1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 _____
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD
4
5 VOLKSWAGEN GROUP OF AMERICA, INC.,
6 Petitioner,
7 vs.
8 YECHEZKAL EVAN SPERO,
9 Patent Owner.
10 _____
11 Case: IPR2023-00315
12 U.S. Patent No. 9,955,551
13
14 Case IPR2023-00318
15 U.S. Patent No. 9,955,551
16
17 DEPOSITION OF MATTHEW TURK, Ph.D.
18 via videoconference
19 Friday, November 17, 2023
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25 Alison C. Webster, CSR-6266, RPR, RMR, CRR, RDR

Videoconference deposition of MATTHEW TURK, Ph.D., Produced as a witness at the instance of the Petitioner, and duly sworn, was taken in the above-styled and numbered cause on Friday, November 17, 2023, from 9:30 a.m. to 4:43 p.m. Eastern Time, before Alison C. Webster, RPR, CRR, RMR, RDR, CSR-6266 (Michigan); License No. 14559 (California); License No. 084.004953 (Illinois); License No. 23001848 (Washington), reported by stenographic method, via videoconference, pursuant to the Federal Rules of Civil Procedure and the provisions stated on the record or attached hereto.

A P P E A R A N C E S

ON BEHALF OF THE PETITIONER
JASON A. FITZSIMMONS, ESQUIRE
TREVOR M. O'NEILL, ESQUIRE
IAN SOULE, ESQUIRE
Sterne Kessler Goldstein Fox
1101 K Street NW
10th Floor, Washington, D.C. 20005
202.772.8701
jfitzsimmons@sternekessler.com
toneill@sternekessler.com
isoule@sternekessler.com

ON BEHALF OF THE PATENT OWNER
ANDREW B. TURNER, ESQUIRE
Brooks Kushman P.C.
1000 Town Center
22nd Floor
Southfield, Michigan 48075
248.358.4400
aturner@brookskushman.com

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DEPOSITION OF MATTHEW TURK, Ph.D.

Friday, November 17, 2023

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

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

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

[No objections made]

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

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

DR. TURK: Yes, I do.

STENOGRAPHER: Thank you.

You may proceed.

MR. FITZSIMMONS: Thanks. Good morning,

Dr. Turk.

THE WITNESS: Good morning.

MR. FITZSIMMONS: Good to see you again.

THE WITNESS: Likewise.

MATTHEW TURK, Ph.D.,

was thereupon called as a witness herein, and after having first been duly sworn to testify to the truth, the whole truth and nothing but the truth, was examined and testified as follows:

EXAMINATION

BY MR. FITZSIMMONS:

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

A. Matthew Alan Turk.

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

A. Yes, I do.

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

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

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

A. That sounds right.

Q. And is it okay if I refer to these proceedings as the '315 proceeding and the '318 proceeding if I need to distinguish between them?
A. Yes.
Q. And I'll do my best to direct you to the appropriate exhibits. And both of these proceedings are related to the patent number.
9,955,551. Does that sound accurate?
A. Yes, it does.
Q. And is it okay if I refer to that patent as the '551 patent?
A. Yes.
Q. And you understand that you are under oath today. Correct?
A. I do.
Q. Is there any reason that would prevent you from providing truthful or accurate testimony today; for example, any medications you may be taking?
A. No.
Q. Is there anything else that would prevent you from providing truthful and accurate testimony?
A. No.
Q. And since this is a remote deposition and we're not currently in the same physical location, if you can please just let me know where you're currently sitting

for this remote deposition?
A. Yes, I'm at home at my desk.
Q. And what city and state is that, please?
A. It is in Chicago, Illinois.
Q. Is there anyone in the room with you?
A. My wife is across the way a little bit.
Q. Okay. And so there's -- and so there is someone else currently in the room with you?
A. She's actually walking out right now.
Q. Okay. Do you plan to be alone in the room for the rest of the deposition?
A. She may have things to do here and there, but generally will not be around too much. If it's important, I can wear earphones so that I -- only I can hear.
Q. If that -- if we think that -- if I think that's necessary, I may do that.
Besides the computer that you are using right now, do you have any other electronic devices with you?
A. My cell phone is next to me on the desk here.
Q. Okay. Do you agree you'll refrain from communicating with anyone with any electronic devices during the deposition?
A. I'm sorry, what was the beginning of that?

Q. Do you agree that you'll refrain from communicating with anyone with your electronic devices during the deposition?
A. Yes, I agree.
Q. And you should have a box of documents that we sent to you yesterday. Do you have that with you?
A. I do, yes.
Q. Okay. Great. And we'll be pulling exhibits from that box as we go along. Other than the documents that we sent to you, do you have any other documents with you there?
A. I don't, but I do have a question. Well, I have PDF documents, clean PDFs of these, and I wanted to ask you, do you only want me to use the paper version that you sent me or can I use the PDFs as well?
Q. As long as those are clean PDF documents, I'm okay if you use those if that's easier for you, but also feel free to use the hard copies if you prefer that.
A. Thank you.
Q. And so any of those PDF documents that you have, though, those are clean copies without any notes; is that correct?
A. That is correct.
Q. Okay. And I know you've done this before, Dr. Turk, so I'll just go briefly through some of the, kind of,

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

A. Yes.

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

A. Yes.

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

A. Yes, it is.

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

A. Yes.

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

A. I believe so.

Q. As soon as --

[Technical interruption]

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

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

BY MR. FITZSIMMONS:

Q. All right, Dr. Turk, since your deposition for the '029 patent when we worked together, have you been deposed in any other matters?
A. No, not since then.
Q. And since that deposition for the '029 patent, have you submitted any reports to a Court -- any -- at any Court or PTAB?
A. I don't think I have. It's possible. I forget exactly when the date was and what has gone on since then. It's possible there might be submission related to this family of patents, but I don't think so.
Q. Okay. How did you prepare for today's deposition?
A. I reviewed my declarations and supporting materials for those declarations and I spoke with the attorneys that I'm working with on this case.
Q. And what -- you said you reviewed your "declarations and supporting materials." Can you be more specific on what the supporting materials are?
A. I would have to look at my list to remind me. The list that's in my declarations.
Q. Okay. So there's a list of references in each of your declarations. Is that the materials you're referring to that you reviewed?
A. Yes.

Q. Did you review your initial declarations and then your second declarations in each of these proceedings? If you recall, you submitted a declaration in support of the patent owner's preliminary response and then a second declaration in support of the patent owner's response in each of these.
A. Yes, I did, yes.
Q. And so you -- and so you reviewed four total declarations in preparation for today; is that correct?
A. Four of my declarations, yes.
Q. Okay. Did you review any documents that are not in your exhibit lists in order to prepare for the deposition today?
A. I don't think so. Not that I can recall.
Q. About how much time did you spend preparing for today's deposition?
A. I would guess about eight hours. It's a very rough estimate, though.
Q. And who did you meet with to prepare for today's deposition?
A. I met with Mr. Turner, who is here, and Ms. Shaw.
Q. Did you meet with anyone else?
A. No.
Q. And when did those meetings occur?

A. We met yesterday and there have been some meetings over the past week. I forget exactly which days.
Q. Were those meetings in person or remotely?
A. They were all remote.
Q. Who is retaining you in these two matters, the '315 and the '318 proceedings?
A. I believe it's technically Torchlight Technologies.
Q. And when were you contacted about potentially working on these two proceedings related to the '551 patent?
A. I have not reviewed the timeline recently, though very roughly I would estimate it was a little over a year ago, perhaps.
Q. What is your understanding of who the owner of the '551 patent is?
A. That's not something that I've looked into in much detail, but my general understanding is that it is Torchlight Technologies.
Q. Is Torchlight Technologies an entity that you consider when you were determining whether you had a potential conflict of interest to work on these matters?
A. Probably. I don't recall that process at this point, but I think it must have been. It's an entity involved in this.
Q. How do you -- how did you go about determining whether you had a potential conflict of interest with

Torchlight Technologies?

MR. TURNER: Objection. Relevance.

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

BY MR. FITZSIMMONS:

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

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

BY MR. FITZSIMMONS:

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

A. Yes, I believe so.

Q. Have you ever communicated with Mr. Spero?

A. Not to my knowledge.

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

Q. And do you confirm that Exhibit 2002 is your first declaration in the '318 proceeding?
A. Yes, it is.
Q. And on the last page, is that your signature?
A. Yes, it is.
Q. Thank you. And in the '318 proceeding, Exhibit 2024 should be your second declaration in the '318 proceeding, if you can just please confirm that.
A. Yes.
Q. And on the last page, is that your signature on Exhibit 2024?
A. Yes, it is.
Q. Good. Thanks. I just wanted to clear all that out of the way so we have those all together.

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

There's significant overlap in your opinions in these two declarations. Correct, Dr. Turk?
A. I believe so. I haven't compared them to each other directly lately, but I believe they're similar.
Q. To your knowledge, do you take any opinions in these two declarations -- and that's Exhibit 2006 in the

'315 and Exhibit 2024 in the '318 -- that are conflicting?
A. Not to my knowledge.
Q. When did you last review these two declarations?
A. To some degree, yesterday.
Q. What do you mean, "to some degree"?
A. I most recently reviewed them yesterday but didn't review every bit of them yesterday.
Q. In preparing for the deposition today, at some point had you reviewed every bit of these declarations?
A. Yes.
Q. Did you write these declarations?
A. What specifically do you mean by "write"?
Q. How would you define the term "write"?
A. "Write" could mean writing in cursive and by hand; "write" could mean typing a document; "write" can mean different things in different contexts so I'm just wanting to answer your question, so...
Q. Sure. What was your -- what was your process for preparing these declarations?
A. I had already spoken with the attorneys I'm working with here at great length about this patent and about the issues raised in the petitions. So after significant discussion about these matters and about 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

you please read that heading for me?
A. It says Claims 32, 33, 41, and 48-49: The Complete Omission of Elements Constitutes a Fatal Failure of Proof Under 35 U.S.C. Section 312(a)3 and 37 C.F.R. Section 42.22 (a)2."
Q. Did you review 35 U.S.C. Section 312(a)3 prior to submitting your declaration?
A. I've read it before. I don't recall when I most recently reviewed it.
Q. So you don't know if you reviewed it prior to submitting the declaration; is that correct?
A. I'm sure I did read it prior to submitting the declaration. I don't recall how recently.
Q. Do you recall what Section 312 is about?
A. At the moment, I don't recall for sure.
Q. And what about 37 C.F.R. Section 42.22(a)2, did you review that regulation prior to submitting your declaration?
A. Same thing for that. I have read it before. I don't remember when I would have looked at it most recently.
Q. In your '315 and '318 declarations there's a number of paragraphs in each of those that say, "intentionally left blank." Do you recall that?
A. Yes.

Q. Now, outside of the declarations and the proceedings that you have submitted declarations for on behalf of Mr. Spero, the '029 patent, the '551 patent, and the '531 patent -- just for your recollection -- for other inter partes review declarations, have you used intentionally left blank paragraphs before?
A. You're asking for others besides related to these patents you just mentioned?
Q. Correct. Outside of those.
MR. TURNER: Objection. Relevance.
A. I believe that I have, yes.
BY MR. FITZSIMMONS:
Q. Would it surprise you that we reviewed 28 of your declarations in other proceedings and didn't find a single instance of an intentionally left blank paragraph in an inter partes review declaration?
A. That would surprise me, yes.
Q. Now, the '315 declaration, there's 15 paragraphs that say, "intentionally left blank," that are paragraphs 123, 124, 129, 146, 149, 151, 155, 164, 170, 175, 178, 184, 189, 201, and 214.
Did you type "intentionally left blank" in your declarations or did someone else?
A. I don't recall typing that myself, so I presume it was someone else.

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

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

A. I don't recall typing them myself.

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

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

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

A. No, I don't.

Q. Were there some sort of conclusion statements that you

or someone else removed from those paragraphs?
A. Not that I recall, but I'm not sure.
Q. Okay. So you're not sure why any of the 36 instances of "intentionally left blank" in these two declarations are there; is that right?
A. Not besides what I said already, that for bookkeeping reasons this is frequently done, I believe, or at least has been in my experience, but I don't recall specifically why in these cases.
Q. Okay. Let's go in your '315 declaration, so again this is Exhibit 2006, in that proceeding, and let's turn to paragraph 48.
A. Okay.
Q. And then in paragraph 48, you say, "I understand that Patent Owner accepts Petitioner's proposed level of ordinary skill in the art."
Do you see that?
A. Yes, I do.
Q. And that level of ordinary skill in the art is listed in the preceding paragraph, paragraph 47. Correct?
A. Yes.
Q. And I'm also going to have you now look at your '318 declaration, that's Exhibit 2024, also paragraph 48.
A. Okay.
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

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

Do you see that paragraph?

A. Yes.

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

A. Yes.

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

A. That's right.

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

A. That's correct.

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

A. That's correct.

Q. And is that still your opinion?

A. Yes, it is.

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

A. Yes.
Q. And just for the record, that Beam patent is patent -- U.S. Patent Number 6,144,158. Correct?
A. That's correct.
Q. And you have a clean copy of that in front of you?
A. I do.
Q. Can you please go to column 4, and starting at line 45 where it says -- perhaps it's 46, starting, "The angular position." Do you see that?
A. Yes.
Q. Can you read that sentence for me? So it's Exhibit 1005 being referenced, column 4, lines, say, 45 to 48.
A. "The angular position or attenuation of each of these microbeams is independently set by the controller 108."
Q. And you've reviewed the Beam reference, I believe, a number of times now. Correct, Dr. Turk?
A. That's correct.
Q. All right. What does Beam mean by controlling the angular position of the microbeams?
A. It means that the spatial light modulator is either allowing a microbeam to pass out of the device into the world or the angle has changed so that it does not pass out, it gets absorbed inside the device.
Q. So one of the functions of Beam system is to control

the angle or direction of its microbeams. Correct?
A. It's partly correct. To be more specific, it -- for each element of the SLM which can produce -- each one can produce a microbeam, it has a choice of either send it out or not send it out. So that's the level of control, either on or off, essentially.
Q. And by sending it out, in your opinion, or not sending it out, as you characterize it, that's controlling the angle or direction of each of the microbeams. Correct?
A. Well, it depends on one's definition. If you consider a microbeam what is exiting the headlamp or the lights, the fixture in this case, the headlamp in this case, there's only one angular direction that microbeam can go, but internal to the device there are two directions in which it can be controlled; either kept in or exited.
Q. You said "if you consider a microbeam what is exiting the headlamp." Is that what you consider a microbeam to be, something that must exit the headlamp?
A. I don't have a general opinion on -- a general definition of it. It depends on the context in which it's being used.
Q. So the context here is the Beam reference that we're talking about?

A. Right.
Q. So in the context of Beam, do you consider a microbeam only what is exiting the headlamp?
A. In the sentence here that I read, starting at line 46, it uses -- it has microbeams, and so that is describing the internal directing of the SLM, not all of the beams that exit the device.
Q. Sorry, I don't understand what you -- what you mean by that. You said it's "describing the internal directing of the SLM." What do you mean by that?
A. The internal directing of the light source that's being directed toward the SLM. And when it uses the word "microbeams" in this context here, it's talking about each light bouncing off, reflecting off each SLM element, and that can be controlled in one of two ways, either to exit into the world or to be diverted internally and not get out of the device.
Q. I see. So if that microbeam is diverted internally, it would be directed in a first direction or at a first angle. Correct?
A. What do you mean by "first" in this case?
Q. By "first," I was then going to compare that. If it, in your characterization, exits the headlamp, that would be a second direction or a second angle.
A. I think that describes -- that is a way to describe

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

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

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

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

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

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

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

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

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

unless you'd like to point me to a place that I did. It's not something that I've really thought about.
Q. So you haven't thought about whether Beam switches from a low beam function to a high beam function; is that correct?
A. Beam might describe that. I don't recall. But, again, I don't think it's something that I opined about in my declarations.
Q. Okay. Do you recall opining about how Beam tracks vehicles with a dimmed area to prevent glare?
A. I don't believe I used the word "tracking" or "tracks" there. I do recall probably saying some things about Beam's dimming, which I think is what you're talking about.
Q. How does Beam provide dimmed areas to prevent glare?
A. In the first embodiment with the SLM that we discussed, it's by the process we were talking about, diverting the light using the SLM so that it doesn't exit, and so, therefore, it blanks. In the second embodiment it's essentially turning off the LED that is going out, that would otherwise be going out into the world.
Q. You said it's "essentially turning off the LED." What do you mean by that?
A. I mean not sending light energy from the LED.

Q. Is it your opinion that Beam, the LEDs in Beam, send zero light energy, as you characterize it, when they're providing a dimmed area to prevent glare?
A. Can you point me to where in my declaration I discuss this so I can recall all of the details?
Q. Let's see. Sure, we can turn to paragraph 107 in your declaration. Again, this is the '315 proceeding, and so that's Exhibit 2006, paragraph 107, you're talking about Beam in this paragraph.
A. Paragraph 107?
Yeah. So as I -- so I think in response to your question, what is in paragraph 107 is that "Beam discloses darkening areas by blanking microbeams."
And then at -- I'm sorry, and then at the bottom, "or LEDs to 'blank' microbeams."
Q. And so with respect to the LEDs, you said "it's essentially turning off the LED," which you said, "I mean not sending light energy from the LED."
And my question then was, in your opinion, do the LEDs in the Beam reference send zero light energy, as you characterize it, when they are providing the dimmed area to prevent glare?
MR. TURNER: Objection. Vague. Mischaracterizes testimony.
A. So the LEDs are blanked in those areas for Beam.

BY MR. FITZSIMMONS:
Q. What do you mean by "blanked"?
A. Turned off, not emitting light energy.
Q. So is it your opinion that Beam's LEDs are either on or off, there's nothing in between?
A. I believe that's true.
Q. Okay. Back to paragraph 35 where we were previously in the '315 declaration, Exhibit 2006. And since that's a long paragraph, we'll go to page 33, I believe. I'm sorry, page 34 at the top, the last bullet point of paragraph 35.
Do you see where you say, "the generated light beam to provide adaptive headlamp functionality," in that paragraph?
A. Yes.
Q. In order to generate a light beam to provide adaptive headlamp functionality, does it need directional light sources?
MR. TURNER: Objection. Vague.
A. Are you talking about Beam specifically or in what context are you asking the question?
BY MR. FITZSIMMONS:
Q. In order to provide adaptive headlamp functionality, does the headlamp need directional light sources?
A. In general -- I'm not sure if I've thought about this

as a general question. I imagine there might be other ways to provide that.
Q. Is an LED die a directional source?
A. Excuse me, you said an "LED die"?
Q. Correct, d-i-e.
A. I hadn't really thought about that so I'm not sure how to -- how specific I can answer that at the moment.
Q. So you don't know whether an LED die is a directional light source; is that correct?
A. It's not something that I've thought about or opined about in my declaration, so it would be off the top of my head and just not sure.
Q. Have you heard of the term "Lambertian," L-a-m-b-e-r-t-i-a-n?
A. I do know the term "Lambertian."
Q. Okay. And can you explain to me your understanding of a Lambertian source?
A. Well, I don't think I opined on it in my declaration, so a very out of context general view of Lambertian is that it's -- at least it can be a property of surfaces and how light bounces off surfaces and is perceived by an observer.
Q. Is an LED die lamp a Lambertian source?
A. It's not something that I've thought about at least

lately, so I'm not sure.
Q. All right. Let's turn to the Karlsson reference. For the record, that's K-a-r-l-s-s-o-n. So the Karlsson reference is Exhibit 1010 in both of these proceedings.
And just let me know when you have that, Dr. Turk.
A. I have it.
Q. Okay. And the Karlsson reference is PCT International Publication Number W0 98/54030. Correct?
A. That's right.
Q. Okay. We'll call this the Karlsson reference, if that's okay with you.
A. That is.
Q. All right. And I'd like you to turn, please, to page 19 of Karlsson.
A. Okay.
Q. And line 29, starting with "The emitted light beam 50," that sentence, page 19, lines 29 to 33, please.
A. "The emitted light beam 50 is represented as a window which can shift in the plane of the drawings from" left -- "from the left to the right and from the top to the bottom, if desired, and vice versa, and which may vary in regards its shape and dimension in dependence on the desired pattern and direction of

the beam."
Q. And so Karlsson discloses controlling the pattern and direction of its light beam. Correct?
A. Karlsson describes the light beam in Figure 14, I believe this is referring to, as something that can shift in these -- in this manner.
Q. All right. And in what we just read, Karlsson is describing controlling the pattern and direction of the beam. Correct?
A. Well, not really. It doesn't say anything there about controlling it. Right here, it just says it can, if desired, do such a thing.
Q. Okay. Would you characterize this passage as Karlsson saying that the admitted light beam may vary with its pattern and direction of the beam?
A. I would say that this sentence, along with some other discussion in Karlsson about sensors, describes some variation of the light beam in certain contexts.
Q. And that variation, as Karlsson says here, can be with respect to the pattern and direction of the beam. Correct?
A. Excuse me, did you say "pattern"?
Q. Pattern, yeah. As it says here on the page, pattern, p-a-t-t-e-r-n.
A. Ah, I see. Okay. Yes. Yes.

Q. And one way that Karlsson discloses varying that pattern and direction of the beam is with an SLM, a special light modulator. Correct?
A. Karlsson does use spatial light modulator in its first set of embodiments. Karlsson is not specific about how that is used to influence the beam 50 that we're talking about here.
Q. Okay. One way that Karlsson discloses sparing the pattern and direction of the beam is with an SLM, though. Correct?
A. I don't recall Karlsson discussing that specifically, no.
Q. What does the SLM in Karlsson do?
A. I think I described it in my declaration. Can we go to that?
And, I'm sorry, can you repeat the question?
Q. Yeah, my question was, what does the SLM in Karlsson do?
A. So I do opine about that on page 32 of my declaration and it says it [as read]: converts a light beam generated by a light source, such as an incandescent halogen bulb, for example, to multiple separate and individually controllable smaller light beams so that the smaller light beams can be individually blanked

or blocked and do not exit the headlamp.
Q. And you were reading from the first bullet on page 32 of your '315 declaration Exhibit 2006; is that correct?
A. That's correct.
Q. Okay. Can you please turn to Figure 1 of Karlsson?
A. Okay.
Q. So this is Exhibit 1010. And in Figure 1, what is Reference Number 3?
A. Figure 1 is the SLM embodiments, not the LED embodiments. And Element 3, I believe, is the SLM in that embodiment.
Q. And in Figure 3, that shows the SLM Reference Number 3. Correct?
A. Yes, that's correct.
Q. And Figure 4 shows Reference Number 3 of the SLM. Correct?
A. Yes. Yeah.
Q. Okay. And Figure 7, that shows Reference Number 3 of the SLM. Correct?
A. I believe that's still the SLM, that figure.
Q. Okay. And Figure 8 also shows Reference Number 3 of the SLM. Correct?
A. I believe so.
Q. Okay. And just to confirm here, if you go to

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

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

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

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

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

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

A. Yeah, I believe so.

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

A. I believe so.

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

A. I believe so.

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

A. Sorry, is this Figure 1?
Q. Figure 1, what is Reference Number 2, please?
A. It's a light source.
Q. So Figure 1 shows a light source represented by Reference Number 2. Correct?
A. That's correct.
Q. Okay. And Figure 2 has Light Source 2. Correct?
A. Yes, that's correct.
Q. Okay. And Figure 3 has Light Source 2. Correct?
A. That's correct.
Q. And Figure 4 has Light Source 2. Correct?
A. That's correct.
Q. Figure 7 has Light Source 2. Correct?
A. I believe so.
Q. So Figure 7 has Light Source 2. Correct?
A. I believe so.
Q. You believe so or it has Light Source 2? Are you unsure about that? I just want to make sure because, the others, you agree that they have -- the figures have Light Source 2, but you said "I believe so." So do you mean yes when you say that?
A. I'm just checking, to make sure I give you a good answer.
Q. Sure.
A. And, yes, it is Light Source 2.

Q. Okay. So Figure 7 has Light Source 2. Correct?
A. That's correct.
Q. And Figure 8 has Light Source 2. Correct?
A. Yes.
Q. Okay. In Karlsson, can you please go to page 14 for me?
A. Okay.
Q. And at the top of the page there, lines 1 through 4, can you read that section for me, please?
A. "The spotlight beams 34 can be obtained, for example, by using a light source 2 which is composed of a grid of separate light sources, such as LEDs, which can preferably be controlled either individually or in groups."
Q. And so Karlsson discloses that the Light Source 2 can be LEDs. Correct?
MR. TURNER: Objection. Vague.
A. I'm sorry, which page was this again? I was looking at a figure.
BY MR. FITZSIMMONS:
Q. Page 14, lines 1 through 4 that you just read.
A. So this says the light source in the context of Figure 6 can be composed -- can be composed of LEDs.
Q. Only in the context of Figure 6? Is that what you're saying?

A. It is the -- it is discussing this in the context of Figure 6.
Q. Okay. What -- so my question again is, Karlsson discloses that Light Source 2 can be LEDs. Correct?
MR. TURNER: Objection. Asked and answered.
A. It's a little vague here, and also it is vague at times because light -- this is description in the context of Figure 6, but there is no Light Source 2 in Figure 6. So it's a little hard to say exactly what Karlsson meant by that.
BY MR. FITZSIMMONS:
Q. Does Karlsson disclose that the Light Source 2 can be LEDs?
A. In this discussion of Figure 6 here, Karlsson mentions a light source which can be LEDs, but it's not necessarily a discussion about the other figures that we've already discussed.
Q. At least with respect to Figure 6, Karlsson discloses that a Light Source 2 can be LEDs. Correct?
A. Yes. Regarding that figure, yes.
Q. Can you go to page 21 for me, please? And can you read lines 14 to 17, please?
A. "The lighting means in the lighting device according 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

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

MR. TURNER: Objection. Vague.

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

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

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

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

BY MR. FITZSIMMONS:

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

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

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

A. I did develop an understanding of the claims.

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

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

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

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

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

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

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

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

A. I did, yes.

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

A. Yes, I did.

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

A. Yes, I did.

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

A. Yes, I did.
Q. Did you review the prosecution history of the '551 patent?
A. I have seen -- I have seen it. I probably have not read all of it in detail.
Q. Do you know what portion -- parts you read?
A. Not offhand.
Q. Did you review the re-examination history of the '551 patent?
A. I reviewed it somewhat. I don't remember in how much detail and which parts I spent more time on, but I have seen it, yes.
Q. And you understand what I mean by the re-examination history? You understand, Dr. Turk, that there was a re-examination of the '551 patent. Right?
A. I do understand that.
Q. Okay. And you understand that there was a proceeding at the U.S. Patent and Trademark Office where the claims of the patent were re-examined before the claims that we're discussing issued. Correct?
A. Yes, I believe so.
Q. Okay. And so when I say, did you review the re-examination history, that's what I was referring to. Is that what you understood me to mean?
A. Yes, I understand that context.

Q. Okay. And so with respect to the re-examination history, you said that you "reviewed it somewhat" but "don't remember in how much detail and which parts I spent more time on."
That's an accurate statement?
A. I think that's what I said.
Q. Is it your understanding that when you are determining the plain and ordinary meaning of claim terms, that that is considered from a viewpoint of a person of ordinary skill in the art?
A. Yes, I do.
Q. Okay. Let's go to your '315 declaration again, Exhibit 2006, that one, and let's go to paragraph 104. And here at paragraph 104 you're referring to Claim 24 of the '551 patent. Correct?
A. That's correct.
Q. And here, paragraph 104, you construed the term "emission" in Claim 24; is that correct?
A. That's correct.
Q. And you provide two dictionary definitions of the term "emission" in paragraph 104; is that correct?
A. Yes.
Q. Why did you think it was necessary to turn to dictionaries to define the term "emission"?
A. I wanted to clarify for the audience of this

declaration what its plain and ordinary meaning is.
Q. So was the '551 patent specification not clear about the plain and ordinary meaning of the term "emission"?
A. I don't really have a comment about that.
Q. You said you wanted to clarify what the plain and ordinary meaning is of the term "emission." Correct?
A. Yes, for the audience of my declaration.
Q. What needed to be clarified about the term "emission" in Claim 24?
A. I don't know if anything did. I wanted to be clear about the term for the purposes of my communication here in my declaration.
Q. And in order to do that, you felt it was necessary to provide definitions from the two dictionaries that you cited; is that correct?
A. I don't know if I felt it was necessary. I did provide those definitions. I thought it might be helpful.
Q. In paragraph 104 here you say that "claim 24 requires an emission (something set forth) from both the selected cluster of LEDs and the other actively emitting LEDs not in the selected cluster (a relativistic comparison)."
Is that correct?
A. That's what it says, yes.

Q. What do you mean by "relativistic comparison"?
A. I mean that I believe the claim is discussing the difference between two sets of emissions.
Q. Is it possible to compare an emission of light to an emission of zero light?
MR. TURNER: Objection. Vague.
A. I don't think an "emission of zero light," if that's exactly what you said, is a very meaningful phrase.
BY MR. FITZSIMMONS:
Q. Why is that not a meaningful phrase to you?
A. Well, if we go back to the first dictionary definition here of a deduction and discharge of something, especially gas or radiation, the lack of production or discharge does not fit in that definition and that's what you are asking me to compare, I believe. So I wouldn't call that an emission.
Q. So if I have a 100-watt light bulb, okay, and it's emitting -- it's emitting 100 watts; is that fair?
A. Sure.
Q. I turned it on. I turned the switch on.
A. Yes.
Q. Okay. And if I turn that switch off and my light bulb is off, it's emitting zero watts. Correct?
MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

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

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

Q. What phrase would you use?

A. For what?

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

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

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

MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

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

A. Not emitted -- not emitting any light energy can be described as, you know, no watts. So in that, sort of, informal description you could do the difference between those two and the difference would be 100 watts. But, again, I wouldn't call the light bulb being off emitting anything.
Q. And so you said the difference would be 100 watts so you can at least make a relativistic comparison between when that light bulb was on and when you turned the switch off. Correct?
A. Well, probably anything can hypothetically be compared. I would say it's not a very meaningful comparison, but you could compare lots of things, so sure.
Q. So looking at, again, paragraph 104 related to Claim 24, and the header in that paragraph 104 talks about change emission. Correct?
A. That's correct.
Q. You didn't provide a definition for the term "change"; is that correct?
A. I don't think I did.
Q. Why not?
A. I probably didn't think it would be needed here or useful here.
Q. Why didn't you think it would be needed here?

A. I don't recall what the particular thought process was in deciding not to define any particular word here, so it's hard to say.
Q. But so at a minimum you thought that the term "emission" requires explaining a definition but not the term "change." Correct?
A. I don't think I said it requires a definition. I think I said that I thought it would be helpful to provide a definition.
Q. Did you assign the term "change" its plain and ordinary meaning?
A. I believe I would have.
Q. What is the plain and ordinary meaning of "change," then, in the context of Claim 24?
A. It's not something that I, you know, opined on specifically in my declaration or have thought about deeply, so I could, you know, tell you off the top of my head it would probably be some measurable difference.
Q. So "some measurable difference," is that the meaning that you have -- the plain and ordinary meaning that you assign to the term "change" in Claim 24?
A. That's what I'm telling you what I'm thinking of right now off the top of my head. Again, I don't recall what specific definition I was attributing to

that word at the time of making these opinions.
Q. Would it have been different than the -- what you just explained to me?
A. Well, again, I don't know for sure, but I doubt it would have been substantially different.
Q. Okay. Paragraph 104 in the 2006, you cite column 19, lines 26 through 33 of the '551 patent, which is Exhibit 1001. Just for your reference, that's on page 97 of your declaration now. And towards the end of the first paragraph, you see that, you say Exhibit 1001, column 19, lines 26 to 33.
A. Yes, let me look at the context here for a moment. Yes, I see that.
Q. Okay. Now, let's go to the '551 patent itself, which I don't believe you've formally pulled up yet, so we'll introduce Exhibit 1001, the '551 patent to Spero. That's U.S. Patent 9,955,551.
Just let me know when you have that in front of you, Dr. Turk.
A. Okay, I do have it.
Q. Okay. And so you have Exhibit 1001, the '551 patent. Correct?
A. Correct.
Q. Thanks. And let's go to that citation, column 19, starting at line 26. Can you read that first sentence

there for me, please?
A. "The discrete light emitting elements by operating and not operating, at full power or at a fraction of, either partially or in unison, generate light with optimal intensity, spectral distribution and spatial distribution of intensity and spectral distribution for the viewing task at hand."
Q. Thanks. And so you cite this passage in paragraph 104 of your '315 declaration for the states of the light elements. Correct?
A. Yes. I think it goes beyond that a little bit as well, but yes.
Q. Okay. In your opinion, there is emission when the LEDs are operating at full power, as it says here in this passage; is that correct?
A. I'm sorry, can you repeat that, please?
Q. Sure. In your opinion, there is emission as recited in Claim 24 when the LEDs are operating at full power as it says in the passage that you just read; is that correct?
A. There is emission then, yes.
Q. So there is emission at full power, in your opinion. Correct?
A. Yes. And the full phrase here is, "at full power or at a fraction of."

Q. That was going to be my next question. So is there also emission, in your opinion, when the LEDs are operating at a fraction of full power?
A. If that fraction is greater than zero, yes.
Q. Would a fraction of full power be the same thing as dimmed?
A. Not the same thing, no.
Q. Why not?
A. The word "dimmed" can be used to describe completely off as well. It depends on the context. It's not a technical word, necessarily, but in general it's not exactly the same as "at a fraction of."
Q. So if I dim the lights in my room, are they operating at a fraction of full power?
A. In that hypothetical situation I think those two phrases would both describe that situation, which is, of course, not saying those two phrases are always the same.
Q. You said "those two phrases." What two phrases are you referring to?
A. I believe the two you are referring to, "at a fraction of," is one, and "dimmed," is the other.
Q. And in your opinion those two phrases are not always the same; is that correct?
A. Yes, I think that's correct. The context matters.

Q. How does the context matter?
A. Well, in the example you just gave me, in that hypothetical context, the two phrases are describing the same situation. But in other contexts, they may not.
Q. When -- and referring back to this passage here in the '551 claim, column 19, starting at line 26, for your reference, when the light emitting elements are operating at a fraction of full power, are they operating at a reduced intensity?
A. That's my understanding, yes.
Q. Okay. In this same passage, do you see where it says "generate light with optimal intensity"?
A. Passage in the patent?
Q. Yes, the same one that we were just talking about, column 19, line 26 through like line 29 or so.
A. Yes, I see that.
Q. It says "generate light with optimal intensity" in the middle of that.
Do you see that?
A. Yes.
Q. How do you determine "optimal intensity"?
A. Are you asking in general or specifically in this passage?
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

passage.
A. Okay.
Q. I believe it starts with, "Thus the lighting."
Can you please read that for me once you're there?
A. "Thus the lighting Figure 410 provides illumination in real time only where people need it to carry out visual tasks while the illumination in other areas is off or dimmed to comfortable or aesthetic lighting levels."
Q. In the '551 patent here, is it your understanding that "off" and "dimmed" mean the same thing?
A. Not necessarily, no.
Q. Well, you said -- you said "not necessarily," but the passage says what it says. Is it your understanding that "off" and "dimmed" mean the same thing here that's described in the '551 patent?
MR. TURNER: Objection. Asked and answered.
A. So you're asking if, in this sentence, "off" and "dimmed" mean exactly the same thing?
BY MR. FITZSIMMONS:
Q. Correct.
A. Yeah, I don't think so. No.
Q. Okay. What's the difference?
A. They're two different words that can be meaning two

1 different things in this context.
2 Q. Okay. And in this context, in the '551 patent, what
3 are those two different -- two different meanings?
4 A. In this sentence here in the patent it seems to be
5 saying that illumination in other areas could be off
6 or it could be what we earlier called -- and I'm
7 trying to remember what the other phrase was -- not
8 zero, but not 100 percent, somewhere in between. A
9 fraction.
10 Q. And so, here, "dimmed" would be a fraction or
11 somewhere between zero and 100 percent; is that
12 correct?
13 A. I think that's a way to read the word here in this
14 context.
15 Q. Okay. And so the '551 patent here is describing that
16 the illumination can be dimmed. Correct?
17 A. As it says here, "off or dimmed."
18 Q. Okay. So the illumination can be dimmed. Correct?
19 A. In this sentence, in this context here, yes.
20 Q. Yes. And when the illumination is dimmed, is the
21 illumination by reduced intensity from the maximum
22 intensity?
23 A. Again, it's been a while since I looked through
24 carefully the -- all of the language in the
25 specification here, but that does seem to be what

it's discussing here, off or operating in a fraction of full power.
Q. A fraction of full power would be illumination that's reduced in intensity. Correct?
A. Those two phrases can describe the same thing, yes.
Q. Still in your '315 declaration from the 2006 proceeding, let's now go to paragraph 106. And here in paragraph 106, you're discussing Claim 32. Correct?
A. Yes.
Q. And you discuss the term "diminished illumination." Correct?
A. Yes, that's what's there.
Q. Okay. Is there a difference between "change emission," as we were discussing in Claim 24 and "diminished illumination" as recited here in Claim 32?
A. Sorry, between "diminished illumination" in this claim and what?
Q. "Change emission," as we were discussing earlier in Claim 24.
A. They are different terms. I'm not sure that I've thought about how exactly they compare. I'd probably have to think about that more. Not sure at the moment.
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

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

Q. Yes.

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

Q. Right.

A. Okay.

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

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

A. I don't recall offhand.

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

A. That's right.

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

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

to make sure we have a common understanding there.
Q. Sorry, I just want to be clear what you meant. You said that there's a "word or a version of that word," referring to, I believe, "illuminate" or "illumination," and then you used, in "the quotes that follow." What do you mean, from "the quotes that follow"? I'm sorry, I didn't understand that.
A. In the rest of this paragraph.
Q. Paragraph 108?
A. That's right.
Q. Okay. And those quotes are from Claim 32 of the '551 patent. Is that what you mean?
A. I believe that's what's being quoted there, yes.
Q. Okay. And you don't cite any passages from the '551 patent here in paragraphs 106 through 108 with respect to the terms you discuss for Claim 32; is that correct?
A. I believe I do quote the patent claims.
Q. Yes. You don't cite the specification anywhere outside of the claims; is that correct?
A. I think that's correct.
Q. Okay. So you -- at the -- it's actually paragraph 106, but it's the very top of page 99, you say, in quotes, "diminished illumination," unquote, that is still, quote, "illuminating something,"

unquote.
Do you see that?
A. I see that, yes, I do.
Q. So in your opinion, "diminished illumination" is still "illuminating something." Is it just illuminating something at a reduced intensity?
A. I think that's a reasonable way of characterizing it. The best way is probably what we said before, operating at a fraction of full power, but I think what you said is okay.
Q. I want to go to the full -- full sort of part of -- full restitution of Claim 32 here, since you only have a couple of exhibits in this section. So if we go to page 46 in Exhibit 2006 here.
A. Okay.
Q. And I think you want to go back a couple of pages to Claim 44 but I want to talk about a limitation that's actually on page 46. It's labeled as Element 32.8a. Do you see that one?
A. Yes, I do.
Q. There's a phrase in there, "one or more changes to characteristics of first light of a cluster of the LEDs." Do you see that?
A. Yes, I do.
Q. Okay. In Claim 32 there, what's your understanding of

the term "characteristics of first light"?
A. I think in this context it probably means intensity or color of the light.
Q. Okay. And so characteristics of first light would at least include intensity for color; is that correct?
A. Yeah, I think that seems appropriate.
Q. Are there other things that would qualify as characteristics of light?
MR. TURNER: Objection. Vague.
A. Light has potentially many characteristics, some of which probably wouldn't be relevant here, so at least color and intensity are the ones that seem obvious in this context at the moment.
BY MR. FITZSIMMONS:
Q. Okay. Also in this same element, 32.8a, you see the term "non-glaring illumination"?
A. Yes.
Q. How do you determine whether illumination is "non-glaring" as recited here in Claim 32?
A. I think in this context it's referring to the parts of the illumination that are intended to reduce driver glare.
Q. Have you determined whether illumination reduces driver glare?
MR. TURNER: Objection. Vague.

A. How do I determine it?
BY MR. FITZSIMMONS:
Q. How can you determine whether illumination reduces driver glare?
A. In general, I suppose you can. For example, in some contexts you could just ask the driver.
Q. So then would glare depend on a particular person experiencing the glare?
A. In general, in the abstract, I suppose glare could be somewhat subjective and dependent on the person.
Q. Is -- do you know if, in the context of automotive headlamps, there is a level of glare that's considered acceptable?
MR. TURNER: Objection. Vague.
A. I don't know from that question, you know, who's doing the accepting and where that level would be stated or anything, but in general it seems like there are some levels of glare that people find annoying and some levels of illumination that they would not consider being annoying glare.
BY MR. FITZSIMMONS:
Q. Do you know, in the context of automotive headlamps, if there is any standard that regulates the level of permissible glare to oncoming vehicles?
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

"cannot."
Q. Cannot means it cannot. So we'll just look at paragraph 109, the very first sentence there, you say, "Independent Claim 40 is directed to decreasing the intensity of emission from first and second clusters of LEDs to a lower, non-zero intensity."
Do you see that?
A. I do.
Q. Okay. And so maybe seeing that will be helpful.
So is it your position, then, that decreasing the intensity means that you are not decreasing to zero intensity, I think is what that's saying? Is that correct?
A. This is saying what my understanding of decreasing the intensity is. It's necessarily what my understanding of decreasing of intensity is not, so I'll say what it is.
Q. Okay.
A. It's changing emission to a lower non-zero intensity.
Q. So it can't be a zero intensity in your opinion; is that correct?
A. I'm not sure that I've thought through in this context if it can't be zero. It is teaching a lower non-zero intensity. Whether that necessarily excludes a zero intensity, that's a different

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

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

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

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

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

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

MR. TURNER: Objection. Vague.

A. Claim 109?

BY MR. FITZSIMMONS:

Q. Excuse me. Paragraph 109. Perhaps I misspoke. So in paragraph 109 you use the phrase "non-zero intensity" again in the first sentence. I just wanted to 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

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

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

A. I see that now, yes.

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

So let's try to go back to that.

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

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

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

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

Q. I'm talking about here.

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

of context we were describing "change" in Claim 24. But a change in the downward direction is generally the same thing as a decrease.

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

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

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

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

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

A. Yes.

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

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

(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

we were discussing for Claim 24?
A. I don't think there's substantial differences. I think they're both describing lowering from one level of illumination to another level of illumination.
Q. I think I sense a pattern here. I just want to confirm. So "reduce intensity," in Claim 356, is there a difference between that and "diminished illumination" as we were discussing in Claim 32?
A. I think in general they are both describing the same kind of situation going from one level of illumination to a lower level of illumination.
Q. Okay. And is there a difference between "reduced intensity," in Claim 56, and "decreased intensity" as we were discussing for Claim 40?
A. Again, in general, I think they're describing the same situation in terms of going from one level of illumination to a lower level of illumination.
Q. Okay. Let's go now to paragraph 114, still in your '318 declaration, Exhibit 2024. So paragraph 114, where you are discussing Claim 72. Correct?
A. Yes.
Q. Now, Claim 72 uses the phrase "vary illumination." Correct?
A. Yes.
Q. And what is your understanding of the word "vary" in

Claim 72?

MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

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

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

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

A. Yes, I do.

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

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

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

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

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

A. Yes.

Q. Now, is there a difference between "vary illumination," here in Claim 72, and "change emission," as we discussed for Claim 24?
MR. TURNER: Objection. Vague.
A. I don't think there's -- there is a substantial difference. I think they're both describing changing the level of illumination.
BY MR. FITZSIMMONS:
Q. And is there a difference between "vary illumination" in Claim 72 and "diminished illumination" as we discussed for Claim 32?
MR. TURNER: Objection. Vague.
A. So for all of these similar questions I have not previously studied or opined on specific differences between those words. But as you're asking now, and as I'm looking at these, I think they're describing substantially the same thing, which is, again, changing the illumination level from one level to another.
BY MR. FITZSIMMONS:
Q. Okay. And is there a difference between "varied illumination" in Claim 72 and "decreased intensity" as we discussed for Claim 40?
MR. TURNER: Objection. Vague.
A. Again, overall I think those phrases are describing

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

BY MR. FITZSIMMONS:

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

MR. TURNER: Same objection.

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

BY MR. FITZSIMMONS:

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

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

A. Yes, I see that.

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

MR. TURNER: Objection. Vague.
A. So, yes, I believe it's referring to the word "data" in the last clause of Claim 32.
BY MR. FITZSIMMONS:
Q. Right. So page 46 of your declaration there, 32.9, right, it says, "based at least in part on data from one or more of the cameras." Right?
A. Yes.
Q. Okay. And so then Claim 33, when it says, "the data includes image data," it's referring back to the data from one or more cameras in Claim 32. Right?
A. Yes, I believe so.
Q. What are -- what's your understanding of the term "image data" in Claim 33?
A. In general, I think it refers to data coming from a camera that creates images.
Q. What are some examples of data that comes from a camera that creates images?
MR. TURNER: Objection. Vague.
A. Images.
BY MR. FITZSIMMONS:
Q. Are there any other examples or is it just images?
A. Examples of data that comes from a camera? Is that the question?
Q. Yes. That's what you said image data was, was data

that come from a camera that creates images.
A. Yeah, I think image data generally refers to images coming from a camera source. A camera.
Q. And so image data comes from the camera and where does it go?
A. I've lost what page we are on in the declaration.
Q. Sure. It's Claim 33, page 47 --
A. Okay. Thank you.
Q. -- of your -- of the '315 declaration.
A. So you asked where does image data go... you're talking about in this claim?
Q. Yes. In the '551 patent system.
A. At least right here, in this claim, it doesn't say anything about where the image data goes.
Q. What's your understanding of where that image data goes in the '551 patent system?
A. I don't recall offhand where the image data goes or system -- what system diagram in the patent might be defining that.
Q. In your understanding of the imaging system, where -- let's start with the image data that's obtained.
MR. TURNER: Objection. Vague.
A. Sorry, what was the last part of the question after "image data"?
BY MR. FITZSIMMONS:

Q. I said, in your understanding of an imaging system, what's done with the image data that's obtained?
A. Really depends. Depends on the imaging system.
Q. Can you give me an example of what -- the image data?
A. Yeah. On a cell phone, imaging system on a cell phone, the data can be displayed on the cell phone's display. It can be stored in an image file or a video file. Those are two examples.
Q. Okay. In the '551 patent system, you don't recall what happens with the image data that's recited in Claim 33?
A. I think you asked about where it goes. I don't recall where it goes in the system in terms of what happens to it. It's processed.
Q. Processed by what?
A. I don't recall offhand what's doing the processing besides the processor.
Q. Okay. Let's go to -- excuse me -- let's go to the Beam reference again, Exhibit 1005.
A. Okay.
Q. And column 4, line 29, do you see where it says, "Sensor 107 which is illustrated as a camera in this embodiment"?
A. Yes.
Q. Okay. And let's also go to column 6 and lines 11

through 12, and do you see where the Beam reference discloses an imaging sensor such as a video camera?
A. This is right after "operate at maximum intensity at all times." Yes.
Q. Okay. And so you agree that the Beam reference discloses a camera. Correct?
A. It discloses an imaging sensor such as a video camera.
Q. A video camera is a camera. Correct?
A. It is, yes.
Q. Okay. All right. Now let's go to column 4 of Beam still, line 32. And can you read for me, please, it starts, "The incoming rays"?
A. That one sentence?
Q. Yes, please.
A. "The incoming rays are imaged by the sensor 107 and are converted to video or other electrical signals used to drive controller 108, which uses the data to determine the particular area of microbeams to be blanked."
Q. Okay. And if we go to column 5, lines 11 through 13, can you read those couple of sentences for me, please?
A. 11 to 15?
Q. Column 5, 11 through 15.
A. "They are imaged by the sensor and are converted to

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

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

MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

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

A. I think so, yes.

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

A. Yes.

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

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

Q. Yes. So Exhibit -- the Exhibit 206 in the '315 proceeding and paragraph 112 in that declaration.
A. Okay. Claim 48, yes.
Q. Okay. And so paragraph 112 here is discussing Claim 48. Correct?
A. That's right.
Q. All right. And can you read, please, the portion of Claim 48 that you have in the header there before paragraph 112?
A. It says, "illuminate a portion of at least one object... by selecting a first cluster of the LEDs to emit first light... and the first light determined based at least in part on classifying the object based at least in part on the data."
Q. Thank you. What's your understanding of the plain and ordinary meaning of the term "classifying" there, the Claim 48?
A. To perform multi-class classification or recognition or determining the identity of an object.
Q. What do you mean by "multi-class classification"?
A. I mean that as distinct from detection or verification, which only looks at one possible output, one possible outcome. You know, for the record, let's say, face or it's not a face; or it's a 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

here, and column 44.
A. Okay.
Q. At the very bottom it goes on to column 45. Can you read for me there, starting at line 44 -- excuse me, starting at column 44, line 67, the next couple of sentences? Read column 45, line 9.
A. Okay. "Outputs from the CDC" -- excuse me, I'll start over.
"Outputs from the CCD arrays are analyzed by appropriate computational means employing trained pattern recognition technologies to classify, identify, or locate the contents. These techniques known in the art are covered in texts such as Schalkoff, Pattern Recognition, statistical, structural and neural approaches, John Wiley and Sons, New York 1992, and Neural Network For Pattern Recognition by Christopher M. Bishop, Chris Bishop, Oxford University Press; (January 1996) included herein by reference."
BY MR. FITZSIMMONS:
Q. Are you familiar with either of those two texts?
A. I am definitely familiar with the Bishop text, the second one. The first, I don't recall offhand if I'm familiar with it or not.
Q. Okay. But the '551 patent states here that the

classifying techniques were known in the art. Correct?
A. Yes, that's correct.
Q. Okay. Let's turn over to the Beam reference now, Exhibit 1005, and column 7, line 21, there in what's Claim 1 of the Beam patent.
Do you see where it says, "A sensor for detecting the presence of at least one predetermined object within an illumination beam"?
A. Yes, I see that.
Q. Do you think that Beam is using that noun "object" in a different way than Claim 48 uses that term "object"?
A. I believe so.
MR. TURNER: Objection.
A. I believe so. I don't recall Beam providing any teaching about any kind of objects or any kind of classification besides car headlights.
BY MR. FITZSIMMONS:
Q. Okay. If you go to Beam column 5 and starting at line 33. Do you see where it says, "The spatial scene data from sensor 107 is thresholded to illuminate weak signals and becomes the input to a processor 1105"?
A. Yes, I see that.
Q. What's your understanding of the term "thresholded" here?

A. It doesn't provide much context but it seems to discuss filtering, in a very simple way, the image data or the sensor data so that small low values, close to zero, will be pushed down to zero. In other words, eliminated, as it says.
Q. Okay, let's go back now to, in your '315 declaration, Exhibit 2006, paragraph 112. Do you see where you say, "Beam does not disclose identifying a particular target"?
A. Yes.
Q. In your opinion, what is required for a system to identify a particular target?
A. In general, to provide a meaningful label to an object out of a set of possible labels.
Q. And how would a system do that, provide meaningful label to an object out of a set of possible labels?
A. Well, one way is through multi-class classification.
Q. Are there other ways?
A. Not really thought of this in particular, but I suppose off the top of my head you could get people to assign a label to something and other, probably, lots of ways.
Q. Okay. In paragraph 113, the next one there after the diagram you provided, you state that "Beam does not identify the targets and therefore cannot distinguish

between the red box associated with vehicle B in Figure 2, from the red box associated with reflection of light from ab overhead sign in Figure 3." Correct?
A. That's right.
Q. I just want to be clear, Claim 48 does not require distinguishing between a sign and a vehicle. Correct?
MR. TURNER: Objection. Vague.
A. It doesn't require that specifically. It requires multi-class classification which the subject is giving an example of. The sentence is giving an example of.
BY MR. FITZSIMMONS:
Q. Where does Claim 48 say "multi-class classification"?
A. We've already discussed that. That's how I describe what Claim 48 is stating.
Q. So Claim 48 does not say "multi-class classification." Correct?
A. I don't believe it uses that particular phrase, but that's what it's -- that's what it's teaching or that's what it's discussing.
Q. Okay. And you agree that Claim 48 does not require distinguishing between a sign and a vehicle. Correct?
MR. TURNER: Objection. Vague.
A. I don't believe Claim 48 specifically requires that.
BY MR. FITZSIMMONS:

Q. So you would agree that the classifying in Claim 48 can be satisfied by more than just distinguishing between a sign and a vehicle. Right?
A. Right. I don't think that's the only possible way of -- only possible kind of classification that Claim 48 is meant to cover.
Q. You can classify beams as being a light source. Correct?
A. Excuse me, as being a what?
Q. A light source. I'll repeat my question.
You can classify beams as being a light source. Correct?
MR. TURNER: Objection. Vague.
A. Yeah, if you're asking is it possible that one could do that or build a system that did that, the answer is yes. It's a different use of the word "classifying" than in Claim 48, but the way you asked it, yes.
BY MR. FITZSIMMONS:
Q. How is it a different use of the word "classifying" as in Claim 48?
A. Well, the way you asked the question, it's -- it puts it in the category of detection, which is a single object that you care about, and you can only classify that object or not. Whereas, that's not -- and we've

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

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

MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

Q. As opposed to what else?

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

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

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

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

A. Well, let's be a little more specific about the context of Claim 48. It's classifying an object and, 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.

Q. A special light modulator or SLM is an optical control element. Correct?
A. It can be considered that, yes.
Q. And is a digital mirror device, or it's sometimes referred to as a DMD, an optical control element?
A. It can be considered that also. I think these last two things you asked me about are probably not as universally called optical control elements as, for example, a lens, but people can refer to them as that.
Q. Is a digital mirror device a reflector?
A. It reflects, it shares characteristics with sort of the simplest reflector which is a mirror, and I suppose some people refer to it as a reflector. It's probably not the first term people would associate with it.
Q. But you agree that a digital mirror device can be considered a reflector. Right?
A. I think it's a kind of active reflector.
Q. Let's go -- let's go to the -- back to the '551 patent, Exhibit 1001. And let's go to column 53, line 30, starting, "in general." Can you read that for me, please?
A. "In general, a cluster may be deemed a separate grouping due to a function it performs either

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

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

MR. TURNER: Objection. Vague.

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

BY MR. FITZSIMMONS:

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

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

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

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

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

the same time?
A. I know the patent discusses multiple vehicles. I would need to look at the details to make sure I got it right. It's a long patent.
Q. Understood. Still in column 53, can you read for me, please, starting at line 27, the "concept cluster"?
A. "The concept cluster shown by the dashed lines, is used to describe a control function and is not necessarily related to contiguous placement."
Q. And so here again, the '551 patent is describing that "cluster" is used to describe a control function. Correct?
A. In order to make sure I clearly understand the sentence here, I'm looking for the dashed lines. I believe this is referring to Figure 15. Is that your understanding?
Q. That's my understanding, correct.
A. Yes, so I think the answer to your question is yes. Concept cluster describes a control function or can describe a control function.
Q. And it's also describing that a cluster does not necessarily have to have contiguous placement. Correct?
A. It does seem to say that.
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,

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

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

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

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

A. Yes, I do see this now.

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

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

Q. No problem.

A. Yeah, I think this is basically stating that the LEDs in a cluster do not have to be all contiguous or -- you know, a given pair of LEDs in a given cluster do not have to be contiguous.
Q. Okay. Let's actually look at Figure 15 now of the '551 patent.
A. Uh-huh.
Q. In your opinion, are the LED 277 and LED 275 noncontiguous as that term is used, for example, in Claim 25 of the '551 patent?
A. Yes, they are noncontiguous.
Q. What makes them noncontiguous?
A. They're not touching immediately adjacent to one another.
Q. What do you mean by "not touching"?
A. I mean adjacent to one another.
Q. What about LED 283 and LED 284, are they noncontiguous as that term is used in the '551 patent claims?
A. I haven't thought about those two LEDs in this figure in terms of the concept of contiguousness, but I would, off the top of my head, call them continuous since they are next to one another.
Q. Okay. What about LED 277? And do you see the LED immediate to the right of it in the horizontal direction in Figure 15? It's not labeled.

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

Q. Okay. So what's your understanding of the term "noncontiguous" in Claim 25?
A. I take it to mean nonadjacent.
Q. What do you mean by "nonadjacent"?
A. Like I said before, non-touching.
Q. How do you interpret LEDs to be touching?
A. I don't have a specific definition of that, but I think in the context here in these claims it's describing LEDs that are not adjacent.
Q. Does that require a certain spatial relationship or distance between the LEDs?
A. I don't have a specific definition for it or a measure for it.
Q. Can a set of two LEDs -- if you have a set of two LEDs, can those LEDs be noncontiguous?
A. I haven't really thought through that particular question so I'm not sure.
Q. Well, I'm asking you.
A. And I'm saying I'm not sure.
Q. Why are you not sure?
A. Because I haven't thought through that before.
Q. I'm asking you to think through it now. So if you have two LEDs, can they be noncontiguous?
A. Well, off the top of my head, I suppose it's possible. If they're an LED in Chicago and an LED in

New York, I don't think anybody would call those contiguous.
Q. Okay. If you had those two LEDs in an automotive headlamp, those are the only two LEDs, can they be noncontiguous?
A. I don't have an opinion on that.
Q. What would you -- what information would you need to form an opinion on that?
A. I'd probably need the fuller context of why someone was asking about contiguousness in that context and what would be the implications of it. But as a hypothetical, I really have no comment on it.
Q. So in view of Claim 25 of the '551 patent which you're providing opinions on, if there are two LEDs in a headlamp, would those LEDs satisfy a limitation noncontiguous in Claim 25?
MR. TURNER: Objection. Vague. Incomplete hypothetical.
A. I think that question depends on where they are and if they're adjacent to one another.
BY MR. FITZSIMMONS:
Q. How would you determine whether or not they're adjacent to one another?
A. I think we're going in circles here. I don't have a 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

be contiguous. Correct?

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

A. That's correct.

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

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

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

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

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

A. Thank you.

BY MR. FITZSIMMONS:

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

A. No, I have not.

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

A. Yes.

Q. Okay. What's your understanding of the term "coordinate specific information"?
A. I think it's describing the classification -- the output of the classification and location processing to know where an object of interest is in the scene.
Q. Could you provide any examples of what "coordinate specific information" is under Claim 24 of the '551 patent?
MR. TURNER: Objection. Vague.
A. I think an example would be where the preceding vehicle is so that the antiglare capability can be invoked.
BY MR. FITZSIMMONS:
Q. Would another example be where an oncoming vehicle is so the antiglare ability can be invoked?
A. That could be another, yes.
Q. Okay. I want to go now in your declaration for the '315 proceeding, Exhibit 2006, starting at paragraph 141 through, I believe, 144. Do you see that?
A. Yes.
Q. Okay. And here you describe what you referred to in paragraph 141, the second line there is a test, and this is a description of that in this paragraph; is that correct?

A. Yes.
Q. Okay. And just to confirm it, before we come back to here, in Exhibit 2024, in the '318 declaration, paragraphs 147 to 150, you're talking about the same test. Correct?
A. Yes, I believe so.
Q. Okay. I just want to do that so that I don't have to keep flipping back and forth. So we'll go to the Exhibit 2006, your declaration from the '315 proceeding, and we'll work from there.
And so in paragraph 141 of that declaration, in that same sentence there, you say, "I supervised a test to evaluate the impact of this viewpoint shift using two vehicles."
Do you see that?
A. Yes.
Q. What do you mean by you "supervised" the test? In particular, I'm interested in what you mean by the word "supervised."
A. I said what I think was important to investigate and opined, I guess, or sort of signed off on what we actually decided to spend time and effort to do.
Q. You said to whom it "was important to investigate"?
A. I'm sorry, please say that again.
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.

Q. Who took those pictures?
A. I actually don't recall the name of the person who took those.
Q. So you don't know who took those three pictures that are in there -- in your declaration there right before paragraph 143; is that correct?
A. I don't recall the name of the person who took those.
Q. Okay. Were you present when those pictures were taken?
A. No, I was not at that location.
Q. Do you know where those pictures were taken?
A. Not precisely. We talked about, you know, the context where they should be and on a roadway and such, but I don't know specifically where.
Q. Do you know what state they were taken in?
A. I expect they were taken in the state of Michigan, but I'm not 100 percent sure.
Q. So you are not -- you can't be certain what state those pictures were taken in; is that correct?
A. I think, like I just said, I'm not 100 percent sure.
Q. In paragraph -- do you know if the person that took these photos is a member of the Brooks Kushman law firm?
A. I'm sorry, was that started about a certain paragraph?

Q. I was, I'm sorry, and then I changed my thought. So how about this? Do you know if the person who took those photos is a member of the Brooks Kushman law firm?
A. I don't recall for sure. I kind of think so, but I'm not really 100 percent sure.
Q. Did you speak with the person that took these photos?
A. I don't believe I did.
Q. Did you communicate with them otherwise, for example, by email with the person that took these photos?
A. Well, like I said, I'm not 100 percent sure. I don't recall who took them, so I guess, technically, I wouldn't know if I've communicated with such a person. But to my knowledge I did not or I have not communicated with the person who took these.
Q. Okay. In paragraph 141, you reference a "first vehicle." Do you see that?
A. Yes.
Q. And that first vehicle, does that represent the vehicle from which the photos were taken?
A. Yes, that's what that's describing.
Q. Okay. What kind of vehicle was that?
A. I don't recall.
Q. Do you know whose vehicle that was?
A. No, I don't.

Q. Okay. You say, "A digital camera was placed at multiple locations on the first vehicle."
Do you see that?
A. I'm looking for it. Yes, I see that.
Q. Do you know what kind of digital camera was used?
A. No, not specifically.
Q. The sentence before that, it says there's a "preceding vehicle (black SUV)."
Do you see that?
A. I do.
Q. Do you know what type of vehicle that is?
A. An SUV.
Q. Do you know more specifically, perhaps, the make or model?
A. No, I don't know the make and model of it.
Q. Do you know if that vehicle is stationary in the images?
A. I presume you mean stationary at the time the images were taken?
Q. Yeah. The black SUV in the images, do you know if, at the time these images were taken, that vehicle was stationary?
A. I don't recall. I know the vehicle is where we wanted it to be to do the tests. I don't recall if it was stationary or not.

Q. What do you mean, it was "where we wanted it to be"?
A. We discussed what would be the right test or a useful test to do, and that means, you know, the details of where to place the camera, where to take pictures from, what to put in the scene ahead, because these were the kind of things we were wanting to investigate, to understand whether there would be problems or not with this proposed combination.
Q. In paragraph 141 you list some locations of where the cameras -- the camera was located; is that correct?
A. That's right.
Q. Okay. So one of them is, for number one, [as read]: The rear-view mirror location is approximately 54 inches above the road; the lower left headlamp position approximately 34 inches above the road, 56 inches forward then 28 inches left of the first position; and a lower right headlamp position approximately 34 inches above the road surface, 56 inches forward and 28 inches to the right of the first position.

Do you see all that?

A. I do, yes.
Q. Who determined where those camera locations should be?
A. They were part of our discussion prior to doing this test what sorts of locations would help investigate

the issue we were trying to investigate, and then those numbers came out of where those locations were on the car, on the automobile that was used.
Q. Why did you use those locations?
A. Because those are the locations approximately of the camera in Satonaka and the cameras in Beam.
Q. Would those locations be different for a different make and model of vehicle than the one you used?
A. They would likely be somewhat different.
Q. For example, would they be higher in an SUV than in a sedan?
A. Likely. The most important thing actually was not the absolute numbers, but just the fact that they are at different heights and that was the main thing to investigate. Different heights and different horizontal directions.
Q. Were the cameras placed outside of the headlamps in the vehicle that was used?
A. I believe so. I don't think they were put inside the headlamps.
Q. But you're not sure; is that correct?
A. I didn't ask specifically, but I wouldn't know a way to do that so I probably would have heard if somehow that was done.
Q. And what about the camera position near the rearview

mirror, was that inside the car or outside of the car, the camera?
A. I believe it was inside the car touching the rearview mirror, but I don't recall for sure.
Q. Did you consider any other locations to try?
A. "Other locations," you said?
Q. For the camera positions.
A. I might have considered other locations and we may have discussed that. I don't recall specifically.
Q. Were there any standards or regulations that you referred to when creating the setup for this test?
A. No. This was to investigate a particular technical question relevant to the proposed combination, so it wasn't really relevant to a standard to my knowledge.
Q. The references that you discuss with respect to this test, that's the combination of Beam and Satonaka and the foundation for Karlsson and Nakamura, do those references describe precise locations of their cameras?
A. It depends on what you mean by "precise." They describe where the cameras -- where the cameras would be placed in the vehicle, but not specific measurements, that I recall.
Q. Does the '551 patent describe where its camera or cameras are located?

A. I believe that --
MR. TURNER: Objection. Relevance.
A. I believe it describes that the camera is in the headlamp.
BY MR. FITZSIMMONS:
Q. So your recollection is that the '551 patent describes that the camera is in the vehicle headlamp; is that right?
A. That's my recollection off the top of my head, but I would have to look through to confirm that.
Q. In paragraph 142, referring to, I believe, the headlamp sort of analogous positions of the cameras, you say "it would be more difficult to perceive the lane markings from this position."
Do you see that?
A. Yes.
Q. Wouldn't the difficulty of seeing the lane markings be something that's subjective?
MR. TURNER: Objection. Vague.
A. Did you say that's objective?
BY MR. FITZSIMMONS:
Q. Subjective.
A. I'm not sure what you mean by that.
Q. Wouldn't you agree that the lane markings would be easier to see from a camera that's closer to the

ground?
MR. TURNER: Objection. Vague.
A. Generally, no, but, of course, depends on what method one was using to detect the lane markings.
BY MR. FITZSIMMONS:
Q. So it would depend. Correct?
A. Yes. It would depend, for example, if we were talking about Satonaka's method or some other completely different method.
Q. And in the pictures at the end of paragraph 142 before paragraph 143, who drew those red triangles in the three images?
A. Who drew them?
Q. Yes.
A. I don't recall. It wasn't me, but I supervised it.
Q. What do those red triangles represent?
A. It represents the vehicle -- and I'm forgetting exactly what it was labeled -- in Satonaka that is the area in which to search for the car.
Q. And the red triangles there don't include the oncoming traffic lane. Correct?
A. That's correct.
Q. In those three images is -- excuse me, in those three images, that's a different oncoming vehicle in each picture. Correct?

A. I'm not really sure.
Q. Do you know if the oncoming vehicle was moving when those pictures were taken?
A. I expect that it was, but I'm not sure.
Q. Do you know if the oncoming vehicle was the exact same distance away from the camera vehicle when those pictures were taken?
A. It looks like it wasn't, but I'm not sure. We weren't really focusing on that vehicle.
Q. In paragraph 147 -- this is at the top of page 120 of your '215 declaration, do you see where it says, "the distorted shape of the vehicle recognition window"?
A. Yes.
Q. Why, in your opinion, is the shape distorted?
A. It's distorted with respect to the center image which is the Satanaya -- wait, what is it?
Q. Satonaka.
A. Satonaka. Thank you.
-- the Satonaka location of the camera. The left and right images -- in the left and right images, the triangle is distorted with respect to that because of the different location of the cameras.
Q. What, in your opinion, is the reason for that distortion?

A. It's how the geometry works in this scenario where you have a camera looking at a, more or less, plane that a car is on top of. It's just straight geometrical distortion.
Q. Do I understand correctly that your opinion is that the change in location or perspective changes the shape of the vehicle detection window, which is your red triangle?
A. That's correct.
Q. Do you recall we were discussing Figure 1 of the Beam reference previously? Does the Beam reference disclose detecting the traffic in the oncoming lane for glare reduction purposes?
A. I believe it does. It's shown in Figure 1.
Q. And --
A. Let me -- may I modify that a little bit? I think you might have used the word "recognize" or "identify" in there, so the way that was characterized, I may disagree with a bit. It does detect light in both lanes.
Q. And the Satonaka reference, that's Exhibit 1014, that also detects traffic in the oncoming lane. Correct?
A. Yes. It's a slightly different method than what's being shown in these images that I have, but, yes, similar.

Q. And same question for Nakamura. That reference also teaches detecting traffic in the oncoming lane. Correct?
A. It teaches looking for lights and attributing those lights coming from a car.
Q. And that includes the oncoming lane. Correct?
A. Yes, I believe it does have a method to do the oncoming lane.
Q. And just for the record, the Nakamura reference is Exhibit 13, and the Karlsson reference, that one is Exhibit 1010. Karlsson also detects traffic in the oncoming lane.
A. I can't recall offhand if Karlsson mentions the oncoming lane or not.
Q. Now, if we go to your '315 declaration, Exhibit 2006, and we go to paragraph 195 --
A. Yes.
Q. -- you have the same three images there that we were discussing just a moment ago which were in paragraph, I think it was, 142.
A. Yes.
Q. Is it fair to say that your argument with respect to these three pictures is the same for the Karlsson ground here at paragraph 196 as we just discussed for the Beam ground at paragraph 142?

A. Yes, it's about the combination and the difficulties that might come about trying to make that combination with the triangle-based detection method.
Q. Let's switch over to your '318 declaration. So this is Exhibit 2024. And let's go to paragraph 122. Can you just read that first sentence for me, please?
A. First sentence of 122?
Q. Paragraph 122, yes, in Exhibit 2024.
A. "While this may result in a darkened area that changes position in response to detected light changing position, Beam does not associate the detected light with a particular target (vehicle or sign)."
Q. How does the '551 patent, in your opinion, identify a target?
A. Through the multi-class classification that we've just discussed.
Q. And how does it determine something is a target?
MR. TURNER: Objection. Vague.
A. I don't know how it determines something is a target.
BY MR. FITZSIMMONS:
Q. In paragraph 122 here, you are saying that there's a darkened area of beam that changes position; is that right?
A. Yeah, there's a darkened area that, if you or I were

to look at it, you would see that it does change position in the image presuming that there are certain movements going on in the world out there.

Q. And so if there's a change in position, that means the darkened area is in at least two different locations; is that fair?

A. Yes, if it has changed, they would be different locations.

Q. Let's look at the Beam reference itself, so Exhibit 1005, column 6, line 24. Can you -- sorry, "As the positions." Can you read that sentence for me, please?

A. "As the positions of both vehicles move, the blanked area tracks the location of the oncoming vehicle dynamically varying in position and in size."

Q. And so Beam's blanked area, as it calls it, that changes position to track the location of the other vehicle. Correct?

A. Well, I think the language here in Beam, in this sentence in particular, is a bit imprecise, using the word "tracking." I think it's getting to the fact that, as I mentioned before, a person observing it could see -- could infer "tracking" there, but the patent itself does not teach tracking specifically.

Q. What do you see as the difference between those two

things?
A. Tracking, as a technical accomplishment, involves intentionally locating over a period of time the same object. Beam does not do this. Beam, every frame freshly anew with no knowledge of the past frame, looks for lights. And a human might look at that and think of that as tracking, but it's not technically doing what is generally considered as tracking because it's not identifying the actual source of those lights.
Q. So in your opinion, in order to track something you have to have identified that object?
A. Tracking implies following the same object over a period of time, so you at least have to know that it is the same object.
Q. So here Beam says "the blanked area tracks the location of the oncoming vehicle."
So the oncoming vehicle is the same object that has the blanked area tracking it. Correct?
A. Not necessarily. It could be other lights that set it off, set off its detection.
Q. But that's not what Beam is disclosing here. Beam says that "the blanked area tracks the location of the oncoming vehicle."
So we're talking about the oncoming

vehicle, the object, and the blanked areas tracking the location of that object, the oncoming vehicle. So that meet your definition of tracking the same thing; correct?

MR. TURNER: Objection. Vague. Compound.

A. As I describe the sentence is not very precise and the -- if you take this sentence as stating technical details, those details are not taught in the patent itself, so I think this is just a vague sentence that's describing a more human view of this than what's actually going on.

BY MR. FITZSIMMONS:

Q. Tracking an object was well-known in prior art before the '551 patent and before the Beam reference. Correct?

A. That's correct.

MR. TURNER: Objection.

BY MR. FITZSIMMONS:

Q. So a person skilled in the art wouldn't need all the details about how you track something in order to know how to do that. Correct?

A. Well, are you talking about Beam system or tracking in the abstract?

Q. I'm talking about -- let's start tracking in the abstract. A person skilled in the art would

understand how to track an object with a camera system. Correct?

MR. TURNER: Objection. Vague.

A. A POSA would generally understand that camera-based tracking is possible and it has been done in various contexts.

BY MR. FITZSIMMONS:

Q. So when Beam says, "the blanked area tracks the location of the oncoming vehicle," the person skilled in the art would understand how to track that vehicle as you explain it as being something following the same object. Correct?

MR. TURNER: Objection. Misstates the testimony.

A. A POSA would understand that that's what tracking means and then see what Beam teaches and realize that Beam does not teach that.

BY MR. FITZSIMMONS:

Q. Why is this anything different than what the person skilled in the art would understand the term "tracking" to mean?

A. Like I said, a person skilled in the art could look at this sentence and say, yes, I know what tracking means, this sentence used tracks, and I know what that means, and I can also look at the full patent

and see that this patent does not teach tracking. It uses the word here, but as I said, it's an imprecise usage here of this word.

Q. But you agreed that a person skilled in the art would understand how a camera system would track something. Right?

A. In the abstract, a person skilled in the art would know that, yes, camera-based systems can track certain things in certain contexts, not necessarily this context and not necessarily Beam's system for sure.

Q. Do you know whether a patent needs to describe techniques that are already known in the art to a person of ordinary skill?

MR. TURNER: Objection. Calls for a legal conclusion.

A. If you're talking about this sentence, I don't think there's any particular thing that a patent has to do with this sentence related to what you said.

BY MR. FITZSIMMONS:

Q. Does the '551 patent describe how it tracks an object?

A. I don't recall offhand. I haven't looked at the details of the spec for that -- regarding that for a long time.

Q. Whether it did -- whether it does or it does not, a

person skilled in the art would understand how you track an object with a camera system. Correct?
A. A person skilled in the art would understand that people have built systems to track objects. But, again, not necessarily in this context and particularly not hilting on Beam's system which is clearly not tracking.
Q. What evidence do you have that you think Beam is not tracking the location of the oncoming vehicle as explicitly stated here in column 6, lines 25 through 27 where it says, "The blanked area tracks the location of the oncoming vehicle"?
MR. TURNER: Objection. Asked and answered.
A. Because Beam describes what it does, not in this sentence, but elsewhere in Beam, and what it does is not tracking as normally understood in the art.
BY MR. FITZSIMMONS:
Q. What is -- what does Beam do that you think is not tracking?
A. Beam detects headlights -- or Beam detects lights. Beam assumes those lights are coming from a car, but then the next frame or the next moment in time Beam starts that process anew and does it again and then again and then again.

Detecting something, and particularly as simple as detecting lights over and over again, is not tracking.

Q. Why is it not tracking?

A. We've discussed this. It's not associating the thing you're looking -- you're looking for now with what you were just looking at a moment ago. It's not having any continuity in time of an object. It's just doing the same thing over and over again. That's not what tracking is.

Q. Got it. Is knowing the location of an oncoming vehicle, tracking?

MR. TURNER: Objection. Incomplete hypothetical.

A. In what context? It depends on the context. So in what context would that be?

BY MR. FITZSIMMONS:

Q. With a camera system if you're -- if you are following the location of an oncoming vehicle with a camera system, that tracking, the oncoming vehicle.

A. So you mean like if a car is following an oncoming vehicle? Say -- sorry, did you say oncoming vehicle?

Q. Yes.

A. Oncoming. It depends how it's done, so I guess I would need more context.

Q. This passage we were discussing, column 26, lines 25 through 27, Beam discloses that the blanked area dynamically varies in position and size. Correct?
A. Yes.
Q. You have a section in both of your declarations that you call Secondary Considerations, is that correct, Dr. Turk?
A. I believe so, yes.
Q. And in the '315 proceeding, so Exhibit 2006, that's paragraph 215 through 218. Correct?
A. That's right.
Q. And then in the '318 proceeding, Exhibit 2024, you have the same section, which is paragraphs 224 through 227; is that correct?
A. That's right.
Q. What is your understanding of the concept of "secondary considerations"?
MR. TURNER: Objection. Calls for a legal conclusion.
A. I don't know how clear a definition I have of it, I guess, sort of off the top of my head right now. I tend to think of it is other relevant sources of information, but I would have to think a little bit to really come up with a precise -- more precise definition.

BY MR. FITZSIMMONS:
Q. You have an entire section in your declaration called Secondary Considerations, but you can't tell me what your understanding of the concept of secondary considerations is?
A. I said I can't come up with a precise definition off the top of my head right now. But the section itself I think describes generally what secondary considerations are, these kind of things that are in here.
Q. Okay. So what is your understanding, then, of what secondary considerations are?
A. The kinds of things that are in here.
Q. "The kind of things that are in here." What do you mean by that?
A. This section talks about statements of long-felt need, of industry praise, of using these kind of things or associating those kind of things with claims of the '551 patent, and showing through those connections that there was real value or novelty in the idea.
So it's these kind of things. These -- not so much the legal matters, but other sort of issues that provide evidence that this was a novel, long-felt need sort of thing. It helps provide

additional evidence for its novelty and importance.
Q. Did you draft this Secondary Considerations section of your declarations yourself?
A. Like I described with the whole thing, I didn't do the first drafts, but certainly edited and went through carefully the whole thing.
Q. So when you use the term "nexus" -- and you can look at your '315 declaration, so Exhibit 2006, paragraphs 215 and 217, you use the term "nexus."
A. Uh-huh.
Q. What's your understanding of the concept of "nexus"?
A. Well, I don't know if I have a great precise definition, but my general understanding, it's connection, some sort of connection between the two.
Q. What's required to show nexus?
A. I know that there are articles and opinions in the legal world about "nexus." I don't -- can't recall any of the details at the moment.
Q. Okay. So you don't know what's required to show nexus. Correct?
MR. TURNER: Objection. Calls for a legal conclusion.
A. I can't recite that at the moment, no.
BY MR. FITZSIMMONS:
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

Patent Owner can still prove nexus by showing that the evidence of secondary considerations is the direct result of unique characteristics of the claimed invention."

So I'm asking you if the -- in that statement, do you understand it to mean that the unique characteristics need to be recited in the claims of the patent?

A. I think there can be unique characteristics in a patent that are not recited in the claims, so not necessarily in all cases.

Q. But in order to provide evidence of secondary consideration, do unique characteristics need to be recited in the claims of the patent?

A. I have not thought of that particular question so I would just stand with what I say here, evidence -- you can prove this nexus by showing evidence which is a direct result of unique characteristics. But otherwise, I don't have a, sort of, legal opinion about where that has to be.

Q. If characteristics of a claimed invention are found in the prior art, would you consider them unique?

MR. TURNER: Objection. Vague.

A. I really don't have an opinion on that. That's not something that I've thought about in the context of

this declaration.
BY MR. FITZSIMMONS:
Q. You say that "The '551 Patent claims include multiple unique characteristics," in paragraph 217. Correct?
A. Yes, that's correct.
Q. Okay. And what do you mean by that, that "The '551 patent claims include multiple unique characteristics"?
A. In this particular sentence it's talking about the claims listed two lines below or one line below.
Q. What makes something a unique characteristic?
A. I don't know that I have a well thought-through definition off the top of my head, but I would say I think there are unique characteristics in these claims.
Q. How can you tell if there's a unique characteristic if you don't have a definition of what "unique characteristic" means? How can you say something is a unique characteristic, then?
A. Well, like I said, I don't have a precise definition off the top of my head at the moment, but I can call something -- I can say that something has a unique characteristic without having a precise dictionary definition of that phrase.
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"

to include in your declaration?
A. I don't recall if I came up with that first or if that was part of a first draft that attorneys provided, but I agreed with the phrase, in any case.
Q. But yet you can't tell me what the phrase "unique characteristic" means. Correct?
A. As I've said multiple times, I can't give you a specific definition of the phrase but I think it's a meaningful phrase that, when looking at a patent's claims, I can have an opinion about it, which I expressed here.
Q. How could it be a meaningful phrase if you can't explain what it means?
A. I have explained what it means. I haven't given you a specific definition of it.
Q. I haven't heard anything from you that gives me any understanding of what you think the term "unique characteristic" means. That's what I'm just trying to understand, Dr. Turk.
A. I said that they're characteristics that are unique. Do you know what those words mean?
Q. I understand what those two words mean, but I'm trying to understand them as you used them in your declaration here and I haven't gotten a good explanation of your understanding of what it means

and, in particular, as it relates to "secondary considerations" or "nexus." So that's what I'm just trying to understand, but maybe you don't have an explanation for that.

A. Yeah, I have explained it. I just don't have a specific definition of them.

Q. Okay. You only list -- so in paragraph 217 here, after that sentence with the unique characteristics, you list a number of claims. Do you see that next sentence?

A. You're referring to the sentence starting with, "As explained in paragraphs"?

Q. Yes, yes.

A. Yes, I see that.

Q. And so you list a subset of claims here that you believed you had unique characteristics. Is that accurate?

A. Yes.

Q. Okay. And this is not all of the claims that you provided opinions on; is that correct?

A. That is correct. These are just examples.

Q. When you use the term here, in quotes, in paragraph 217, "Predictive Curve Illumination" in quotes, so the term "predictive curve illumination," what do you mean by that?

A. I mean what the claims listed there describe.
Q. So in your opinion, Claims 26 through 29, 34 to 37, 42 through 45, and 50 through 53, describe predictive curve illumination; is that right?
A. I believe those are in the context of the subject of predictive curve illumination.
Q. And so it's your opinion that predictive curve illumination is a unique characteristic in the '551 patent claims; is that correct?
A. Yes, I think the way the '551 patent does that in the context of the whole patent makes it a unique characteristic.
Q. In that same paragraph 217... let's see. I believe it's with respect to Claim 40, you have the term "light in-between." Do you see that?
A. Yes.
Q. What does "light in-between" mean there?
A. I believe it's describing areas of the field of view looking ahead with a dark zone and, adjacent to that, a light zone, and adjacent to that, a darker zone.
Q. Let's go up one paragraph there to 216, starting with "Since 2017." Can you read that sentence for me, please?
A. "Since 2017, Petitioner individually and through the 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

that.
Q. And so you did not know that independently; is that correct?
A. Yes, that's correct.
Q. You also state that the Petitioner and the Automotive for Alliance -- excuse me.
You also state that the Petitioner and the Alliance for Automotive Innovation "petitioned NHTSA for a change in regulations to allow... ADB." How do you know whether the Petitioner and the Alliance for Automotive Innovation petitioned NHTSA for a change in regulations to allow for ADB?
A. That was either directly in the Stam declaration or the attorneys -- the attorneys I'm working with informed me of that.
Q. So you didn't know that independently before this proceeding. Correct?
A. I don't believe I did.
Q. In the next sentence here, you mention the Alliance filings. You see that?
A. I do, yes.
Q. Have you reviewed those filings?
A. No, I have not.
Q. You also mentioned "the NHTSA proposed rule changes." Correct?

A. That's right.
Q. Have you ever used those proposed rule changes that you're referring to?
A. No, I haven't.
Q. You also state that the Stam declaration establishes that ADB technology falls within the scope of the claims; is that correct?
A. Yes, I say that here.
Q. Okay. How do you know whether the Stam declaration establishes that ADB technology falls within the scope of the claims?
A. From looking through the Stam declaration.
Q. What about the Stam declaration indicated to you that ADB technology falls within the scope of the claims? And I believe you were referring to the '551 patent claims.
A. I think the Stam declaration states this.
Q. Did you independently verify that statement in the Stam declaration?
A. No. I'm describing what the Stam declaration says.
Q. So you don't have an opinion specifically as to whether ADB technology falls within the scope of the '551 patent claims. Correct?
A. My opinion is that the Stam declaration explains that it does.

Q. Understood. So you personally do not have a opinion as to whether ADB technology falls within the scope of the '551 patent claims. Correct?
A. I do because I learned it from the Stam declaration.
Q. So the basis -- so your basis for alleging that ADB technology falls within the scope of the '551 patent claims is based solely on what you read in the Stam declaration; is that accurate?
A. I think it was in the Stam declaration and as also told to me by the attorneys that I am working with on this.
Q. You stated that you did not independently verify whether ADB technology falls within the scope of the '551 patent claims. Correct?
A. Not independent of the declaration and the attorneys I have been working with.
MR. FITZSIMMONS: Okay, I think let's take a break here.
(Off the record at 3:35 p.m.)
(Back on the record at 3:57 p.m.)
BY MR. FITZSIMMONS:
Q. All right, Dr. Turk, I'm going to ask you to please take back out your '318 proceeding declaration, so that's Exhibit 2024. And I'll ask you to turn, please, to paragraph 132.

A. Okay.
Q. And so paragraph 132, and it continues, this is your section related to the motivation to combine Beam and Satonaka. Correct?
A. Yes.
Q. Okay. And if we continue down in those sections to, I believe it's, paragraph 148, we see those same three images there, the vehicle and red triangle that we were discussing before in your '315 declaration. Correct?
A. Right.
Q. Okay. And is it fair to say that your opinions here in the '318 declaration regarding the Beam and Satonaka combination are essentially the same as in your '315 declaration?
A. I think so. I don't recall any significant differences.
Q. Okay. And if then we just go to paragraph 201 of your '318 declaration, here you are discussing the combination of Karlsson and Nakamura. Correct?
A. Yes.
Q. Okay. And if we continue down to paragraph 206, we see there is the same three images of the vehicle with the red triangle. Correct?
A. Yes.

Q. And is it fair to say that your opinions here in the '318 declaration regarding Karlsson and Nakamura are the same as in your '315 declaration Karlsson and Nakamura?
A. I believe so.
Q. Dr. Turk, do you know what a daytime running light is?
A. Yes, generally.
Q. Okay. Can you explain to me your understanding of what a daytime running light is?
A. I think of it as a car light that is intended to be on during the day, not necessarily intended to fully illuminate nighttime driving by itself.
Q. And in your declarations you referred to the FMVSS, the Federal Motor Vehicle Safety Standards. And I'll give you an example, paragraph 26 of your '315 declaration.
A. 26?
Q. Yes.
A. Yes.
Q. Okay. So the FMVSS. Do you know if a low beam headlamp can serve as a daytime running light per the FMVSS?
A. I don't know offhand. I would have to check their standards.
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

here.
Q. I see. What does the text here mean by "elements"?
A. I think it's referring to the LED elements in the patent.
Q. So the LED elements are specifically aimable and dimmable? Is that what this is explaining?
A. Yes.
Q. And how are the LED elements aimable, as described here?
A. I don't really recall all of the details of how '551 defines aimability but an example is in the figure on this page 39 where we can see at the top there are LEDs that are aimed differently, so that's certainly an example of that.
Q. Are there other examples that you know of how a LED would be aimable?
A. You mean in this patent?
Q. Or generally. You said that that's one example, so I assume that you were thinking of other examples of how an LED would be aimable.
A. I wasn't thinking of them, necessarily, but I could imagine just in general off the top of my head an LED could be aimable by a person moving it around and pointing it in a different location or mounting it in a way that aims it.

Q. And so in the context here, I think as you mentioned Figure 15, so like a headlamp of a vehicle, are there any other examples of how an LED is aimable?
A. Not in this figure that I can see.
Q. And the term "dimmable" there, what does that mean?
A. Generally means that the element can change its intensity value.
Q. Can we turn, please, back to paragraph 215 of your '315 declaration?
A. Okay.
Q. Here you say, "I have reviewed the objective statements in the Stam declaration." Correct?
A. That's correct.
Q. Did you only review the portion of the Stam declaration relating to objective evidence statements?
A. I don't recall that necessarily being a specific section in Stam, but I reviewed all of Stam.
Q. So you reviewed the entire Stam declaration that was part of the re-examination file history; is that correct?
A. Yes, I did.
Q. Do you recall any portions of that Stam declaration that you disagreed with?
A. I don't really recall it very well right now and, no, I don't recall anything in particular that I

disagreed with.

MR. FITZSIMMONS: Okay, let's just take a five-minute break here, if that's okay with everybody.

THE WITNESS: Okay.

(Off the record at 4:12 p.m.)

(Back on the record at 4:18 p.m.)

MR. FITZSIMMONS: I have no further questions for you today, Dr. Turk. Thank you for your time.

THE WITNESS: You're welcome.

MR. FITZSIMMONS: Andy?

MR. TURNER: All right. I think I would like to take a little redirect, but if we can take another couple-minute break, if we can take ten minutes, and then we'll come back and then I'll make the call.

MR. FITZSIMMONS: Of course.

MR. TURNER: All right. Thank you.

(Off the record at 4:18 p.m.)

(Back on the record at 4:36 p.m.)

MR. TURNER: Hello, Dr. Turk.

THE WITNESS: Hello.

EXAMINATION

BY MR. TURNER:

Q. I guess, first, Dr. Turk, are you a patent attorney?

A. I am not.
Q. All right. Prior to today were you ever asked to specifically compare the specific phrases from the specific claims that were presented to you for comparison today?
MR. FITZSIMMONS: Objection. Form. Objection. Leading.
A. The ones that I'm recalling, I was not.
BY MR. TURNER:
Q. Do you agree that there is a difference between the words "change emission" and the words "decrease intensity of emission"?
MR. FITZSIMMONS: Objection. Form. Leading.
A. Generally, yes. Those are not exactly the same.
BY MR. TURNER:
Q. Is there a difference between the words "decrease intensity of emission" and the words "vary illumination provided to the target"?
MR. FITZSIMMONS: Objection. Form. Objection. Leading.
A. They are not exactly the same, so they can be different.
BY MR. TURNER:
Q. Do you agree that the words "vary illumination" do not

require that the illumination is decreased?
MR. FITZSIMMONS: Objection. Form. Objection. Leading.
A. Yes. Vary could, for example, include increasing illumination.
BY MR. TURNER:
Q. Do you agree that when claims include different words, that the claims have different meanings?
MR. FITZSIMMONS: Objection. Form. Objection. Leading. And objection, calls for a legal conclusion.
A. It seems that unless those different words mean exactly the same thing, then, yes, that's true.
MR. TURNER: Okay, that's all. That's all I have.
MR. FITZSIMMONS: Okay, we'll take five minutes and then return.
MR. TURNER: Okay.
(Off the record at 4:38 p.m.)
(Back on the record at 4:43 p.m.)
RE-EXAMINATION
BY MR. FITZSIMMONS:
Q. Dr. Turk, did you speak with counsel during the break from when I was asking you questions until counsel began redirect questions?

A. No, I didn't.
Q. Did you speak with anyone during that break?
A. Nope.
MR. FITZSIMMONS: Okay, then I have no further questions. Thanks, Doctor.
THE WITNESS: You're welcome. Thank you.
STENOGRAPHER: Anything further for the record?
MR. FITZSIMMONS: That's all from here.
(Proceedings concluded at 4:43 p.m.)

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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