
12 decreasing to zero intensity, I think is what that's
13 saying? Is that correct?

14 A. This is saying what my understanding of decreasing
15 the intensity is. It's necessarily what my
16 understanding of decreasing of intensity is not, so
17 I'll say what it is.

18 Q. Okay.

19 A. It's changing emission to a lower non-zero intensity.

20 Q. So it can't be a zero intensity in your opinion; is
21 that correct?

22 A. I'm not sure that I've thought through in this
23 context if it can't be zero. It is teaching a lower
24 non-zero intensity. Whether that necessarily
25 excludes a zero intensity, that's a different

1 question. I'm not sure that I've really thought that
2 through so I'm not sure.

3 Q. Okay. The term "decrease," does it ordinarily exclude
4 a decrease to a zero value?

5 A. In general, just asking about the word out of any
6 particular context, in general I don't know that
7 there are any particular constraints on what
8 "decreasing" can mean.

9 Q. To your recollection, does the '551 patent define a
10 decrease in intensity to exclude zero light emission?

11 A. I don't recall if there's any specific definition of
12 that. It does talk about, you know, for example,
13 "beam of diminished illumination illuminating,"
14 which, you know, implies that it's not zero, but I
15 don't think there's a definition. At least that I
16 recall.

17 Q. Claim 40 doesn't use the term "non-zero intensity"
18 that you use in Claim 109, though; is that correct?

19 MR. TURNER: Objection. Vague.

20 A. Claim 109?

21 BY MR. FITZSIMMONS:

22 Q. Excuse me. Paragraph 109. Perhaps I misspoke. So in
23 paragraph 109 you use the phrase "non-zero intensity"
24 again in the first sentence. I just wanted to
25 confirm, Claim 40 does not use the phrase "non-zero

1 intensity." Correct?

2 A. I don't think it uses that phrase, but it describes
3 that phrase.

4 Q. What do you mean, "it describes that phrase"?

5 A. It uses phrases like "diminished glaring
6 illumination." Yeah, diminished -- "diminished glare
7 illumination," which is substantially the same. So
8 if there's illumination, that's non-zero intensity.
9 And diminished, that's lower.

10 Q. Okay. So I think what you're saying, so decreased
11 illumination, the light is reduced in intensity; is
12 that correct? In your opinion.

13 A. I don't think I used the word "decreased"
14 necessarily. Here in the claim it's "diminished
15 glare illumination," and I think "lower non-zero
16 intensity" is the same thing.

17 Q. And does -- Claim 40 does say "decrease intensity."
18 Do you see that? If we're looking at paragraph 109
19 and the portion of Claim 40 that you have in the
20 header there, it does say "decreased illumination."
21 It also says "diminished glare illumination," so maybe
22 that's -- there is a couple of different phrases
23 there, but do you see -- you have it bolded and
24 underlined and italicized there in Claim 40, header?

25 A. I see that in my declaration. I don't actually at

1 the moment see the word "decreased" in the claim, but
2 maybe it's there.

3 Q. So the last clause, I believe -- it's column 5 of the
4 re-exam certificate, which was, I believe, where you
5 were quoting from, the first line, "decrease
6 intensity."

7 A. I see that now, yes.

8 Q. Okay. All right. So, yeah, there's multiple terms in
9 there. Okay.

10 So let's try to go back to that.

11 Okay. So "decreased intensity," then, in
12 your opinion, would mean that the light is reduced in
13 intensity; is that correct?

14 A. Yes, that's what it means here.

15 Q. Okay. Now, in Claim 40, the same phrase here,
16 "decrease intensity of first emission," is there a
17 difference between that and "change emission" as we
18 were talking about with respect to Claim 24?

19 A. Well, in general, "decrease" and "change" are -- you
20 know, are different words and can describe different
21 things. For example, "change" can mean increase or
22 can describe an increase, so it depends on the
23 context.

24 Q. I'm talking about here.

25 A. Yeah, I would have to remind myself exactly what kind

1 of context we were describing "change" in Claim 24.

2 But a change in the downward direction is generally
3 the same thing as a decrease.

4 Q. Okay. And -- before, we were also talking about
5 Claim 32 and the term "diminished illumination" there.
6 Is there a difference between "diminished
7 illumination" in Claim 32 and "decreased intensity of
8 first emission" that we're talking about here in
9 Claim 40?

10 A. And you said "diminished illumination" in Claim 40?

11 Q. Claim 32, was the term "diminished illumination," and
12 Claim 40, was the term "decreased intensity of first
13 emission," is there a difference between those two
14 terms?

15 A. I think they're referring to the same concepts here
16 in these two instances.

17 Q. Okay. Now we're going to switch declarations, so now
18 the '318 proceeding declaration. So your second
19 declaration there is Exhibit 2024.

20 A. Yes.

21 THE WITNESS: Would this be an okay time
22 for a quick break?

23 MR. FITZSIMMONS: Absolutely. If you need
24 a break, we can do that.

25 (Off the record at 12:12 p.m.)

(Back on the record at 12:19 p.m.)

BY MR. FITZSIMMONS:

Q. Okay, Dr. Turk, let's pick back up with your '318 proceeding declaration. Again, it's Exhibit 2024 in there. And let's go to paragraph 104 where you're discussing Claim 56. Correct?

A. Paragraph 104?

Q. Yes.

A. Yes. Correct.

Q. And in Claim 56, you discuss the term "reduce intensity." Correct?

A. Yes, that is mentioned there.

Q. What is your understanding of the term "reduce intensity" there in Claim 56?

A. It's to reduce from one level of illumination to a lower -- change from one level of illumination to a lower level of illumination.

Q. Does the term "reduce" ordinary exclude -- excuse me.

Does the term "reduce" ordinarily exclude any specific values that it may be reduced to?

A. Well, in general, it can't be reduced to higher values. Otherwise, I would say it depends on the context.

Q. Is there any difference between the term "reduce intensity" here in Claim 56 and "change emission" as

1 we were discussing for Claim 24?

2 A. I don't think there's substantial differences. I
3 think they're both describing lowering from one level
4 of illumination to another level of illumination.

5 Q. I think I sense a pattern here. I just want to
6 confirm. So "reduce intensity," in Claim 356, is
7 there a difference between that and "diminished
8 illumination" as we were discussing in Claim 32?

9 A. I think in general they are both describing the same
10 kind of situation going from one level of
11 illumination to a lower level of illumination.

12 Q. Okay. And is there a difference between "reduced
13 intensity," in Claim 56, and "decreased intensity" as
14 we were discussing for Claim 40?

15 A. Again, in general, I think they're describing the
16 same situation in terms of going from one level of
17 illumination to a lower level of illumination.

18 Q. Okay. Let's go now to paragraph 114, still in your
19 '318 declaration, Exhibit 2024. So paragraph 114,
20 where you are discussing Claim 72. Correct?

21 A. Yes.

22 Q. Now, Claim 72 uses the phrase "vary illumination."
23 Correct?

24 A. Yes.

25 Q. And what is your understanding of the word "vary" in

1 Claim 72?

2 MR. TURNER: Objection. Vague.

3 A. In this context, I -- let's see. Yeah, I think it
4 means to change the level of illumination.

5 BY MR. FITZSIMMONS:

6 Q. To your recollection, does the '551 patent define the
7 term "vary illumination"?

8 A. I don't think there's a specific definition of it.

9 Q. Okay. In paragraph 114, you provide a dictionary
10 definition for the word "illuminate." Do you see
11 that?

12 A. Yes, I do.

13 Q. In Claim 72, is the verb there "illuminate" or is it
14 "vary"?

15 A. Claim 72 uses both, at least versions of the word
16 "illuminate," and it also uses "vary."

17 Q. Claim 72 uses the word "illumination" with respect to
18 "vary." Correct?

19 A. It uses "illuminating," "illuminated,"
20 "illumination," at least those. And it uses "vary,"
21 "vary illumination."

22 Q. And in the phrase there, "vary illumination," that you
23 have in paragraph 114, "vary" is the verb in that
24 clause. Correct?

25 A. Yes.

1 Q. Now, is there a difference between "vary
2 illumination," here in Claim 72, and "change
3 emission," as we discussed for Claim 24?

4 MR. TURNER: Objection. Vague.

5 A. I don't think there's -- there is a substantial
6 difference. I think they're both describing changing
7 the level of illumination.

8 BY MR. FITZSIMMONS:

9 Q. And is there a difference between "vary illumination"
10 in Claim 72 and "diminished illumination" as we
11 discussed for Claim 32?

12 MR. TURNER: Objection. Vague.

13 A. So for all of these similar questions I have not
14 previously studied or opined on specific differences
15 between those words. But as you're asking now, and
16 as I'm looking at these, I think they're describing
17 substantially the same thing, which is, again,
18 changing the illumination level from one level to
19 another.

20 BY MR. FITZSIMMONS:

21 Q. Okay. And is there a difference between "varied
22 illumination" in Claim 72 and "decreased intensity" as
23 we discussed for Claim 40?

24 MR. TURNER: Objection. Vague.

25 A. Again, overall I think those phrases are describing

1 the same general concept of going from one level to a
2 lower level of illumination or intensity.

3 BY MR. FITZSIMMONS:

4 Q. Okay. And is there a difference between the term
5 "varied illumination" in Claim 72 and "reduced
6 intensity" in Claim 56?

7 MR. TURNER: Same objection.

8 A. And I give the same answer with the caveat that, you
9 know, again, before this moment, I have not really
10 studied or opined on the exact similarities and
11 differences between those words, but I think it's
12 describing a substantially similar situation.

13 BY MR. FITZSIMMONS:

14 Q. Okay. I'm going to ask you now to go back to your
15 '315 declaration. Again, this is Exhibit 2006 in the
16 '315 proceeding. And let's go to -- it's page 47,
17 which has Claim 33 there, and Claim 33 actually starts
18 on page 46 and carries on to page 47.

19 And do you see, on page 47, where it uses
20 the phrase "the data includes image data"?

21 A. Yes, I see that.

22 Q. Now, just for reference, the "data" there is data from
23 one or more of the cameras as recited in Claim 32 from
24 which Claim 33 depends; is that correct? I'll give
25 you a moment to review that.

1 MR. TURNER: Objection. Vague.

2 A. So, yes, I believe it's referring to the word "data"
3 in the last clause of Claim 32.

4 BY MR. FITZSIMMONS:

5 Q. Right. So page 46 of your declaration there, 32.9,
6 right, it says, "based at least in part on data from
7 one or more of the cameras." Right?

8 A. Yes.

9 Q. Okay. And so then Claim 33, when it says, "the data
10 includes image data," it's referring back to the data
11 from one or more cameras in Claim 32. Right?

12 A. Yes, I believe so.

13 Q. What are -- what's your understanding of the term
14 "image data" in Claim 33?

15 A. In general, I think it refers to data coming from a
16 camera that creates images.

17 Q. What are some examples of data that comes from a
18 camera that creates images?

19 MR. TURNER: Objection. Vague.

20 A. Images.

21 BY MR. FITZSIMMONS:

22 Q. Are there any other examples or is it just images?

23 A. Examples of data that comes from a camera? Is that
24 the question?

25 Q. Yes. That's what you said image data was, was data

1 that come from a camera that creates images.

2 A. Yeah, I think image data generally refers to images
3 coming from a camera source. A camera.

4 Q. And so image data comes from the camera and where does
5 it go?

6 A. I've lost what page we are on in the declaration.

7 Q. Sure. It's Claim 33, page 47 --

8 A. Okay. Thank you.

9 Q. -- of your -- of the '315 declaration.

10 A. So you asked where does image data go... you're
11 talking about in this claim?

12 Q. Yes. In the '551 patent system.

13 A. At least right here, in this claim, it doesn't say
14 anything about where the image data goes.

15 Q. What's your understanding of where that image data
16 goes in the '551 patent system?

17 A. I don't recall offhand where the image data goes or
18 system -- what system diagram in the patent might be
19 defining that.

20 Q. In your understanding of the imaging system, where --
21 let's start with the image data that's obtained.

22 MR. TURNER: Objection. Vague.

23 A. Sorry, what was the last part of the question after
24 "image data"?

25 BY MR. FITZSIMMONS:

1 Q. I said, in your understanding of an imaging system,
2 what's done with the image data that's obtained?

3 A. Really depends. Depends on the imaging system.

4 Q. Can you give me an example of what -- the image data?

5 A. Yeah. On a cell phone, imaging system on a
6 cell phone, the data can be displayed on the cell
7 phone's display. It can be stored in an image file
8 or a video file. Those are two examples.

9 Q. Okay. In the '551 patent system, you don't recall
10 what happens with the image data that's recited in
11 Claim 33?

12 A. I think you asked about where it goes. I don't
13 recall where it goes in the system in terms of what
14 happens to it. It's processed.

15 Q. Processed by what?

16 A. I don't recall offhand what's doing the processing
17 besides the processor.

18 Q. Okay. Let's go to -- excuse me -- let's go to the
19 Beam reference again, Exhibit 1005.

20 A. Okay.

21 Q. And column 4, line 29, do you see where it says,
22 "Sensor 107 which is illustrated as a camera in this
23 embodiment"?

24 A. Yes.

25 Q. Okay. And let's also go to column 6 and lines 11

1 through 12, and do you see where the Beam reference
2 discloses an imaging sensor such as a video camera?

3 A. This is right after "operate at maximum intensity at
4 all times." Yes.

5 Q. Okay. And so you agree that the Beam reference
6 discloses a camera. Correct?

7 A. It discloses an imaging sensor such as a video
8 camera.

9 Q. A video camera is a camera. Correct?

10 A. It is, yes.

11 Q. Okay. All right. Now let's go to column 4 of Beam
12 still, line 32. And can you read for me, please, it
13 starts, "The incoming rays"?

14 A. That one sentence?

15 Q. Yes, please.

16 A. "The incoming rays are imaged by the sensor 107 and
17 are converted to video or other electrical signals
18 used to drive controller 108, which uses the data to
19 determine the particular area of microbeams to be
20 blanked."

21 Q. Okay. And if we go to column 5, lines 11 through 13,
22 can you read those couple of sentences for me, please?

23 A. 11 to 15?

24 Q. Column 5, 11 through 15.

25 A. "They are imaged by the sensor and are converted to

1 video or other electrical signals. The output drives
2 controller 108, which uses the data to determine the
3 size and position of the light emitters to be
4 dimmed."

5 Q. These passages to Beam, they are describing that the
6 video or other electrical signals are being
7 transferred from Beam's camera to Beam's controller.
8 Correct?

9 MR. TURNER: Objection. Vague.

10 A. I'm not sure if they say anything about beam
11 transferred, but one says "drive controller" and the
12 other says "controller uses the data."

13 BY MR. FITZSIMMONS:

14 Q. Okay. So the video or other electrical signals from
15 the camera are used by the controller in Beam's
16 controller 108. Correct?

17 A. I think so, yes.

18 Q. And you'd agree that the video or other electrical
19 signals is image data. Correct?

20 A. Yes.

21 Q. Okay. Back now into your '315 declaration, so
22 Exhibit 2006 in that proceeding, and paragraph 112.
23 In this you are discussing Claim 48. Correct?

24 A. I think it's Claim 64. Oh, sorry, this is the --
25 this is the 2006 exhibit?

1 Q. Yes. So Exhibit -- the Exhibit 206 in the '315
2 proceeding and paragraph 112 in that declaration.

3 A. Okay. Claim 48, yes.

4 Q. Okay. And so paragraph 112 here is discussing
5 Claim 48. Correct?

6 A. That's right.

7 Q. All right. And can you read, please, the portion of
8 Claim 48 that you have in the header there before
9 paragraph 112?

10 A. It says, "illuminate a portion of at least one
11 object... by selecting a first cluster of the LEDs to
12 emit first light... and the first light determined
13 based at least in part on classifying the object
14 based at least in part on the data."

15 Q. Thank you. What's your understanding of the plain and
16 ordinary meaning of the term "classifying" there, the
17 Claim 48?

18 A. To perform multi-class classification or recognition
19 or determining the identity of an object.

20 Q. What do you mean by "multi-class classification"?

21 A. I mean that as distinct from detection or
22 verification, which only looks at one possible
23 output, one possible outcome. You know, for the
24 record, let's say, face or it's not a face; or it's a
25 dog or it's not a dog. Multi-class means it can be

multiple things. So it says, in this analogy, it's a dog or it's a cat or it's an elephant, for example.

Q. Does Claim 48 recite any types of objects that are classified?

A. The Claim 48 does not seem to, but the specification of the patent does.

Q. You said "the specification of the patent does." What are you referring to there?

A. I don't recall at the moment where specifically, but the specification of the patent discusses distinguishing among different kinds of objects; for example, people, vehicle, signs.

Q. Does Claim 48 recite differentiating different types of objects?

A. The Claim 48 does not use that phrase, but in the context of this patent and the specification that describes -- that provides a lot of description of what this invention is doing, that is the context of multiple objects that can be classified in order to illuminate in different ways different kinds of objects.

Q. Does Claim 48 recite storing any classification results?

A. I do not think 48 mentions that.

Q. Let's go to the '551 patent itself, again Exhibit 1001

1 here, and column 44.

2 A. Okay.

3 Q. At the very bottom it goes on to column 45. Can you
4 read for me there, starting at line 44 -- excuse me,
5 starting at column 44, line 67, the next couple of
6 sentences? Read column 45, line 9.

7 A. Okay. "Outputs from the CDC" -- excuse me, I'll
8 start over.

9 "Outputs from the CCD arrays are analyzed
10 by appropriate computational means employing trained
11 pattern recognition technologies to classify,
12 identify, or locate the contents. These techniques
13 known in the art are covered in texts such as
14 Schalkoff, Pattern Recognition, statistical,
15 structural and neural approaches, John Wiley and Sons,
16 New York 1992, and Neural Network For Pattern
17 Recognition by Christopher M. Bishop, Chris Bishop,
18 Oxford University Press; (January 1996) included
19 herein by reference."

20 BY MR. FITZSIMMONS:

21 Q. Are you familiar with either of those two texts?

22 A. I am definitely familiar with the Bishop text, the
23 second one. The first, I don't recall offhand if I'm
24 familiar with it or not.

25 Q. Okay. But the '551 patent states here that the

1 classifying techniques were known in the art.

2 Correct?

3 A. Yes, that's correct.

4 Q. Okay. Let's turn over to the Beam reference now,
5 Exhibit 1005, and column 7, line 21, there in what's
6 Claim 1 of the Beam patent.

7 Do you see where it says, "A sensor for
8 detecting the presence of at least one predetermined
9 object within an illumination beam"?

10 A. Yes, I see that.

11 Q. Do you think that Beam is using that noun "object" in
12 a different way than Claim 48 uses that term "object"?

13 A. I believe so.

14 MR. TURNER: Objection.

15 A. I believe so. I don't recall Beam providing any
16 teaching about any kind of objects or any kind of
17 classification besides car headlights.

18 BY MR. FITZSIMMONS:

19 Q. Okay. If you go to Beam column 5 and starting at
20 line 33. Do you see where it says, "The spatial scene
21 data from sensor 107 is thresholded to illuminate weak
22 signals and becomes the input to a processor 1105"?

23 A. Yes, I see that.

24 Q. What's your understanding of the term "thresholded"
25 here?

1 A. It doesn't provide much context but it seems to
2 discuss filtering, in a very simple way, the image
3 data or the sensor data so that small low values,
4 close to zero, will be pushed down to zero. In other
5 words, eliminated, as it says.

6 Q. Okay, let's go back now to, in your '315 declaration,
7 Exhibit 2006, paragraph 112. Do you see where you
8 say, "Beam does not disclose identifying a particular
9 target"?

10 A. Yes.

11 Q. In your opinion, what is required for a system to
12 identify a particular target?

13 A. In general, to provide a meaningful label to an
14 object out of a set of possible labels.

15 Q. And how would a system do that, provide meaningful
16 label to an object out of a set of possible labels?

17 A. Well, one way is through multi-class classification.

18 Q. Are there other ways?

19 A. Not really thought of this in particular, but I
20 suppose off the top of my head you could get people
21 to assign a label to something and other, probably,
22 lots of ways.

23 Q. Okay. In paragraph 113, the next one there after the
24 diagram you provided, you state that "Beam does not
25 identify the targets and therefore cannot distinguish

1 between the red box associated with vehicle B in
2 Figure 2, from the red box associated with reflection
3 of light from ab overhead sign in Figure 3." Correct?

4 A. That's right.

5 Q. I just want to be clear, Claim 48 does not require
6 distinguishing between a sign and a vehicle. Correct?

7 MR. TURNER: Objection. Vague.

8 A. It doesn't require that specifically. It requires
9 multi-class classification which the subject is
10 giving an example of. The sentence is giving an
11 example of.

12 BY MR. FITZSIMMONS:

13 Q. Where does Claim 48 say "multi-class classification"?

14 A. We've already discussed that. That's how I describe
15 what Claim 48 is stating.

16 Q. So Claim 48 does not say "multi-class classification."
17 Correct?

18 A. I don't believe it uses that particular phrase, but
19 that's what it's -- that's what it's teaching or
20 that's what it's discussing.

21 Q. Okay. And you agree that Claim 48 does not require
22 distinguishing between a sign and a vehicle. Correct?

23 MR. TURNER: Objection. Vague.

24 A. I don't believe Claim 48 specifically requires that.

25 BY MR. FITZSIMMONS:

1 Q. So you would agree that the classifying in Claim 48
2 can be satisfied by more than just distinguishing
3 between a sign and a vehicle. Right?

4 A. Right. I don't think that's the only possible way
5 of -- only possible kind of classification that
6 Claim 48 is meant to cover.

7 Q. You can classify beams as being a light source.
8 Correct?

9 A. Excuse me, as being a what?

10 Q. A light source. I'll repeat my question.

11 You can classify beams as being a light
12 source. Correct?

13 MR. TURNER: Objection. Vague.

14 A. Yeah, if you're asking is it possible that one could
15 do that or build a system that did that, the answer
16 is yes. It's a different use of the word
17 "classifying" than in Claim 48, but the way you asked
18 it, yes.

19 BY MR. FITZSIMMONS:

20 Q. How is it a different use of the word "classifying" as
21 in Claim 48?

22 A. Well, the way you asked the question, it's -- it puts
23 it in the category of detection, which is a single
24 object that you care about, and you can only classify
25 that object or not. Whereas, that's not -- and we've

1 already discussed -- that's not what Claim 48 is
2 talking about.

3 Q. So are you saying there are two types of classifying?

4 MR. TURNER: Objection. Vague.

5 A. As I think I said before, "classification" or
6 "classifying" is a pretty general term and it can
7 mean various things. It can mean government
8 positions. It can mean things people do. In the
9 context of Claim 48, it means multi-class
10 classification.

11 BY MR. FITZSIMMONS:

12 Q. As opposed to what else?

13 A. All the other potential meanings that classification
14 might take.

15 Q. So when you're assigning a specific meaning to the
16 term "classifying" here in Claim 48, you mean
17 multi-class classification; is that right?

18 A. I'm saying that's what Claim 48 is describing.

19 Q. I'm just -- I'm trying to understand what you mean by
20 that term "multi-class classification." Would
21 classifying things as red or blue fit your definition
22 of "multi-class classification"?

23 A. Well, let's be a little more specific about the
24 context of Claim 48. It's classifying an object and,
25 you know, that's when I'm saying, that phrase in this

1 context is about multi-class classification.

2 In your hypothetical question about red
3 and blue, it may depend on the full context of, you
4 know what that task is being done for, so I would say
5 it depends.

6 Q. Okay, let's go to paragraph 119 of your '315
7 declaration Exhibit 2006, and this is referring to
8 Claim 30, of which you say is representative also of
9 Claims 38, 46, and 54. Do you see that?

10 A. I do, yes.

11 Q. And can you please explain your understanding of the
12 term "optical control element" as recited in Claim 30?

13 A. I'm sorry, this is on page 106?

14 Q. That's right.

15 A. Okay.

16 Q. Where it says, "one or more optical control elements
17 to control light emitted from one or more of the
18 LEDs."

19 And my question was, just to refresh, can
20 you explain, please, your understanding of the term
21 "optical control element" as recited in Claim 30?

22 A. Yeah, so in general I take that to mean what is
23 typically considered in field of optics and related
24 fields as elements or devices that modify the optics;
25 for example, a lens or a reflector.

1 Q. A special light modulator or SLM is an optical control
2 element. Correct?

3 A. It can be considered that, yes.

4 Q. And is a digital mirror device, or it's sometimes
5 referred to as a DMD, an optical control element?

6 A. It can be considered that also. I think these last
7 two things you asked me about are probably not as
8 universally called optical control elements as, for
9 example, a lens, but people can refer to them as
10 that.

11 Q. Is a digital mirror device a reflector?

12 A. It reflects, it shares characteristics with sort of
13 the simplest reflector which is a mirror, and I
14 suppose some people refer to it as a reflector. It's
15 probably not the first term people would associate
16 with it.

17 Q. But you agree that a digital mirror device can be
18 considered a reflector. Right?

19 A. I think it's a kind of active reflector.

20 Q. Let's go -- let's go to the -- back to the '551
21 patent, Exhibit 1001. And let's go to column 53,
22 line 30, starting, "in general." Can you read that
23 for me, please?

24 A. "In general, a cluster may be deemed a separate
25 grouping due to a function it performs either

1 exclusively or in conjunction with other clusters or
2 subclusters such as high beam function versus a
3 second cluster 278 which may provide a parking light
4 function."

5 Q. So as it relates to the '551 patent, a "cluster" can
6 be defined by its function. Correct?

7 MR. TURNER: Objection. Vague.

8 A. I'm not sure exactly how to interpret the question,
9 but a cluster can be grouped in a certain way due to
10 a function -- due to the function that it performs,
11 that cluster performs. I think that's what's being
12 said here.

13 BY MR. FITZSIMMONS:

14 Q. Glare reduction, that's a function discussed in the
15 '551 patent. Correct?

16 A. Glare reduction is discussed in this patent, yes.

17 Q. Do you recall, does the '551 patent disclose
18 performing glare reduction for multiple vehicles at
19 the same time?

20 A. I don't remember if I opined on that in my
21 declaration. Is there someplace you want to point me
22 to?

23 Q. If you don't recall, that's okay. You don't recall at
24 this time whether or not the '551 patent discusses
25 performing glare reduction for multiple vehicles at

1 the same time?

2 A. I know the patent discusses multiple vehicles. I
3 would need to look at the details to make sure I got
4 it right. It's a long patent.

5 Q. Understood. Still in column 53, can you read for me,
6 please, starting at line 27, the "concept cluster"?

7 A. "The concept cluster shown by the dashed lines, is
8 used to describe a control function and is not
9 necessarily related to contiguous placement."

10 Q. And so here again, the '551 patent is describing that
11 "cluster" is used to describe a control function.
12 Correct?

13 A. In order to make sure I clearly understand the
14 sentence here, I'm looking for the dashed lines. I
15 believe this is referring to Figure 15. Is that your
16 understanding?

17 Q. That's my understanding, correct.

18 A. Yes, so I think the answer to your question is yes.
19 Concept cluster describes a control function or can
20 describe a control function.

21 Q. And it's also describing that a cluster does not
22 necessarily have to have contiguous placement.
23 Correct?

24 A. It does seem to say that.

25 Q. And similarly, a little further down, lines 34 through

37, it describes that clusters can be discontinuous.

Correct?

A. It does say, "clusters may"... "be discontinuous."

Q. Okay. And so when we're -- so in the context of the '551 patent, a cluster does not need to be a single continuous or contiguous group of LEDs in the headlamp; is that correct?

A. So could you repeat that, please?

Q. Sure. And so in the context of the '551 patent, a cluster does not need to be a single continuous or contiguous group of LEDs in the headlamp; is that correct?

A. I'm not sure that that's what this section is clearly teaching and I don't recall opining on this in my declaration. So, you know, any thoughts about it right now would sort of be off the top of my head, but... so I'm not really sure how to interpret that.

Q. What do you think that this passage in the '551 patent is teaching, then, at column 53 lines about 27 through, say, 37?

A. I'd say I haven't read these words specifically for quite a while, and, again, I didn't opine on them -- on this section, I don't believe, in my declaration, so it's not something I've formed a specific opinion on. I could go through it and think about it now,

1 but it would be very much off the top of my head and
2 wouldn't necessarily be the same as a
3 well-thought-out opinion that I would write down.

4 I mean, offhand it's hard to quickly get an
5 impression in the right context of what these words --
6 "not necessarily related to contiguous replacement,"
7 whether that means individual LEDs or it means groups
8 of LEDs. It would take some analysis, which I haven't
9 done at least lately.

10 Q. If you go to paragraph 116 of your declaration,
11 Exhibit 2006, you actually specifically cite to these
12 sentences, this passage, citing Exhibit 1001, column
13 15, lines 28 to 30 and lines 37 to 39 there.

14 Do you see where you say, in your
15 declaration, "The '551 patent discloses, with
16 reference to Figure 15, that the," quote, "concept
17 cluster shown by the dashed lines is used to describe
18 a control function and is not necessarily related to
19 contiguous placement," end quote?

20 A. Yes, I do see this now.

21 Q. Okay. So can you explain to me what you think that
22 means?

23 A. Yeah, it's also a long declaration, so thanks for
24 pointing that out.

25 Q. No problem.

1 A. Yeah, I think this is basically stating that the LEDs
2 in a cluster do not have to be all contiguous or --
3 you know, a given pair of LEDs in a given cluster do
4 not have to be contiguous.

5 Q. Okay. Let's actually look at Figure 15 now of the
6 '551 patent.

7 A. Uh-huh.

8 Q. In your opinion, are the LED 277 and LED 275
9 noncontiguous as that term is used, for example, in
10 Claim 25 of the '551 patent?

11 A. Yes, they are noncontiguous.

12 Q. What makes them noncontiguous?

13 A. They're not touching immediately adjacent to one
14 another.

15 Q. What do you mean by "not touching"?

16 A. I mean adjacent to one another.

17 Q. What about LED 283 and LED 284, are they noncontiguous
18 as that term is used in the '551 patent claims?

19 A. I haven't thought about those two LEDs in this figure
20 in terms of the concept of contiguousness, but I
21 would, off the top of my head, call them continuous
22 since they are next to one another.

23 Q. Okay. What about LED 277? And do you see the LED
24 immediate to the right of it in the horizontal
25 direction in Figure 15? It's not labeled.

- 1 A. Yes, I do.
- 2 Q. Okay. Are those two LEDs noncontiguous?
- 3 A. Again, I've not really thought about those two LEDs
- 4 specifically, but I think I would call them
- 5 contiguous.
- 6 Q. Okay. So you said -- you said presumably you had
- 7 thought about LED 277 and LED 275, I believe. Would
- 8 those two LEDs be contiguous or noncontiguous if the
- 9 two LEDs shown in Figure 15 between them were removed?
- 10 A. It's not something I've thought about, so I don't
- 11 really know.
- 12 Q. You can't tell me whether those two LEDs would be
- 13 contiguous if there were not the two shown there in
- 14 the drawing, if those were removed?
- 15 A. I haven't thought about that hypothetical situation,
- 16 so, no, I can't right now.
- 17 Q. What would you need to know in order to determine
- 18 whether those are contiguous or noncontiguous?
- 19 A. If I needed to determine that, I would go basically
- 20 through this whole patent and see if the concept of
- 21 contiguousness covers that situation, which I haven't
- 22 done for that particular situation.
- 23 Q. So the term "noncontiguous" is recited in Claim 25.
- 24 Correct?
- 25 A. Yes.

1 Q. Okay. So what's your understanding of the term
2 "noncontiguous" in Claim 25?

3 A. I take it to mean nonadjacent.

4 Q. What do you mean by "nonadjacent"?

5 A. Like I said before, non-touching.

6 Q. How do you interpret LEDs to be touching?

7 A. I don't have a specific definition of that, but I
8 think in the context here in these claims it's
9 describing LEDs that are not adjacent.

10 Q. Does that require a certain spatial relationship or
11 distance between the LEDs?

12 A. I don't have a specific definition for it or a
13 measure for it.

14 Q. Can a set of two LEDs -- if you have a set of two
15 LEDs, can those LEDs be noncontiguous?

16 A. I haven't really thought through that particular
17 question so I'm not sure.

18 Q. Well, I'm asking you.

19 A. And I'm saying I'm not sure.

20 Q. Why are you not sure?

21 A. Because I haven't thought through that before.

22 Q. I'm asking you to think through it now. So if you
23 have two LEDs, can they be noncontiguous?

24 A. Well, off the top of my head, I suppose it's
25 possible. If they're an LED in Chicago and an LED in

1 New York, I don't think anybody would call those
2 contiguous.

3 Q. Okay. If you had those two LEDs in an automotive
4 headlamp, those are the only two LEDs, can they be
5 noncontiguous?

6 A. I don't have an opinion on that.

7 Q. What would you -- what information would you need to
8 form an opinion on that?

9 A. I'd probably need the fuller context of why someone
10 was asking about contiguousness in that context and
11 what would be the implications of it. But as a
12 hypothetical, I really have no comment on it.

13 Q. So in view of Claim 25 of the '551 patent which you're
14 providing opinions on, if there are two LEDs in a
15 headlamp, would those LEDs satisfy a limitation
16 noncontiguous in Claim 25?

17 MR. TURNER: Objection. Vague. Incomplete
18 hypothetical.

19 A. I think that question depends on where they are and
20 if they're adjacent to one another.

21 BY MR. FITZSIMMONS:

22 Q. How would you determine whether or not they're
23 adjacent to one another?

24 A. I think we're going in circles here. I don't have a
25 specific definition or metric of that and it's not

1 something that I've particularly studied or opined
2 on, so I just don't have an opinion.

3 Q. If we look at the Beam reference, and then we'll
4 probably wrap up here for lunch. Look at the Beam
5 reference, Exhibit 1005, and look at Figure 1, which
6 has also within it 1A, 1B, 1C, and 1D.

7 A. Yes.

8 Q. You see there is the oncoming car there in Figure 1
9 labeled as 102. Correct?

10 A. Yes.

11 Q. And that's in the left lane. Right? Excuse me.
12 That's in the left lane. Correct?

13 A. That's correct.

14 Q. Okay. And then there's a proceeding car, one of the
15 three, in the right lane. Correct?

16 A. That's correct.

17 Q. And the, sort of, schematic of those are shown in
18 Figure 1C and 1D respectively, describing the system.
19 Correct?

20 A. Yes, I believe so.

21 Q. And you see the shaded areas there in Figure 1C and
22 Figure 1D?

23 A. Yes, I do.

24 Q. Okay. In Beam's system, the LEDs that are dimmed to
25 correspond to those two shaded areas, they would not

1 be contiguous. Correct?

2 And the two shaded areas being 1C and 1D,
3 so the two different cars in the scene.

4 A. That's correct.

5 Q. I think that's correct, they would not be contiguous.
6 At least in the way it appears to be shown here.

7 MR. FITZSIMMONS: Okay. I think let's take
8 a break for lunch.

9 (Off the record at 1:37 p.m.)

10 (Back on the record at 2:15 p.m.)

11 MR. FITZSIMMONS: All right, welcome back,
12 Dr. Turk.

13 A. Thank you.

14 BY MR. FITZSIMMONS:

15 Q. Before we get started here I just want to ask, did you
16 have any conversations with counsel during any of our
17 breaks so far today?

18 A. No, I have not.

19 Q. Okay. Let's turn to Claim 24, and I'll ask you to go
20 into Exhibit 1035, which is the re-exam certificate.
21 Claim 24 is the first one on there again. And at
22 column 1, lines 36 to 37, do you see where it says [as
23 read]: Detecting coordinate specific information about
24 the eliminated area"?

25 A. Yes.

1 Q. Okay. What's your understanding of the term
2 "coordinate specific information"?

3 A. I think it's describing the classification -- the
4 output of the classification and location processing
5 to know where an object of interest is in the scene.

6 Q. Could you provide any examples of what "coordinate
7 specific information" is under Claim 24 of the '551
8 patent?

9 MR. TURNER: Objection. Vague.

10 A. I think an example would be where the preceding
11 vehicle is so that the antiglare capability can be
12 invoked.

13 BY MR. FITZSIMMONS:

14 Q. Would another example be where an oncoming vehicle is
15 so the antiglare ability can be invoked?

16 A. That could be another, yes.

17 Q. Okay. I want to go now in your declaration for the
18 '315 proceeding, Exhibit 2006, starting at
19 paragraph 141 through, I believe, 144. Do you see
20 that?

21 A. Yes.

22 Q. Okay. And here you describe what you referred to in
23 paragraph 141, the second line there is a test, and
24 this is a description of that in this paragraph; is
25 that correct?

1 A. Yes.

2 Q. Okay. And just to confirm it, before we come back to
3 here, in Exhibit 2024, in the '318 declaration,
4 paragraphs 147 to 150, you're talking about the same
5 test. Correct?

6 A. Yes, I believe so.

7 Q. Okay. I just want to do that so that I don't have to
8 keep flipping back and forth. So we'll go to the
9 Exhibit 2006, your declaration from the '315
10 proceeding, and we'll work from there.

11 And so in paragraph 141 of that
12 declaration, in that same sentence there, you say,
13 "I supervised a test to evaluate the impact of this
14 viewpoint shift using two vehicles."

15 Do you see that?

16 A. Yes.

17 Q. What do you mean by you "supervised" the test? In
18 particular, I'm interested in what you mean by the
19 word "supervised."

20 A. I said what I think was important to investigate and
21 opined, I guess, or sort of signed off on what we
22 actually decided to spend time and effort to do.

23 Q. You said to whom it "was important to investigate"?

24 A. I'm sorry, please say that again.

25 Q. You said -- to whom did you say what you thought "was

important to investigate"?

A. To the attorneys I've been working with in this case.

Q. And what did you think was important to investigate?

A. An important aspect of how Beam and Satonaka were proposing to be combined and what kind of problems that that would cause.

Q. So you "sort of signed off on what we actually decided to spend time and effort to do."

What do you mean, you "signed off"?

A. Well, I mean, that's a very unofficial phrase there. Just that we discussed it. I discussed what I thought would be problematic or could be problematic about this combination or, you know, one thing in particular or one set of things, and we discussed it. My colleagues came back with, you know, well, what if we took the following pictures and looked at the following things, we discussed these things. And because this was going to be my declaration, I -- you know, I sort of had the final word, I guess, in terms of what would be useful to make the points I wanted to look into. So that's what I mean by signing off.

Q. I see. So at the end of paragraph 142 and before paragraph 143, there's three pictures in the declaration. Correct?

A. Correct.

1 Q. Who took those pictures?

2 A. I actually don't recall the name of the person who
3 took those.

4 Q. So you don't know who took those three pictures that
5 are in there -- in your declaration there right before
6 paragraph 143; is that correct?

7 A. I don't recall the name of the person who took those.

8 Q. Okay. Were you present when those pictures were
9 taken?

10 A. No, I was not at that location.

11 Q. Do you know where those pictures were taken?

12 A. Not precisely. We talked about, you know, the
13 context where they should be and on a roadway and
14 such, but I don't know specifically where.

15 Q. Do you know what state they were taken in?

16 A. I expect they were taken in the state of Michigan,
17 but I'm not 100 percent sure.

18 Q. So you are not -- you can't be certain what state
19 those pictures were taken in; is that correct?

20 A. I think, like I just said, I'm not 100 percent sure.

21 Q. In paragraph -- do you know if the person that took
22 these photos is a member of the Brooks Kushman law
23 firm?

24 A. I'm sorry, was that started about a certain
25 paragraph?

1 Q. I was, I'm sorry, and then I changed my thought.

2 So how about this? Do you know if the
3 person who took those photos is a member of the
4 Brooks Kushman law firm?

5 A. I don't recall for sure. I kind of think so, but I'm
6 not really 100 percent sure.

7 Q. Did you speak with the person that took these photos?

8 A. I don't believe I did.

9 Q. Did you communicate with them otherwise, for example,
10 by email with the person that took these photos?

11 A. Well, like I said, I'm not 100 percent sure. I don't
12 recall who took them, so I guess, technically, I
13 wouldn't know if I've communicated with such a
14 person. But to my knowledge I did not or I have not
15 communicated with the person who took these.

16 Q. Okay. In paragraph 141, you reference a "first
17 vehicle." Do you see that?

18 A. Yes.

19 Q. And that first vehicle, does that represent the
20 vehicle from which the photos were taken?

21 A. Yes, that's what that's describing.

22 Q. Okay. What kind of vehicle was that?

23 A. I don't recall.

24 Q. Do you know whose vehicle that was?

25 A. No, I don't.

1 Q. Okay. You say, "A digital camera was placed at
2 multiple locations on the first vehicle."

3 Do you see that?

4 A. I'm looking for it. Yes, I see that.

5 Q. Do you know what kind of digital camera was used?

6 A. No, not specifically.

7 Q. The sentence before that, it says there's a "preceding
8 vehicle (black SUV)."

9 Do you see that?

10 A. I do.

11 Q. Do you know what type of vehicle that is?

12 A. An SUV.

13 Q. Do you know more specifically, perhaps, the make or
14 model?

15 A. No, I don't know the make and model of it.

16 Q. Do you know if that vehicle is stationary in the
17 images?

18 A. I presume you mean stationary at the time the images
19 were taken?

20 Q. Yeah. The black SUV in the images, do you know if, at
21 the time these images were taken, that vehicle was
22 stationary?

23 A. I don't recall. I know the vehicle is where we
24 wanted it to be to do the tests. I don't recall if
25 it was stationary or not.

1 Q. What do you mean, it was "where we wanted it to be"?

2 A. We discussed what would be the right test or a useful
3 test to do, and that means, you know, the details of
4 where to place the camera, where to take pictures
5 from, what to put in the scene ahead, because these
6 were the kind of things we were wanting to
7 investigate, to understand whether there would be
8 problems or not with this proposed combination.

9 Q. In paragraph 141 you list some locations of where the
10 cameras -- the camera was located; is that correct?

11 A. That's right.

12 Q. Okay. So one of them is, for number one, [as read]:
13 The rear-view mirror location is approximately 54
14 inches above the road; the lower left headlamp
15 position approximately 34 inches above the road, 56
16 inches forward then 28 inches left of the first
17 position; and a lower right headlamp position
18 approximately 34 inches above the road surface, 56
19 inches forward and 28 inches to the right of the first
20 position.

21 Do you see all that?

22 A. I do, yes.

23 Q. Who determined where those camera locations should be?

24 A. They were part of our discussion prior to doing this
25 test what sorts of locations would help investigate

1 the issue we were trying to investigate, and then
2 those numbers came out of where those locations were
3 on the car, on the automobile that was used.

4 Q. Why did you use those locations?

5 A. Because those are the locations approximately of the
6 camera in Satonaka and the cameras in Beam.

7 Q. Would those locations be different for a different
8 make and model of vehicle than the one you used?

9 A. They would likely be somewhat different.

10 Q. For example, would they be higher in an SUV than in a
11 sedan?

12 A. Likely. The most important thing actually was not
13 the absolute numbers, but just the fact that they are
14 at different heights and that was the main thing to
15 investigate. Different heights and different
16 horizontal directions.

17 Q. Were the cameras placed outside of the headlamps in
18 the vehicle that was used?

19 A. I believe so. I don't think they were put inside the
20 headlamps.

21 Q. But you're not sure; is that correct?

22 A. I didn't ask specifically, but I wouldn't know a way
23 to do that so I probably would have heard if somehow
24 that was done.

25 Q. And what about the camera position near the rearview

1 mirror, was that inside the car or outside of the car,
2 the camera?

3 A. I believe it was inside the car touching the rearview
4 mirror, but I don't recall for sure.

5 Q. Did you consider any other locations to try?

6 A. "Other locations," you said?

7 Q. For the camera positions.

8 A. I might have considered other locations and we may
9 have discussed that. I don't recall specifically.

10 Q. Were there any standards or regulations that you
11 referred to when creating the setup for this test?

12 A. No. This was to investigate a particular technical
13 question relevant to the proposed combination, so it
14 wasn't really relevant to a standard to my knowledge.

15 Q. The references that you discuss with respect to this
16 test, that's the combination of Beam and Satonaka and
17 the foundation for Karlsson and Nakamura, do those
18 references describe precise locations of their
19 cameras?

20 A. It depends on what you mean by "precise." They
21 describe where the cameras -- where the cameras would
22 be placed in the vehicle, but not specific
23 measurements, that I recall.

24 Q. Does the '551 patent describe where its camera or
25 cameras are located?

1 A. I believe that --

2 MR. TURNER: Objection. Relevance.

3 A. I believe it describes that the camera is in the
4 headlamp.

5 BY MR. FITZSIMMONS:

6 Q. So your recollection is that the '551 patent describes
7 that the camera is in the vehicle headlamp; is that
8 right?

9 A. That's my recollection off the top of my head, but I
10 would have to look through to confirm that.

11 Q. In paragraph 142, referring to, I believe, the
12 headlamp sort of analogous positions of the cameras,
13 you say "it would be more difficult to perceive the
14 lane markings from this position."

15 Do you see that?

16 A. Yes.

17 Q. Wouldn't the difficulty of seeing the lane markings be
18 something that's subjective?

19 MR. TURNER: Objection. Vague.

20 A. Did you say that's objective?

21 BY MR. FITZSIMMONS:

22 Q. Subjective.

23 A. I'm not sure what you mean by that.

24 Q. Wouldn't you agree that the lane markings would be
25 easier to see from a camera that's closer to the

1 ground?

2 MR. TURNER: Objection. Vague.

3 A. Generally, no, but, of course, depends on what method
4 one was using to detect the lane markings.

5 BY MR. FITZSIMMONS:

6 Q. So it would depend. Correct?

7 A. Yes. It would depend, for example, if we were
8 talking about Satonaka's method or some other
9 completely different method.

10 Q. And in the pictures at the end of paragraph 142 before
11 paragraph 143, who drew those red triangles in the
12 three images?

13 A. Who drew them?

14 Q. Yes.

15 A. I don't recall. It wasn't me, but I supervised it.

16 Q. What do those red triangles represent?

17 A. It represents the vehicle -- and I'm forgetting
18 exactly what it was labeled -- in Satonaka that is
19 the area in which to search for the car.

20 Q. And the red triangles there don't include the oncoming
21 traffic lane. Correct?

22 A. That's correct.

23 Q. In those three images is -- excuse me, in those three
24 images, that's a different oncoming vehicle in each
25 picture. Correct?

1 A. I'm not really sure.

2 Q. Do you know if the oncoming vehicle was moving when
3 those pictures were taken?

4 A. I expect that it was, but I'm not sure.

5 Q. Do you know if the oncoming vehicle was the exact same
6 distance away from the camera vehicle when those
7 pictures were taken?

8 A. It looks like it wasn't, but I'm not sure. We
9 weren't really focusing on that vehicle.

10 Q. In paragraph 147 -- this is at the top of page 120 of
11 your '215 declaration, do you see where it says, "the
12 distorted shape of the vehicle recognition window"?

13 A. Yes.

14 Q. Why, in your opinion, is the shape distorted?

15 A. It's distorted with respect to the center image which
16 is the Satanaya -- wait, what is it?

17 Q. Satonaka.

18 A. Satonaka. Thank you.

19 -- the Satonaka location of the camera.

20 The left and right images -- in the left and right
21 images, the triangle is distorted with respect to
22 that because of the different location of the
23 cameras.

24 Q. What, in your opinion, is the reason for that
25 distortion?

1 A. It's how the geometry works in this scenario where
2 you have a camera looking at a, more or less, plane
3 that a car is on top of. It's just straight
4 geometrical distortion.

5 Q. Do I understand correctly that your opinion is that
6 the change in location or perspective changes the
7 shape of the vehicle detection window, which is your
8 red triangle?

9 A. That's correct.

10 Q. Do you recall we were discussing Figure 1 of the Beam
11 reference previously? Does the Beam reference
12 disclose detecting the traffic in the oncoming lane
13 for glare reduction purposes?

14 A. I believe it does. It's shown in Figure 1.

15 Q. And --

16 A. Let me -- may I modify that a little bit? I think
17 you might have used the word "recognize" or
18 "identify" in there, so the way that was
19 characterized, I may disagree with a bit. It does
20 detect light in both lanes.

21 Q. And the Satonaka reference, that's Exhibit 1014, that
22 also detects traffic in the oncoming lane. Correct?

23 A. Yes. It's a slightly different method than what's
24 being shown in these images that I have, but, yes,
25 similar.

1 Q. And same question for Nakamura. That reference also
2 teaches detecting traffic in the oncoming lane.

3 Correct?

4 A. It teaches looking for lights and attributing those
5 lights coming from a car.

6 Q. And that includes the oncoming lane. Correct?

7 A. Yes, I believe it does have a method to do the
8 oncoming lane.

9 Q. And just for the record, the Nakamura reference is
10 Exhibit 13, and the Karlsson reference, that one is
11 Exhibit 1010. Karlsson also detects traffic in the
12 oncoming lane.

13 A. I can't recall offhand if Karlsson mentions the
14 oncoming lane or not.

15 Q. Now, if we go to your '315 declaration, Exhibit 2006,
16 and we go to paragraph 195 --

17 A. Yes.

18 Q. -- you have the same three images there that we were
19 discussing just a moment ago which were in paragraph,
20 I think it was, 142.

21 A. Yes.

22 Q. Is it fair to say that your argument with respect to
23 these three pictures is the same for the Karlsson
24 ground here at paragraph 196 as we just discussed for
25 the Beam ground at paragraph 142?

1 A. Yes, it's about the combination and the difficulties
2 that might come about trying to make that combination
3 with the triangle-based detection method.

4 Q. Let's switch over to your '318 declaration. So this
5 is Exhibit 2024. And let's go to paragraph 122. Can
6 you just read that first sentence for me, please?

7 A. First sentence of 122?

8 Q. Paragraph 122, yes, in Exhibit 2024.

9 A. "While this may result in a darkened area that
10 changes position in response to detected light
11 changing position, Beam does not associate the
12 detected light with a particular target (vehicle or
13 sign)."

14 Q. How does the '551 patent, in your opinion, identify a
15 target?

16 A. Through the multi-class classification that we've
17 just discussed.

18 Q. And how does it determine something is a target?

19 MR. TURNER: Objection. Vague.

20 A. I don't know how it determines something is a target.

21 BY MR. FITZSIMMONS:

22 Q. In paragraph 122 here, you are saying that there's a
23 darkened area of beam that changes position; is that
24 right?

25 A. Yeah, there's a darkened area that, if you or I were

1 to look at it, you would see that it does change
2 position in the image presuming that there are
3 certain movements going on in the world out there.

4 Q. And so if there's a change in position, that means the
5 darkened area is in at least two different locations;
6 is that fair?

7 A. Yes, if it has changed, they would be different
8 locations.

9 Q. Let's look at the Beam reference itself, so
10 Exhibit 1005, column 6, line 24. Can you -- sorry,
11 "As the positions." Can you read that sentence for
12 me, please?

13 A. "As the positions of both vehicles move, the blanked
14 area tracks the location of the oncoming vehicle
15 dynamically varying in position and in size."

16 Q. And so Beam's blanked area, as it calls it, that
17 changes position to track the location of the other
18 vehicle. Correct?

19 A. Well, I think the language here in Beam, in this
20 sentence in particular, is a bit imprecise, using the
21 word "tracking." I think it's getting to the fact
22 that, as I mentioned before, a person observing it
23 could see -- could infer "tracking" there, but the
24 patent itself does not teach tracking specifically.

25 Q. What do you see as the difference between those two

1 things?

2 A. Tracking, as a technical accomplishment, involves
3 intentionally locating over a period of time the same
4 object. Beam does not do this. Beam, every frame
5 freshly anew with no knowledge of the past frame,
6 looks for lights. And a human might look at that and
7 think of that as tracking, but it's not technically
8 doing what is generally considered as tracking
9 because it's not identifying the actual source of
10 those lights.

11 Q. So in your opinion, in order to track something you
12 have to have identified that object?

13 A. Tracking implies following the same object over a
14 period of time, so you at least have to know that it
15 is the same object.

16 Q. So here Beam says "the blanked area tracks the
17 location of the oncoming vehicle."

18 So the oncoming vehicle is the same object
19 that has the blanked area tracking it. Correct?

20 A. Not necessarily. It could be other lights that set
21 it off, set off its detection.

22 Q. But that's not what Beam is disclosing here. Beam
23 says that "the blanked area tracks the location of the
24 oncoming vehicle."

25 So we're talking about the oncoming

1 vehicle, the object, and the blanked areas tracking
2 the location of that object, the oncoming vehicle. So
3 that meet your definition of tracking the same thing;
4 correct?

5 MR. TURNER: Objection. Vague. Compound.

6 A. As I describe the sentence is not very precise and
7 the -- if you take this sentence as stating technical
8 details, those details are not taught in the patent
9 itself, so I think this is just a vague sentence
10 that's describing a more human view of this than
11 what's actually going on.

12 BY MR. FITZSIMMONS:

13 Q. Tracking an object was well-known in prior art before
14 the '551 patent and before the Beam reference.
15 Correct?

16 A. That's correct.

17 MR. TURNER: Objection.

18 BY MR. FITZSIMMONS:

19 Q. So a person skilled in the art wouldn't need all the
20 details about how you track something in order to know
21 how to do that. Correct?

22 A. Well, are you talking about Beam system or tracking
23 in the abstract?

24 Q. I'm talking about -- let's start tracking in the
25 abstract. A person skilled in the art would

1 understand how to track an object with a camera
2 system. Correct?

3 MR. TURNER: Objection. Vague.

4 A. A POSA would generally understand that camera-based
5 tracking is possible and it has been done in various
6 contexts.

7 BY MR. FITZSIMMONS:

8 Q. So when Beam says, "the blanked area tracks the
9 location of the oncoming vehicle," the person skilled
10 in the art would understand how to track that vehicle
11 as you explain it as being something following the
12 same object. Correct?

13 MR. TURNER: Objection. Misstates the
14 testimony.

15 A. A POSA would understand that that's what tracking
16 means and then see what Beam teaches and realize that
17 Beam does not teach that.

18 BY MR. FITZSIMMONS:

19 Q. Why is this anything different than what the person
20 skilled in the art would understand the term
21 "tracking" to mean?

22 A. Like I said, a person skilled in the art could look
23 at this sentence and say, yes, I know what tracking
24 means, this sentence used tracks, and I know what
25 that means, and I can also look at the full patent

1 and see that this patent does not teach tracking. It
2 uses the word here, but as I said, it's an imprecise
3 usage here of this word.

4 Q. But you agreed that a person skilled in the art would
5 understand how a camera system would track something.
6 Right?

7 A. In the abstract, a person skilled in the art would
8 know that, yes, camera-based systems can track
9 certain things in certain contexts, not necessarily
10 this context and not necessarily Beam's system for
11 sure.

12 Q. Do you know whether a patent needs to describe
13 techniques that are already known in the art to a
14 person of ordinary skill?

15 MR. TURNER: Objection. Calls for a legal
16 conclusion.

17 A. If you're talking about this sentence, I don't think
18 there's any particular thing that a patent has to do
19 with this sentence related to what you said.

20 BY MR. FITZSIMMONS:

21 Q. Does the '551 patent describe how it tracks an object?

22 A. I don't recall offhand. I haven't looked at the
23 details of the spec for that -- regarding that for a
24 long time.

25 Q. Whether it did -- whether it does or it does not, a

1 person skilled in the art would understand how you
2 track an object with a camera system. Correct?

3 A. A person skilled in the art would understand that
4 people have built systems to track objects. But,
5 again, not necessarily in this context and
6 particularly not hilding on Beam's system which is
7 clearly not tracking.

8 Q. What evidence do you have that you think Beam is not
9 tracking the location of the oncoming vehicle as
10 explicitly stated here in column 6, lines 25 through
11 27 where it says, "The blanked area tracks the
12 location of the oncoming vehicle"?

13 MR. TURNER: Objection. Asked and
14 answered.

15 A. Because Beam describes what it does, not in this
16 sentence, but elsewhere in Beam, and what it does is
17 not tracking as normally understood in the art.

18 BY MR. FITZSIMMONS:

19 Q. What is -- what does Beam do that you think is not
20 tracking?

21 A. Beam detects headlights -- or Beam detects lights.
22 Beam assumes those lights are coming from a car, but
23 then the next frame or the next moment in time Beam
24 starts that process anew and does it again and then
25 again and then again.

1 Detecting something, and particularly as
2 simple as detecting lights over and over again, is not
3 tracking.

4 Q. Why is it not tracking?

5 A. We've discussed this. It's not associating the thing
6 you're looking -- you're looking for now with what
7 you were just looking at a moment ago. It's not
8 having any continuity in time of an object. It's
9 just doing the same thing over and over again.
10 That's not what tracking is.

11 Q. Got it. Is knowing the location of an oncoming
12 vehicle, tracking?

13 MR. TURNER: Objection. Incomplete
14 hypothetical.

15 A. In what context? It depends on the context. So in
16 what context would that be?

17 BY MR. FITZSIMMONS:

18 Q. With a camera system if you're -- if you are following
19 the location of an oncoming vehicle with a camera
20 system, that tracking, the oncoming vehicle.

21 A. So you mean like if a car is following an oncoming
22 vehicle? Say -- sorry, did you say oncoming vehicle?

23 Q. Yes.

24 A. Oncoming. It depends how it's done, so I guess I
25 would need more context.

1 Q. This passage we were discussing, column 26, lines 25
2 through 27, Beam discloses that the blanked area
3 dynamically varies in position and size. Correct?

4 A. Yes.

5 Q. You have a section in both of your declarations that
6 you call Secondary Considerations, is that correct,
7 Dr. Turk?

8 A. I believe so, yes.

9 Q. And in the '315 proceeding, so Exhibit 2006, that's
10 paragraph 215 through 218. Correct?

11 A. That's right.

12 Q. And then in the '318 proceeding, Exhibit 2024, you
13 have the same section, which is paragraphs 224 through
14 227; is that correct?

15 A. That's right.

16 Q. What is your understanding of the concept of
17 "secondary considerations"?

18 MR. TURNER: Objection. Calls for a legal
19 conclusion.

20 A. I don't know how clear a definition I have of it, I
21 guess, sort of off the top of my head right now. I
22 tend to think of it is other relevant sources of
23 information, but I would have to think a little bit
24 to really come up with a precise -- more precise
25 definition.

1 BY MR. FITZSIMMONS:

2 Q. You have an entire section in your declaration called
3 Secondary Considerations, but you can't tell me what
4 your understanding of the concept of secondary
5 considerations is?

6 A. I said I can't come up with a precise definition off
7 the top of my head right now. But the section itself
8 I think describes generally what secondary
9 considerations are, these kind of things that are in
10 here.

11 Q. Okay. So what is your understanding, then, of what
12 secondary considerations are?

13 A. The kinds of things that are in here.

14 Q. "The kind of things that are in here." What do you
15 mean by that?

16 A. This section talks about statements of long-felt
17 need, of industry praise, of using these kind of
18 things or associating those kind of things with
19 claims of the '551 patent, and showing through those
20 connections that there was real value or novelty in
21 the idea.

22 So it's these kind of things. These --
23 not so much the legal matters, but other sort of
24 issues that provide evidence that this was a novel,
25 long-felt need sort of thing. It helps provide

1 additional evidence for its novelty and importance.

2 Q. Did you draft this Secondary Considerations section of
3 your declarations yourself?

4 A. Like I described with the whole thing, I didn't do
5 the first drafts, but certainly edited and went
6 through carefully the whole thing.

7 Q. So when you use the term "nexus" -- and you can look
8 at your '315 declaration, so Exhibit 2006, paragraphs
9 215 and 217, you use the term "nexus."

10 A. Uh-huh.

11 Q. What's your understanding of the concept of "nexus"?

12 A. Well, I don't know if I have a great precise
13 definition, but my general understanding, it's
14 connection, some sort of connection between the two.

15 Q. What's required to show nexus?

16 A. I know that there are articles and opinions in the
17 legal world about "nexus." I don't -- can't recall
18 any of the details at the moment.

19 Q. Okay. So you don't know what's required to show
20 nexus. Correct?

21 MR. TURNER: Objection. Calls for a legal
22 conclusion.

23 A. I can't recite that at the moment, no.

24 BY MR. FITZSIMMONS:

25 Q. Can you look at paragraph 217? Can you read the first

1 sentence there that starts "On the issue of nexus"?

2 A. "On the issue of nexus, it is my understanding that
3 if the Patent Owner does not produce a product, the
4 Patent Owner can still prove nexus by showing that
5 the evidence of secondary considerations is the
6 direct result of unique characteristics of the
7 claimed invention."

8 Q. Is it your understanding here that the patent owner
9 does not produce a product?

10 A. I don't know for sure that the patent owner produces
11 a product, but I don't have a specific opinion about
12 that.

13 Q. So you don't know whether or not the patent owner here
14 produces a product; is that correct?

15 A. I don't recall being sure about that, so, no.

16 Q. In your statement here, what do you mean by "unique
17 characteristics of the claimed invention"?

18 A. Generally, I think a patented invention needs to be
19 novel and that you -- and that unique characteristics
20 is a way of describing the novel aspects of such an
21 invention.

22 Q. Do these unique characteristics need to be recited in
23 the claims of the patent?

24 A. You're asking in general for any patent?

25 Q. When you're talking about here, you say that "the

1 Patent Owner can still prove nexus by showing that the
2 evidence of secondary considerations is the direct
3 result of unique characteristics of the claimed
4 invention."

5 So I'm asking you if the -- in that
6 statement, do you understand it to mean that the
7 unique characteristics need to be recited in the
8 claims of the patent?

9 A. I think there can be unique characteristics in a
10 patent that are not recited in the claims, so not
11 necessarily in all cases.

12 Q. But in order to provide evidence of secondary
13 consideration, do unique characteristics need to be
14 recited in the claims of the patent?

15 A. I have not thought of that particular question so I
16 would just stand with what I say here, evidence --
17 you can prove this nexus by showing evidence which is
18 a direct result of unique characteristics. But
19 otherwise, I don't have a, sort of, legal opinion
20 about where that has to be.

21 Q. If characteristics of a claimed invention are found in
22 the prior art, would you consider them unique?

23 MR. TURNER: Objection. Vague.

24 A. I really don't have an opinion on that. That's not
25 something that I've thought about in the context of

1 this declaration.

2 BY MR. FITZSIMMONS:

3 Q. You say that "The '551 Patent claims include multiple
4 unique characteristics," in paragraph 217. Correct?

5 A. Yes, that's correct.

6 Q. Okay. And what do you mean by that, that "The '551
7 patent claims include multiple unique
8 characteristics"?

9 A. In this particular sentence it's talking about the
10 claims listed two lines below or one line below.

11 Q. What makes something a unique characteristic?

12 A. I don't know that I have a well thought-through
13 definition off the top of my head, but I would say I
14 think there are unique characteristics in these
15 claims.

16 Q. How can you tell if there's a unique characteristic if
17 you don't have a definition of what "unique
18 characteristic" means? How can you say something is a
19 unique characteristic, then?

20 A. Well, like I said, I don't have a precise definition
21 off the top of my head at the moment, but I can call
22 something -- I can say that something has a unique
23 characteristic without having a precise dictionary
24 definition of that phrase.

25 Q. Well, you can call it that, but how do I know what --

1 how do I know or how do you know what that means?
2 What do you mean when you say, in your declaration,
3 "The '551 patent claims include multiple unique
4 characteristics"?

5 A. I think plainly it means that there are
6 characteristics of these claims, there are ones that
7 are unique in the sense that they're not the same
8 claims as already existing patents, and there is more
9 than one.

10 Q. So if a characteristic is in the prior art, then that
11 would not be a unique characteristic. Correct?

12 A. Well, to me, it depends on context, and if a
13 characteristic is combined with something in a way
14 that hasn't been done before it would be unique, so
15 it's hard to answer just broadly out of context.

16 Q. How did you determine whether a characteristic in the
17 '551 patent claims was unique or not?

18 A. I read the '551 patent and its claims and, to me,
19 they seem like unique characteristics.

20 Q. But I'm asking you, what makes things
21 characteristically different?

22 A. They're characteristic and they're unique. I don't
23 have, again, a specific definition of it -- of that
24 phrase off the top of my head.

25 Q. Did you come up with the term "unique characteristic"

1 to include in your declaration?

2 A. I don't recall if I came up with that first or if
3 that was part of a first draft that attorneys
4 provided, but I agreed with the phrase, in any case.

5 Q. But yet you can't tell me what the phrase "unique
6 characteristic" means. Correct?

7 A. As I've said multiple times, I can't give you a
8 specific definition of the phrase but I think it's a
9 meaningful phrase that, when looking at a patent's
10 claims, I can have an opinion about it, which I
11 expressed here.

12 Q. How could it be a meaningful phrase if you can't
13 explain what it means?

14 A. I have explained what it means. I haven't given you
15 a specific definition of it.

16 Q. I haven't heard anything from you that gives me any
17 understanding of what you think the term "unique
18 characteristic" means. That's what I'm just trying to
19 understand, Dr. Turk.

20 A. I said that they're characteristics that are unique.
21 Do you know what those words mean?

22 Q. I understand what those two words mean, but I'm trying
23 to understand them as you used them in your
24 declaration here and I haven't gotten a good
25 explanation of your understanding of what it means

1 and, in particular, as it relates to "secondary
2 considerations" or "nexus." So that's what I'm just
3 trying to understand, but maybe you don't have an
4 explanation for that.

5 A. Yeah, I have explained it. I just don't have a
6 specific definition of them.

7 Q. Okay. You only list -- so in paragraph 217 here,
8 after that sentence with the unique characteristics,
9 you list a number of claims. Do you see that next
10 sentence?

11 A. You're referring to the sentence starting with, "As
12 explained in paragraphs"?

13 Q. Yes, yes.

14 A. Yes, I see that.

15 Q. And so you list a subset of claims here that you
16 believed you had unique characteristics. Is that
17 accurate?

18 A. Yes.

19 Q. Okay. And this is not all of the claims that you
20 provided opinions on; is that correct?

21 A. That is correct. These are just examples.

22 Q. When you use the term here, in quotes, in
23 paragraph 217, "Predictive Curve Illumination" in
24 quotes, so the term "predictive curve illumination,"
25 what do you mean by that?

1 A. I mean what the claims listed there describe.

2 Q. So in your opinion, Claims 26 through 29, 34 to 37, 42
3 through 45, and 50 through 53, describe predictive
4 curve illumination; is that right?

5 A. I believe those are in the context of the subject of
6 predictive curve illumination.

7 Q. And so it's your opinion that predictive curve
8 illumination is a unique characteristic in the '551
9 patent claims; is that correct?

10 A. Yes, I think the way the '551 patent does that in the
11 context of the whole patent makes it a unique
12 characteristic.

13 Q. In that same paragraph 217... let's see. I believe
14 it's with respect to Claim 40, you have the term
15 "light in-between." Do you see that?

16 A. Yes.

17 Q. What does "light in-between" mean there?

18 A. I believe it's describing areas of the field of view
19 looking ahead with a dark zone and, adjacent to that,
20 a light zone, and adjacent to that, a darker zone.

21 Q. Let's go up one paragraph there to 216, starting with
22 "Since 2017." Can you read that sentence for me,
23 please?

24 A. "Since 2017, Petitioner individually and through the
25 Alliance for Automotive Innovation, of which

Petitioner is a member, petitioned NHTSA for a change in regulations to allow adaptive driving beam (ADB) technology."

Q. What is the Alliance for Automotive Innovation?

A. I believe it's an industry organization.

Q. Have you heard of the Alliance for Automotive Innovation before you got involved in this proceeding?

A. I don't recall whether I had or not.

Q. Do you know what the focus of the Alliance for Automotive Innovation is?

A. I don't recall specifically.

Q. You don't recall or you don't know?

A. I don't recall.

Q. So that presumes that you're telling me at some point you did know?

A. I may have known more precisely.

Q. But sitting here today, you can't tell me what the purpose of the Alliance for Automotive Innovation is. Correct?

A. I don't recall it, so, yes, correct.

Q. All right. You say that the Petitioner is a member of the Alliance for Automotive Innovation. How do you know whether the Petitioner is a member of the Alliance for Automotive Innovation?

A. The attorneys I work with on this informed me of

1 that.

2 Q. And so you did not know that independently; is that
3 correct?

4 A. Yes, that's correct.

5 Q. You also state that the Petitioner and the Automotive
6 for Alliance -- excuse me.

7 You also state that the Petitioner and the
8 Alliance for Automotive Innovation "petitioned NHTSA
9 for a change in regulations to allow... ADB." How do
10 you know whether the Petitioner and the Alliance for
11 Automotive Innovation petitioned NHTSA for a change in
12 regulations to allow for ADB?

13 A. That was either directly in the Stam declaration or
14 the attorneys -- the attorneys I'm working with
15 informed me of that.

16 Q. So you didn't know that independently before this
17 proceeding. Correct?

18 A. I don't believe I did.

19 Q. In the next sentence here, you mention the Alliance
20 filings. You see that?

21 A. I do, yes.

22 Q. Have you reviewed those filings?

23 A. No, I have not.

24 Q. You also mentioned "the NHTSA proposed rule changes."
25 Correct?

1 A. That's right.

2 Q. Have you ever used those proposed rule changes that
3 you're referring to?

4 A. No, I haven't.

5 Q. You also state that the Stam declaration establishes
6 that ADB technology falls within the scope of the
7 claims; is that correct?

8 A. Yes, I say that here.

9 Q. Okay. How do you know whether the Stam declaration
10 establishes that ADB technology falls within the scope
11 of the claims?

12 A. From looking through the Stam declaration.

13 Q. What about the Stam declaration indicated to you that
14 ADB technology falls within the scope of the claims?
15 And I believe you were referring to the '551 patent
16 claims.

17 A. I think the Stam declaration states this.

18 Q. Did you independently verify that statement in the
19 Stam declaration?

20 A. No. I'm describing what the Stam declaration says.

21 Q. So you don't have an opinion specifically as to
22 whether ADB technology falls within the scope of the
23 '551 patent claims. Correct?

24 A. My opinion is that the Stam declaration explains that
25 it does.

1 Q. Understood. So you personally do not have a opinion
2 as to whether ADB technology falls within the scope of
3 the '551 patent claims. Correct?

4 A. I do because I learned it from the Stam declaration.

5 Q. So the basis -- so your basis for alleging that ADB
6 technology falls within the scope of the '551 patent
7 claims is based solely on what you read in the Stam
8 declaration; is that accurate?

9 A. I think it was in the Stam declaration and as also
10 told to me by the attorneys that I am working with on
11 this.

12 Q. You stated that you did not independently verify
13 whether ADB technology falls within the scope of the
14 '551 patent claims. Correct?

15 A. Not independent of the declaration and the attorneys
16 I have been working with.

17 MR. FITZSIMMONS: Okay, I think let's take
18 a break here.

19 (Off the record at 3:35 p.m.)

20 (Back on the record at 3:57 p.m.)

21 BY MR. FITZSIMMONS:

22 Q. All right, Dr. Turk, I'm going to ask you to please
23 take back out your '318 proceeding declaration, so
24 that's Exhibit 2024. And I'll ask you to turn,
25 please, to paragraph 132.

1 A. Okay.

2 Q. And so paragraph 132, and it continues, this is your
3 section related to the motivation to combine Beam and
4 Satonaka. Correct?

5 A. Yes.

6 Q. Okay. And if we continue down in those sections to, I
7 believe it's, paragraph 148, we see those same three
8 images there, the vehicle and red triangle that we
9 were discussing before in your '315 declaration.
10 Correct?

11 A. Right.

12 Q. Okay. And is it fair to say that your opinions here
13 in the '318 declaration regarding the Beam and
14 Satonaka combination are essentially the same as in
15 your '315 declaration?

16 A. I think so. I don't recall any significant
17 differences.

18 Q. Okay. And if then we just go to paragraph 201 of your
19 '318 declaration, here you are discussing the
20 combination of Karlsson and Nakamura. Correct?

21 A. Yes.

22 Q. Okay. And if we continue down to paragraph 206, we
23 see there is the same three images of the vehicle with
24 the red triangle. Correct?

25 A. Yes.

1 Q. And is it fair to say that your opinions here in the
2 '318 declaration regarding Karlsson and Nakamura are
3 the same as in your '315 declaration Karlsson and
4 Nakamura?

5 A. I believe so.

6 Q. Dr. Turk, do you know what a daytime running light is?

7 A. Yes, generally.

8 Q. Okay. Can you explain to me your understanding of
9 what a daytime running light is?

10 A. I think of it as a car light that is intended to be
11 on during the day, not necessarily intended to fully
12 illuminate nighttime driving by itself.

13 Q. And in your declarations you referred to the FMVSS,
14 the Federal Motor Vehicle Safety Standards. And I'll
15 give you an example, paragraph 26 of your '315
16 declaration.

17 A. 26?

18 Q. Yes.

19 A. Yes.

20 Q. Okay. So the FMVSS. Do you know if a low beam
21 headlamp can serve as a daytime running light per the
22 FMVSS?

23 A. I don't know offhand. I would have to check their
24 standards.

25 Q. Okay. But do you know if a high beam headlamp can

1 serve as a daytime running light per the FMVSS?

2 A. Same thing, I don't know offhand. I would have to
3 check the standards.

4 Q. If you go to paragraph number 40 in your '315
5 declaration, so Exhibit 2006, do you see the quote
6 there at the bottom of the page starting with "The
7 added"?

8 A. Yes.

9 Q. And continues to the next page. Can you please read
10 that sentence for me?

11 A. "The added controllability offered by breaking the
12 total light output up into discrete ('digital'),
13 specifically aimable and dimmable elements which can
14 be addressed by control electronics to effect
15 intensity, spectrum, and spatial distribution of
16 intensity and spectrum, yields a lighting fixture (vs
17 lamp) of unparalleled performance."

18 Q. And this is a quote from the '551 patent; is that
19 correct?

20 A. Yes, I think it is.

21 Q. In this description, "aimable" and "dimmable" are
22 separate functions; is that right?

23 A. Separate elements, yes.

24 Q. What do you mean by "separate elements"?

25 A. Well, I'm just quoting what the -- what the text says

1 here.

2 Q. I see. What does the text here mean by "elements"?

3 A. I think it's referring to the LED elements in the
4 patent.

5 Q. So the LED elements are specifically aimable and
6 dimmable? Is that what this is explaining?

7 A. Yes.

8 Q. And how are the LED elements aimable, as described
9 here?

10 A. I don't really recall all of the details of how '551
11 defines aimability but an example is in the figure on
12 this page 39 where we can see at the top there are
13 LEDs that are aimed differently, so that's certainly
14 an example of that.

15 Q. Are there other examples that you know of how a LED
16 would be aimable?

17 A. You mean in this patent?

18 Q. Or generally. You said that that's one example, so I
19 assume that you were thinking of other examples of how
20 an LED would be aimable.

21 A. I wasn't thinking of them, necessarily, but I could
22 imagine just in general off the top of my head an LED
23 could be aimable by a person moving it around and
24 pointing it in a different location or mounting it in
25 a way that aims it.

1 Q. And so in the context here, I think as you mentioned
2 Figure 15, so like a headlamp of a vehicle, are there
3 any other examples of how an LED is aimable?

4 A. Not in this figure that I can see.

5 Q. And the term "dimmable" there, what does that mean?

6 A. Generally means that the element can change its
7 intensity value.

8 Q. Can we turn, please, back to paragraph 215 of your
9 '315 declaration?

10 A. Okay.

11 Q. Here you say, "I have reviewed the objective
12 statements in the Stam declaration." Correct?

13 A. That's correct.

14 Q. Did you only review the portion of the Stam
15 declaration relating to objective evidence statements?

16 A. I don't recall that necessarily being a specific
17 section in Stam, but I reviewed all of Stam.

18 Q. So you reviewed the entire Stam declaration that was
19 part of the re-examination file history; is that
20 correct?

21 A. Yes, I did.

22 Q. Do you recall any portions of that Stam declaration
23 that you disagreed with?

24 A. I don't really recall it very well right now and, no,
25 I don't recall anything in particular that I

1 disagreed with.

2 MR. FITZSIMMONS: Okay, let's just take a
3 five-minute break here, if that's okay with everybody.

4 THE WITNESS: Okay.

5 (Off the record at 4:12 p.m.)

6 (Back on the record at 4:18 p.m.)

7 MR. FITZSIMMONS: I have no further
8 questions for you today, Dr. Turk. Thank you for your
9 time.

10 THE WITNESS: You're welcome.

11 MR. FITZSIMMONS: Andy?

12 MR. TURNER: All right. I think I would
13 like to take a little redirect, but if we can take
14 another couple-minute break, if we can take ten
15 minutes, and then we'll come back and then I'll make
16 the call.

17 MR. FITZSIMMONS: Of course.

18 MR. TURNER: All right. Thank you.

19 (Off the record at 4:18 p.m.)

20 (Back on the record at 4:36 p.m.)

21 MR. TURNER: Hello, Dr. Turk.

22 THE WITNESS: Hello.

23 EXAMINATION

24 BY MR. TURNER:

25 Q. I guess, first, Dr. Turk, are you a patent attorney?

1 A. I am not.

2 Q. All right. Prior to today were you ever asked to
3 specifically compare the specific phrases from the
4 specific claims that were presented to you for
5 comparison today?

6 MR. FITZSIMMONS: Objection. Form.
7 Objection. Leading.

8 A. The ones that I'm recalling, I was not.

9 BY MR. TURNER:

10 Q. Do you agree that there is a difference between the
11 words "change emission" and the words "decrease
12 intensity of emission"?

13 MR. FITZSIMMONS: Objection. Form.
14 Leading.

15 A. Generally, yes. Those are not exactly the same.

16 BY MR. TURNER:

17 Q. Is there a difference between the words "decrease
18 intensity of emission" and the words "vary
19 illumination provided to the target"?

20 MR. FITZSIMMONS: Objection. Form.
21 Objection. Leading.

22 A. They are not exactly the same, so they can be
23 different.

24 BY MR. TURNER:

25 Q. Do you agree that the words "vary illumination" do not

1 require that the illumination is decreased?

2 MR. FITZSIMMONS: Objection. Form.

3 Objection. Leading.

4 A. Yes. Vary could, for example, include increasing
5 illumination.

6 BY MR. TURNER:

7 Q. Do you agree that when claims include different words,
8 that the claims have different meanings?

9 MR. FITZSIMMONS: Objection. Form.

10 Objection. Leading. And objection, calls for a legal
11 conclusion.

12 A. It seems that unless those different words mean
13 exactly the same thing, then, yes, that's true.

14 MR. TURNER: Okay, that's all. That's all
15 I have.

16 MR. FITZSIMMONS: Okay, we'll take five
17 minutes and then return.

18 MR. TURNER: Okay.

19 (Off the record at 4:38 p.m.)

20 (Back on the record at 4:43 p.m.)

21 RE-EXAMINATION

22 BY MR. FITZSIMMONS:

23 Q. Dr. Turk, did you speak with counsel during the break
24 from when I was asking you questions until counsel
25 began redirect questions?

1 A. No, I didn't.

2 Q. Did you speak with anyone during that break?

3 A. Nope.

4 MR. FITZSIMMONS: Okay, then I have no
5 further questions. Thanks, Doctor.

6 THE WITNESS: You're welcome. Thank you.

7 STENOGRAPHER: Anything further for the
8 record?

9 MR. FITZSIMMONS: That's all from here.

10 (Proceedings concluded at 4:43 p.m.)
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CERTIFICATE OF NOTARY

STATE OF MICHIGAN)
) SS
COUNTY OF OAKLAND)

I, ALISON WEBSTER, certify that the
deposition of MATTHEW TURK, Ph.D. was taken before
me via videoconference on the date hereinbefore set
forth; that the foregoing questions and answers
were recorded by me stenographically and reduced to
computer transcription; that this is a true, full,
and correct transcript of my stenographic notes so
taken; and that I am not related to, nor of counsel
to, either party nor interested in the event of
this cause.

Alison Webster

ALISON C. WEBSTER, CSR-6266, RPR, RMR, CRR, RDR
Notary Public, Oakland County, Michigan
My commission expires: May 1, 2029

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