

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**MERCEDES-BENZ USA, LLC,
Petitioner,**

V.

**YECHEZKAL EVAN SPERO,
Patent Owner.**

U.S. Patent No. 10,894,503

Case IPR 2023-01026

Case IPR 2023-01027

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- - -

DEPOSITION OF DR. NIKOLAOS PAPANIKOLOPOULOS

Tuesday, March 26, 2024

9:52 A.M.

Via Remote Zoom

REPORTED BY:

JEANETTE M. FALLON, CRR/RMR/CSR-3267

JOB NO. 29410

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NUMBER	DESCRIPTION	PAGE
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Via Remote Zoom

Tuesday, March 26, 2024

9:52 a.m.

* * *

NIKOLAOS PAPANIKOLOPOULOS

having first been duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. TURNER:

Q. All right. Good morning, Dr. Papanikolopoulos.

A. Good morning.

Q. How are you this morning?

A. I'm fine, how are you doing?

Q. Good. Sorry for the technical difficulties.

A. Fine.

Q. All right.

Do you understand you're here for a deposition today in two IPR proceedings?

A. I do.

Q. Concerning U.S. Patent Number 10,894,503?

A. Yes, I do.

Q. Okay. So these IPR proceeding numbers we have IPR 2023-01026 and 2023-01027.

A. Yes.

Q. Okay, and now your declarations, so I guess you

1 have -- your declarations for these IPR proceedings?

2 A. Yes, I have them.

3 Q. Okay. All right. Supposedly your exhibits are marked
4 1003, so with these, are you okay if we refer to one
5 as the 026 IPR declaration, so that will be the one
6 that's challenging claims 1 through 36; are you okay
7 with that?

8 A. Yeah, yeah.

9 Q. Do you know which one we're referring to? And then
10 the other declaration, we'll just refer to that as
11 your declaration in the 027 IPR.

12 A. I do.

13 Q. Excellent.

14 All right, so how did you prepare for your
15 deposition today?

16 A. So I spent my time just reviewing the declarations,
17 because there has been some time since I -- I -- and
18 then I had a phone consultation with Scott, and then I
19 came yesterday -- the day before basically, I avoided
20 the snowstorm in the Twin Cities.

21 Q. Okay. No snow in DC?

22 A. But it's a little bit chilly.

23 Q. Yeah. Okay. So you're located in DC at the Hogan
24 office today; is that correct?

25 A. Correct, yes.

1 Q. Okay. All right, and so you said you -- to prepare
2 for your deposition you met with Scott. Did you meet
3 with anyone else to prepare for your deposition?

4 A. And Scott and Joe Raffeto.

5 Q. So you mentioned you reviewed your declarations. Did
6 you review any other documents in preparation for your
7 deposition?

8 A. And all the references that I cited.

9 Q. In your declaration?

10 A. Yes.

11 Q. Okay.

12 A. My declaration.

13 Q. Did you review any documents that are not cited in
14 your declaration?

15 A. No.

16 Q. Okay. Okay, can you turn to your declaration for the
17 026 IPR?

18 A. Yes.

19 Q. Okay. Who drafted your declaration?

20 A. I was in full control of every paragraph and
21 statement, so as I said, I just -- I drafted --
22 basically the opinions basically are mine and I had
23 full control of whatever went into it and I had, of
24 course, to ask explanation about the legal terms.

25 Q. Okay, and how much time did you spend preparing the

1 026 declaration?

2 A. You mean the original preparation or like last -- last
3 May or May 2023 and June?

4 Q. Well, let me -- so yes, in preparing the original
5 declaration, how much time did you spend preparing it?

6 A. If my memory is correct, this was the first one I did,
7 but my memory may be -- may fail me. So probably
8 around 50 hours, 60 hours both -- both the 26 -- it's
9 quite -- I don't have a good recollection between the
10 time between 1026 and 1027, but I would say around 50,
11 60 hours for both.

12 Q. Okay, for both of them. And who did you work with in
13 preparing these declarations?

14 A. Again, it was Scott and Joe Raffeto.

15 Q. Okay, and did you work with anyone outside of the
16 Hogan law firm?

17 A. Can you explain to me what you --

18 Q. Did -- I'm sorry.

19 Did you work with anyone else besides Scott
20 and Joe in preparing the declaration?

21 A. I believe Sally Yi Zhang was involved.

22 Q. Does Sally work for the same law firm, for the Hogan
23 law firm?

24 A. I believe so.

25 Q. Okay. And what did you rely on in preparing your

1 declaration?

2 A. Basically you can see -- like, for example, I look at
3 the '503 --

4 Q. Okay.

5 A. -- and all the associated references, like Alden,
6 Others, Bergkvist, Beam, Kobayashi, Stamp, and Braun.

7 Q. Okay. So did you rely on anything that's not cited in
8 your declaration?

9 A. I rely on my background in order to express opinions.

10 Q. Okay.

11 All right, do you have a copy of the Alden
12 reference? Exhibit 1005, which is --

13 A. Just give me one minute. Yes.

14 Q. Okay. So this is U.S. Patent Application Publication
15 2003/0137849 to Alden. Alden is the inventor?

16 A. Yes.

17 Q. You're okay if we refer to this as the Alden
18 reference?

19 A. That's fine.

20 Q. Okay. All right, can you turn to Figure 2 of Alden?

21 A. Yes.

22 Q. All right, are we looking at a top view or a side view
23 in Figure 2?

24 A. A POSITA --

25 THE COURT REPORTER: I'm sorry, what was

1 the beginning of your answer?

2 A. A POSITA would look at this, a person of ordinary
3 skill in the art, top view and also a possible side
4 view. It's a 2D slice.

5 THE COURT REPORTER: Two slides did you
6 say?

7 THE WITNESS: Two-dimensional slice.

8 THE COURT REPORTER: Thank you.

9 BY MR. TURNER:

10 Q. So you're saying this Figure 2 is a two-dimensional
11 slice. What do you mean by a two-dimensional slice?

12 A. It is a two-dimensional view of a three-dimensional
13 structure. When a POSITA would look at the headlight,
14 it is a three-dimensional structure.

15 Q. So when you say slice, is that like a section view?

16 A. Just like a planar view on a plane.

17 Q. Is that different than a section view?

18 A. If you assign -- if a POSITA assigns a section as a 2D
19 section, it's the same thing.

20 Q. So planar view on a plane. So you're saying this is
21 not like an internal view, this is a top view of the
22 structure; is that correct?

23 A. Yeah, again, if you look at -- this is just an
24 illustrative figure that shows the different
25 components from the top, just a POSITA would look at

1 this as a top view of the different components and
2 their interactions, possible interactions.

3 Q. Okay. So what does the line that's marked with
4 reference numeral 65 in Figure 2 represent?

5 A. Let me go into Alden, if you can bear with me.

6 So I'm reading from Alden, paragraph 26.
7 So Alden discloses, "61 produces a high beam in a
8 first sector 65 while concurrently producing a low
9 beam in a second respective sector 63 (or dim beam)
10 where the 41 is sensed."

11 So Alden discloses 65 as being the first
12 sector, which is illuminated with a high beam.

13 Q. Okay. And what is -- what is figure -- or what does
14 reference 41 in Figure 2 represent?

15 A. Let me go again. So again, Alden discloses in both
16 the figure and the spec in paragraph 26, 41 is
17 basically the vehicle sensed by the camera system.

18 Q. So 41 represents a vehicle that is sensed by the
19 camera system; correct?

20 A. Yes.

21 Q. Okay. And reference numeral 65 represents a high beam
22 that is provided by the lighting system?

23 A. Six --

24 MR. HUGHES: Objection, vague.

25 A. I just have to say that 61 produces a high beam in the

1 first sector 65.

2 BY MR. TURNER:

3 Q. Okay.

4 A. So just to be exact on the disclosure.

5 Q. So you're saying that reference numeral 65 references
6 to a sector, not necessarily the high beam?

7 A. This is what the disclosure states.

8 Q. Okay. Now, that sector, is that located above vehicle
9 41, if this represents a top view, or is that to the
10 side of vehicle 41?

11 A. A POSITA would have interpreted this as something that
12 does not interfere, that doesn't produce glare for the
13 driver of element 41. Again, if we go to paragraph
14 25, it says Figure 1, which basically summarizes,
15 "depicts a vehicle employing an automatic illumination
16 means," the word automatic, "of the present
17 invention."

18 So again, as it's stated clearly in the
19 spec, the objective is basically maximize the
20 visibility to reduce the glare. And let me -- so if
21 you look at the last sentence of the abstract of
22 Alden, he says, "All embodiments maximize the areas
23 receiving high beams for the benefit of the equipped
24 vehicle driver while concurrently all areas with other
25 drivers present receive low beams so as to minimize

1 the glare for to betterment of other drivers."

2 This is from the abstract.

3 A POSITA would have looked at this -- to
4 answer your question, a POSITA would have looked at
5 this as 65 sector being illuminated with a high beam
6 since we want to maximize the visibility for the
7 driver of the vehicle --

8 THE COURT REPORTER: For the driver of the
9 vehicle? Could you repeat?

10 THE WITNESS: The driver of the vehicle
11 that -- that basically what the headlight is mounted
12 on.

13 BY MR. TURNER:

14 Q. Okay, so would a person of ordinary skill in the art
15 understand sector 65 as to the side or above vehicle
16 41?

17 A. I will say the 65 is -- basically doesn't interfere --
18 is outside -- if we go -- give me one minute and I can
19 explain.

20 So if we go to Figure 3 of Alden, if you
21 look at the -- because I think we need to look at
22 Figures 2, 3, 4 and 5 together. If you look at the
23 left light control circuit, if you look at the element
24 75, which is the box that encircles the headlights and
25 the driver, the area can be viewed --

1 THE COURT REPORTER: I'm sorry, but the
2 area can be viewed -- I couldn't understand you.

3 THE WITNESS: Sure.

4 A. So if we go to Figure 3, if you look at the element
5 77, left light control circuit, basically there is a
6 rectangle in the shaded area that involves the driver
7 and the 2D headlight as disclosed by Alden. So the
8 area basically 65 can infer either on the side or on
9 the top or can be viewed by a POSITA as such.

10 BY MR. TURNER:

11 Q. So are you saying that the two black dots in box
12 Figure 77 represent the two headlights of the vehicle
13 that's reference numeral 41 in Figure 2?

14 A. So again, we have to look Figure 3 in its totality, so
15 the control circuit 77, I use it because it
16 illustrates this principle of which LEDs vertically
17 are on high beam or low beam depending on the presence
18 of a vehicle. If you go and you see there are two
19 sensors on the top, 51a and 51b. And basically this
20 detects in a two-dimensional fashion the two dots and
21 then based on the control logic that is described in
22 Figure 4, they make a decision about this box that we
23 see in 77 and the subsequent activation of the LEDs in
24 order to maximize visibility and reduce glare for the
25 driver of the oncoming vehicle.

1 Q. All right, so you mentioned before that Alden
2 describes with reference to Figure 2 providing a high
3 beam along sector 65; is that correct?

4 A. Yes.

5 Q. Now, when Alden uses the term high beam, does high
6 refer to intensity or angle or direction or both?

7 A. Let me go to Alden in my declaration, if you don't
8 mind.

9 Q. Sure.

10 A. So let me read from my declaration, paragraph 49.
11 Again, this is the declaration -- I'm still in 1026.

12 Q. Okay.

13 A. So "49. Alden teaches that, with its system of
14 individually-controllable LEDs, a vehicle can 'emit a
15 low beam illumination 35 in a first headlight
16 distribution sector while concurrently emitting a high
17 beam, illumination 37 in a second highlight
18 distribution sector' with '[t]he low beam illumination
19 being emitted in a response to the detection of an
20 oncoming vehicle 33' to reduce 'glare.'"

21 And this is from Figure 1, paragraphs 4 and
22 25. So Figure 1 and the specs in paragraph 4 and 25.

23 "For example, if we look at the figure
24 above, Alden's system directs dimmed low beam light in
25 the segments of the light distribution area that

1 contain detected vehicle 33. Other sectors where no
2 other vehicles are detected will have high beam
3 light."

4 Q. Okay. So when he says high beam light, is he
5 referring to intensity, high intensity?

6 A. Basically I want to use the term illumination that
7 Alden discloses.

8 Q. So high beam refers to high illumination in Alden?

9 A. Yeah, it says the spec -- basically says emitting a
10 high beam illumination 37.

11 Q. Is there a difference between the term illumination
12 and intensity in your opinion?

13 A. For a POSITA will have read this as intensity, but
14 there are different terms like -- so I would say,
15 again, going back to the objective that I read
16 earlier, we want to have basically illumination that
17 maximizes visibility and minimizes glare.

18 Q. Okay, so what's the difference between illumination
19 and intensity?

20 A. For a POSITA at that time in 2002, if I'm correct, it
21 will have been the same thing.

22 Q. Okay, so a person of ordinary skill in the art in 2002
23 when reading Alden would understand when he's
24 describing high beams, that would refer to high
25 intensity beams or high illumination beams; is that

1 correct?

2 MR. HUGHES: Objection, vague.

3 A. Kindly repeat the question, please.

4 THE COURT REPORTER: Would you like me to
5 read it?

6 MR. TURNER: I can restate it.

7 BY MR. TURNER:

8 Q. Do you agree that Alden's description of high beams
9 would be understood to be high intensity beams or high
10 illumination beams?

11 MR. HUGHES: Objection, vague.

12 A. I think there is a disclosure in 61, paragraph 61 of
13 Alden, that basically will be -- it's a clear
14 disclosure along these lines for a POSITA.

15 "It will be understood --" this is the last
16 sentence in paragraph 61. "It will be understood that
17 the present invention can also be used to operate a
18 segmented light distribution system to provide
19 illumination to independently controlled segments each
20 operable within a range of intensities between the
21 high beam and the low beam state."

22 BY MR. TURNER:

23 Q. All right, so what does that sentence that you read
24 from Alden mean to you?

25 A. What a POSITA will mean that you try to provide

1 illumination to -- and this is important -- to this
2 independently controlled segments, so because if you
3 look at the optics, we have -- you need to look at the
4 illumination with respect to the radiant angles, for
5 example, and other terms like this. So we have a
6 clear disclosure that basically the -- we understood
7 that the present invention of Alden can also be used
8 to operate a segmented light distribution to provide
9 illumination to independently controlled segments,
10 each or probably within the range of intensities
11 between the high beam and the low beam state.

12 So in other words, we have a high beam
13 state that is associated with an intensity of light
14 and this is used to provide illumination that improves
15 visibility for the driver and we have a low beam state
16 and everything in between which is associated with
17 reducing glare to an oncoming driver.

18 And if I may, in the same paragraph, there
19 is another important disclosure which says in the
20 middle of paragraph 61 -- let me -- "One or more
21 methods employed herein may be used in combination to
22 vary illumination in a segmented system."

23 Q. So how does that relate to the difference between
24 illumination and intensity?

25 A. Again, as I mentioned, illumination needs to be viewed

1 with respect to the segment. So in other words, think
2 of a candle. The candle emits light with a certain
3 intensity. For the viewer, it's basically we need to
4 see the light emitted with respect to the radiant
5 angle or basically we need to look at the power per
6 the square -- per the area, so we have lumen
7 intensities, we have lumen -- luminous flux from
8 optics, and this is where a POSITA at that time will
9 have been well aware.

10 Q. All right. And so that's what Alden is describing in
11 paragraph 61?

12 A. Yeah, I think clearly with the sentence -- with the
13 two sentences that I read, I think this is clearly
14 disclosed.

15 Q. All right, can you turn to paragraph 27 of Alden?

16 A. Give me a minute. I'm there.

17 Q. Okay. About halfway through this paragraph do you see
18 where he's describing triangulation and it says,
19 "Triangulation is thus used by the CPU to determine
20 the distance which 41 is from 47?"

21 A. Yes.

22 Q. All right. Can you explain how Alden is using
23 triangulation to determine this distance?

24 A. So I think -- give me one minute.

25 So I think Alden discloses triangulation in

1 Figure 3 and Figure 4. Let me go there.

2 So Figure 3 in the spec of Figure 3, which
3 is paragraph 27, I believe, so the spec of figure --
4 the spec described in paragraph 27, as you mention,
5 but we need to look at paragraph 28 where the Figure 4
6 illustrates the flowchart described in the logic of
7 the process described in Figure 3.

8 If we go in the spec, do you see -- so in
9 the middle -- after the middle of paragraph 28, we
10 say, "A triangulation process 105 is used to determine
11 distance of fixed object."

12 And it's important to mention that if you
13 look at Figure 4, the triangulation -- if we look at
14 the element 1 of 5 in Figure 4, the triangulation is
15 informed by L -- by the comparison between the left
16 map, the right map, L map to R map, along with
17 information that is in the memory and it says
18 calculates the distance of its threshold object using
19 triangulation, and this is part of an iterative
20 process that starts with the element 8 and 9, which
21 says its threshold light presence at A1L sensor
22 position, then goes through the component 91, step 91
23 is transfer light present at A2L through XYL. In
24 other words, in a 2-dimensional array, it searches for
25 light, and then goes to the element 93, which looks --

1 it says is transfer light present at A1R sensor
2 position, then it has a step 95, is transfer light
3 present at A2R, XYR sensor positions.

4 It compiles these to a left sensor map,
5 element 97, and compares this to -- basically to a
6 right sensor map 99, through the use of the element
7 103 it does the comparison of the left map to the R
8 map, element 101, and then finally calculates the
9 distance, which is -- all these are steps of a pretty
10 elaborate computer vision process, to calculate the
11 distance of the object using triangulation, which is
12 the element 105. And this informs the dim zones in
13 element 107.

14 Q. So Alden's describing using data from these sensor
15 maps with his triangulation calculation?

16 A. A POSITA will understand that the triangulation is the
17 outcome of these computer vision steps of basically as
18 I described, it then will go to the left map and the
19 right map, which are basically R inputs to this
20 distance calculation for the object, which in this
21 particular case is the vehicle. At least this is how
22 a POSITA will have read this controlling logic.

23 Q. So Alden describes calculating the distance of each
24 threshold object. By object is he referring to each
25 headlight as an object or the vehicle itself as an

1 object?

2 A. I think an object in this case -- let me go to the
3 spec 28.

4 After the sentence that I read earlier
5 triangulation process 105 is used to determine
6 distance of its object, it says, "The location of
7 objects is used to calculate which zones of its
8 headlight need to be dimmed in a calculate headlight
9 dim zone process 107."

10 So in this particular instance, since
11 basically we have the Figures that as I discuss we
12 need to look at them together, a POSITA will have made
13 a determination that it's talking about a vehicle.

14 Now, it's interesting to point out that
15 this is a quite extensive disclosure in computer
16 vision process, because basically it takes the driver
17 into consideration, and if we go to paragraph 27, it
18 says, "The 81 area is significantly larger than the
19 headlight dots that were initially received by 51a and
20 51b because the CPU has made assumptions about the
21 space that may potentially be occupied by the driver
22 of the sensed vehicle."

23 So a POSITA will understand here that not
24 only detects this vehicle but also makes an effort to
25 account for the driver. That's why the stated areas

1 are a little bit larger than basically standard
2 headlights or where the driver is. So for a POSITA,
3 this will be a disclosure of basically detecting not
4 only the vehicle but also the driver, and I think this
5 is quite illustrative here.

6 Q. So you're saying that Alden describes enlarging this
7 shaded area beyond just where the location of the
8 headlights were detected?

9 A. I just read you Alden disclosures that basically "the
10 CPU has made assumptions about the space that may
11 potentially be occupied by the driver of the sensed
12 vehicle."

13 Q. Does Alden describe what these assumptions are?

14 A. Give me a minute. I have to look at the spec.

15 I think a POSITA will have look at this in
16 the sense that the triangulation -- if we go to Figure
17 4, not the spec 4, Figure 4, so if you look the
18 element 105, which says calculate distance of fixed
19 threshold object using triangulation, there is an
20 arrow, a double arrow that connects 105 with 103,
21 which basically says that the distance is sent back to
22 the memory and then this updates the comparison
23 between the left map and the right map.

24 In other words, what is happening, the
25 driver will be viewed with few pixels if it is further

1 away and with many more pixels if it is close to our
2 sensors. So a POSITA will understand these
3 assumptions being basically assumptions which are
4 informed, because again, this is an iterative process
5 in realtime, as is mentioned in paragraph -- at the
6 end of paragraph 28, "The process then begins again so
7 as to be responsive to changing environmental
8 conditions in realtime."

9 So in other words, as this is a realtime
10 scenario, the driver -- the CPU has to say, okay, if
11 the distance shows that the driver -- the car, the
12 oncoming vehicle is too close, then I should assign
13 more pixels. If the vehicle is further away, I am
14 basically to assign fewer pixels for the driver size.

15 Q. Okay.

16 Did the Alden reference distinguish between
17 headlights and taillights using these sensors we were
18 just discussing?

19 A. There is -- let me go to my declaration, if you
20 don't -- if you can bear with me.

21 Q. Sure.

22 A. So I will go to paragraph 138 of my declaration.

23 Q. Okay.

24 A. Let me -- let me read -- I want to read -- so I want
25 to read the statement from my -- "Thus --" this is at

1 the beginning, second line, page 95.

2 "Thus the headlights of the oncoming
3 vehicle will be visible. A preceding vehicle will be
4 one traveling the same lane and direction as the
5 driven vehicle. The preceding vehicle could be ahead
6 of the driven vehicle such that the brakes or rear
7 lights are visible."

8 So let me explain here that what we saw in
9 Figure 3 and 4, particular 4, with the appropriate
10 selection of the values can detect headlights. So
11 basically Alden discloses the elements of claim 8 for
12 the same reasons are discussed with respect to
13 claim 7.

14 So I don't know -- I will stop here, but
15 this is my opinion I think in this 138 paragraph.

16 Q. All right, so you're saying that Alden can distinguish
17 between headlights or taillights or it cannot?

18 A. What I'm saying is a POSITA by reading the Alden
19 disclosure could do this.

20 Q. Okay. So the heading before paragraph 138, this is
21 your Ground 4 Alden in view of Beam; is that correct?

22 A. Yes.

23 Q. So what are you relying on Beam for in this
24 combination?

25 A. With respect to all the claims or --

1 Q. Just this claim 8 that we're looking at here.

2 A. So I believe -- let me -- let me make sure that --
3 let's go paragraph 140.

4 Q. Okay.

5 A. Tell me when you are there.

6 Q. I'm there.

7 A. "Beam recognizes that headlights can cause glare or
8 'dazzle,' that impacts not only drivers of oncoming
9 vehicles, but also drivers of preceding vehicles 'when
10 reflected by a rearview mirror.' 4 -- basically
11 "(4:9-25, 4:45-59; and 6:61-7:8.) That is, glare can
12 be caused not only by bright lights shining directly
13 into the eyes of another driver, but also light that
14 is emitted from behind the other driver's car and then
15 it reflects into the eyes of that driver off the
16 rearview mirror. Thus, Beam discloses that lights
17 from both the headlights of oncoming vehicles and the
18 taillights of preceding vehicles can be detected, and
19 the output of the headlight controlled to darken light
20 directed to the areas of the sensed oncoming and
21 preceding vehicles." And this is from Beam "(4:9-25,
22 4:45-59, 5:61-6:8, 6:61-7:8.)"

23 Q. All right, so that disclosure you just read from,
24 paragraph 140 of your declaration, you're describing
25 Beam, is that correct, the Beam reference?

1 A. Yeah.

2 Q. Okay.

3 A. You asked me if -- correct me if I'm wrong, you asked
4 me where I depend and I basically this is -- this is
5 the logic that I follow, a POSITA will have followed
6 when basically read Beam.

7 Q. Okay. So this section, you're relying on the Beam
8 disclosure for headlights and taillights; is that
9 correct?

10 MR. HUGHES: Objection to the extent it
11 mischaracterizes his testimony.

12 A. Can you repeat your question?

13 BY MR. TURNER:

14 Q. So what claim limitation are you relying on Beam for
15 satisfying?

16 MR. HUGHES: Objection, vague.

17 BY MR. TURNER:

18 Q. With respect to claim 8, which you're describing in
19 this paragraph?

20 A. So the claim 8 has -- are you asking me -- can you
21 clarify -- let's see with respect to the patent claim
22 8, 18 or 24?

23 Q. All right, why don't we skip down -- can you read the
24 first sentence of paragraph 142 of your declaration?

25 A. Yes. You said -- you asked me to read the first --

1 Q. Okay.

2 A. -- 142, am I right?

3 Q. Correct.

4 A. "It would have been obvious to a POSITA to modify
5 Alden to detect headlights of oncoming vehicles and
6 taillights of preceding vehicles, and to dim headlight
7 beam output directed to areas of both oncoming and
8 preceding vehicles as taught by Beam. Both Alden and
9 Beam are directed to controlling headlight beams to
10 reduce glare for other drivers by dimming the
11 headlights in areas occupied by detected vehicles.
12 And, both Alden and Beam accomplish this by detecting
13 lights from other vehicles using a sensor, determining
14 the locations of the other vehicles based on the
15 detected lights, and controlling the output of an
16 array of light sources so that beams directed to the
17 other vehicles are dimmed."

18 Q. Okay, so you say you are modifying Alden to detect
19 headlights of oncoming vehicles and taillights of
20 preceding vehicles based on Beam; is that correct?

21 MR. HUGHES: Objection to the extent it
22 mischaracterizes his testimony.

23 A. I think the paragraph exactly describes what I'm
24 saying. I say it will have been not me but obviously
25 a POSITA to modify Alden to detect headlights of

1 oncoming vehicles and taillights of preceding
2 vehicles. More than that, "to dim headlight beam
3 output directed to areas of both oncoming and
4 preceding vehicles as taught by Beam."

5 And then I continue, "both Alden and Beam
6 are directed to controlling headlight beams to reduce
7 glare for other drivers by dimming the headlights in
8 areas occupied by detected vehicles. And, both Alden
9 and Beam accomplish this by detecting lights from
10 other vehicles by using a sensor."

11 BY MR. TURNER:

12 Q. Okay, so does the Alden reference distinguish between
13 headlights and taillights?

14 A. If you ask me if expressly he uses the words
15 taillights, this word, he does not use this word, but
16 if you look -- as I mentioned earlier, it's my belief
17 that Alden controlling logic accompanied by the Figure
18 3 can accomplish this by using the exact same set of
19 steps which are outlined in Figure 4.

20 Q. So why would a person of ordinary skill in the art
21 modify Alden based on Beam if in your view it's
22 already described in Alden?

23 A. The way I see it is a POSITA will have had multiple
24 choices to look at Alden, because I think Figure 4 of
25 Alden along with Figure 3 are disclosing the

1 information needed to detect headlights, and the other
2 option is actually to look at the combination of both.
3 It's just always more options are better.

4 Q. So how is this combination better than Alden by
5 itself? By this combination, I'm referring to the
6 combination of Alden and Beam for the limitations of
7 the claims.

8 A. I didn't say that one's better than the other, I said
9 having more options is better.

10 THE COURT REPORTER: Is that you,
11 Mr. Turner?

12 MR. TURNER: No, just a lot of background
13 noise here. Sorry about that.

14 MR. HUGHES: Counsel, we've been going
15 about a little over an hour and half or so, so when
16 you get to a good point for a break soon, just let us
17 know.

18 MR. TURNER: Yeah, this is good. Take a
19 break, 5 minutes, 10 minutes?

20 THE WITNESS: Just I need to use the
21 bathroom.

22 MR. HUGHES: All right, we'll be back in 5
23 to 10. That's fine. Sounds good.

24 MR. TURNER: Okay, thank you.

25 (A brief recess was taken.)

(Ms. Zhang not present.)

BY MR. TURNER:

Q. Dr. Papanikolopoulos, can you turn to Figure 5 of Alden, please?

A. Just give me a minute.

Q. Okay.

A. I am there.

Q. Okay. Now, in Figure 5, is this a top view or a side view?

A. A POSITA will have look at this both ways. I use the top view in my analysis.

Q. Okay. And what does reference numeral 119 represent in Figure 5?

A. Let me go to the paragraph that describes it.

So paragraph 29 states, "Figure 5 illustrates the segmented headlight means a controlling switch array in the first embodiment. The headlight is comprised of an array of individual lighting elements similar to light element 119."

"The light elements being part of a segmented headlight 123. The 119 can be a wire LED or alternate lighting mechanism."

And it says, "For example the power to 119 is controlled by the CPU which dictates its respective switch characteristics at 115 such that the power from

1 a part supply 113 carried via segment wire 117 is
2 controlled in response to the sensed environmental
3 conditions. The 119 --" and it continues.

4 Q. Okay, and you are reading from paragraph 29 of the
5 Alden reference; is that correct?

6 A. Yes.

7 Q. All right, so reference numeral 119 refers to a
8 lighting element; is that correct?

9 A. Yes, a light element, according to the disclosure.

10 Q. Okay. And how many light elements are described with
11 reference to Figure 5?

12 A. Do you want me to count? Because again, this is a
13 figure that demonstrates this embodiment of Figures 2,
14 3, 4.

15 Q. Okay, so yeah, so for Figure 5, if you need to count
16 to determine how many light elements are shown, please
17 do so.

18 A. Nine. Again, in the context of this illustrative or
19 demonstrated figure.

20 Q. All right, and what is the shape of the structure that
21 holds these nine light elements in Figure 5 of Alden?

22 A. Since this is a slice, this -- according to Alden, the
23 119 light elements are on a curve.

24 THE COURT REPORTER: Light elements are
25 what?

1 THE WITNESS: Are on a curve, C-U-R-V-E.

2 THE COURT REPORTER: Oh, curve, thank you.

3 THE WITNESS: Yeah.

4 BY MR. TURNER:

5 Q. Again, so you're describing this as a slice, so is
6 that a section view in your opinion?

7 A. Yes. And a POSITA -- not according to my view, but a
8 POSITA will view this as a slice, because we don't
9 have a flat headlight. I mean, a headlight is a 3D
10 structure.

11 Q. Now, when you say a flat headlight, are you referring
12 to the structure, the substrate that the light
13 elements are mounted to, or are you referring to like
14 the whole headlamp assembly itself?

15 A. If you look all the elements, if you recall we had
16 this discussion about Figure 2, that is a slice. The
17 same applies here for illustrative purposes, you have
18 a number of LEDs on a curve, which are basically part
19 of a curvilinear surface in 3D based on the
20 discussions in the specs in Figures 3 and 4. As I
21 said, we need to look at them together, and in fact, I
22 want to emphasize, Figure 5 illustrates D segmented
23 headlight means a controlling switch array in a first
24 embodiment. So all this description in the
25 disclosures by Alden and here it shows how the

1 segmented headlight means a controlling switch array
2 will direct light in order maximize visibility and
3 minimize glare for the driver of the oncoming vehicle.

4 Q. So is it fair to describe the shape of the structure
5 that these lighting elements are mounted on in Alden
6 as semicylindrical?

7 A. I think it's informative -- I think it's -- Alden
8 teaches an important point, which is I want to read it
9 and I want to explain.

10 So first of all, I would like to -- if we
11 look at Figure 3, if you look there, control circuit
12 is a two-dimensional, and element 77 and 79. If you
13 look at Figure 4, there is discussion of X and Y,
14 which are basically coordinates which indicate that it
15 is a two-dimensional array.

16 And then I want to read again a sentence
17 from 29.

18 "The 119 and other lighting elements are on
19 a curve along the focal point of a headlight lens 121
20 such that the light from each lighting element goes
21 into a specified portion (or portions) of the
22 headlight distribution area."

23 So to a POSITA, this disclosure is very
24 specific, because we have the LED or LEDs 119 and
25 they're positioned on the surface and done in

1 conjunction with the characteristics. In other words,
2 the focal point of the headlight lens in order to
3 direct the light where we want, we say illumination
4 that we want. In other words, a POSITA will have look
5 at this drawing and say if I have, for example -- if I
6 want to look over or under, which are basically
7 Figures 12 and 13, or Figure 11 around the corner, I
8 can place or I can activate individually different
9 rows and I would say that since we have the focal
10 point, I will say that the row above or the row below
11 may be closer to the focal point in order to basically
12 have the desired light basically control for different
13 segments.

14 Q. All right, so you're saying that Alden describes
15 multiple rows of lighting elements with reference to
16 Figure 5?

17 A. I think the disclosure -- a POSITA will look at this
18 drawing in conjunction with the specs in Figures 3 and
19 4 and the sentences I read from 29 and will have
20 built -- will look at this as a 3-dimensional
21 structure. Which again is very interesting, there is
22 a disclosure, a teaching by Alden, about the
23 connection between the lens and its characteristics;
24 in other words, the focal point and the placement of
25 LEDs.

1 Q. All right, so you're saying that Alden describes
2 multiple rows of lighting elements with reference to
3 Figure 5?

4 A. Figure 5 shows the first embodiment, I'm using his
5 words, I don't want -- I am trying to explain how this
6 disclosure works as a first embodiment, all the
7 methods and the steps and the words that describe
8 Figures 3 and 4 regarding this automatic headlight
9 system.

10 Q. So does Alden describe multiple rows of lighting
11 elements with reference to Figure 5?

12 A. I repeat my answer before. Alden's teaching is
13 basically how -- illustrates the segmented headlight
14 means and controlling switch array in first embodiment
15 and in particular it tells us that we need the -- in
16 cooperation synergy of LEDs placed on the surface
17 along with the -- basically the lens. The headlight
18 lens is a 3D structure, the headlight is a 3D
19 structure, so a POSITA will have found the teaching
20 here informative and as a first embodiment of all
21 these two-dimensional steps which were discussed in
22 paragraphs 28, 27, and the respective Figures 3 and 4.

23 Q. So does the shape of the lighting element structure
24 Figure 5 correspond to the shape of the sensor in
25 Figure 3?

1 A. Can you repeat the question?

2 Q. Sure. Does the shape of the lighting element
3 structure in Figure 5 correspond to the shape of the
4 sensor in Figure 3?

5 A. So Figure 5 shows the light elements, so again, the
6 sensor is described -- the left and right sensors are
7 described in Figure 3 and the paragraph 27. The steps
8 of the controlling logic that basically is a
9 disclosure of how the sensor works and the associated
10 steps basically take place as part of the iterative
11 process are shown in Figure 4. And then it says that
12 Figure 5 illustrates the segmented headlight means a
13 controlling switch array in the first embodiment.

14 Q. So is this first embodiment also shown in Figure 3?

15 MR. HUGHES: Objection, vague.

16 A. If I understand your question correctly, the
17 embodiment according to Alden, again, Figure 5
18 illustrates the segmented headlight means and
19 controlling switch array in the first embodiment. So
20 a POSITA, who will be informed, will be taught by
21 Figure 3 and the paragraphs 27 and 28 about the
22 sensing steps and in 29 illustrates and teaches how
23 the LEDs are going to be put together in order to
24 create this segmented light means and controlling
25 switch array in an embodiment -- in a first

embodiment.

BY MR. TURNER:

Q. Okay, so this first embodiment that you're describing with reference to Figure 5, is that the same first embodiment that's illustrated in Figure 3?

MR. HUGHES: Objection, vague.

A. Figure 3 demonstrates the sensors and their connection with the logic CPU, the memory, the power source, and how basically the left light control circuit and the right light control circuit basically are informed, and then if we look at Figure 3, there is a left segmented headlight 83 and there is a right segmented headlight 85, which are shown in a first embodiment in the 0029 paragraph.

BY MR. TURNER:

Q. So what is the shape of the sensor array in Figure 3 embodiment?

A. Alden doesn't describe Figure 3 as an embodiment.

Q. Okay, what is the shape of the sensor array illustrated in Figure 3?

A. Are you referring to elements 51a and 51b?

Q. Does Alden describe 51a and 51b as sensors with reference to Figure 3?

A. The figure -- let's go to Alden, give me one minute.

So 27, it says, "Figure 3 is a more

1 detailed illustration of the information flow
2 processes and architecture of the elements described
3 in Figure 2."

4 So it ties Figure 3 with Figure 2.

5 "In practice, a left sensor 51a and a right
6 sensor 51b are used concurrently. The 51a detects the
7 two headlights of 41 at the first illuminated spot 43a
8 and a second illuminated spot 43b."

9 Q. Okay, so 51a represents a left sensor, 51b represents
10 a right sensor; is that correct?

11 A. Yes.

12 Q. So what is the shape of the left and right sensor
13 illustrated in Figure 3 of Alden?

14 A. A POSITA will have looked at this as a two-dimensional
15 array with rows and columns.

16 Q. Okay.

17 A. And in fact, the discussion we had about
18 triangulation, the Figures 3 and 4, requires a
19 two-dimensional array in order to take place, and in
20 order to create the sensor maps, which are
21 referenced -- sensor maps 97, 99, which are referenced
22 in Figure 4.

23 Q. All right, so if these are two-dimensional arrays,
24 would you agree that they are generally square in
25 shape or the same size in both dimensions?

1 A. I think paragraph 26 and Figure 2, it has some
2 information where "Figure 2 illustrates the elements
3 of the segmented distribution illumination process. A
4 light emitting vehicle 41 emits an emitted light 43
5 which passes through a primary lens 49 before
6 converging. The 43 falling upon one or more sectors
7 [...] within a detector array 51 where it is detected.
8 The 51 is a photodiode array (or an alternative means
9 of detecting photon intensity such as CCD)."

10 When a POSITA hears about the photodiode
11 arrays, CCD, a lens, basically he thinks of a camera.

12 "The 49 and 51 being elements of a sensor
13 unit 45 which is mounted on an equipped automobile 47
14 (47 being a part of the automobile--the fill
15 automobile is not shown)."

16 And then it continues.

17 "The 51 converting photons to electrons
18 which are sent by a ribbon cable 53 into a light
19 control circuit including logic and memory 55."

20 55 is very important. This "is further
21 described in Figure 3. 55 controls which segments of
22 a segmented beam headlight 61 are on low and which are
23 on high by controlling the power flow to each
24 respective sector from a power source."

25 So a POSITA will have followed the flow

1 from all the logic or the disclosures from Figure 2 to
2 Figure 3 and Figure 5 that basically demonstrates of
3 how the segmented headlight system worked.

4 Q. So before we were discussing Figure 5, you counted the
5 lighting elements in Figure 5, and I believe you said
6 there were nine lighting elements; is that correct?

7 A. Yeah, nine elements --

8 MR. HUGHES: Objection to the extent it
9 mischaracterizes his testimony.

10 MR. TURNER: Okay.

11 BY MR. TURNER:

12 Q. So which sensors of the sensor array shown in Figure 3
13 control the lighting elements that are shown in Figure
14 5?

15 A. Can you repeat your question, please?

16 Q. Which sensors of the sensor array shown in Figure 3
17 control the lighting elements that are shown in Figure
18 5?

19 A. Let me go to the specs.

20 So in paragraph 27, it says, "Information
21 from the 72 and 71 --" again, paragraph 27 towards the
22 bottom.

23 It says, "Information from the 72 and 71 is
24 sent to control the power flow from a power source 73
25 via a left light control circuit 55a and a right light

1 control circuit 55b. Note that a left shaded circuit
2 area 75 indicates the areas of a segmented headlight
3 control switch array switches which will cause
4 portions of the left headlight to be dim while a
5 non-shaded left circuit area 77 represents the
6 portions of the segmented headlights which will be on
7 high beam. The 75 area is significantly larger than
8 the headlight dots that were initially received by 51a
9 and 51b because, the CPU has made assumptions about
10 the space that may potentially be occupied by the
11 driver of the sensed vehicle."

12 And then it continues, "The CPU logic flow
13 is described in Figure 4," and it says, "The 55a
14 controls the power flow from 73 to a left segmented
15 headlight 83 which distributes high beams throughout
16 its distribution areas except in a box in the
17 direction of 41. Similarly, the 55b controls the
18 power flow from 73 to a right segmented headlight 83
19 which distributes high beams throughout its
20 distribution."

21 Then in 28 explains the different steps of
22 thresholding triangulation, estimation of distance and
23 object detection, and then 29 as a first embodiment of
24 whatever was discussed previously shows "the segmented
25 headlight means and controlling switch array."

1 Q. All right, so the switch array, is that also shown in
2 Figure 3?

3 A. A switch array is shown in Figure 5, but this is
4 basically a slice, because if you look at the elements
5 77 and 79, its elements here for a POSITA could be a
6 way of controlling basically the power to an LED. By
7 using a resistor or by using a pulse, PWM method, and
8 then basically you can activate high beam/low beam in
9 any element that you have in this structure that I
10 described regarding Figure 5.

11 Q. So you're saying the elements 77 in Figure 3, each
12 element in that box would control one LED or one
13 lighting element of Figure 5; is that correct?

14 A. A POSITA by reading the disclosure could have thought,
15 because basically this is a two-dimensional array, but
16 there are other alternate ways of doing that.

17 Q. So if each element in box 77 corresponds to one LED or
18 one lighting element, does the shape of this light
19 control circuit illustrated in Figure 3 correspond to
20 the shape of the structure that holds the lighting
21 elements in Figure 5?

22 MR. HUGHES: Objection, hypothetical and
23 calls for speculation.

24 A. Let me repeat what I said. Figure 3 and Figure 4 show
25 how we can move from data and sensed light to an

1 object and basically make a decision through the logic
2 and the CPU in conjunction with the memory of which
3 segments need to be in high beam and which segments
4 should be in low beam, and this is demonstrated by the
5 elements 83 and 85.

6 Figure 4 shows the steps, the controlling
7 logic, and in fact, it has the element 109, which
8 says, "Switch requisite headlight segments to dim,
9 switch other segments to high beam."

10 Figure 5 shows an embodiment where the LEDs
11 are placed on a curve in order to have an effective
12 automatic segmented headlight system.

13 BY MR. TURNER:

14 Q. So in Figure 5, does Alden show one row of LEDs?

15 A. One slice of LEDs.

16 Q. So does Alden disclose another slice or another row of
17 LEDs that would be located above or below the slice
18 illustrated in Figure 5?

19 A. As I said, I want to look at Figures 2, 3, 4 and 5
20 together. Two is the overall description, 3 and 4 is
21 sensing processing, and Figure 5 is how the segmented
22 headlight system is implemented.

23 Q. Okay, so does Alden disclose another slice or row of
24 LEDs located below the row illustrated in Figure 5?

25 A. I have to repeat my previous answer, and also the

comment that all the structures demonstrated here are three-dimensional, the lens is three-dimensional, the headlight is three-dimensional, everything described in Figures 3 and 4 are three-dimensional and the sensing is done in the two dimensions.

Q. Okay, so can you answer yes or no? Does Alden describe another row of LEDs below the row illustrated in Figure 5?

MR. HUGHES: Objection, asked and answered.

A. I don't think it is a yes or no answer for the reasons that I explained. A POSITA cannot ignore what is described in Figure 3, Figure 4 and Figure 5.

BY MR. TURNER:

Q. So can you explain what a POSITA would have understood from the descriptions of Figure 3, Figure 4 and Figure 5 what the shape of the lighting structure is in Figure 5?

A. So a POSITA will look at the elements 77, 79, and the power source, then they look at the fact that the image processing the computer vision part, the detection of the light is done in two-dimension X and Y. We have the maps which are two dimensions, and then we need to have these structures, which are viewed at two dimensions basically, this control circuit, controlling the LEDs. Again, we have to look

1 at the figures as basically demonstrative or
2 illustration of what is happening, and I don't see any
3 other way that the POSITA could read this. Then we
4 will go to irrational conclusions like, for example,
5 this is a flat headlight, this is a flat basically
6 lens. Anyone who is a POSITA in this area will know
7 that the lens is basically three-dimensional and the
8 headlight is three-dimensional.

9 Q. So the POSITA would know they're three-dimensional but
10 the POSITA wouldn't know the shape of the lighting
11 structure based on the disclosure in Alden?

12 A. As I mentioned earlier, let me read it again.

13 If we go to paragraph 29, "The 119 and
14 other lighting elements are on a curve along the focal
15 point a headlight lens 121 such that the light from
16 each lighting element goes into a specified portion
17 (or portions) of the headlight distribution area.
18 Element emitted light 125 being an example of an
19 element's light being directed into one sector of the
20 light distribution area."

21 So it's a very clear teaching. We are
22 placing the LEDs on a curve, on a surface in order
23 to -- basically to maximize the interaction of the
24 LEDs with the optical element when in this case is the
25 headlight lens 121 and its corresponding focal point.

1 Q. So if it's a very clear teaching, can you explain what
2 the shape of this lighting structure is that's
3 described with reference to Figure 5, as a shape?

4 A. So in other words, what is very clear here is that
5 this is not -- the LEDs are not on a flat surface.
6 Why? Because this is not really the best way to
7 direct light. So they are on a curve and as basically
8 we move from slice to slice, the LEDs are placed
9 closer to the lens or further away in order to
10 capitalize on this focal point that is mentioned in
11 this disclosure.

12 Q. So are you saying the slices of LEDs or rows of LEDs
13 have different numbers of LEDs, different shapes?

14 A. What I'm saying is that the disclosure informs the
15 POSITA, place the LEDs in a way that you maximize the
16 collaboration, the cooperation between the LED
17 elements and the lens, which means that as you get
18 different slices, you may want to place them closer to
19 the lens or further away from the lens.

20 Q. Okay, what is the shape of the lens illustrated in
21 Figure 5 of Alden?

22 A. The shape of the lens in what sense?

23 Q. How would you describe the shape of the lens
24 illustrated in Figure 5 of Alden?

25 A. It's protruding in the center and thinner on the

1 sides. And again, this impacts the focal point.

2 Q. So if this is a slice of the lens or a top view of the
3 lens, if we were looking at a forward view of the
4 lens, what shape would the lens be?

5 A. It looks like a convex lens.

6 THE COURT REPORTER: Convex?

7 THE WITNESS: Convex, yes.

8 BY MR. TURNER:

9 Q. And the lens we're referring to in Figure 5, does this
10 have a reference numeral pointing to it?

11 A. Just one minute. It's 121.

12 Q. Okay.

13 A. Which is referenced as headlight lens 121 in paragraph
14 29.

15 Q. Okay, so the lens 121, you described it as a convex
16 lens, would that be convex or biconvex lens?

17 A. It can be a biconvex. The objective is -- again, the
18 importance of the disclosure here is actually how do
19 we couple -- how a POSITA is informed to couple the
20 characteristics of the lens with the placement of LEDs
21 on this slice surface.

22 Q. So if we were at a front view of this lens, would it
23 be circular in shape?

24 A. What will be circular? Circular is referring to a
25 planar structure, 2D structure.

1 Q. Okay, if we were looking at a front view of this lens,
2 how would you describe the shape of the lens?

3 A. A front view.

4 Q. Correct.

5 A. If there is no texture, it will be just a
6 polycarbonated material or material that is used for
7 the -- it will be -- it will be the headlight outliers
8 are going to inform the shape.

9 Q. What do you mean by headlight outliers?

10 A. If you see this part, the headlight lens is basically
11 also a cover for the -- to protect the LEDs, so a
12 POSITA at that time will have known that the cover
13 needs to satisfy, for example, the elements of being
14 placed in such a way to protect the LEDs.

15 Q. Okay, so what would be the shape of this lens if we
16 were looking at it from a front view?

17 A. It depends on the material. And if you look -- there
18 is a structure, if you look, the element 119, there is
19 a structure that goes from the -- basically the LED --
20 the light clusters basically to the lens, and do you
21 see how the lens is supported? So in this case, it
22 depends on how this structure, this mounting structure
23 from the lens, will look like and the overall
24 structure of the headlight.

25 Q. Okay, so what would be the shape of the lens if we

1 were looking at it from a front view?

2 A. I have to repeat my previous answer. It depends on
3 how the lens is mounted and where it's mounted.

4 Q. Does Alden describe how the lens is mounted and where
5 it's mounted?

6 A. It shows -- again, Figure 5, it shows a connection and
7 how by working together the placement of LEDs and the
8 lens work in order to achieve maximal visibility for
9 the driver and minimal glare for the driver of the
10 oncoming vehicles.

11 Q. Okay, so if we were looking at the lens from a front
12 view, would it be circular in shape, square in shape,
13 rectangular in shape?

14 MR. HUGHES: Objection, asked and answered.

15 A. It depends on the mounting structure, which is
16 illustrated here.

17 BY MR. TURNER:

18 Q. So based on the mounting structure illustrated here,
19 what is the shape of the lens illustrated in Figure 5
20 of Alden?

21 A. Maybe circular, for example. A POSITA will have heard
22 that circular is -- is an option. But again, we have
23 to consider that lenses are protected covers as well
24 in headlights, so the material may have opaque
25 properties or properties that maintains the

1 perception. Okay, the perception of circular or not
2 is not really what is important here. For a POSITA
3 the importance is actually the placement of LEDs in
4 conjunction with the lens along with the logic
5 described in paragraphs 27, 28 and Figures 3 and 4
6 and --

7 THE COURT REPORTER: And what was the last?

8 THE WITNESS: Figures 3 and 4 and as a
9 general overview, Figure 2.

10 THE COURT REPORTER: Thank you.

11 BY MR. TURNER:

12 Q. Okay, before when we were discussing the lighting
13 elements 119, you mentioned that the shape of that
14 structure would correspond to the shape of the lens;
15 do you recall that?

16 MR. HUGHES: Objection to the extent it
17 mischaracterizes his testimony.

18 A. Let me say again -- let me read the sentence from
19 Alden.

20 So in paragraph 29, "The 119 and other
21 lighting elements are on a curve along the focal point
22 of a headlight lens 121 such that the light from each
23 lighting element goes into a specified portion (or
24 portions) of the headlight distribution area. Element
25 emitting light 125 being an example of the element's

1 light being directed into one sector of the light
2 distribution area."

3 BY MR. TURNER:

4 Q. Okay, so if the shape of the lens is circular in shape
5 when looking at it from a front view, what would the
6 corresponding shape of the structure holding lighting
7 elements 119 look like?

8 A. A POSITA will have understood that what we see from
9 the front view of the lens is not relevant in this --
10 in answering your question. A POSITA finds all the
11 information they need by reading this statement that
12 the 119 and the other light elements are on a curve
13 along the focal point of a headlight lens 121. So
14 such that the light from its light elements goes into
15 a specified portion or portion of the headlight
16 distribution area. In other words, if I don't -- if I
17 put -- if the POSITA puts them on a -- something
18 different than a curve, for example, on flat surface,
19 then it's not the most effective implementation of
20 this segmented headlight means.

21 Q. Can you turn to Figure 10 of Alden?

22 A. Sure, give me a minute. Yes.

23 Q. So what is shown in Figure 10 of Alden?

24 A. Let's go to Alden.

25 So it's paragraph 35. "Figure 10 depicts a

1 segmented headlight with individually controlled
2 sectors of distribution of the third embodiment. A
3 single light element 129a produces collimated light
4 due to collimating surface 131a. The light then
5 passes through an array of variable infraction
6 elements (described in Figure 9). This headlight
7 architecture enables light from an individual
8 headlight distribution sector to be redirected in
9 response to sensed environmental conditions when used
10 in conjunction with the elements and processes
11 previously discussed herein. Thus light from one
12 section has been diverted to become diverted light 151
13 (in low beam where a vehicle (not shown) has been
14 sensed) while the light from other segments are not
15 diverted (are in high beam) where no vehicle is
16 sensed."

17 Q. So Alden describes this lighting -- this headlamp as
18 both a high beam and a low beam; is that correct?

19 MR. HUGHES: Objection, form.

20 A. According to the words used by Alden, this is -- this
21 depicts a segmented headlight with individual control
22 sectors of distribution of the third embodiment.

23 BY MR. TURNER:

24 Q. So does Alden describe this segmented headlight as
25 providing both high beam and low beam light?

1 A. Again, he discloses here that basically "This
2 headlight architecture enables light from an
3 individual headlight distribution sector to be
4 redirected in response to sensed environmental
5 conditions when used in conjunction with the elements
6 and processes previously discussed herein."

7 I think it's important. So it provides an
8 embodiment that by using this structure when there is
9 a vehicle which has been sensed basically can dim the
10 light -- or can take certain action and when basically
11 there's no object while the light from other segments
12 are not diverted where no vehicle is sensed.

13 Q. Does Alden describe combining this third embodiment
14 that's illustrated in Figure 10 of the segmented
15 headlight with the embodiment illustrated in Figure 5?

16 A. Can you repeat the question?

17 Q. Does Alden describe combining the headlamp illustrated
18 in Figure 10 with the headlamp illustrated in Figure
19 5?

20 A. Let me read something.

21 So if we go to 61, paragraph 61, it says,
22 "While the above description describes many
23 specifications, these should not be construed as
24 limitations on the scope of invention, but rather as
25 an exemplification of a preferred embodiment thereof.

1 Many other variations are possible. For example,
2 light sectors may overlap such that one light
3 distribution sector is covered by more than one
4 illumination emitting, filtering, and/or diverting
5 sectors. One or more methods employed herein may be
6 used in combination to vary illumination in a
7 segmented system. Many light detectors (wherein
8 electromagnetic radiation is converted to an electric
9 signal) techniques can be used herein as sensors, for
10 example, photodiode, CCD etc."

11 And continues along the same lines. So a
12 POSITA will have understood that these embodiments can
13 be combined depending on the particular task in hand.
14 And in fact, if you see paragraphs 36, 37, 38, all of
15 them they finish the directing of light can be
16 achieved with a segmented sensing elements and
17 segmented light distribution elements described
18 herein.

19 37, the same, "The directing of light can
20 be achieved with the segmented sensing elements and
21 segmented light distribution elements described
22 herein.

23 38, again, "The directing of light can be
24 achieved with the segmented sensing elements and
25 segmented light distribution lens described herein."

1 Q. Okay. So you're saying based on this, a person of
2 ordinary skill in the art would have known how to
3 combine the Figure 5 and Figure 10 embodiments of
4 Alden?

5 A. I believe so.

6 Q. So to combine these references, which light source
7 would you use? The light source illustrated in Figure
8 5 or the light source illustrated in Figure 10?

9 MR. HUGHES: Objection, vague.

10 A. I think a POSITA at that time will have looked at
11 Alden -- for example, Alden talks of LEDs. LEDs were
12 something that at that time will have been one --
13 probably the first option, if we want to have the
14 segmented automatic headlight system.

15 BY MR. TURNER:

16 Q. Okay. So if that combination included the LEDs, would
17 it still include the lens 121 of the Figure 5
18 embodiment?

19 A. I think we need to narrow down the application, as I
20 mentioned earlier. You want to maximize visibility
21 and reduce glare, you want to look around the corners,
22 you want to look up or down.

23 Q. So you're saying the optics or the lenses selected
24 would be based on the application for the headlight;
25 is that correct?

1 A. What I'm saying is actually as Alden states in 29 and
2 to some degree in 61, in fact 61 I think equally in
3 61, and to be thorough, similar statements paragraphs
4 36, 37, 38. I think they could -- there is enough
5 information, there is enough disclosure and teachings,
6 there are many teachings here that can empower a
7 POSITA to build this segmented automatic headlight
8 system.

9 MR. TURNER: All right, you guys want to
10 break for lunch?

11 MR. HUGHES: That's fine with us.

12 THE COURT REPORTER: I'll go off for a
13 second while we discuss.

14 (Discussion off the record.)

15 (Luncheon recess between
16 12:27 p.m. and 1:00 p.m.)

17 BY MR. TURNER:

18 Q. Well, welcome back. Let's see.

19 Dr. Papanikolopoulos, can you turn to
20 paragraph 54 of your declaration? So this is the -- I
21 think we're calling this the 026 declaration.

22 A. Give me a moment. Yes.

23 Q. Okay. All right, so the heading above this
24 paragraph -- I guess what do you have -- what is in
25 the heading above paragraph 54?

1 A. 1[B]?

2 Q. Yes.

3 A. "A plurality of light clusters, arranged in each of
4 the one or more of the one or more headlamps, the
5 headlamps capable of projecting light so as to
6 illuminate a plurality of subsections of a
7 field-of-view with different illumination
8 characteristics."

9 THE COURT REPORTER: If you could start
10 again.

11 THE WITNESS: Sure.

12 A. "Wherein the light clusters operate to create a
13 headlight beam."

14 BY MR. TURNER:

15 Q. So what disclosure in Alden are you relying on for the
16 plurality of light clusters limitation?

17 A. So let me read that. So basically I'm saying -- I'm
18 reading from paragraph 54.

19 "Alden discloses Claim 1[B]. First, 'light
20 clusters' can comprise 'one or more light emitting
21 sources,' such as one or more LED(s). The patent
22 specifically says that in dependent claims, where it
23 confirms the term 'light cluster' need only include
24 one LED."

25 And I'm referring to the '503 patent, claim

1 2.

2 Q. Okay. So are you relying on a single LED to satisfy
3 the light cluster limitation?

4 A. Let me -- let me read, because I'm -- there are
5 multiple I'm using.

6 "Alden's system includes a 'plurality of
7 light clusters' in the headlamps, as it includes a
8 plurality of lighting elements arranged in the
9 headlamps. These lighting elements are 'on a curve
10 along the focal point of a headlight lens 121,' with
11 different groups projecting light into different
12 areas, which may be made up of one or more sectors, in
13 front of the vehicle, e.g., left, center, right.

14 "Alden also discloses that these lighting
15 elements can also be individually controlled, and
16 thereby arranged in additional groupings, to
17 project --" and I think this is important to your
18 question "-- to project different illumination levels
19 in different areas in front of the vehicle, such as
20 low beam light in the area of a detected oncoming
21 vehicle and high beam light in other areas."

22 This is paragraphs 26 through 29 from
23 Alden.

24 Do you want me to continue? Because I give
25 an example.

1 Q. Well, let's -- so my question was are you relying on a
2 single LED for satisfying the cluster limitation?

3 A. On single or multiple LEDs -- just -- I don't -- I
4 will read this. I have multiple paragraphs. The
5 first item is light clusters can comprise one or more
6 light emitting sources. This is, again, in my
7 declaration.

8 "Alden's system also includes a 'plurality
9 of light clusters' in the headlamps, as it includes a
10 plurality of light elements (LEDs) arranged in the
11 headlamps."

12 So this is the second disclosure in Figure
13 5, paragraph 27.

14 Moreover, "These lighting elements are 'on
15 a curve along the focal point of a headlight lens,'
16 with different groups projecting light into different
17 areas, which may be made up of one or more sectors, in
18 front of the vehicle, for example, left, center,
19 right: Figure 5 (annotated)."

20 And I have this Figure 5 with the different
21 colors.

22 "Alden also discloses that these lighting
23 elements can be individually controlled, and thereby
24 arranged in additional groupings --" I don't have it
25 highlighted here, but to answer your question, I want

1 to highlight it -- "in additional groupings, to
2 project different illumination levels in different
3 areas in front of the vehicle, such as low beam light
4 in the area of a detected oncoming vehicle and high
5 beam light in other areas."

6 If, for example, you look at the Figure 5,
7 the annotated Figure 5, which is in paragraph 54, I
8 have one example of the different clusters.

9 So I think Alden discloses this 1[B] and I
10 mention that a POSITA will have thought that this is a
11 full disclosure teaching.

12 Q. Okay, so this annotated Figure 5 that's in paragraph
13 54 of your declaration, what do the different colors
14 represent?

15 A. The different colors represent, for example, the
16 different clusters you may have if you have, for
17 example, the algorithm, the CPU logic, based on the
18 sensed data of the environment, just having some of
19 them in high beam and some of them in low beam.

20 Q. So in your annotated Figure 5, do you illustrate a
21 high beam and a low beam?

22 A. In Figure 5 I'm illustrating different clustering and
23 this is a convention I use throughout to illustrate
24 basically the point. So these lighting elements are
25 on a curve along the focal point with different

1 groups -- this is what I'm trying to illustrate --
2 with different groups projecting light into different
3 areas, which may be made up of one or more sectors in
4 front of the vehicle. And I have left, center, right.
5 So this is the example that basically Figure 5 -- the
6 annotated Figure 5 tries to demonstrate and to
7 support.

8 Q. Okay. So you're saying that the LEDs that you have
9 colored in red, for example, would provide the light
10 pattern that's illustrated in red in your annotated
11 Figure 5; is that correct?

12 A. Yes, they can be grouped together in order to have the
13 same high or low beam depending on the existence of an
14 object these segments.

15 Q. All right, so which LEDs provide the light pattern
16 that's kind of shown in a purple color in your
17 annotated Figure 5?

18 A. This is to demonstrate the overlap and is just for
19 illustration purposes.

20 Q. Okay, so all of the grouping of LEDs that you have
21 different colors, the red, the green and the blue, the
22 light pattern provided by all of these overlaps in the
23 purple section; is that correct?

24 A. Yeah, I'm trying to show that basically there is this
25 section where these groupings, but the importance of

1 the point I'm trying to make here is actually we have
2 light clusters based -- so again, these lighting
3 elements which are on a curve along the focal point of
4 a headlight lamp 121 with different groups, this is
5 what I'm trying to highlight, projecting light into
6 different areas. So, for example, the red one
7 corresponds to the left basically. The green one is
8 the center. And basically the blue one corresponds to
9 the right.

10 Q. Okay. So that would -- by left and right, you mean
11 this Figure 5 is illustrating what would be a top view
12 of the light assembly; is that correct?

13 A. It's like I'm -- my right hand points towards the
14 blue, if I'm looking top down.

15 Q. Okay. From the point of view of the driver of the
16 vehicle that has this headlamp; is that correct?

17 A. I want to say more -- yeah, I mean, a POSITA will have
18 looked at it this way assuming that this is a
19 forward -- a headlight basically.

20 Q. Okay. All right, can you turn to paragraph 61?

21 A. Give me a minute. Yes.

22 Q. Okay.

23 A. You said 61, right?

24 Q. Yeah, 61. So the last sentence of your paragraph you
25 say, "Where less power is supplied, the illumination

1 from the lighting element will be lower."

2 Then the last sentence, "Where more power
3 is supplied, the illumination will be higher."

4 Do you see that section?

5 A. Yes.

6 Q. Okay. So by this you're describing how Alden
7 describes the high beam and low beam; is that correct?

8 A. Basically I'm trying to explain a POSITA -- how a
9 POSITA would have understood basically, the -- the
10 Figure 5 and the associated section. I mean, we have
11 to read the whole paragraph because I'm starting,
12 "The switch array control circuitry --"

13 THE COURT REPORTER: I'm sorry, but you're
14 going to have to slow down.

15 A. So paragraph 61 we say, "The switch array control
16 circuitry is further illustrated in Figure 5 in Alden,
17 where the individual lighting elements are
18 'individually controlled' by a 'switch array,' with
19 each switch being 'controlled by the CPU logic
20 previously described. For example, the power to 119
21 is controlled by the CPU which dictates its respective
22 switch characteristics at 115 such that the power from
23 a power supply 113 carried via segment wire 117 is
24 controlled in response to the sensed environmental
25 conditions."

1 This is 29 paragraph that we -- but it's
2 very important to basically reiterate, paragraph 29
3 states, "With each switch being 'controlled by the CPU
4 and logic previously described.'"

5 We're talking about Figures 3 and 4 along
6 with Figure 2 and the respective descriptions of these
7 figures in 27 and 29 -- and 28.

8 BY MR. TURNER:

9 Q. So based on this, you're -- your description in
10 paragraph 61, Alden, describes switching between high
11 beam and low beam by adjusting the power supply to the
12 119, which are the light elements; is that correct?

13 A. No, the 61 is basically --

14 MR. HUGHES: Sorry, counsel, for the
15 record, when you say paragraph 61 here, are you
16 talking about 61 of his declaration or Alden?

17 MR. TURNER: Of his declaration. Yeah,
18 we're on paragraph 61 of his declaration, Exhibit 1003
19 that we're referring to, his 026 declaration.

20 MR. HUGHES: Thank you.

21 A. So 61 is part of my arguments about claim 1 -- claim
22 "1[D]: electronic control circuitry configured to
23 independently operate the light clusters."

24 So I'm using paragraph 59, for example, I'm
25 saying, "Alden discloses Claim 1[D]. Alden discloses

1 that its headlight system includes a 'left light
2 control circuit' (55a) and a 'right light control
3 circuit' (55b). Figure 3 (annotated)."

4 Paragraph 60 says, "These control circuits
5 may include 'segmented headlight control switch array
6 switches,' which provide power to the different light
7 elements in the segmented headlights, causing certain
8 'portions' of the headlight to be 'dim' while other
9 portions are 'on high beam.'

10 And then paragraph 60 continues. "In
11 particular, based on information received from the
12 sensors, the control circuitry 'controls the power
13 flow' to the segmented headlights to independently
14 control the lighting elements."

15 Again, paragraphs 26 and 27, also paragraph
16 6 and paragraph 8. Figure 4, at paragraph 28.

17 "For example, where information from
18 sensors 51a and 51b indicates the presence of another
19 vehicle 41, the control circuitry 'controls the power
20 flow' so the headlight 'distributes high beams
21 throughout its distribution areas except in a box in
22 the direction of the 41.' Paragraph 27."

23 And I have another paragraph 61 that
24 basically I say the switch is the one you are
25 referring to. So it needs to be viewed -- 61, it

1 needs to be viewed in conjunction with paragraph --
2 paragraph 59 and 60.

3 BY MR. TURNER:

4 Q. Okay, so based on those paragraphs you just read, how
5 does Alden describe switching from high beam to low
6 beam?

7 A. Can you repeat the question?

8 Q. How does Alden describe switching from high beam to
9 low beam?

10 A. So if you look at paragraph 60, I say, "For example,
11 where information from sensors 51a, 51b indicates the
12 presence of another vehicle, the control circuitry
13 'controls the power flow' so the headlight
14 'distributes high beams throughout its distribution
15 areas except in a box in the direction of 41.'"

16 This is paragraph 27.

17 Q. Okay, so you're saying he controls the power flow; is
18 that correct?

19 A. Yeah.

20 Q. Okay.

21 A. And if you look at 61, I have another example where it
22 says, "'the power to 119 is controlled by the CPU
23 which dictates its respective switch characteristics
24 at 115 such that the power from a power supply 113
25 carried via segment wire 117 is controlled in response

1 to the sensed environmental conditions.' Paragraph
2 29."

3 Q. Okay. So can you turn to paragraph 71 of your
4 declaration?

5 A. Give me a minute. I'm there.

6 Q. Okay. So you see here this is your analysis of
7 independent claim 20; do you see that?

8 A. Indeed.

9 Q. Okay, so now if you can turn to paragraph 74, do you
10 see the first sentence there, "Third, Alden further
11 discloses that its lighting elements, for example
12 light sources, are configured to have one or more
13 controllable light characteristics, as it teaches each
14 lighting elements is independently controllable as to
15 intensity and direction."

16 Do you see that?

17 A. Yes.

18 Q. So how does Alden teach independently controlling
19 intensity and direction of the lighting elements?

20 A. So I will refer -- I'm referring to paragraph 8,
21 abstract, and paragraphs 26 and 29. Let me go -- if
22 you go to paragraph 8 of Alden.

23 Q. Okay.

24 A. To put things into context, let me read from the
25 second sentence.

"It is an object of the present invention to maximize the amount of light that the driver can use without inhibiting the ability of other drivers to see. It is an advantage of the present invention to provide the means for segmenting illumination into sectors of the light distribution area. It is an advantage of the present invention to automatically control each illumination sector. It is an advantage of the present invention to automatically control each illumination sector in response to certain environmental conditions. In a first embodiment, it is an advantage of the present invention to incorporate separate lighting elements within a headlight, each of said elements corresponding in a sector of the light distribution area of the headlight, each of said elements being independently controllable as to intensity and/or direction."

Q. Okay, so you're saying that paragraph 8, Alden is describing controlling intensity and direction?

A. I just read it, yes.

Q. Okay. So how does Alden teach controlling intensity with reference to the Figure 5 embodiment?

A. So, for example, I'm at paragraph -- give me a minute.

Paragraph 74, from my declaration. "To adjust intensity, for example, the power to each

1 individual lighting element is CPU-controlled, such
2 that 'the light sent to the area of 41 [an oncoming
3 vehicle] is dimmed using a headlight with segmented
4 lighting means' (that is, the light elements have
5 independently-controllable light characteristics)."

6 Q. Okay, so that was intensity. So how does Alden
7 describe independently controlling the direction of
8 the light elements?

9 A. Give me a minute.

10 So I want to go to paragraph 76.

11 Q. So this is 76 of your --

12 A. Yeah, let me go first to Alden 61.

13 "It will be understood that the present
14 invention can also be used to operate a segmented
15 light distribution system to provide illumination to
16 independently controlled segments each operable within
17 a range of intensities between the high beam and the
18 low beam state."

19 So in addition to having these directional
20 elements, if we switch -- if we use basically -- if we
21 turn to low beam because we have this option and we
22 eliminate the light -- block the light in this area,
23 basically we don't have any light, we're changing the
24 direction of the characteristics, the pattern, the
25 same. And this is in combination with the directional

1 placement of LEDs.

2 Q. So is it your opinion that when Alden's disclosure
3 that you say is to independently control the direction
4 of the LEDs, that's achieved by turning off the LEDs?

5 A. I think a POSITA will look at the placement of the
6 LEDs with respect to the lens plus the individually
7 controlled. Let me -- let me go back, because I think
8 I have more elements in my declaration.

9 So let me read you -- because I think this
10 paragraph -- let me -- let's go to paragraph 75.

11 "Alden discloses claim 20[B]. The
12 different lighting elements ('light sources') in
13 Alden's headlight are situated and aimed at different
14 angles, based on their location along the curve. This
15 results in 'light from each lighting element [going]
16 into a specified portion (or portions) of the
17 headlight distribution area.' Any lighting element
18 angled such that it directs light into a portion where
19 another vehicle is not present towards the side of the
20 road will be less visually disturbing to drivers of
21 other vehicles as compared to lighting elements that
22 are so they emit portions into an oncoming vehicle."
23 This is Figure 5, 29.

24 Alden discloses that, for example, its
25 angled lighting elements can produce a high beam in a

1 first sector 65, "While concurrently producing a low
2 beam in a respective sector 63 or dim beam where 41
3 common vehicle is sensed such that the driver of 41
4 has minimal glare while the driver of 47 has maximum
5 light."

6 And we have -- I have Figure 2 annotated.
7 It also references paragraph 25 through 29.

8 Q. Are you saying that Alden teaches independently
9 controlling the direction of the LEDs by mounting them
10 on a curved surface?

11 A. Among other things. By telling them basically by
12 switching their state, by having full controllability
13 of their state.

14 Q. By state do you mean on or off?

15 A. By state I mean whatever is disclosed in 61, among
16 other paragraphs, where it says, "It will be
17 understood that the present invention can also be used
18 to operate a segmented light distribution system to
19 provide illumination to independently controlled
20 segments each or probably within a range of
21 intensities between the high beam and the low beam
22 state."

23 Q. Can you turn to paragraph 93 of your declaration?

24 A. Sure, give me a minute. Yes, I'm there.

25 Q. Okay. Do you see the heading here that starts with

1 "one or more light modifying elements?"

2 A. Yes.

3 Q. For 2[C]. So those are the claim limitations you're
4 analyzing here?

5 A. Uh-huh.

6 Q. So what do you -- what are you relying on from Alden
7 for satisfying these light modifying elements of
8 claim 2[C]?

9 A. Just to be accurate, let me -- first of all, I want to
10 say that "the '503 patent discloses that 'light
11 modifying elements' can include 'lenses' and
12 'refractors,' each of which 'controls' light by
13 directing it to or focusing it on specific areas."
14 This is claims 3 and 4 from the '503.

15 "The '503 patent further discloses that
16 'light-source characteristics' can include not only
17 intensity, but also things like direction of the
18 light."

19 So "Alden discloses such a light modifying
20 element, as it discloses a 'lens 121' in the path of
21 light emitted of lighting elements 119. Alden
22 discloses that this lens causes 'the light from each
23 lighting element [to go] into a specified portion (or
24 portions) of the headlight distribution area' as shown
25 below." This is at "29, Figure 5 (annotated).

1 "This lens controls a 'characteristic' of
2 the light emitted from the lighting elements 119, as
3 it focuses the light from each lighting element into
4 particular portions of the light distribution area.
5 As shown above, for example, lens 121 focuses the
6 light from the lighting element labeled with reference
7 numeral 119 in the '15 degrees' segment designated to
8 125. Thus, Alden discloses claim 2[C] for this reason
9 alone."

10 "In addition --" and this goes to Figures 8
11 to 10 and paragraphs 33 through 35 and paragraph 61,
12 "-- Alden discloses that other 'light modifying
13 elements' can be included in its system, including 'a
14 variable refractive element' in the form of a liquid
15 crystal. This variable refractor 'enables light from
16 an individual headlight distribution sector to be
17 redirected --'" I want to emphasize this -- "'to be
18 redirected in response --'" in other words, changing
19 direction, "'in response to sensed environmental
20 conditions when used in conjunction with the elements
21 and processes previously discussed herein.'"

22 Q. Okay. So are you relying on Alden's lens 121 that's
23 illustrated in the Figure 5 embodiment or Alden's
24 variable refractive element as illustrated in Figures
25 8 through 10 for satisfying the light modifying

1 elements of claim 2?

2 MR. HUGHES: Objection, vague, and
3 compound.

4 A. I just read -- I'm doing an analysis about basically
5 '503 patent discloses lenses and refractors and I'm
6 saying how Alden discloses not only a lens but "In
7 addition, discloses that other 'light modifying
8 elements' [that] can be included in its system," may
9 include the "'variable refractive element' in the form
10 of a liquid crystal."

11 BY MR. TURNER:

12 Q. Okay, so for your analysis of claim 2, are you relying
13 on Alden's lens 121 or is variable refractive element
14 as illustrated in Figures 8 through 10 or both for
15 satisfying this claim limitation of light modifying
16 elements?

17 MR. HUGHES: Same objection.

18 A. I'm using the term "In addition."

19 BY MR. TURNER:

20 Q. Okay, so that said, the beginning of paragraph 95 you
21 say "In addition."

22 A. "In addition --

23 Q. Sorry, go ahead.

24 A. Go ahead. Just finish.

25 Q. So by "In addition," you're saying you would

1 combine -- you would use both of these. So in your
2 analysis, you're relying on a headlamp that would
3 include both the lens 121 and the variable refractive
4 element?

5 MR. HUGHES: Objection, to the extent it
6 mischaracterizes his testimony.

7 A. The addition refers to the fact that there is a
8 disclosure by Alden "that other 'light modifying
9 elements' can be included in its system, including a
10 'variable refractive element' in the form of a liquid
11 crystal." Which is Alden 33-35.

12 So the addition refers to the disclosures
13 by Alden of other light modifying elements, which
14 disclose, for example, in this case redirection or
15 changing direction of light in response to sensed
16 environmental conditions.

17 BY MR. TURNER:

18 Q. So you're saying the term in addition is just
19 referring to the additional disclosure, not that
20 you're relying on both of them for satisfying this
21 limitation?

22 A. I'm saying there is a teaching by Alden that is part
23 of my answer basically, my statement here that "Alden
24 discloses claim 2[C]."

25 Q. So which disclosure of Alden are you relying on for

1 satisfying this claim 2[C]?

2 A. So paragraph 94, I'm stating, "Alden disclosed such a
3 light modifying element, as it discloses a 'lens 121'
4 in the path of light emitted of lighting element -- of
5 lighting elements 119. Alden discloses that this lens
6 causes 'the light from each lighting element [to go]
7 into a specified portion (or portions) of
8 the...headlight...as shown below."

9 And then I continue saying, "This lens
10 controls a 'characteristic' of the light emitted from
11 the lighting elements."

12 And then I'm saying, "In addition,"
13 although the claim uses from at least one -- it says,
14 "one or more light modifying elements," I'm just
15 saying in order to be complete with all the
16 disclosures of Alden, I'm saying, "In addition, Alden
17 discloses that other 'light modifying elements' can be
18 included in its system, including a 'variable
19 refractive element.'"

20 Q. Okay, can you turn to paragraph 97? It's a long
21 paragraph so it's on the -- the first full sentence on
22 page 62.

23 A. Give me a minute.

24 MR. HUGHES: Counsel, did you say page 62?

25 MR. TURNER: I don't know. The version I'm

1 looking at doesn't have page numbers, so it's 62 of
2 the PDF.

3 MR. HUGHES: Okay, I have 58 of the
4 exhibit.

5 MR. TURNER: Okay, well, it's --

6 MR. HUGHES: Okay.

7 MR. TURNER: Paragraph 97.

8 MR. HUGHES: Got it, thank you.

9 MR. TURNER: Of his declaration.

10 A. It starts, "Alden discloses that it's used." Am I
11 right?

12 BY MR. TURNER:

13 Q. So this is -- yes, so that's the beginning of 97, but
14 if you can turn to the following page, do you see the
15 sentence there, "And, a POSITA would have been
16 motivated to add this refractor element to the system
17 depicted in Figure 5 of Alden, so as to provide
18 multiple means of modifying the direction or intensity
19 of the individual lighting sectors."

20 Do you see that?

21 A. Yes.

22 Q. So here are you describing combining the refractor
23 element from your Figures 8 through 9 of Alden with
24 the Figure 5 embodiment including that lens, which was
25 reference numeral 121?

1 A. I'm talking about the options that the POSITA will
2 have been motivated to -- or will be taught by Alden.

3 Q. Okay, so how would a POSITA have added this refractor
4 element to the Figure 5 embodiment?

5 A. So, for example, let me go to figure -- so let's
6 suppose -- for example, if you go to Figure 5, let's
7 suppose that we are going on a curve and we want to
8 have more light directed to the right, to the bottom
9 of the figure, because basically we have an upcoming
10 curve, so in addition to the reflectors or after
11 detecting the reflectors on the curve, we want to have
12 more control of the light that goes on the side of the
13 road. So the element -- the first element from the
14 top, the first LED element, we can put a refractor,
15 which is basically it's quite small, we can put it as
16 close to the LED as possible, among other options.

17 Q. You're saying taking the refractors that are in the
18 figure, let's see, was that Figure 10; is that
19 correct? And you're adding that to the Figure 5
20 embodiment?

21 A. No, I'm taking the single liquid crystal, so the
22 element I believe -- just let me make sure that I have
23 it right -- if you look at the element of 141,
24 paragraph 33, Figure 8, it says in the third
25 embodiment the electro-optic material 141 is a liquid

1 crystal. So what I'm saying, taking this element 141
2 and place it on Figure 5 as close to the LED as
3 possible.

4 Q. So that would be close to one LED or the whole series
5 of LEDs on the curve?

6 A. In the curve basically for this I mentioned earlier
7 you need to do for one or two. Let's start with one,
8 a POSITA will have started with one. So with the
9 objective of shedding more light towards the curve, to
10 the side of the road basically.

11 Q. Okay, so you're inserting this -- you're adding this
12 to the Figure 5 embodiment between the LEDs and the
13 lens 121 or are you removing lens 121?

14 A. A POSITA will have the option, depending on the
15 particular task, but in this case in this scenario
16 that I mention in the context I mention before, we can
17 keep the lens.

18 Q. Okay. And you said you would only -- how many of
19 these refractive elements would you include in this
20 embodiment?

21 A. In this -- in the context I mentioned before, just
22 one. In the ones -- the first LED on the top.

23 Q. By the top you're saying, if we look at Figure 5, it's
24 the light element 119 that's all the way at the upper
25 portion of the curve next to the switch array?

1 A. Yeah, if you take -- if you take the end of the switch
2 array where it says 115 and you follow the 117, take
3 the to the right 117, the cable that goes to the first
4 LED.

5 Q. All right, so you're saying you would take one
6 refractive element and insert it between that top
7 lighting element and the lens 121; is that correct?

8 A. Yes.

9 Q. Okay. And why would a POSITA do this?

10 A. If they want to have more control of the light
11 bending.

12 Q. And what type of control would this provide?

13 A. Basically -- let me think for a minute. So -- so I
14 think I explain -- so if you go to paragraph 96, I
15 say, "The liquid crystal has a first refractive state
16 when a circuit is open, such that light passes
17 straight through, without bending. The liquid crystal
18 then has a second refractive state when the circuit is
19 closed, causing the 'light to bend due to refraction
20 after passing through.' Figure 9, 33 paragraph.
21 Thus, by selectively closing the circuit, light for a
22 particular distribution sector can be 'bent' to
23 redirect or redistribute the light to a different
24 area. A POSITA would have known that factors such as
25 pressure, the presence of an electric field,

1 temperature, and chemical composition," because a
2 liquid crystal is an anisotropic material, this is my
3 addition, "can have an impact on the refractive state
4 of a liquid crystal."

5 So it gives you in a very small factor the
6 ability to bend on will, which is, as I mentioned this
7 is -- a POSITA might have found this as an option for
8 the case of the curve.

9 Q. Okay.

10 A. And also going back to 97, I say, "This would include,
11 for example, allowing for selective and controllable
12 bending of the light output in certain desired
13 portions, allowing more variable control of lighting
14 of various subsections of a headlight beam. For
15 example, as disclosed in Alden," this is paragraph 97,
16 "the inclusion of variable refractor elements in the
17 path of different beam segments allows for greater
18 control of the light, including allowing a user to
19 'divert' light from one section to become low beam
20 light in areas where a vehicle is sensed (Alden 35).
21 This diversion of light could also be used for more
22 controlled bending or directing of the light of
23 certain segments of the headlight beam in the
24 direction of a curve in the road, as shown in Figure
25 11. (Figure 11 of 36 paragraph), see also Figures

1 14-15, and paragraphs 39 and 40.)"

2 Q. Okay. And so you describe this as adding one of these
3 refractor elements. Do you describe this in your
4 declaration?

5 A. I think this is -- this is what I described here.
6 This diversion of light could also be used for more
7 controlled bending or directing, paragraph 97.

8 Q. Okay. Do you illustrate this modification where
9 you're combining these lenses, this refractor element
10 with your lens 121?

11 MR. HUGHES: Objection, vague.

12 A. What do you mean if I have illustrated?

13 BY MR. TURNER:

14 Q. Did you create a figure illustrating this modification
15 of the Figure 5 embodiment to include the refractor
16 element and include it in your declaration?

17 A. Expressly I didn't include the figure because I
18 believe for a POSITA this would have been a well-known
19 option, but I provide -- for example, I have text
20 which I thought it will be enough because it says this
21 will include, for example, allowing for selective and
22 controllable bending of the light output in certain
23 desired portions allowing more variable control of
24 lighting of various subsections of the headlight beam.
25 For example, as disclosed in Alden, I mention one

1 example, with an idea of reducing glare for the
2 driver, I say, "As disclosed in Alden, the inclusion
3 of variable refractor elements in the path of
4 different beam segments allows for greater control of
5 the light including allowing a user to divert light
6 from one section to become low beam light in areas
7 where the vehicle is sensed (Alden 35). This
8 diversion of light could also be used for more
9 controlled bending or directing of the light of
10 certain segments of the headlight beam in the
11 direction of the curve in the road. As shown in
12 Figure 11."

13 And I have Figure 11 as referenced, but
14 paragraph 36, see also Figures 14-15, and paragraphs
15 39 and 40.

16 Q. You described adding one refractor element in front of
17 one of the LEDs in the curve. Why not more than one
18 refractor element?

19 A. A POSITA will start with one in the curve, two may be
20 an option, but it depends on your speed, on
21 virtually -- on other information, on how -- on other
22 parameters. But I think a POSITA will start from one.

23 Q. Now, by adding this refractor element in between,
24 would you need to alter the lens 121?

25 A. What do you mean by alter?

1 Q. Would you need to modify lens 121 to account for the
2 additional refractor element between the lens and the
3 LEDs?

4 A. I don't believe so.

5 Q. Would the same sensors and switching technology as
6 described with reference to Figure 3 be used to
7 control both the LEDs and this refractor element?

8 A. The same architecture will be used.

9 Q. So what do you mean by the same architecture?

10 A. You supply power, current, and again, if we go to
11 paragraph 101 of my declaration, tell me when you are
12 there.

13 Q. I'm there.

14 A. So -- because I think this answers this.

15 "As discussed above, with respect to claim
16 2[C], Alden also disclosed that variable refractive
17 liquid crystal elements can be included in its
18 headlight system with control circuitry configured to
19 the 'open' or 'closed' to control the direction and
20 distribution of light passing through the elements.
21 (Alden 33-35). (Claim 2[C]). That is, the control
22 circuit which can be open or closed is 'variable light
23 modifier control circuitry.' Opening or closing the
24 circuitry for the liquid crystal element alters the
25 variable refractive liquid crystal, causing the light

1 to either pass straight through or be 'bent' and
2 redistributed to a different portion of the headlight
3 distribution area. (33-35.)"

4 Q. Are you saying that Alden describes using the same
5 control circuitry for the Figure 5 embodiment and the
6 figure embodiments that also include the refractive
7 elements, so that would be, what, Figure 10?

8 MR. HUGHES: Objection, vague.

9 A. What do you mean by same?

10 BY MR. TURNER:

11 Q. So does Alden describe control circuitry in Figure 3?

12 A. In Figure 3, Alden describes the control circuits,
13 left and right control circuits 77, and left and right
14 control circuit 79.

15 Q. Would you describe this as architecture?

16 A. This is more than architecture. It's the most
17 illustration of how the steps of Figure 4 are
18 materialized with the ultimate objective to --

19 THE COURT REPORTER: I'm sorry, if you can
20 start again. After how the steps of Figure 4 are
21 materialized.

22 THE WITNESS: Are materialized.

23 A. So, for example, if we look at element 109, all the
24 steps lead to switching the requisite headlight
25 segments to dim, switch other segments to high beam,

1 109.

2 BY MR. TURNER:

3 Q. Are you saying that Alden's description with reference
4 to element 109 is applicable to both the Figure 5
5 embodiment and the Figure 10 embodiment?

6 A. I'm not the one who says it. It's actually Alden
7 discloses.

8 Q. And where does Alden disclose it?

9 A. Give me one minute. If you go to paragraph 35 in the
10 middle it says, "This headlight architecture emits
11 light from an individual headlight distribution sector
12 to be redirected in response to sense the
13 environmental conditions when used in conjunction with
14 the elements and processes previously discussed
15 herein. Thus, light from one section has been
16 diverted to become diverted light 151 (in low beam
17 where a vehicle (not shown) has been sensed) while the
18 light from other segments are not diverted (are at
19 high beam) where no vehicle is sensed."

20 MR. HUGHES: Counsel, we've been going
21 about an hour and 10, 15 minutes now. So if you could
22 just let us know whenever you get to a good place for
23 a break?

24 MR. TURNER: Yeah, why don't we break now?

25 MR. HUGHES: Okay.

1 MR. TURNER: Five minutes, 10 minutes?

2 MR. HUGHES: Yeah.

3 (A brief recess was taken.)

4 BY MR. TURNER:

5 Q. Dr. Papanikolopoulos, if you recall before the break,
6 we were talking about your combination where you were
7 adding a refractive element in Alden to the Figure 5
8 embodiment; correct?

9 A. Yeah, I was talking of how Alden discloses --

10 Q. Okay.

11 A. -- the combination.

12 Q. Okay. And again, where is Alden's description of this
13 combination?

14 A. Give me a minute.

15 So please go to paragraph 95 of my
16 declaration.

17 "In addition, Alden discloses that other
18 'light modifying elements' can be included in its
19 system, including a 'variable refractive element' in
20 the form of a liquid crystal. (Alden 33-35, 61, and
21 Figures 8-10).

22 "This variable refractor" beginning quote
23 from Alden, "'enables light from an individual
24 headlight distribution sector to be redirected in a
25 response to sensed environmental conditions when used

1 in conjunction with the elements and processes
2 previously discussed herein.'"

3 So this is paragraph 35 in the middle.

4 Now, let's go to my declaration. Paragraph
5 97.

6 "Alden discloses that its use of refractive
7 elements to 'bend' light can be included in its
8 headlight system, such as that of Figure 5, and a
9 POSITA would have readily understood how to implement
10 the variable refractive elements in the system of
11 Figure 5. In fact, Alden specifically discloses that,
12 beginning quote, '[o]ne or more methods employed
13 herein may be used in combination to vary illumination
14 in a segmented system.'" This is from Alden paragraph
15 61. "Thus, including one or more variable refractive
16 elements in the system of Figure 5 would be the use of
17 a known optical element (a variable refractive liquid
18 crystal) in a system having different light
19 distribution sectors that Alden describes the liquid
20 crystal as acting upon. Moreover, a POSITA would have
21 had a reasonable expectation of success as the liquid
22 crystal elements would perform their same function of
23 allowing light to pass straight through when a circuit
24 is open and they have one refractive state, and
25 bending light when the circuit is closed and the

1 crystal has a different refractive state. And, a
2 POSITA would have been motivated to add this refractor
3 element to the system depicted in Figure 5 of Alden,
4 so as to provide multiple means of modifying the
5 direction or intensity of the individual lighting
6 sectors. This will include, for example, allowing for
7 selective and controllable bending of the light
8 elements in certain desired portions, allowing more
9 variable control of lighting of various subsections of
10 the headlight beam. For example, as disclosed in
11 Alden, the inclusion of variable refractive elements
12 in the path of different beam segments allows for
13 greater control of the light, including allowing a
14 user to 'divert' light from one section to become low
15 beam light in areas where a vehicle is sensed. (Alden
16 35.) This diversion of light could also be used for
17 more controlled bending or directing of the light of
18 certain segments of the headlight beam in the
19 direction of a curve in the road, as shown in Figure
20 11. Figure 11 as a reference, paragraph 36, see also
21 Figures 14-15, and paragraphs 39-40."

22 Q. All right, and are you including one variable
23 refractive element or multiple variable refractive
24 elements?

25 A. A POSITA -- I mean, I mention one example, the last

1 example that I mention, the curve, a POSITA would have
2 known based on the needs of the application to do the
3 implementation as described with respect to this
4 particular.

5 Q. The application described with reference to Figure 5,
6 are you proposing one refractive element or multiple
7 refractive elements?

8 A. Using the one example I have in my declaration, and I
9 want to stick to this because I have spent some time
10 thinking about that, is this diversion of light for
11 the curve.

12 "This diversion of light can also be used
13 for more controlled bending or direction of the light
14 of certain segments of the headlight beam in the
15 direction of the curve in the road as shown in Figure
16 11."

17 Among other things.

18 Q. Okay, so for the application that's described with
19 reference to Figure 11, how many refractive elements
20 would you include in this modified Figure 5
21 embodiment?

22 A. As I mentioned earlier, you need to look at the whole
23 setting, but I think in my opinion, a POSITA at that
24 time one refractive elements should have been enough,
25 with the place that I mentioned.

1 Q. Okay, and for the refractive elements, you referenced,
2 let's see, Alden's disclosure with reference to
3 Figures 8 through 10; is that correct?

4 A. And also the paragraphs 33 to 35, and the paragraph 61
5 as well.

6 Q. So what type of refractive element does Alden describe
7 with reference to Figure 8?

8 A. Let me go there, just one moment.

9 Figure 8 expands on Figure 6, which
10 describes basically an electro-chromatic medium -- and
11 let me.

12 So "Figure 8," if we go to paragraph 32,
13 "illustrates the elements of an individual
14 electro-optic cell in a first state. A first
15 transparent substrate such as glass 137 has deposited
16 on it a first transparent electrode 139. A second
17 transparent substrate 145 such as glass has a second
18 transparent electrode 143 deposited thereon. In the
19 embodiment of Figure 6 and 7, the electro-optic
20 material 141 is an electro-chromatic material which
21 allows greater light to pass through it in a first
22 state (such as when the circuit is open) and a lesser
23 amount of light to pass through when in a second state
24 (such as when the circuit is closed). The elements of
25 Figure 8 comprising an individually controlled segment

1 of 127 or 127a segmented electro-chromatic array. In
2 the electro-chromatic embodiment, generally the 143
3 surfaces are parallel to 139 surfaces (though not
4 depicted as such in Figure 8)."

5 Again, the paragraph 33 says, "In a third
6 embodiment, the electro-optic material 141 of Figure 8
7 is a liquid crystal."

8 And it says, "The alignment of the liquid
9 crystal causes a first refractive index in a first
10 state when the circuit is open. This causes the light
11 to pass straight through the elements of Figure 8.
12 Realigned liquid crystal 141a assumes a second state
13 of alignment when the circuit is closed as illustrated
14 in Figure 9 causing the light to bend due to
15 refraction after passing there through. The liquid
16 crystal birefringent principles are well-known in the
17 prior art. The surfaces of 139 generally not being
18 parallel to the 143 surfaces."

19 Q. So this is a liquid crystal type refractive element in
20 figure --

21 A. Yeah.

22 Q. -- what are we talking about, Figure 8?

23 A. It talks about an embodiment in the third embodiment,
24 the electro-optic material 141 of Figure 8 is a liquid
25 crystal as disclosed by Alden.

1 Q. All right, is the electro-optic material a liquid
2 crystal in Figures 8, 9 and 10 and all those
3 embodiments is it liquid crystal?

4 A. In the third embodiment it says -- it starts Figure 8
5 as an electro-optic cell and talks more about the
6 physics associated with this. Then in 33 talks about
7 the third embodiment where it says that electro-optic
8 material 141 of Figure 8 is a liquid crystal. Then
9 34, which describes Figure 9 is an electro-optic
10 material of Figure 8 in a second state of alignment.
11 And 35 describes the Figure 10, which is basically
12 the -- it has the combination of the single light
13 element 129a, 131a, and the light then passes through
14 an array of variable refraction elements.

15 So it moves from one to an array of
16 variable refraction elements. In other words,
17 multiple refractors.

18 Q. Okay, but in -- but the whole array is not needed in
19 combination with the Figure 5 embodiment; is that
20 correct?

21 A. I was asked to view -- if Alden discloses, so the
22 write-up I described earlier in paragraphs -- in
23 paragraph, for example, 101, it talks about variable
24 refractive elements, but the example I mentioned in --
25 the examples I mentioned in 98, they can have at least

1 one or more.

2 Q. Okay. So now by adding one or more of these
3 refractive elements to the Figure 5 embodiment, does
4 Alden describe any other additional changes that would
5 be needed with respect to hardware or software of the
6 headlamp?

7 A. What do you mean?

8 Q. By adding this refractive element to the Figure 5
9 embodiment, would you need to change any of the
10 software for controlling the LEDs?

11 A. A POSITA will understand there's no change is needed
12 except of adding the element and having the
13 appropriate hardware connections, plus the driver for
14 this particular element.

15 Q. So you're saying there's a separate driver for driving
16 a refractive element as the drivers used for
17 controlling the LEDs?

18 A. A POSITA will have many options. I mean, it may be
19 the addition of a resistor, it may be just slightly
20 modified -- I mean, the easiest actually is to add the
21 resistor. A POSITA at that time would have thought
22 about adding a resistor to control the current.

23 Q. So where would you connect this resistor?

24 A. If we go to Figure 5, if you see the switch -- you see
25 the switch array, I'm referring to the switch array

115 for the example of the road curve assuming there
is a connection -- a series of connections 117, I will
have had a small addition, after the switch array.
Among other options. Again, if you look at that time,
I think this is -- will be the first choice.

Q. So how would a POSITA mount this refractive element
adjacent to one of these lighting elements without
blocking any of the light from the other lighting
elements?

A. That's why I said that it needs to be placed close to
the LED. In fact, the size -- the size of a refractor
at that time will enable something like that.

Q. Are you saying the refractors were relatively small in
size at this time frame?

A. I'm saying at that time frame, it was something that
could be mounted close to the LED without affecting
the overall operation.

Q. Now, before we discussed the shape of the structure
that holds all these lighting elements, and I think we
discussed that there would be multiple rows
potentially of these lighting elements; is that
correct?

A. Are you referring to Figure 5?

Q. Yes, yes.

A. Yes, as I mentioned, this is a slice of whatever is

described in Figures 3 and 4.

Q. Okay, so if this is a slice and we discussed adding a refractive element to what would be the upper lighting element shown in Figure 5, would you only need -- would you need one refractive element on each slice or just one on the slice illustrated in Figure 5?

A. Since we don't have scale on this drawing, it's tough to answer this, but I think this combination can be accomplished at least by one and maybe an extra pair for the things above or below. And again, assuming that this is on a 3-dimensional surface, you may not have -- the row below may not be the exact number of elements. For example, I believe '503 talks about 90 elements, LED elements.

Q. Sorry, '503, are you referring to the Spero --

A. Correct --

THE COURT REPORTER: I'm sorry, but I didn't get the entire question. It was answered on top of your question.

THE WITNESS: Sure.

THE COURT REPORTER: Again, Mr. Turner, I just missed the end of it.

BY MR. TURNER:

Q. Okay, so what are you referring to as the '503?

A. If my memory is correct, I can check, if you can bear

1 with me. Bear with me to bring --

2 THE WITNESS: Do you happen to have the
3 '503 patent?

4 THE COURT REPORTER: I'll go off for just a
5 moment.

6 (Discussion off the record.)

7 THE WITNESS: Just give me one minute.

8 So if we go to the '503 patent.

9 BY MR. TURNER:

10 Q. And just for reference, so the '503 patent, we're
11 referring to -- this is Mercedes Exhibit 1001 from the
12 IPR; is that correct?

13 A. Yes, I'm referencing the actual Spero patent,
14 10,894,503.

15 Q. Okay.

16 A. I'm on column 11, line -- row 42. "Lumileds Luxeon
17 DS25 emitter running at 350 milliamp percent is an
18 example of such approach. In a few years
19 manufacturers have raised currents from 50 milliamp to
20 above 500 milliamp, at the time of this writing.
21 These advances are certainly favorable at reducing
22 costs and making LEDs a practical light source but
23 attempting to get 1000 lumen (equivalent to a 60 watt
24 incandescent lamp) isn't necessarily the best path to
25 take, especially if it come at the price of light

1 conversion or distribution efficiency."

2 In other words, what it says here, you need
3 10 LEDs in order to reach this particular luminous
4 flux that basically -- that you need 10 LEDs in order
5 to reach the 1000 lumens, luminous flux, which is
6 equivalent to a 60 watt incandescent lamp.

7 And if you go column 53, part -- row 17 and
8 below, this is further analyzed. In other words --

9 Q. You say -- sorry, go ahead. Go ahead.

10 A. Please tell me.

11 Q. So you're citing to the '503 patent, does this help
12 explain the teachings in Alden?

13 A. No. So what I'm trying to say that in order to reach
14 the lumen output required, basically you need to have
15 more than what basically we have here in this
16 demonstrative or illustrative figure. So going back
17 to your question, you may have in the next row below
18 an LED or you may have an expanded row with more LEDs.
19 This depends, again, on the placement of LEDs with
20 respect to the focal point of the headlamp lens 121.

21 Q. Are you saying you might need more LEDs and more
22 refractive elements just to provide sufficient
23 lighting for this functionality that you're trying to
24 achieve?

25 A. No, what I'm trying to say is actually this Figure 5

1 for a POSITA will have meant that this is only one
2 slice of the tons of LEDs that you need, number of
3 LEDs that you need in order to have this -- basically
4 this segmented headlight system, the automatic
5 segmented headlight system.

6 So to go back to the refractor elements,
7 depending on -- on the application, you may need more
8 or less refractors, and I mention the example of one
9 refractor how can be integrated, can be combined with
10 this particular system of LEDs on a curve along the
11 focal point of the headlight lamps.

12 Q. So for the application that you were proposing for
13 adding the refractor to the Figure 5 embodiment, do
14 you think you would need more than one LED and one
15 refractor to provide that functionality?

16 A. I'm not proposing. Alden discloses.

17 Q. Okay. So how many refractors and how many LEDs does
18 Alden disclose are needed to provide this
19 functionality?

20 A. Alden discloses again in paragraph 61 that "One or
21 more methods employed herein may be used in
22 combination to vary illumination in a segmented
23 system."

24 So for the example that I gave, I think
25 basically one refractor along with LED structure as

1 indicated by the Figure 5 and the 29, paragraph 29,
2 will be sufficient. And this is the disclosure of
3 Alden.

4 Q. Can you turn to Figure 6 and 7 of Alden?

5 A. Yes.

6 Q. Does Alden disclose refractive elements with reference
7 to Figure 6 and 7?

8 A. Figure 6 discloses a "headlight with an
9 electro-chromatic dimming means 131 consists of a
10 light element 129 which emits light which is
11 reflective of a collimating surface resulting in
12 collimated light. The collimated light processes
13 through a segmented array 127 of electro-chromatic
14 cells. Using a switch array similar to 115 and the
15 processes previously described herein, the light
16 intensity flowing through each individual segment is
17 controlled by causing each individual
18 electro-chromatic cell to filter out the desired
19 amount of light such as the distribution of light is
20 dim where a car is sensed and on high beam elsewhere."

21 So for Figure 6, there is a disclosure of
22 electro-chromatic dimming system means 131.

23 Q. Okay. Does Alden disclose combining the Figure 6 and
24 7 embodiments with the Figure 5 embodiment?

25 A. It says -- if we go at the paragraph 13, at the end

1 of -- at the end it says, "Means for sensing and
2 controlling electrical flow. Controlling the
3 electro-chromatic filter array having been previously
4 discussed and not restated to avoid redundancy."

5 Q. So Alden's description in paragraph 61 regarding
6 variations of the different embodiments, would that be
7 applicable to combining Alden's Figure 5 and Figure 6
8 embodiments?

9 A. The POSITA -- it will have been an option for a
10 POSITA. A POSITA also will have understood that Alden
11 in paragraph 31 it says, "Figure 7 is identical to
12 Figure 6 except that the alternate segmented
13 electro-chromatic element 127a is incorporated into
14 the optic."

15 So in other words, proposes something which
16 is improved, because if you look Figure 6, these
17 components were separate, whereas they were separate
18 components in Figure 6. And then in Figure 8, starts
19 talking about an electro-optic cell that the
20 electro-optic cell -- the electro-optic material of
21 Figure 8 in paragraph 33 becomes a liquid crystal.
22 And then Figure 10 has several of this liquid
23 crystals.

24 Q. So based on that disclosure in Alden in paragraph 61,
25 a POSITA would have understood that any of these

1 combinations are options for combining with Figure 5;
2 is that correct?

3 MR. HUGHES: Objection, vague.

4 A. I think 61 epitomizes what has been said eventually in
5 several places starting from Figure 5, paragraph 29.
6 So if we go, for example, all these combinations and
7 all these possibilities, so in fact, let's start with
8 Figure 5.

9 If we go to paragraph 29, it says, "Each
10 switch is controlled by the CPU and logic previously
11 described." So this ties Figures 3, 4, and 5 along
12 with Figure 2.

13 Then if we go to Figure 6, it says, "Means
14 for sensing and controlling electrical flow to
15 (controlling) the electro-chromatic filter array
16 having been previously discussed and not restated to
17 avoid redundancy."

18 This is paragraph 30 at the end.

19 BY MR. TURNER:

20 Q. So had Alden says previously discussed, that's
21 incorporating all the description for all the prior
22 embodiments?

23 MR. HUGHES: Objection, mischaracterizes.

24 A. We have to look at the placement of these statements
25 in the text. So if we look at Figure 5, and its

1 corresponding paragraph 29, each switch is controlled
2 by the CPU and the logic. It's very specific that the
3 CPU and logic previously described.

4 "For example," it goes further, "the power
5 to 119 is controlled by the CPU which dictates its
6 respective switch characteristics at 115 such that the
7 power from a power supply 113 carried via segment wire
8 117 is controlled in response to the sensed
9 environmental conditions. All of the other light
10 elements are similarly individually controlled."

11 So that's one. If we go to the Figure 6,
12 it says, "Means for sensing and controlling." Again,
13 it refers to 3 and 4 for basically controlling the --
14 "for sensing and controlling electrical flow to
15 (controlling) the electro-chromatic filter array
16 having been previously discussed and not restated to
17 avoid redundancy."

18 If you go to Figure 10, it says, "This
19 headlight architecture." This is paragraph 35. "This
20 headlight architecture enables light from an
21 individual headlight distribution sector to be
22 redirected in response to sensed environmental
23 conditions when used in conjunction with the elements
24 and processes previously discussed herein. Thus light
25 from one section," and continues.

1 If we go 36, Figure 11, "The directing of
2 light can be achieved with the segmented sensing
3 elements and segmented light distribution elements
4 described herein."

5 If we look at Figure 12, again, the
6 directing of light, paragraph 37, "the directing of
7 light can be achieved with the segmented sensing
8 elements and segmented light distribution elements
9 described herein."

10 And 38, which is basically look down a
11 hill, paragraph 38, it says, "The directing of light
12 can be achieved with a segmented sensing elements and
13 segmented light distribution elements described
14 herein."

15 So all of them refer to Alden disclosures
16 and in part it's very -- I think it's indicative of
17 the intentions of Alden it says, "have been previously
18 discussed and not restated in order to avoid
19 redundancy."

20 This is the end of paragraph 30.

21 BY MR. TURNER:

22 Q. Okay. All right, so why don't we move to paragraph
23 103 of your declaration. All right, do you see in
24 this section you're analyzing claim 7?

25 A. Yeah.

1 Q. All right, so claim 7, the first line, "The headlight
2 system of claim 1, wherein at least one of the sensors
3 is a camera-sensor."

4 Do you see that?

5 A. Yes.

6 Q. All right, so which feature of Alden are you relying
7 on for satisfying the camera-sensor limitation?

8 A. So first of all, as I say in paragraph 103, "As viewed
9 by a POSITA --"

10 THE COURT REPORTER: I'm sorry, if you can
11 slow down, please.

12 THE WITNESS: Sorry.

13 A. "As viewed by a POSITA, Alden anticipates and renders
14 obvious claim 7."

15 And then Alden discloses that its 'sensors'
16 include a lens that directs light to photodiode arrays
17 or CCD detectors 51 (i.e., 'camera sensors')
18 configured to image lights of oncoming vehicles having
19 drivers whose visions could be disturbed by the glare
20 of the headlight beam. (Figures 2 and 3.) See also
21 the analysis in paragraph 62-70 (Claims 1[E] - 1[F]).
22 A POSITA would have known that a photodiode array or a
23 CCD detector can be viewed individually as essential
24 parts of a camera sensor since they both capture and
25 convert light to electrical signals, which then are

1 processed to become images. For example, a photodiode
2 array has a set of photodiodes where each one of them
3 acts as a pixel that captures the light and transforms
4 it to electrical signals. These signals from all the
5 photodiodes are collected and processed in order to
6 create the images."

7 BY MR. TURNER:

8 Q. All right, so when you refer to these --

9 A. Sorry, can I -- because there is another element. I'm
10 saying second, may I continue?

11 Q. Sure.

12 A. It's important.

13 Q. Sure.

14 A. "Alden further discloses that CPU logic controller
15 ('logical controller'), or processor, receives data
16 from these camera sensors containing 'illuminated
17 spots' indicating the position of the lights of the
18 oncoming vehicle."

19 Q. Okay, so are you relying on the CPU logic controller
20 for satisfying the camera sensor limitation?

21 A. This is not what I said.

22 Q. Okay.

23 A. First I'm saying I have a lens that directs light to a
24 photodiode array or a CCD detector. When I see this
25 in figure -- in Figure 2, there is the sensor element

45 mounted on the vehicle 47, I see a lens, I see an array, I see an object, and I see the images, 51a and 51b. To me this is a camera and also the text I just mentioned. For a POSITA it is a camera.

Q. Okay, so the camera includes the lens which is -- is it a reference numeral --

A. 49 in Figure 2.

Q. Okay. So the reference to the Figure 5 embodiment, would that lens 121 be part of the camera sensor also?

A. This is a headlamp lens. This is -- if we look at 49, let me go back.

Q. So you're saying in Figure 2 that's a separate lens than the lens that's shown in Figure 5?

A. It's shown -- it's a lens element that is showing its function is part of the camera.

Q. Okay.

A. So for example, if we go to paragraph 26 to answer your earlier question, it says, "51 is a photodiode array (or an alternate means of directing photon intensity such as a CCD)."

In other words, it's not only we have a lens, we have a light that comes from the vehicle 41, this light is the light 43 which passes through a primary lens 49, therefore converging. So any POSITA when he reads this text will automatically view this

1 as a camera system.

2 "The 43 falling upon one or more sectors
3 within a detector array where it is detected. The 51
4 is a photodiode array (or an alternate means of
5 detecting photo intensity such as a CCD). 49 and 51
6 being elements of a sensor unit 45 which is mounted on
7 an equipped automobile 47 (47 being a part of the
8 automobile--the fill automobile is not shown). The 51
9 converting photons to electrons which are sent by a
10 ribbon cable 53 into a light control circuit including
11 logic and memory 55. 55 is further described in
12 Figure 3." And continues, "55 controls with
13 segments of a segmented beam headlight 61 are on low
14 and which are on high."

15 Q. All right, can you turn to paragraph 113 of your
16 declaration?

17 A. Yes, I'm there, yes.

18 Q. So you see this is your analysis of dependent claims
19 15, 21 and 32 through 33?

20 A. Yes.

21 Q. All right. So the heading here, the system of claims,
22 so it looks like you combined multiple claims here,
23 but this is claims 1 and 20, "wherein the [logical
24 controller/processor] is further configured to
25 determine at least a road curvature, indicated by the

1 sensor data, ahead of the vehicle and [wherein the
2 required illumination includes increasing
3 illumination/to direct the control circuitry to adjust
4 the directional light sources] in a direction of the
5 road curvature."

6 Do you see that?

7 A. Yes.

8 Q. So what disclosure in Alden are you relying on for
9 disclosing these limitations?

10 A. So I'm talking by looking at the 15, 21. Okay.

11 So paragraph 113, it says, "Alden discloses
12 that its segmented light system, including the CPU
13 logic controller 71 in detector arrays 51, can be used
14 to 'concentrate light to look around corners in
15 response to road conditions.' It does this by, for
16 example, sensing 'that the road turns by receiving
17 light from reflectors such as a reflector 157.'" This
18 is Figure 11.

19 "As illustrated in Figure 11 above, Alden
20 discloses that a vehicle equipped with the 'segmented
21 sensing elements and segmented light distribution
22 elements described' therein 'senses that the road
23 turns by receiving light from reflectors such as a
24 reflector 157.'" This is paragraph 36. "This sensor
25 information is used by the controller such that the

1 'responding headlights 155'" as demonstrated in Figure
2 11, "'direct light into the corner to maximize the
3 driver's ability to see there.' This is paragraphs 36
4 and 26-29. See also supra claim 1[D], paragraphs
5 63-70 claim 1[F]. By directing light into the corner,
6 or curve of the road, to maximize the driver's ability
7 to see there, the system is increasing illumination
8 (or adjusting the directional light sources) in the
9 direction of the road curve. For example, Alden can
10 recognize the curve, determine which segments of the
11 light distribution area of the headlight lie along the
12 curve, and then switch the lighting segments that
13 direct light to those segments to be on high beam.
14 This can be considered in reference to Figures 3 and 5
15 of Alden."

16 I can continue if --

17 Q. No, that's okay.

18 So farther down below in that paragraph,
19 you have a sentence here, "Further, a POSITA would
20 have understood from Alden that when positioning LEDs
21 along the curve structure in the headlamp, such as
22 shown in Figure 5, LEDs could be positioned to ensure
23 that the beam created by the headlamp is sufficiently
24 wide to illuminate turns."

25 Do you see that?

1 A. Yes.

2 Q. Are you proposing adding additional LEDs to what's
3 shown in Figure 5 or you're saying that's what is
4 shown in Figure 5?

5 A. I say such as shown in Figure 5.

6 Q. Okay.

7 MR. HUGHES: Counsel, whenever we get to a
8 point for a break, I think we could use about 5 or 10
9 minutes.

10 MR. TURNER: Yeah, about -- I think we'll
11 get through this claim in another 5 or 10 minutes.

12 MR. HUGHES: Thank you.

13 MR. TURNER: Yep.

14 BY MR. TURNER:

15 Q. All right, so now in paragraph 114, let's see, so
16 about halfway through you say, "Thus, when a driver
17 turns her steering wheel before moving in anticipation
18 of an upcoming turn, Alden's system 'increases
19 illumination illuminating the turn.'"

20 Can you explain that, what you mean by that
21 sentence?

22 A. I think before the dots we need to follow the argument
23 from the start. So if we look at the 114, I'm saying,
24 "Alden discloses that its system can include a
25 'rotation sensor' in the steering wheel that can

1 further detect when a vehicle is planning to turn.
2 (Alden paragraphs 39-40, Figures 14-15). For example,
3 the steering wheel sensor would indicate that the
4 driver has turned the wheel by a certain amount,
5 indicating that the vehicle will be making a turn
6 corresponding to the amount the wheel was turned. In
7 particular, as the steering wheel 'rotates X degrees,'
8 the system calculates the new intended direction of
9 the vehicle and 'changes the direction of the
10 headlight output 197 and corresponding 'f(x)'
11 degrees.' Thus, when a driver turns her steering
12 wheel before moving, in anticipation of the upcoming
13 turn, Alden's system 'increases illumination
14 illuminating the turn.'"

15 So we have the reflectors, we have the
16 steering wheel, the automatic system, which is
17 proposed by Alden, or whoever who have described in
18 Figures 2, 3, 4 and 26 and 29, it basically is going
19 to increase the illumination towards the turn, because
20 otherwise, we're going to crash. The driver is going
21 to crash. So as I'm getting older, I'm trying to
22 increase the illumination along the curve because I
23 don't want to be without information about the sensor.
24 The POSITA will understand that a curve is a dangerous
25 situation and having more information about the sensed

1 environment and more complete models, this will have
2 been the preferred way of acting. And how Alden's
3 system will do this will increase illumination towards
4 the curve.

5 Q. So you're saying --

6 A. If I can -- sorry, sorry to interrupt, if I may.

7 And I add that one example of this will be
8 when a driver is at the stop light or a stop sign, as
9 a POSITA will do oftentimes, the driver will turn
10 their wheel before giving the vehicle gas so as to be
11 ready to turn after oncoming traffic has passed.

12 "In this example the system of Alden will
13 anticipate the upcoming turn and increase illumination
14 in the anticipated new direction of the vehicle so
15 that that area will be illuminated before the driver
16 makes a turn and heads in that direction."

17 Q. So are you describing a situation where the car is
18 stopped and you're turning your steering wheel to turn
19 the wheels while your vehicle is stopped?

20 A. What I'm saying, in order to highlight the point, in
21 anticipation of a turn, and to simplify the thing so
22 we don't have the velocity as a component, because a
23 curve is a different -- it's a -- it's a major
24 objective, look around the curve, is a major objective
25 of Alden. One is actually reducing the glare for when

1 you have oncoming vehicles and maximize the
2 visibility, but the other one, which is the second
3 objective, is basically to deal with curves. So what
4 I try to show here are the steps based on not only the
5 reflector information, and I can go how these
6 reflectors are detected by using the Figures 3 and 4,
7 but instead of detecting -- instead of detecting
8 vertically headlights, we detect reflectors, and
9 instead of dimming the lights where the headlights
10 are, we do the opposite, which actually is increasing
11 the light, I'm trying to say that this is a POSITA --
12 this is the way that the POSITA will have understood
13 how Alden's system operates in this situation and as
14 described in paragraphs 36 and 39-40.

15 Q. So you're describing this situation where a driver's
16 at a stop light, they turn their wheel while the
17 vehicle's not moving before giving the vehicle gas,
18 and they're ready -- so they turn their wheel and
19 you're saying that by turning their wheel, Alden will
20 start illuminating the curve based on that steering
21 wheel?

22 A. Based on the location, at least a POSITA will do that.

23 Q. So the driver turns their wheel while they're waiting
24 for the oncoming traffic to pass, that's the scenario?

25 A. Yeah, and it's called -- in traffic engineering called

1 measuring the gap. So basically imagine a left turn
2 at the stop sign, basically waiting for ongoing
3 traffic to pass -- for oncoming traffic to pass.
4 Imagine that you are ready, your sensors, your eyes,
5 in this case the camera, will sense the gap, will
6 estimate how much time you need in order to make the
7 turn, and basically you need to have increased
8 situational awareness, and this is basically what I'm
9 describing here.

10 Q. So if you turn your steering wheel while you're
11 waiting for the oncoming traffic to pass, what happens
12 if you're rear-ended?

13 A. You are at the stop sign or basically you are waiting
14 so you assume the other driver or the POSITA will wait
15 behind you.

16 Q. So if you are rear-ended, will that push your car
17 right into oncoming traffic?

18 A. One way or another, I think you are going to be pushed
19 forward.

20 Q. But if your wheels are turned, would you go right into
21 oncoming traffic?

22 A. I mean, what the POSITA will do at that time is --
23 actually will make a light turn. For example, there
24 are European manufacturers which are using the fog
25 lights to be activated as soon as the steering wheel

1 is turned, so a POSITA will make a light turn in order
2 to be ready to cross.

3 Q. Okay, I'm just remembering back my driver's ed days,
4 so that was one thing my driver's ed teacher said,
5 don't turn your wheels, you get pushed right into
6 oncoming traffic, so that's my frame of reference. We
7 can move on.

8 All right, can you turn to --

9 MR. TURNER: Actually we were going to take
10 a break; right? So let's -- why don't we take a break
11 here.

12 (A brief recess was taken.)

13 BY MR. TURNER:

14 Q. All right, welcome back.

15 A. Thank you.

16 Q. All right, so now if you could turn to paragraph 127
17 of your declaration. And so now this -- do you see
18 you're analyzing claim 5?

19 A. Just give me one minute. Yeah. Yes.

20 Q. And I guess if we just scroll up to the prior page, so
21 above paragraph 125, you see that you're analyzing
22 Ground 2 here?

23 A. Yeah.

24 Q. So here it's a combination of Alden and Harbers for
25 these claims?

1 A. Yes.

2 Q. Okay. So now for claim 5, you see the last line of
3 this claim in the heading shows that -- requires
4 different color of light from another of the at least
5 two subsections?

6 A. Yes.

7 Q. Okay. So are you relying on Harbers for this
8 different color limitation?

9 A. Just one minute, let me refresh my memory.

10 So basically if you go at the end of
11 paragraph 127, Alden specifically mentions in
12 paragraph -- it mentions that the system can include
13 white LEDs and alternating light mechanisms.

14 So -- but it does not expressly say this
15 alternate night mechanisms include color LEDs.
16 Harbers being in the same field of art as Alden
17 discloses with headlamps comprised of a plurality of
18 controllabilities, and I think it's indicative, if you
19 go in paragraph at the end of paragraph 129, Figure 1b
20 annotated, which shows blue for the side and white or
21 yellow for the on-axis light. And basically the idea
22 is the following, is that Harbers teaches off-axis and
23 on-axis beam sections -- I'm on paragraph 131. Beam
24 segments have different spectrum characteristics so
25 that objects situated outside the center of the light

1 beam are better observed. This is 9:28-10:5;
2 2:33-3:10, 4:33-5:26, from Harbers, 6:1-7, 9:1-27, and
3 5:21-26.)

4 So basically, "Again, the on-axis beam
5 segments are being projected along the road in front
6 of the driver, while the off-axis beams are directed
7 towards the sides of the road. Indeed, a POSITA will
8 have understood that this could be easily achieved by
9 including particular colors LEDs, as taught by
10 Harbers, at particular locations along the curve in
11 Alden's Figure 5 headlight to produce 'blue' light in
12 portions of the beam that are off-axis and directed
13 toward the side of the road, while including yellow
14 light in the main, or on-axis portions of the
15 headlight distribution area." And I have the "Figure
16 5 (annotated)."

17 Q. Okay. So in your annotated Figure 5, the ones that
18 you -- the LEDs that you annotated in blue, so those
19 are providing off-axis lighting?

20 A. Yeah, the blue light as demonstrated in Figure 1b
21 annotated in -- at the end of paragraph 129.

22 Q. So you're proposing replacing the LEDs -- the lighting
23 elements that are colored in blue with the Harbers
24 blue LEDs; is that correct?

25 A. I'm not proposing, I'm just saying a POSITA will have

1 used the teachings of Harbers in the Alden system in
2 order to have better visibility of the side of the
3 road and -- better visibility of a road basically.

4 Q. Okay, so what are you changing in the Alden Figure 5
5 embodiment?

6 A. So I'm just -- by capitalizing on the other -- Alden
7 discloses, as I mention in paragraph 127, of why that
8 each system can include "white LEDs" and "alternate
9 lighting mechanisms."

10 So what I'm saying is actually -- if you
11 look at the Figure 5 annotated, at the end of
12 paragraph 131, I'm just using instead of a white LED,
13 I'm using a blue LED. In fact, if you see the LEDs, I
14 either blue or ultraviolet that for the surface and
15 then without the white LED that comes out.

16 THE COURT REPORTER: Did your say white or
17 Y?

18 THE WITNESS: So basically you have either
19 blue or UV, ultraviolet.

20 THE COURT REPORTER: Thank you.

21 A. And then falls on the forceful substrate and produces
22 the white color of the LED.

23 BY MR. TURNER:

24 Q. Are you saying that you're modifying Alden to include
25 Harbers' blue LEDs but it still produces white light?

1 A. No, what I'm saying is actually if you look at 133,
2 "Moreover, such use of color LEDs would have been the
3 simple substitution of one known element (color LEDs)
4 for another (generically-recited LEDs) in a similar
5 system, which system will now have the ability to
6 control an additional lighting characteristic to
7 further improve driver visibility."

8 Q. Okay, so by using such color LEDs, are you adding LEDs
9 to the embodiment or you're replacing existing LEDs
10 with these blue and yellow ones?

11 A. I'm saying subs -- it will have been the simple
12 substitution.

13 Q. Okay.

14 A. But at least this is what the POSITA would have done.

15 Q. Okay. So if a POSITA would have changed the LEDs,
16 would they have needed to make any other changes like
17 to the optics or controls, the software?

18 A. I don't believe so. At least with my knowledge as a
19 POSITA at that time, 2002.

20 Q. All right.

21 Now, would this embodiment still include
22 that refractive element that we talked about before,
23 the Figure 5 embodiment, adding that refractor --
24 refractive element?

25 MR. HUGHES: Objection, vague.

1 A. Let me think. I don't believe there is any other
2 change needed for I believe the POSITA at that time.

3 BY MR. TURNER:

4 Q. All right, can you turn to paragraph 136, please?

5 A. I'm there.

6 Q. All right. So for this -- this is your Ground 3
7 analysis where you have Alden in view of Bergkvist --
8 Bergkvist. What are you relying on this Bergkvist
9 reference for teaching?

10 A. So I'm going to paragraph 136 where it says, "To
11 ensure sufficient illumination of roadside objects,
12 Bergkvist discloses a headlight that produces both
13 visible light and ultraviolet light, so that roadside
14 objects (such as signs) 'glow' when illuminated with
15 UV."

16 This information comes this disclosure
17 comes from the abstract of Bergkvist, column 2, row 7
18 to 23, column 2, rows 40 to 60, and column 3, 66 to
19 4 -- column 4, 44.

20 Now, "A POSITA would have known that UV
21 light is associated with a phenomenon called
22 fluorescence. It's associated with certain materials
23 that can absorb UV light and then re-emit it in the
24 visible range. The visible range has a longer
25 wavelength than the UV range."

1 So for example, if you look -- a visible
2 range is around 700 meters to 750, I believe. And the
3 UV range is either -- has basically a shorter
4 wavelength. Other visible objects appear suddenly to
5 glow.

6 "Bergkvist discloses that by including a UV
7 light source in the headlight, the driver will
8 'observe' objects like road signs and pedestrians
9 'despite said objects being located in an area not
10 irradiated by visible light."

11 So think of the following. A POSITA who
12 walks a dog at night or a construction worker wears
13 this yellowish fabric in order to increase visibility.
14 When you have a UV light, then the cognition or the
15 identification of signs and pedestrians and other
16 objects will be more successful and more pronounced.

17 Q. All right, so are you proposing replacing all of the
18 Alden LEDs with UV lights or these are additional LED
19 lights or additional light sources?

20 A. I believe 137 has -- let me just read it.

21 If we go to paragraph 137, I'm saying,
22 "Including such a UV light source will have been well
23 within the skill of a POSITA, as it would merely
24 require adding a known element for its intended
25 purpose in a headlight that is already made up of a

1 plurality of light sources and that can already use a
2 variety of 'lighting mechanisms.'

3 Again, this is directly from Alden where he
4 speaks about white LEDs and not an alternative
5 lighting mechanism.

6 "That headlight system of Alden already
7 includes a number of disparate components that can,
8 together, be mounted or affixed to a vehicle. Thus, a
9 POSITA could have easily included a UV light source
10 within the headlight system of Alden and would have
11 further been able to direct the UV light source
12 towards the side of the road, so that its emitted UV
13 light would be incident upon the roadside objects,
14 such as signs, painted lines, and pedestrians, that
15 Bergkvist indicates should be illuminated so they are
16 more visible to the driver. Moreover, a POSITA will
17 have been motivated to include at least one UV light
18 source in the array of Alden in order to have light
19 outside the visible range," such as in the case of UV
20 light, "such that it is not distracting to other
21 drivers or pedestrians but can still illuminate
22 reflective materials such as road signs or markings.
23 Because UV light is outside the visible spectrum, it
24 is not detected by the human eye."

25 Q. When you say that a POSITA would have included this UV

1 light source within the headlight system of Alden, do
2 you mean you would mount this UV light within the
3 Figure 5 headlamp assembly or it would be mounted
4 elsewhere?

5 A. I think the easiest will be, as I mentioned earlier,
6 9 LEDs are based on either blue or UV, so the easiest
7 thing is actually to just bend it in the existing
8 array. You just replace one of the LEDs with a UV
9 light.

10 Q. Okay. And would you need to modify any of the optics
11 or controls to have that UV light?

12 A. No. In fact, you just add it there, be continuously
13 on, because you only increase visibility and this is
14 not visible by oncoming vehicle drivers.

15 Q. And I think you mentioned -- so you want to direct
16 this off-road, this is for illuminating signs off the
17 road is; is that correct?

18 A. Signs, markings, individuals on sidewalk, roadside
19 objects. This is basically -- Bergkvist states to
20 ensure -- this is my paragraph, 126, to ensure
21 sufficient illumination of roadside objects, Bergkvist
22 discloses a headlight that produces both visible light
23 and ultraviolet light.

24 Q. So if this is directed off-road, would you be using
25 one of the refractive elements or different optic to

1 direct it off the road?

2 A. I don't think you need this at this stage. The
3 limitation of UV light is actually you need to
4 capitalize on this phenomenon that's called
5 fluorescence. In other words, if I'm walking on the
6 side of the road with black colors, I won't be
7 detected. So a POSITA will have understood at that
8 time we want to focus on objects that have material --
9 the kind of material they wear material that can
10 capitalize on the interaction of the material with the
11 ultraviolet wavelength light.

12 Q. So you're saying UV light won't illuminate dark
13 colors, it will only illuminate something that has
14 reflector or fluorescence on them?

15 A. Yes, capitalize basically on certain materials that
16 can absorb the UV light and then in the immediate
17 visible range. And this was well understood by a
18 POSITA at that time.

19 Q. All right, can you turn to paragraph 145 of your
20 declaration?

21 A. Give me a minute. Yes.

22 Q. All right. So here you're analyzing a claim or claims
23 that include the limitation, the laser diode; do you
24 see that?

25 A. Yeah.

1 Q. So you're relying on the Beam reference for teaching
2 laser diode; is that correct?

3 A. Give me a minute just to read it.

4 Yes.

5 Q. All right, so you see --

6 A. So --

7 Q. Sorry, go ahead.

8 A. Yeah, basically the "Claims 18 and 24 merely add that
9 the light source can be a laser diode, a 'lighting
10 mechanism' for --"

11 THE COURT REPORTER: I'm sorry, can you
12 slow down, please?

13 A. "Claims 18 and 24 merely add that the light source can
14 be a laser diode, a 'lighting mechanism' called for
15 headlights that was well-known in the art. As
16 explained, Beam, like Alden, disclosed a system
17 controlling headlight output patterns in particular
18 areas to eliminate the blinding of a driver in
19 oncoming vehicle while continuing to provide intense
20 forward illumination, which system can include sensors
21 and a plurality of individually-controlled light
22 sources. See supra 138 -- paragraphs 138-144, claim
23 8."

24 And "Beam further discloses that its light
25 sources can include LEDs or an array of lasers ('laser

1 diodes') (Beam, Claims 4 to 5). Thus, Beam recognizes
2 that LEDs and lasers, which are emitted from laser
3 diodes, are an alternative known 'lighting mechanisms'
4 that can be used in an array to generate a
5 controllable headlight beam. A POSITA would have
6 known that laser light in automotive headlight
7 applications is produced by a laser diode which is a
8 semiconductor device. The laser light is created when
9 an electric current passes through the laser diode.
10 Lasers using headlights can provide several advantages
11 since laser offers longer reach, energy efficiency,
12 and improved visibility."

13 So, for example, a laser can produce
14 basically in comparison to LED sometimes more lumens
15 at half the power.

16 Q. Okay, so you're proposing -- or sorry, strike that.

17 So your first sentence of paragraph 147 you
18 say, "It would have been obvious to a POSITA to modify
19 Alden to include laser diodes instead of LEDs as light
20 sources."

21 Do you see that?

22 A. Give me the paragraph.

23 Q. Sorry, that's 147, the first paragraph -- or the first
24 sentence.

25 A. Yeah.

1 Q. So when you say modify Alden to include laser diodes
2 instead of LEDs as light sources, you're proposing
3 replacing all of the LEDs of Alden with these laser
4 diodes; is that correct?

5 A. Not necessarily. For example, I'm going back to this
6 issue of curve. Some of the LEDs that cover the
7 curve, like the ones we discussed on the opposite side
8 of the element 119, can be used. Basically I'm saying
9 that's using laser -- this is 147, "using laser diodes
10 instead of LEDs as the light sources in Alden would
11 have simply been the replacement of one known
12 component for another. Indeed, with reference to
13 Figure 5, Alden specifically says that each lighting
14 element 119 can be a 'white LED or alternate lighting
15 mechanism).' (Alden, 0029.) Moreover, a POSITA would
16 have a reasonable expectation of success in using
17 laser diodes instead of LEDs, as the system of Alden
18 would continue to work the same if laser diodes were
19 used. For example, the system will continue to sense
20 the lights from other vehicles and adjust light
21 outputs in different portions of the headlight
22 distribution area in response, by controlling
23 individual lighting elements as disclosed in Alden."

24 Q. So with the laser diodes, changing those -- sorry,
25 strike that.

1 So in your proposal to replace LEDs with
2 laser diodes, would you need to change any other
3 components of the Alden headlamp assembly such as
4 optics, electronics, the driver, software?

5 A. Not really except reducing -- you don't need the same
6 current, as I mentioned earlier, the same power to go.

7 Q. So if you don't use the same power, if you had a mix
8 combination that had both LEDs and laser diodes, would
9 you use the same driver to control both?

10 MR. HUGHES: Objection, vague.

11 A. I will use the same architecture. In fact, lower
12 current is not an issue. The problem -- the problem
13 is if you send -- I mean, if you send more current
14 through the LEDs, you may destroy them, so I think you
15 don't need any changes at that point. A POSITA would
16 have viewed this as no change, because as I mention,
17 you achieve thousands times more lumens at half the
18 power.

19 BY MR. TURNER:

20 Q. Okay. And the optics are the same too, you wouldn't
21 have to change those?

22 A. I believe so.

23 MR. TURNER: All right, do you want to take
24 a 5-minute break? I'm just going to switch to the
25 other declaration. Do you -- do you have the other

1 declaration?

2 THE WITNESS: Give me one minute.

3 MR. TURNER: If you don't mind, why don't
4 we take a 5-minute break?

5 THE WITNESS: Yeah, let's take a 5-minute
6 break.

7 MR. TURNER: Okay, thank you.

8 (A brief recess was taken.)

9 BY MR. TURNER:

10 Q. All right, well, welcome back.

11 So did you -- were you able to locate your
12 declaration for the 027 IPR?

13 A. Yes, this one covers claims 37-67.

14 Q. 37 through 70?

15 A. 67.

16 Q. Okay.

17 A. Sorry, 70, yeah.

18 Q. I think that's what is on the front cover.

19 A. Yeah, yeah.

20 Q. Okay. And I think -- we can skip past that.

21 Let's see, can you turn to -- let's see, so
22 page 20.

23 A. Page 20.

24 Q. Yeah.

25 A. Do you have a paragraph?

1 Q. I think it's 44. No, that's not it. Oh, sorry,
2 paragraph 50, please.

3 A. This is independent claim 37.

4 Q. Correct.

5 A. Yes.

6 Q. All right, so for this ground you're relying on Alden
7 alone or in combination with Stam, and you say that
8 anticipates and renders obvious claims -- that series
9 of claims.

10 A. Uh-huh.

11 Q. So what are you relying on the Stam reference for
12 teaching for Ground 1?

13 A. Give me a minute.

14 So let's go to paragraph 69 where I say,
15 "Moreover, Alden in view of Stam renders claim 37[E]
16 obvious with respect to the 'predefined threshold
17 value' element."

18 And I say I have reviewed Stam, I say when
19 it was published, is the same field.

20 Q. So you're relying on Stam for the predefined threshold
21 value limitation?

22 A. Yes. In particular, if we go to paragraph 70, I'm
23 saying, "Stam further disclosed that predefined
24 illuminance threshold values can be considered in
25 setting the illuminance of low and high beams."

1 Column 1-16 until column 2-5.

2 "Stam notes that, in fact, governments have
3 laws and regulations that limit the intensity of
4 vehicle headlamps, including to control the amount of
5 glare experienced by drivers of other vehicles. Stam
6 gives an example limiting headlight illuminance to
7 below a threshold of '0.1 footcandles' incident on
8 other vehicles, in order to avoid causing them glare
9 and to comply with Department of Transportation
10 regulations. Stam notes that when no other vehicles
11 are present, the lights can be on high beam and above
12 the 0.1 footcandles threshold."

13 And then I elaborate more. Stam, in 71,
14 I'm saying this predefined illuminance threshold
15 value, it will have been obviously included in a
16 system of Alden. Including such a threshold will have
17 required nothing more. 71-72 gives more details about
18 why combining, looking at both Stam and Alden, I
19 inform a POSITA about this predetermined threshold.

20 Q. All right, so this modification, would you have to
21 modify anything with Alden, any of the hardware or
22 software to accommodate this combination?

23 A. Nope.

24 Q. And is the Alden's already, when it sensors, is it
25 detecting based on footcandles as the units for

1 illuminance?

2 A. Can you repeat?

3 Q. So the threshold value from Stam is in -- it's in
4 footcandles; is that correct?

5 A. Uh-huh.

6 Q. And that refers to an illuminance value? Is the Alden
7 reference already evaluating the illuminance value in
8 footcandles for the detected light?

9 MR. HUGHES: Objection, vague.

10 A. What I'm saying is actually we want to reduce glare.
11 In other words, we want to have -- Stam provides a
12 specific value in order to avoid causing glare and to
13 comply with the Department of Transportation
14 regulations. This is the Federal Highway Safety
15 Board.

16 So it says, "Stam notes that when no other
17 vehicles are present, the lights can be on high beam,
18 and above the 0.1 footcandles threshold."

19 When basically a vehicle is detected, when
20 it go -- to avoid glare -- when it go below 0.1
21 footcandles.

22 BY MR. TURNER:

23 Q. And Alden is already analyzing detected light
24 according to its footcandles, its illuminance measured
25 in footcandles; is that correct?

1 A. No, this is incorrect. Alden measures by using the
2 computer vision methods we discussed earlier, finds
3 the headlights, the footcandles applies on the
4 segmented -- on the automatic segmented headlight
5 system of Alden. It basically tells you that in low
6 beam you cannot exceed 0.1 footcandles.

7 Q. So are you relying on Stam for teaching any other
8 limitations in Ground 1?

9 MR. HUGHES: Objection, vague.

10 A. I think Stam discloses -- first of all, "Stam, in the
11 same field as Alden, similarly discloses vehicles with
12 headlamps containing individual light sources that can
13 be controlled to change brightness and beam patterns
14 based on detected objects, so as to 'maximize the
15 illuminated area in front of the vehicle without
16 causing excessive glare in the eyes of other
17 drivers.'" This is in the abstract of Stam. "Like
18 Alden, Stam also receives data from sensors, and
19 controls the headlights to 'control their beam
20 patterns in response to objects detected' in the
21 vicinity of the vehicle."

22 Also, "Stam discloses that the light output
23 of the headlights 'may be varied by changing the
24 illumination output of one or more lights forming the
25 headlights, ... activating or deactivating some or all

1 of the lights, altering the illumination pattern
2 forward of the vehicle, or a combination of the
3 above.'"

4 BY MR. TURNER:

5 Q. Okay, so are you relying on Stam for teaching any
6 other limitations of Ground 1?

7 A. So Stam discloses that "predefined illuminance
8 threshold values can be considered in setting the
9 illuminance of low and high beams." And also notes
10 that "governments have laws and regulations that --"

11 THE COURT REPORTER: I'm sorry, governments
12 have what?

13 A. "Laws and regulations that limit the intensity of
14 vehicle headlamps, including to control the amount of
15 glare experienced by drivers of other vehicles."

16 BY MR. TURNER:

17 Q. All right, so you were reading the abstract of Stam
18 right there; is that correct?

19 A. I believe -- yeah, let me check, let me check, one
20 minute, let me check Stam.

21 Yeah, I'm reading from the page which has
22 in Mercedes Exhibit 1010, it has a page number 2 out
23 of 159. And I'm reading the fourth paragraph. "Known
24 vehicle beam headlamp --"

25 THE COURT REPORTER: I'm sorry, but you're

1 going to have to slow down. I can't understand you
2 when you speak fast.

3 A. So I'm basically on Exhibit Mercedes EX 1010, Bates 2
4 out of 159, the title on the page system for
5 controlling exterior vehicle lights. Background of
6 the invention. And 1, 2, 3 -- I'm reading third
7 paragraph, laws and various government regulations on
8 illuminance and "vehicle manufacturers must build cars
9 that comply with these regulations. For example, a
10 regulation set forth by the United States Department
11 of Transportation and regulate the light emissions of
12 the vehicles high beam headlamps."

13 That mentions various state regulations are
14 used to determine the amount of glare experienced by
15 drivers. Continues and in the fourth paragraph it
16 says, "An example of an admission part admitting these
17 regulations is illustrated in Figure 1 of U.S. Patent
18 Number 5,837,994 entitled control system to
19 automatically dim vehicle headlamps issued to Joseph
20 Scott Stam, et al., on November 17, 1998. In order to
21 avoid illuminance of 0.1 footcandles on another
22 vehicle at these angles the vehicle high beam head
23 lams should be dimmed within 700 feet of another
24 vehicle."

25 And then continues with more details on

1 that.

2 BY MR. TURNER:

3 Q. Okay. So you're reading from page 1 of Stam, the
4 introduction here to Stam?

5 A. It says background of invention.

6 Q. Okay. But back to what you're relying on from Stam,
7 what you're relying on Stam for, for teaching
8 different limitations of Ground 1, is it just -- it is
9 the threshold limitations we were talking about?

10 A. Not only this, but also the overall operation of Stam.

11 Q. Okay. And where do you reference that in your
12 declaration?

13 A. I'm starting from paragraph 69, which is, "Stam, in
14 the same field as Alden, similarly discloses vehicles
15 with headlamps containing individual light sources can
16 be controlled to change brightness and beam patterns,"
17 the stuff I read earlier, and this continues
18 throughout 69, and then on 70 I'm saying, paragraph
19 70, "Stam further discloses that predetermined
20 illuminance threshold values can be considered in
21 setting the illuminance of low and high beams."

22 Q. Okay.

23 A. And then I'm continuing throughout 70 with mostly
24 information from the background of invention, and then
25 in 71 I'm saying, "It would have been obvious to

1 include such a predefined illuminance threshold value,
2 such as of 0.1 footcandles, in the system of Alden.
3 Including such a threshold value would have required
4 nothing more than setting a predetermined illuminance
5 level to 'control the amount of glare experienced by
6 drivers' as taught by Stam--an issue already focused
7 on by Alden. A POSITA would have also had a
8 reasonable expectation of success and been motivated
9 to use such a predetermined value as told by Stam
10 since Alden and Stam are in the same field."

11 And continue by saying about Alden, "In
12 particular," I'm saying, "The controllers in Stam
13 would be able to apply appropriate power to the
14 lighting elements for sectors of the headlight
15 distribution area where other vehicles are present
16 with 'low beam' light that will not cause glare, while
17 powering light elements illuminating sectors with no
18 other vehicles to emit light with an intensity higher
19 than the predetermined threshold to maximize
20 visibility."

21 In 72 I'm saying, "A POSITA would have had
22 a reasonable expectation of success," and I explain
23 this, and also I explain why "a POSITA would have been
24 motivated to use such a predetermined illuminance
25 threshold value," since this is a heavily regulated --

government regulated area.

Q. Okay. All right, can you turn to paragraph 137, please?

A. One -- paragraph 137?

Q. Yes.

A. Yes, I'm there.

Q. Okay. So this is your Ground 4 analysis where you have Alden or alternatively Alden in view of Stam in view of Beam for claims 48, 57 and 63; do you see that?

A. Yes.

Q. Okay. So what are you relying on the Beam reference for for this ground?

A. Give me a minute to read it.

So my explanation starts by saying that "As viewed by a POSITA, Alden (alone or as modified by Stam) in view of Beam renders obvious claim 48."

"Dependent claim 48 is nearly identical to dependent claim 47, but says that instead of detecting an oncoming vehicle, the system detects lights indicative of a 'preceding vehicle' and adjusts the beam to decrease at least one 'vision-disturbing characteristic' to the driver of the preceding vehicle."

I explain what is an oncoming vehicle and

1 I'm saying that the "preceding vehicle is one that is
2 traveling the same direction as the one driven by a
3 driver."

4 I continue explanations and I'm saying the
5 preceding vehicle will be -- would "be ahead of the
6 driven vehicle, such that its brake or rear lights are
7 visible. Alden discloses the elements of claim 48 for
8 the same reasons as discussed with respect to claim
9 47." Claim 47.

10 And it says that "Beam," in 138, "discloses
11 a system for controlling vehicle headlights, in which
12 headlight output patterns in particular areas are
13 controlled or changed to eliminate 'the blinding of a
14 driver in an oncoming vehicle, while continuing to
15 provide forward illumination.'"

16 Q. You're reading -- this is paragraph 138 in your
17 declaration; is that correct?

18 A. 138.

19 Q. Okay.

20 A. So "Beam describes a vehicle that uses a 'sensor 107'
21 to detect light from other vehicles. The sensor data
22 is used by a controller 108 to adjust the output of a
23 plurality of individually-controlled light sources, or
24 'microbeams.'"

25 In 139 paragraph, "Beam recognizes that

1 headlights can cause glare, or 'dazzle,' that impacts
2 not only drivers of oncoming vehicles, but also
3 drivers of preceding vehicles 'when reflected by a
4 rearview mirror.' (Column 4:9-25, column 4:45-59,
5 column 6:61, 'til column 7, row 8.) That is, glare
6 can be caused not only by bright lights shining
7 directly into the eyes of another driver, but also the
8 light that is emitted from behind the other driver's
9 car and then it reflects into the eyes of that driver
10 off the rearview mirror. Thus, Beam discloses that
11 lights from both the headlights of oncoming vehicles
12 and the taillights of preceding vehicles can be
13 detected, and the output of the headlight controlled
14 to darken light directed to the areas of the sensed
15 oncoming and preceding vehicles."

16 And I have the references at the end of
17 paragraph 139.

18 Q. All right, so how does Beam distinguish between a
19 headlight and a taillight?

20 A. I think the combination goes back to the issue of
21 Alden and Beam. Alden by using these threshold values
22 in Figure 3 can do basically this differentiation, so
23 I think the combination with Beam can allow, because
24 they are in the same field and is applying known
25 methods, so on and so forth as I explain.

1 So Beam talks about a system that
2 automatically -- paragraph 140 of my declaration,
3 "'automatically sens[es] the presence and location of
4 headlights and taillights ahead of the car on which it
5 is mounted,' and then controls the 'light output.'"

6 So I think paragraph 142 explains in detail
7 how "modifying Alden to dim headlight beams directed
8 to a portion of the headlight beam distribution area
9 may include preceding vehicles."

10 And paragraph 142 provides the details.

11 Q. All right. So if you said that Alden already
12 discloses this distinguishing between headlights and
13 taillights, what does it need from Beam? What does --
14 why would a person of ordinary skill in the art have
15 Beam?

16 MR. HUGHES: Objection, mischaracterizes
17 his testimony.

18 A. Can you repeat the question?

19 BY MR. TURNER:

20 Q. I think you described Alden as distinguishing between
21 headlights and taillights, so then why would a person
22 of ordinary skill in the art add Beam to Alden?

23 MR. HUGHES: Same objection.

24 A. I said Alden system in conjunction with -- in
25 combination with Beam can do this distinction. I

1 believe, as I mentioned earlier in my testimony, Alden
2 can detect taillights by changing the threshold
3 values, but Beam express -- says -- uses the term
4 taillights. A POSITA in -- I'm saying a POSITA would
5 have recognized that taillights can be detected in the
6 same way the Alden system detects the headlights of
7 oncoming vehicles by using the left and right sensors
8 51a and 51b to "detect light and determine another
9 vehicle is present at the location of the sensed light
10 when it's above a threshold density or distance (Alden
11 27-28.)"

12 And then I say how we can "modify Alden to
13 reduce glare as well as preceding vehicles will
14 require no additional equipment or changes in the
15 processing steps. It will at most merely require
16 exhausting all the thresholds for detected light
17 because taillights are often dimmer than headlights.
18 However, this will not be introducing any new
19 processing steps and a POSITA will readily understand
20 how to set the threshold value -- threshold level such
21 that headlights and taillights could be detected. A
22 POSITA would have also readily understood that
23 different thresholds will be set such that light above
24 one threshold will be detected as headlights of an
25 oncoming vehicle and light above a lower threshold

1 value will be detected as taillights of a preceding
2 vehicle."

3 And then 143 discusses the reasonable
4 expectation of success and a motivation to include
5 preceding vehicles in addition to oncoming vehicles.

6 BY MR. TURNER:

7 Q. Okay. Can you turn to paragraph 152, please?

8 A. I'm there.

9 Q. Okay. So for Ground 6 here, you're relying on Alden
10 or alternatively Alden in view of Stam in view of
11 Braun for these claims; do you see that?

12 A. Yes.

13 Q. So what are you relying on Braun for teaching for
14 these claims?

15 A. Just give me a minute to read it.

16 So Braun is titled "Method for providing
17 adaptive illumination," and, like Alden, is directed
18 to a vehicle headlight system that includes
19 individually controllable light sources that can
20 illuminate different regions of an area in front of
21 the vehicle to different light characteristics based
22 on detecting objects so as to increase safety," and
23 I'm listing all the reference from Braun.

24 One example -- "For example, Braun
25 discloses that 'cameras 112 (Figure 5) image the

1 roadway scene and determine distances to objects and
2 features in the scene,' that 'pattern recognition' is
3 applied to process the images and identify particular
4 objects, such as 'roadway signs' or 'people in a
5 road,' and that the individual illuminator elements
6 are controlled to illuminate the roadway based on the
7 detected objects."

8 So at the end of 153, there is a Figure 6
9 that basically highlights what I'm stating in 154.

10 "It would have been obvious to a POSITA to
11 modify Alden to include using a camera system to
12 acquire camera images and apply pattern recognition to
13 detect objects in a roadway such as road signs and
14 pedestrians."

15 So I emphasize objects in a roadway such as
16 road signs and pedestrians.

17 Q. All right, so you are modifying Alden to replace its
18 camera and its sensor with Beam's pattern and pattern
19 recognition system; is that correct?

20 MR. HUGHES: Objection, mischaracterizes
21 his testimony.

22 BY MR. TURNER:

23 Q. I'm sorry, I said Beam, I meant Braun.

24 You're replacing Alden's sensors with
25 Braun's camera pattern and recognition system; is that

1 correct?

2 A. No. What I said is actually we want to apply Braun's
3 teachings of further controlling the light output of
4 certain individual light elements to create a
5 spotlight illuminating any detected roadway signs or
6 pedestrians. This is the element I'm focusing.
7 Pattern recognition, computer vision and camera are
8 already existing in Alden are fully disclosed and, in
9 fact -- so basically a POSITA would have been
10 motivated -- what I'm stating here, "A POSITA would
11 have motivated to apply Braun's teachings of further
12 controlling the light output of certain individual
13 lighting elements to create a spotlight illuminating
14 any detected roadway signs or pedestrians ('third
15 subsections') to the system of Alden. In fact, Alden
16 already recognizes that other objects (like
17 reflectors, which are similar to road-signs) can be
18 detected, and that the individual lighting elements
19 can be controlled based on this detected reflectors to
20 change illumination characteristics of the headlight
21 distribution area so as to, for example, direct light
22 into the curve."

23 And earlier, during my deposition today, we
24 discussed that Alden, for example, considers -- the
25 computer vision of Alden considers the size of the

1 driver in order to determine the boxes in Figure 3.

2 The boxes 75 and 81 in Figure 3 in the left light
3 control circuitry and the right light control
4 circuitry.

5 Q. For your combination you're -- you still are --
6 include Alden's camera and computer vision but you're
7 just using Braun's teaching of detecting pedestrians;
8 is that -- is that what you're saying?

9 A. Yeah, pedestrians and roadway signs.

10 Q. Okay. So in paragraph 154, about the middle of that
11 paragraph, you describe "the simple substitution of
12 one camera sensor and processing unit (Alden's lens
13 and photodiode array or CCD detectors and logic CPU)
14 with another (Braun's camera and pattern recognition
15 system)."

16 So are you describing replacing the camera
17 sensor and processing unit or just the -- I guess what
18 are you -- what do you mean by a simple substitution
19 of this camera and sensor and processing unit?

20 A. Counsel, can you point me where -- where are you
21 reading this?

22 Q. So this is -- you see paragraph 154 starts right under
23 your --

24 A. Uh-huh.

25 Q. Okay?

1 A. Yes.

2 Q. So let's see, I was reading -- that was the second
3 sentence that starts with "Alden already discloses."

4 A. What I'm saying here is actually "Alden already
5 discloses acquiring light to image roadways scene in
6 front of a vehicle, and using the camera system of
7 Alden with further capabilities of detecting road
8 signs and pedestrians from the images would have been
9 the simple substitution of one camera sensor and
10 processing unit (Alden's lens and photodiode array or
11 CCD...) with another (Braun's camera and pattern
12 recognition system)."

13 Q. Are you describing replacing hardware there?

14 A. A POSITA would have viewed more -- would have
15 considered this option to detect the pedestrians,
16 since the pedestrians are an object of interest.

17 MR. TURNER: Okay, I don't have any further
18 questions. Do you want to take a break, Scott, or did
19 you --

20 MR. HUGHES: Yeah, can you give us just 2,
21 3 minutes and then we'll be right back?

22 MR. TURNER: Sure.

23 (A brief recess was taken.)

24 MR. HUGHES: Okay, we don't have any
25 questions.

1 MR. TURNER: Okay.

2 MR. HUGHES: Yeah, just for tomorrow, I
3 know you had mentioned continuation. I believe for
4 tomorrow that's actually a deposition on a separate
5 patent, a separate proceeding. So this issue is
6 closed out.

7 MR. TURNER: Yeah, we can close out. So
8 you guys can talk tonight and not worry about
9 anything, so we can close out tonight.

10 MR. HUGHES: Appreciate the clarification.

11 THE COURT REPORTER: Counsel, are you
12 ordering the rough draft? I understand you want the
13 rough draft?

14 MR. HUGHES: Yes, please.

15 MR. TURNER: Yeah, we want the rough also.

16 THE COURT REPORTER: Okay.

17 (Discussion off the record.)

18 MR. TURNER: As far as timing, we'd like to
19 target like a week for the final transcript. Is that
20 doable?

21 THE COURT REPORTER: Yes, that will be
22 expedited, but I'm sure you know that.

23 MR. TURNER: Yes, that's fine.

24 MR. HUGHES: We don't need the expedited on
25 the final.

THE COURT REPORTER: Okay, thank you.

MR. TURNER: Thank you.

MR. HUGHES: Thank you.

(Deposition concluded at 5:37 p.m.)

*** * ***

1 State of Michigan)

2 County of Oakland)

3 Certificate of Notary Public

4 I do hereby certify that the witness, whose testimony
5 was taken in the above-entitled matter, was first duly sworn
6 to tell the truth; the testimony contained herein was
7 reduced to writing by means of stenography; afterwards
8 transcribed; and is a true and complete transcript of the
9 testimony given by the witness.

10 I further certify that I am not connected by blood or
11 marriage with any of the parties; their attorneys or agents;
12 and that I am not interested, directly, indirectly or
13 financially, in the matter of controversy.

14 In witness whereof, I have hereunto set my
15 hand this 1st day of April, 2024.

16
17 *Jeanette M. Fallon*
18
19

20 Jeanette M. Fallon, CRR/RMR/CLR/CSR-3267

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