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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MOBILEYE GLOBAL INC. and
ZF ACTIVE SAFETY AND ELECTRONICS US LLC,
Petitioner,

v.

FACET TECHNOLOGY CORP.,
Patent Owner

IPR2024-01110[1] (Patent 9,335,255 B2)
IPR2024-01111[2] (Patent 9,671,328 B2)

Record of Oral Hearing
Held: December 5, 2025

Before KEVIN F. TURNER, ROBERT J. SILVERMAN, and SEAN P. O'HANLON, *Administrative Patent Judges*.

[1] ZF Active Safety and Electronics US LLC, which filed a petition in IPR2025-00748, has been joined as a petitioner in IPR2024-01110.

[2] ZF Active Safety and Electronics US LLC, which filed a petition in IPR2025-00749, has been joined as a petitioner in IPR2024-01111.

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The above-entitled matter came on for hearing on December 5, 2025, commencing at 1:00 p.m.

1 P R O C E E D I N G S
2 - - - - -
3 JUDGE O'HANLON: You may be seated. Good afternoon,
4 everyone. I am Judge O'Hanlon, and I'm joined remotely by Judges Turner
5 and Silverman. This is a consolidated hearing in two proceedings, IPR2024-
6 01110 regarding Patent Number 9,335,255 and IPR2024-01111 regarding
7 Patent Number 9,671,328. Both cases are captioned Mobileye Global Inc.
8 versus Facet Technology Group, and ZF Active Safety and Electronics US
9 LLC has been joined as a petitioner in each of these proceedings.
10 I'd like to have the parties -- I'm sorry, counsel for each party
11 introduce yourselves for the record, beginning with the Petitioner, please.
12 MR. HIGH: This is Robert High on behalf of Petitioner Mobileye.
13 Also with me today is Wyatt Bazrod and Corey Bell.
14 JUDGE O'HANLON: Thank you. And for the Patent Owner?
15 MR. SAUNDERS: Good afternoon, Your Honor. Michael
16 Saunders of Prince Lobel on behalf of Patent Owner.
17 JUDGE O'HANLON: Thank you. As I mentioned, Judges Turner
18 and Silverman are joining us remotely, and they will only be able to hear
19 what the microphones pick up, so please keep that in mind when making
20 your presentations today. Each side will have 90 minutes of total time to
21 argue. Petitioner will go first followed by Patent Owner, and each side may
22 reserve time for rebuttal.
23 Please remember that your arguments should be limited to only
24 those arguments previously presented in your briefs. Please make it clear
25 which challenges and claims you're addressing at all times. We ask that the
26 parties hold any objections regarding the opposing party's arguments until it

1 is your time at the podium.

2 Finally, please note this is a public hearing, and people may be

3 remotely listening to and viewing today's proceedings.

4 Are there any questions before we begin?

5 With that, I invite, is it, Mr. High who is going to argue?

6 MR. HIGH: Yes, Your Honor.

7 JUDGE O'HANLON: You may begin when you're ready. Would

8 you like to reserve any time for rebuttal?

9 MR. HIGH: I'd like to reserve 40 minutes.

10 JUDGE O'HANLON: You'd like to reserve 40 minutes, okay. So,

11 set the clock to 50 minutes. Okay, you may begin when you're ready.

12 Thank you.

13 MR. HIGH: Good afternoon, this is Robert High on behalf of the

14 Petitioner. We're here today to talk about these two IPRs. Today, I plan to

15 begin with the '328 Patent IPR first, which is IPR2024-01111.

16 Starting on Slide 3 here, the '328 patent is titled, System and

17 Assessment of Reflective Objects Along a Roadway. I have Figure 1 here

18 from the '328 Patent on the slide. The '328 Patent is largely dealing with

19 determining what's called retroreflectivity about traffic signs. That's what it

20 spends most of its specification about.

21 The Figure 1 embodiment here that's depicted is depicting a

22 vehicle with a video camera that as the vehicle drives along a road is

23 creating a video stream. And then, separately, there is a processor that takes

24 the video stream and identifies road signs from the video stream and stores

25 information about those road signs in what it calls an asset management

26 database. Separately, it also discloses determining information like the color

1 and the retroreflectivity of those signs and adding that information to the
2 database as well. And all of this is in furtherance of maintaining the
3 integrity of these road signs and other road markings, so that they can be
4 visible to the drivers as you drive along the road.
5 Slide 4 now, I have what are the remaining unpatentability
6 grounds. So before institution, the Patent Owner disclaimed Claims 17
7 through 22. So, Claims 1 through 16 are the only claims that are remaining.
8 And those are challenged in four separate grounds, all of which involve the
9 Gallagher reference and what I've been calling the Schofield reference.
10 Turning to Slide 5 now, the Gallagher reference, as I mentioned, is
11 a reference that's involved in all of the unpatentability grounds that you'll
12 hear today, including the IPR of the '255 Patent as well. So, similar to the
13 '328 and the '255 Patents, the Gallagher reference is disclosing a vehicle that
14 is designed to measure the reflectivity of road markings as the vehicle is in
15 transit. And so, it's got a broad disclosure. It says that it can test the
16 reflectivity of a wide variety of reflective road markings. I'm reading from
17 paragraph 33 here, and it gives several examples, including road signs and
18 posts, reflective painted lines, whether continuous or broken, and more
19 particularly, raised pavement markers. So these are all examples of
20 reflective road markings that Gallagher's apparatus is designed to measure.
21 Then the rest of this paragraph says that for simplicity, the
22 description of the preferred embodiment of the invention is limited to the
23 raised pavement markers embodiment, but that a skilled artisan can
24 appreciate that the apparatus can be adapted to measure these other types of
25 road markings as well.
26 On Slide 6 now, on the left we have an annotated version of Figure

1 3 from Gallagher. In this figure, we've got the processor that is colored
2 orange. We've got a light source that's colored blue -- dark blue, and the
3 sensor array, which is light blue with purple sensors. And so on the right,
4 we have more excerpts from Gallagher, and this is explaining the general
5 structure of Gallagher's system. So, you've got this light sensor that detects
6 reflected light from a marker, and this light sensor array is adjustable to
7 increase the accuracy, or you can change the direction that it's pointed, or
8 you can change the size of the area that it's measuring. And then you've got
9 a processing means, which is the processor that is designed to carry out a
10 method of testing the integrity of these road markings.
11 And so, as the driver is driving along the road, the driver can
12 initiate the apparatus. And when that's done, there's a relay that switches the
13 power of the light source to on. And the light source, it says in paragraph 46
14 here, illuminates a reflective surface of a marker, and the reflected light is
15 detected by one or a number of the light sensors. And then Gallagher goes
16 into its processor. And so it can do things like detect an object and give a
17 visual indication that an object is present to the driver. It can do things like
18 detect whether you've got a reflective surface. It can do things like, what is
19 the reflectivity of the specific road marker and then compare it to the road
20 authority's minimum threshold of reflectivity that it specifies to make sure
21 that it complies with regulations.
22 Slide 7 now, we also are talking about this Schofield reference.
23 And so, Schofield reference is another broad reference. It's got an image
24 capture sensor that can be used for a variety of different purposes. What
25 Schofield spends a good amount of its disclosure talking about is detecting
26 the presence of headlights and taillights on the road and using that to either

1 turn on or turn off the bright lights on a vehicle, but then it goes on to say
2 that these types of image processing techniques that it uses can be used for
3 other things as well.
4 So I have one example on the bottom right-hand part of this slide
5 here, which is an excerpt from Schofield that says, the invention may be
6 utilized to identify particular traffic signs by their spectral signature. In this
7 context, spectral signature is just the color. So it can use color to identify a
8 sign as well as their geometric organization, and it gives several examples.
9 Red octagons may be identified as stop signs, yellow triangles as caution
10 signs, and the like. And then it also gives other examples as well, not
11 pictured here. There's an example where it's used to detect lane markings
12 and assist in either helping to steer the car or to give an alert to the driver
13 that they might be weaving out of the lane.
14 On the top right-hand part of this slide here, we've got one excerpt
15 from Schofield that deals with how it's improving the detection of these
16 objects. And so, it talks about what's called pattern recognition. And so it
17 says, pattern recognition may be used to further assist in the detection of
18 headlights, taillights, and other objects of interest. Pattern recognition
19 identifies objects of interest based upon their shape, reflectivity, luminance,
20 and other spectral characteristics. So there are these different parameters
21 that you can measure and then use all these different parameters together to
22 do this pattern recognition and improve your identification of objects. So it
23 goes on to say that this can be used to assist in either qualifying or
24 disqualifying different objects.
25 So issue one that I'll start with is the Gallagher-Schofield
26 combination, which is Ground 1, performs all of the claimed functions of the

1 computer processing system. So as I'll get into later, there's some dispute
2 between the parties about the scope of the claims as it relates to the order of
3 the steps, does it require a particular order or not. But before I get into that,
4 I just wanted to start with our argument that the evidence shows these steps
5 are met regardless of whether it requires a particular order or not. In our
6 petition, in our reply, we showed that each of these steps is met by a separate
7 individual disclosure in Gallagher or the combination of Gallagher and
8 Schofield, and we walked through that evidence here.
9 And so, for example, Claim 1, you've got this computer processing
10 system that's operably connected to an image capture system, the active light
11 sensor. And it says, it's configured to detect objects of interest within the
12 field of view, and for each object of interest, determine whether the object of
13 interest includes a reflective surface, determine whether the reflective
14 surface is a road marker, and determine the location. And Claim 9 has a
15 similar set of disclosures that are slightly different and in certain ways a little
16 bit broader.
17 And so, looking at Slide 10 now, the Figure 2 on the left-hand side
18 of this slide is from Gallagher, and this is showing a top-down view of
19 Gallagher's vehicle as it drives along a road. And so, what is colored here in
20 red is what Gallagher refers to as a raised pavement marker, and then what's
21 colored in blue is a dashed lane marking.
22 And so on the right-hand side, we have our expert Dr. Thorpe's
23 description of this figure and what it shows in connection with the
24 disclosures in Gallagher and kind of explaining how Gallagher's system
25 works. So he says that you're testing a variety of these pavement markings,
26 these road markings, that include raised pavement markers, highlighted in

1 red, and painted lines highlighted in blue, and that both of these may be
2 reflective and that the apparatus can test both.
3 And so he says in his declaration, as the vehicle travels along this
4 roadway, Gallagher's light sensor array and computer create a representation
5 of the reflected light intensity values one row at a time. As you're moving
6 along the road, he said, it's kind of like a push broom. In doing so,
7 Gallagher's system measures light intensity values from the background
8 areas of the road, from areas of the road including painted lines, and from
9 areas of the road including raised pavement markings.
10 So, Slide 11 now. Gallagher, as we showed in our petition and
11 with the supporting evidence, Gallagher detects objects of interest and
12 determines whether each object has a reflective surface. And so, one of the
13 things that we have pointed to for this detecting objects of interest is the
14 processing that goes into creating what Gallagher describes as this visual
15 indicator. And so, this is described in paragraph 10 as well as paragraphs 60
16 to 62.
17 But what this describes is you've got a driver that is manually
18 driving this road -- this vehicle down the road, and he's trying to keep the
19 vehicle positioned so that the area measured by the apparatus is pointed at
20 the part of the road that he wants to actually measure the reflectivity of. So
21 if you imagine you've got a limited field of view for your sensor and your
22 light, you want to keep that pointed at either your lane markings or your
23 raised pavement markers. You want to make sure that that's within your
24 field of view.
25 And so, one of the techniques that Gallagher discloses is you can
26 have a visual indicator that lights up where you're detecting an object. And

1 so it uses this processing to basically figure out, okay, which one of my light
2 sensors is showing an object of interest. It could be a lane marking. It could
3 be a raised pavement marker. And I'm going to light up a light that
4 corresponds to that sensor. And Gallagher says the driver wants to make
5 sure that the light that's lighting up is the one that's in the center, just in case
6 he veers off, you know, that sensor array will still be able to capture it.
7 JUDGE O'HANLON: And Mr. High, what you just described, that
8 corresponds, or you mapped that to the recitation in both Claims 1 and 9 of
9 detecting objects of interest; is that correct?
10 MR. HIGH: Yes, Your Honor, that's part of our argument for both
11 Claims 1 and 9.
12 JUDGE O'HANLON: And do you map that teaching in Gallagher
13 to any other recitation, any of the determining steps?
14 MR. HIGH: So what I can get to now is that there are other ways
15 that you can map it, and I think show that Gallagher is doing this detecting
16 objects of interest. One of these is depicted on the right-hand side, which is
17 that Gallagher separately determines whether each object has a reflective
18 surface. Here you've got paragraph 65 and 66 together.
19 So paragraph 65 says, determining the background reflectance
20 level on the road and establishing non-marker reflectance levels. And so by
21 doing that, Gallagher's system is making a determination as what are the
22 background levels and what are the non-background levels, so that it can
23 determine this background, this non-marker reflectance level. That is, in
24 essence, disclosing detecting of objects of interest because it's
25 distinguishing, okay, this one corresponds to background, this one doesn't,
26 and I'm going to use the ones that are background to determine this non-

1 marker reflectance level. And then it's going to select which ones of the
2 reflectivity readings from the sensor correspond to objects of interest.
3 Another thing that we pointed to in our petition and in our reply is
4 on the left-hand side of Slide 12. This is paragraphs 63 and 64. This is what
5 immediately follows the visual indicator discussion in Gallagher. And so,
6 63 says that process E involves getting data from the vehicle gearbox
7 revolution sensor and determining distance traveled from the start position
8 of the road marking test so as to determine the location of each road
9 marking.
10 And then this information, the location of each road marking, is
11 used to tag or identify the road markers tested along a stretch of road. And
12 so this is showing that by this point, by the time you've determined the
13 location of each road marking, you have detected the objects of interest.
14 You've detected that object so that you can then determine what its location
15 is, either based on this gearbox data or based on GPS.
16 Going back to Slide 11, we've also pointed to paragraphs 65 and 66
17 for this determine step to determine whether each object has a reflective
18 surface. So you've got these non-marker reflectance levels. Paragraph 66
19 says, select the data -- select from the data which reflectance levels indicate
20 a reflective surface. We have, you know, expert testimony saying that this is
21 disclosing, okay, as you're driving along the road, you've got these lane
22 markings, you've got these raised pavement markers. I can distinguish the
23 background, which is not an object of interest, from the non-background.
24 These lane markings, these raised pavement markers, each of those may
25 have an object of interest.
26 Now, once you've done that, you then need to figure out further

1 information. Am I dealing with a lane marking or am I dealing with a raised
2 pavement marker? And so Gallagher is saying next, which relates to Claim
3 1 of our mapping, that in the case of road markers, the peak responses
4 sensed are determined as the highly reflective surfaces of a road marker.
5 So it's doing this additional processing to figure out, like, okay,
6 this is a reflective surface, a lane marking, but it's not one of these peaks that
7 I'm associating with a raised pavement marker. So it's doing this processing
8 to figure out, okay, I've got a reflective surface. What is that reflective
9 surface? This one is a raised pavement marker. And then it can take the
10 location data of the raised pavement marker and then associate it with a
11 reflectivity measurement and store that within its memory.
12 Another issue that Patent Owner raises here on Slide 12 is the
13 determining the location of the reflective object. And so --
14 JUDGE O'HANLON: Before you get into that, Mr. High, and I
15 apologize for interrupting. Just focusing on the language of Claim 1, there's
16 an extra or an additional determine step with respect to Claim 9. I think you
17 may have just addressed it, but I want to make sure I understand your
18 position.
19 So Claim 1 has detect objects of interest and then determine
20 whether objects of interest include a reflective surface, and then also has the
21 next step, 1G, determine whether the reflective surface is a road marker. So
22 can you just run me through your mappings for those two determine steps,
23 please?
24 MR. HIGH: Yes. So, Claim 1, what we've mapped that to is in
25 Gallagher. Looking again at this Figure 2 drawing, you've got these raised
26 pavement markers and you've got these painted lines on the road. Both of

1 those have reflective surfaces. The reflectivity of the road -- what Gallagher
2 calls the road marker, the raised pavement marker, will be higher than the
3 lane marking. And so, what we've mapped that to is essentially Gallagher's
4 disclosure of determining the reflective surfaces for both the painted lines
5 and the raised pavement markers.
6 And then it says in paragraph 66 here on Slide 11, the last part, in
7 the case of road markers, the peak responses sensed are determined as the
8 highly reflective surfaces of a road marker. So it's doing this additional
9 processing to figure out, okay, is this a road marker or is this a painted line,
10 for example.
11 And then you can see in additional steps that -- I don't have a
12 picture here, but there are additional steps in Gallagher that talk about
13 identifying whether a raised pavement marker is missing. It specifically
14 says it's doing this pattern recognition. And so, these raised pavement
15 markers are at set distances along the road. And so what it can do is it can
16 figure out, like, I've got a pavement marker, pavement marker, pavement
17 marker, no pavement marker. And then it sees that and flags in its memory,
18 okay, that one was missing.
19 And so, it's doing some additional processing on top of all of this
20 to do this pattern recognition to make sure, okay, not only is it detecting all
21 of the objects as you go, it's also detecting when there's not an object that
22 should be there because it's doing this pattern recognition.
23 So turning to Slide 12 now, determining the location of the
24 reflective objects. So we think that Gallagher has a pretty clear disclosure of
25 this, and I think the clearest disclosure is in paragraph 48 here where it says,
26 location means for determining the location of the markers has also attained

1 to allow identification of each marker being tested. And at the end of that
2 paragraph, what we've highlighted says, alternatively, a GPS interface 15
3 can be used to pinpoint the position of the vehicle and/or the markers, too, as
4 measurements are being taken.
5 And so, our expert explained this and how this happens in his reply
6 declaration in more detail. But essentially, the GPS interface would be on
7 the vehicle, and you've got a set geometry associated with your measurement
8 apparatus relative to the vehicle. So you know as you're driving along the
9 road, my vehicle is here, and I detect an object with this particular sensor. I
10 know how far in front of that sensor array the object is. I know where it's
11 supposed to be, and so it's just a matter of simple geometry to then take that
12 GPS data value from the GPS interface and convert that into the pinpoint
13 position of the marker as measurements are taken.
14 And I think Figure 5 here shows that that's happening because on
15 this Slide 12 here, you've got in Gallagher actually two different sensor
16 arrays. It talks about one that's pointed forward and one that's pointed
17 backwards. And it says that these ray pavement markers actually have a
18 front reflective surface and a back reflective surface, and it's detecting and
19 measuring the reflectivity of both sides as you're going along the road, and
20 then it's storing both of those values together for each raised pavement
21 marker as you're driving along.
22 And so the fact that it knows, okay, you know, my forward-facing
23 measurement system just detected a reflectivity value of X for a particular
24 road marker. Here's its location. As you keep going, then you measure it
25 when you pass it with the one that's rear-facing, and then you can take those
26 two values and put them together because you know the locations of both

1 measurements.

2 And so the issue, too, that is getting more into the claim
3 construction now. And so Slide 14, we have an excerpt from the case law
4 that's talking about the general rule. Claim steps need not be performed in a
5 particular order unless either, one, the claim language as a matter of logic or
6 grammar requires a particular order, or two, the specification directly or
7 implicitly requires such a narrow construction.

8 And so turning to Slide 15 now, this is just looking at the claim
9 language. In our view, these detect and determine steps don't, as a matter of
10 logic or grammar, require a particular order that we think that it's broad
11 enough to be done concurrently, simultaneously, for example, because these
12 objects of interest, these are things that, you know, that exist in 3D space.
13 And so, you can do two different things to an object concurrently. You don't
14 necessarily have to have done one step before the next step. These are
15 things that exist, and you can say, all right, I'm going to do detect objects of
16 interest and separately determine information about that object
17 simultaneously.

18 And that's essentially what the Board stated in its institution
19 decision. It preliminarily determined that Gallagher discloses
20 simultaneously detecting and determining. And the Board pointed
21 specifically to paragraphs 65 and 66 and said that on this preliminary record,
22 it appears that Gallagher's system simultaneously performs the steps of
23 detecting objects of interest and determining whether the objects of interest
24 include at least one light-intensity value associated with a reflective surface
25 of a road marker.

26 And that's similar to the argument that I went over earlier about 65

1 and 66. You have these processing steps that are doing this, determining
2 what the non-marker reflectance levels are, and then selecting the data that
3 indicates a reflective surface. And both of those things can happen
4 simultaneously.
5 And turning to Slide 17 now, there's also language in the '328
6 patent that supports that interpretation of the claims. And on the left-hand
7 side we've got an excerpt from column 5 of the patent. And this is, if you
8 recall, the '328 patent is dealing with this video stream and identifying signs
9 from that video stream. And at the top of this paragraph, it says, either
10 concurrent with or subsequent to the identification of road signs and
11 generation of the asset management database, the computer processor can do
12 other things relating to that kind of data.
13 So it says, the computer processor evaluates the portion of each
14 video frame or image that depicts a road sign to determine a set of color
15 values. It says the values of retroreflectivity are determined by measuring
16 the intensity of the signal for each color portion. So the '328 patent is
17 painting this picture of two different steps that can happen concurrently. At
18 the top-hand part of Figure 2, it's got this generation of the object
19 management database. So identify the signs, put them into this database.
20 And then on the bottom portion, it actually is using, in the
21 preferred embodiment, a separate sensor for this to determine the
22 retroreflectivity of the sign. And in the top-hand -- top right corner of this
23 slide, it says that it's only preferable that the computer processor correlates
24 the portion of an image frame of the digital imagery stream with a similar
25 portion of the intensity frame containing the object of interest.
26 So in this preferred embodiment, which is only preferred, not

1 required, you've got an object being identified with the image frame of the
2 digital imagery stream, and then you've got a retroreflectivity being
3 determined using an intensity frame from a totally separate sensor. And
4 those frames don't necessarily even need to be correlated, according to the
5 '328 patent. So --
6 JUDGE SILVERMAN: Counselor, forgive me. This is Judge
7 Silverman on the monitor. Just for clarity, are you saying that any of these
8 items from the specification of the '328 patent you were just discussing, do
9 any of those correspond to the limitations, the determining limitations that
10 are at issue about whether or not they're simultaneous or not? Just to be sure
11 that I understand.
12 MR. HIGH: Sure. So, these specific embodiments aren't explicitly
13 describing -- I'll go back to the claim language, Slide 15. These specific
14 embodiments aren't explicitly describing a step of determining whether the
15 object of interest includes a reflective surface based on the light intensity
16 value, but it's kind of a few steps down the line from that.
17 So, it is talking about, now I'm back to Slide 17, the values for
18 retroreflectivity are determined by measuring the intensity of the signal for
19 each color portion. So, you've got these signs that have, you know, maybe a
20 red and a white portion, and it's determining a retroreflectivity value of each
21 of those. And so, it's kind of a few steps down the line where you know that
22 this is, or you can -- you've got the color value and you know you want to
23 determine the retroreflectivity. If you're determining the retroreflectivity,
24 you've got a reflective surface.
25 And so, here on Slide 18, we just have an excerpt from the Patent
26 Owner's response. We think that the Patent Owner is improperly attempting

1 to rewrite the claims here by inserting, you know, this requirement that the
2 determining steps are performed on objects of interest which have already
3 been previously detected, and they detect objects of interest. Essentially,
4 they're trying to convert, going back to Slide 15, the determine steps to
5 determine whether the detected object of interest includes a reflective
6 surface, and that language doesn't appear in the claim.
7 So, turn now on Slide 19 to motivation to combine. I'm going to
8 focus specifically on the Gallagher and Schofield parts of the motivation to
9 combine references, or motivation to combine arguments. The additional
10 arguments related to some of these other grounds, I'm happy to answer any
11 questions that Your Honors might have. But for the sake of the hearing
12 today, I think for my opening, I'm going to focus largely on the Gallagher
13 and Schofield. So, there's two different obviousness combinations being
14 proposed, depending on whether you're dealing with Claim 1 or Claim 9.
15 For Claim 9, there's this analyze the -- go back to the claim
16 language, on Slide 15, and it’s this bottom step, analyze the at least one light
17 intensity value to determine an assessment of a discrete location of the road
18 marker within the field of view. We've got alternative mappings for this.
19 So, one that doesn't even require this Schofield spatial representation,
20 disclosures, and it doesn't seem like the Patent Owner is taking a position
21 one way or another, which interpretation applies.
22 But in this interpretation where you're relying on this combination
23 with Schofield, Schofield talks about using the location within the -- within
24 the camera's field of view to distinguish between objects of interest. And the
25 way that we map that in our combination for Claim 9 is focusing on
26 Gallagher's specific disclosure that you can have side-by-side road markers,

1 and those can be detected simultaneously as you're driving along the road.
2 And so, there are motivations to basically incorporating the spatial
3 use of -- use of spatial analysis that's disclosed in Schofield to be able to say,
4 okay, I'm measuring two different road markers right now. The one on the
5 left might be good; the one on the right might not be good. I want to be able
6 to differentiate between those two and mark in my system, hey, the one on
7 the right needs to be fixed or replaced, the one on the left is fine.
8 And Schofield talks about those types of uses. There are
9 disclosures in Schofield about doing additional processing to help set
10 different thresholds for identifying headlights and taillights and whether
11 they're relevant, but that comes after you're doing this spatial analysis to
12 figure out, okay, are my headlights on the far right-hand side of the image,
13 or are they in the center? And then, after you've done that analysis, you can
14 incorporate different types of image processing. The other one --
15 JUDGE O'HANLON: Regarding that, the alternative mapping, as
16 you talked about, is that discussed in the petition at the bottom of page 25 to
17 26 where it starts -- the paragraph starts off with, "To the extent Patent
18 Owner contends or the Board finds that 'a discrete location of the road
19 marker within the field of view' refers to a location in 3D space"; is that it?
20 MR. HIGH: Yes, Your Honor.
21 JUDGE O'HANLON: So that paragraph talks about Gallagher, but
22 you also mentioned parts of Schofield. Is that from the, I guess, first
23 mapping of your discussion of Schofield? So you rely on those teachings for
24 both of your mappings; is that correct?
25 MR. HIGH: So I'm looking at the paragraph that starts at the
26 bottom of page 25 in the petition to the extent Patent Owner contends. I

1 don't see a discussion of Schofield in that paragraph, Your Honor. Maybe
2 I'm missing it?
3 JUDGE O'HANLON: Right. That was my point. I didn't see one
4 either.
5 MR. HIGH: Okay.
6 JUDGE O'HANLON: But you mentioned Schofield in what you
7 just said, so I assume it's incorporating what you mentioned about -- what
8 you argued about Schofield in the, I'll call it the first mapping.
9 MR. HIGH: Right. So the first mapping is looking at more so not
10 the 3D space, but where within the kind of your image sensors viewpoint,
11 where it is. So if you imagine you've got this array and in Gallagher it uses
12 as one embodiment, a line array of photodiodes. You can do this analysis to
13 figure out within that field of view of your array, is the raised pavement
14 marker on the right-hand side, is it on the left hand side.
15 And then you can differentiate between, okay I've got these two
16 markers, one's on the left, one's on the right, and then I can kind of use that
17 analysis to include additional information about the discrete location within
18 the database. And then the alternative mapping is where you're actually
19 figuring out where that is in 3D space, the actual location.
20 JUDGE O'HANLON: Okay. So the alternative mapping takes
21 what you just said about the relative field of view and then adds the specific
22 --
23 MR. HIGH: That's right, that's right.
24 JUDGE O'HANLON: Okay, thank you.
25 MR. HIGH: Okay. So going back to Slide 21 now. For Claim 1,
26 Claim 1 requires this image capture system, and we've relied on a

1 combination of Gallagher and Schofield for that limitation, as well as
2 bringing those benefits into the detect objects of interest step. And so what
3 Schofield says is you've got this pattern recognition. We talked about this
4 previously. It can improve your object identification by considering things
5 like the shape, the reflectivity, and spectral characteristics.
6 Well, Gallagher is explicitly disclosing that its system is measuring
7 the reflectivity of these objects and using that, for example, in this visual
8 indicator to figure out which light to light up. And Schofield is saying, you
9 can also look at the color of an object, you can also look at the shape of an
10 object. So now we've got this explicit disclosure that suggests this
11 combination that says if you take the data from Gallagher, you take the data
12 from Schofield's image capture system, you put that together, now you've
13 got a much more accurate understanding of what the objects of interest are.
14 And just for the sake of time now, I will turn to the '255 IPR and
15 the slides for that start on Slide 34. So for the sake of time, again, I won't go
16 into the disclosures of the '255 patent, because they're continuations. It's
17 largely the same specification. There is one part in the '255 patent that's
18 slightly different. It's got an additional disclosure, but in general it's -- it's
19 very similar.
20 And so in this IPR, and I'm on Slide 36 now, the Patent Owner
21 disclaims before institution every challenged claim except for Claim 15.
22 And so we've only got one claim that's at issue here, and that claim is
23 challenged based on the combination of Gallagher and Lumia.
24 And so on Slide 37 now, Claim 15 is a dependent claim. It
25 depends from Claim 12. And Patent Owner has not disputed Gallagher's
26 disclosures with respect to any limitation in Claim 12. And Claim 12 is

1 disclaimed. And so, the disputes here are focusing on the specific
2 limitations that are added in dependent Claim 15. So the determining a
3 luminance value and the characterization profile are the two main focuses, as
4 well as the motivation to combine Gallagher and Lumia.
5 So, I'll jump through to Lumia's summary on Slide 40 here. So,
6 Lumia discloses a very similar device to what the '255 patent discloses, and
7 it's essentially a moving vehicle that's got a black-and-white camera. And as
8 the vehicle is driving down the road, you can take an image with the camera,
9 and then it's got a strobe light that flashes, and it's really bright to make sure
10 that you could do this in the daytime if you wanted to. And then taking that
11 image that you've captured, you can then do some image analysis and come
12 up with a retroreflectivity value. And Lumia gives an example of how you
13 can calculate that retroreflectivity value from your image data.
14 And so on the top right part of this slide here on Slide 40, we've
15 got Equation 2. And Equation 2 is kind of the simplified equation of, okay,
16 how do I calculate retroreflectivity? It's the luminance divided by the
17 illuminance. And so if you determine a luminance value and you know what
18 your illuminance value is, then all you have to do is take your luminance
19 divided by your illuminance, and it gives you retroreflectivity. And then
20 Lumia also gives you a simplified equation to use to estimate the
21 illuminance value. And so this is talked about in our expert's declaration
22 that was submitted with the petition, and he goes through in detail how this
23 equation kind of simplifies things and allows you to determine
24 retroreflectivity.
25 And at the bottom of this slide here, it's talking about these simple
26 software algorithms. And so Lumia is in a context of road signs. And so

1 you've got a background and a foreground, so example like a stop sign.
2 You've got the white letters that say stop, that would be like your
3 foreground, and you've got the red part, that would be your background.
4 And then you -- so Lumia says that you can take the average
5 intensity of each of those sections, and then if your system is properly
6 calibrated, then those intensity values correspond to an average luminance
7 value. So that would correspond to average luminance for your foreground
8 and an average luminance for your background. And then if you know your
9 luminance, then you can calculate retroreflectivity using Equation 2. And so
10 that's what this last sentence says. Assuming the illumination is known, the
11 retroreflectance is readily obtained using Equation 2.
12 So the parties focus largely on claim construction of
13 characterization profile for this claim. And the interpretation that Petitioner
14 has adopted here is the one that the Board preliminarily issued in its
15 institution decision, which is a conversion factor to convert measured light
16 intensity into luminance. And that's consistent with the claim language. It's
17 saying that you're determining a luminance value utilizing the plurality of
18 light intensity values and a characterization profile of the at least one light
19 intensity sensor. So it makes sense that if you're taking your light intensity
20 values, and then you're using your conversion factor to convert the light
21 intensity into luminance, then you've determined luminance.
22 And this is consistent with the specification. So the specification
23 goes into this example and it says, by knowing the background or
24 foreground color of the object of interest, along with the light intensity
25 sensor's ability to sense for the light intensity sensor's profile for a particular
26 color, the intensity value for a particular color can be converted into a

1 luminance value. So we think that's consistent with the preliminary
2 construction in the institution decision, which is what the Petitioner has
3 adopted here.
4 And the Petitioner's construction is based largely on the intrinsic
5 record. We have submitted an expert declaration with the reply, and our
6 expert walks through and explains why he agrees with it. Facet's position
7 here, which I'll go back to on Slide 42, a compilation, presented in a usable
8 format, of the description of the properties and performance characteristics
9 of a sensors across various conditions. This is largely based on extrinsic
10 evidence, and if you read through the Patent Owner's response, Patent
11 Owner is starting with the extrinsic evidence and looking to all these
12 external sources and saying, this is what this term means.
13 And then Patent Owner and their expert goes through in the
14 specification and they argue, well this is consistent with the specification.
15 That's actually the opposite approach that *Phillips* shot down in its decision,
16 where it said that was the *Texas Digital* analysis where you start with
17 extrinsic, and then you confirm it's consistent. And *Phillips* said, no, that's
18 wrong. You need to start with the intrinsic evidence, and there's case law
19 cited in the rehearing decision that, you know, oftentimes the specification is
20 dispositive, and that's all you need, and that's our position here.
21 So, determining luminance value. So, Patent Owner's arguments
22 here are largely focused on a totally different part of Lumia, and basically
23 saying Lumia's system doesn't do it this way, and so you should just
24 disregard it. That's inconsistent with the law. Lumia is describing this
25 technique for determining retroreflectance, and that technique is starting
26 with determining a luminance value, and then determining your illuminance,

1 and then dividing it, and you're getting the retroreflectivity. And it's
2 specifically saying at the bottom here that the retroreflectance is readily
3 obtained using Equation 2. Just because this is disclosed in the background
4 doesn't mean you get to disregard it.
5 And that's consistent with the case law here on Slide 48. A
6 reference must be considered for everything that it teaches, not simply the
7 described invention or a preferred embodiment. If this were a system art
8 reference, it would be one thing. They say that the only system that was
9 created did it this way. Well, here we're dealing with a printed publication.
10 And so, the fact that there's like this, going back to Slide 47 now, that there's
11 this experimental results, and they've created this experimental system as a
12 proof of concept essentially, that doesn't take away from any of the other
13 teachings that are described elsewhere in Lumia.
14 And so, it's entirely consistent to say Lumia discloses, using
15 Equation 2, it discloses converting light intensity to luminance using this
16 calibration, and our expert explains how this scale factor in the experimental
17 results section is one example of how you can calibrate the light intensity
18 sensor to take an intensity value and convert it to a luminance value. And in
19 doing that, you can then calculate your retroreflectivity.
20 The other thing that I wanted to point out here is that in Patent
21 Owner's sur-reply, they kind of acknowledge like, okay, well, in our
22 construction, we're arguing, back to Slide 42 here, that it's got to be across
23 various conditions. This doesn't have to be considering multiple colors;
24 that's just one example. That admission kind of makes it clear, even clearer,
25 that Lumia is disclosing this because -- and I don't see Patent Owner
26 disputing this -- Lumia has two different modes. It's got a highway mode

1 and it's got a road mode, and it uses two different distances. You've got this
2 100 feet distance, you've got a 200 feet distance, depending upon what mode
3 you're in.
4 And so, that is disclosing various conditions. You've got these two
5 different setups, and you can have two different calibrations for your light
6 intensity sensor that you can use to determine luminance, depending upon
7 which mode that you're in. The other thing --
8 JUDGE O'HANLON: Well, let me ask a question about that, Mr.
9 High. So the scale factor that's mentioned in Lumia, that's -- is that based
10 just on color, the color of the light that's sensed by the sensors to
11 accommodate shortcomings in the sensor, depending on what light is being
12 sensed?
13 MR. HIGH: So, yes. So in this experimental results section, it's
14 focused just on a proof of concept, and it's saying, we've got this white
15 sheeting material that we know the retroreflectivity of. And so we want to
16 measure it with our system and figure out how close we can get. And so, the
17 scale factor in this experimental results is focusing just specifically on a
18 scale factor for white. And so, you know, I think it's playing from the rest of
19 Lumia's disclosure that it's not limited to just determining white signs, and
20 that there's disclosure about background and foreground. You've got a stop
21 sign in there that would have red and white. You've got the introduction
22 that's talking about, you want to have this be able to detect retroreflectivity
23 across signs of various colors.
24 But in this specific situation, it's just dealing with a scale factor for
25 white. And so our expert explains that, you know, a person of ordinary skill
26 in the art would understand from Lumia that if you're going to use this

1 technique for different colors, that you have a different scale factor for other
2 colors as well.
3 JUDGE O'HANLON: Right. I understand it's about different
4 colors, but my question was, how does that factor into the different
5 distances? Why would there be two different scale factors, for example, for
6 the same color based on different distances? I didn't follow that part of the
7 argument.
8 MR. HIGH: Yeah, so I think Lumia doesn't go into explicit detail
9 about the differences in the calibration between the 100 feet and 200 feet
10 situation. I think that the fact that you're doing that across these two
11 different modes means you probably want to calibrate it for that specific
12 situation. And I think in this experimental results, it's saying that this was
13 done, 16 image samples were obtained for each sign, and a distance of 200
14 feet in the highway mode is performed. And so, you know, whether the
15 scale factor would be different or not isn't explicitly described in Lumia, but
16 I think it's something that a person of ordinary skill in the art would
17 understand you could have depending upon your situation.
18 And then just really quickly, since I'm into my rebuttal time, the
19 motivation to combine here. So we go through this, especially in our
20 analysis with Claim 12, and we say that in the context of Claim 12,
21 Gallagher is determining this reflectance level in a value of millicandela per
22 Lux. And Patent Owner's expert, our expert, everybody agrees that that's
23 different from Lumia's retroreflectance. Those are different units.
24 And so in our petition, we explain that road authorities have these
25 different standards. Some might require a minimum level in this
26 millicandela per Lux, that's the coefficient of luminous intensity. Others

1 might require a minimum level in the coefficient of reflectance, which is
2 what Lumia talks about. And so in our petition, we explain you would want
3 to determine this luminance value, because that is what you would then use
4 to divide by your illuminance to get your coefficient of retroreflectance for
5 those situations where that's your value that you're considering in assessing
6 whether the road marking meets the minimum threshold set by the road
7 authority.
8 JUDGE O'HANLON: So the combination is just based on what
9 requirement the road authority has, converting luminance to retroreflectivity,
10 is that correct?
11 MR. HIGH: So in the Gallagher system, because of the units, so
12 the coefficient of luminous intensity CIL is millicandela per Lux. Intensity
13 is in millicandela, Lux is in the illuminance. And so basically the way the
14 math works out, sorry to get really granular into this, coefficient of
15 retroreflectance is in millicandela per Lux per meter squared. And so the
16 way the math works out is if you convert that intensity into luminance and
17 then divide by your illuminance, then essentially you're getting your
18 coefficient of retroreflectance. So that's the difference there.
19 By converting the intensity values from Gallagher into luminance
20 and using that processing that's described in Lumia, then it's describing an
21 obvious technique that you could implement in Gallagher to determine a
22 luminance and then determine retroreflectance and compare that to the road
23 authority's minimum threshold.
24 JUDGE O'HANLON: So with that combination, just take one of
25 the equations used in Lumia, use all the data, everything from Gallagher and
26 just use the conversion or the equations in Lumia to convert that to whatever

1 the road authority uses as their measurement?

2 MR. HIGH: Right. We think that all you would need to do is just
3 modify the processing. You don't necessarily need to touch any of the
4 hardware involved in Gallagher's system. You know, Gallagher discloses
5 these different light sensors that you can use, some are photodiodes, some
6 can detect color, and that within those sets of light sensors, you can take that
7 data and then implement Lumia's processing described in those equations
8 and the corresponding disclosures and determine luminance.

9 JUDGE SILVERMAN: Can I just trouble you for a second on
10 that, Counselor. Thank you. Where would we find the sort of best
11 description of that? Would it be in the expert statement or sort of pages --
12 set of pages in the brief petition or the reply that you'd point to?

13 MR. HIGH: Sure. So the reply declaration from Dr. Thorpe is
14 probably the one that lays it out in the, you know, the most concise way.
15 The petition, if you look at the last limitation in Claim 12, that's talking
16 about the reflectance value that Gallagher is determining. And then in
17 getting into Claim 15, that gets into you would want to modify Gallagher to
18 determine retroreflectivity.

19 If you look at paragraphs 75 and 89 of Patent Owner's expert
20 declaration, that's where he's kind of explaining the backgrounds of these
21 concepts and the units and how the units of the value that Gallagher is
22 determining are different from the units of the value that Lumia is
23 determining, and that luminance is different from both of those. And so I
24 think all of those together kind of give you what you need.

25 JUDGE SILVERMAN: Thank you very much, Counsel.

26 MR. HIGH: Thank you. With that, I'll reserve the remainder of

1 my time for rebuttal.

2 JUDGE O'HANLON: Thank you, Mr. High. We'll now hear from

3 Patent Owner, Mr. Saunders. I'll give you a moment to get up to the

4 podium.

5 Mr. Saunders, would you like to reserve any time for rebuttal?

6 MR. SAUNDERS: Yes, Your Honor. I'd like to reserve 25

7 minutes.

8 JUDGE O'HANLON: Twenty-five. You may begin when you're

9 ready, Mr. Saunders.

10 MR. SAUNDERS: Thank you. May it please the Board. Just one

11 highlight as I go through the presentation today, a persistent theme that we

12 saw in Petitioner's presentation was the reliance on improper new reply

13 arguments that came up again and again in Petitioner's presentation. In

14 particular, framing the issues in a completely new way, citing new evidence

15 appearing in the reply brief that we did not see in the petition. We're going

16 to see that over and over again and we're going to point it out.

17 But, like Petitioner, I'm starting with the '328 patent. This is Patent

18 Owner's demonstratives for the '328 patent. And just at a high level, what

19 we see in the '328 patent, it is describing the problem of measuring

20 retroreflectivity and the importance of that problem. In particular, the

21 problem of having deterioration of road markings. It talks about the problem

22 of in the past having departments actually go ahead and look at those road

23 markers and they had to often manually measure them. That can be time

24 consuming and expensive.

25 We're on slide 3 now, talking about the preferred embodiment of

26 the patent, how it addresses that. We see a lot of the important concepts.

1 We're having an automated determination of retroreflectivity values for
2 those markers along the roadway. They're being repeatedly illuminated.
3 Multiple light intensity values are measured. And we have a computer
4 system that's doing some processing. It's processing to identify a portion of
5 the light intensity values associated with the reflective surface. It's
6 analyzing the portion of light intensity values to determine at least one
7 retroreflectivity value.
8 Most importantly, this isn't saying that this is the same thing that is
9 in the prior art. We're enhancing the accuracy of these determinations.
10 That's a key aspect that gets reflected in the claims of both the '328 and '255
11 patents.
12 Moving on to slide 4, we're going to Ground 1, and this is
13 obviously focused on the two independent claims, Claim 1 and Claim 9, and
14 the Gallagher and Schofield references. Just a brief bit about claim
15 construction. I'm on slide 5 now. The most important issue, it's clear after
16 the briefing has finished in this, as to claim construction, is Petitioner's
17 concession that is in their reply brief. And this is the reply brief at 9, where
18 they admit that their position is that they cannot re-detect and terminate steps
19 on the same act being performed simultaneously in the same object of
20 interest.
21 They're admitting that they dispute the issue of the order of detect
22 and determine, but they're admitting they can't just read those two separate
23 claim limitations on the same step in the prior art. And that becomes very
24 important, particularly about the Gallagher reference. They can't just say
25 that everything is Gallagher step G, because they've made this concession.
26 And so what we have to see in Gallagher, although there was a dispute about

1 the order, the more important thing is they have to point to different things in
2 Gallagher as satisfying the different detect and determine limitations. And
3 what we're going to see is that there's a failure to do that, or at least a failure
4 to do so in a way that's plausible.
5 Going to slide 6, starting to talk about the Gallagher reference.
6 Gallagher is focused on measuring reflectivity, in particular retroreflectivity
7 of road markers. It does so in a very particular way. It's measuring the area
8 A in front of it, what it calls its test area, which is the area it's illuminating.
9 It has a broad array of photodiodes that are scanning that roadway as the
10 vehicle in Gallagher is moving down the roads. And it's aiming those
11 photodiodes at the area A in front of it.
12 Turning next to claim limitations, I'll talk about both Claims 1 and
13 9 and the detect and determine steps together. I'm on slide 7 now. What's
14 important to keep in mind is Gallagher has a very particular system that
15 follows a very particular series of steps. And we see that in Figure 4 on the
16 left of Gallagher. Those correspond to the steps that Gallagher labels Steps
17 A through L.
18 And we can see early on the initial steps in Gallagher are not
19 performing detect or determining. They are data gathering steps. That's step
20 A in paragraph 56. There's a data filtering step in step B in paragraph 57.
21 And there's a calibration step in paragraph 58, which is calibrating for the
22 different position of one photodiode versus the other photodiode. So no
23 detect or to determine, I understand there's no dispute from Petitioner's
24 expert about that in steps A through C.
25 Turning to slide 8, we have step D of Gallagher, and this is a key
26 issue, is the interpretation of Gallagher step D. What is Gallagher actually

1 doing in step D? And this is the limitation that the petition identified for the
2 detect steps. I'm going to go and talk a little bit about some of the other stuff
3 that we heard in the presentation that I submit is not properly part of the
4 theory that was in the petition. But the petition squarely lays step D in
5 Gallagher as the detect step.
6 And the problem we see here is they focus a lot on the word detect,
7 which is the first word on that second to last line of this quote here. But
8 what we see Gallagher detecting is not objects of interest. What Gallagher is
9 detecting is which light sensor is reading the highest reflectance reading and
10 to provide the operator with that information. So what Gallagher itself says
11 is, we're just going to constantly tell you which is the highest sensor.
12 And why is that? Why is that important? Well, because this is a
13 step early in that sequence of steps to Gallagher. It's a prerequisite step to
14 making sure that Gallagher does collect good data, right? This is a step of
15 providing an indicator to the operator to tell them, hey, you're veering off the
16 road, right? You're veering off the center line, we're not getting, in general,
17 high readings. But it says nothing about actually saying, we're going to find
18 out whether we have a marker or not in step D. It's just outputting that high
19 level, okay, here's this high level. And it explains, why does it work? So
20 this is another part of this last sentence here.
21 The Petitioner points to the language about given the background
22 reflectance levels. And they want to say that that's performing some kind of
23 analysis. But there's nothing in Gallagher that's saying that we're performing
24 analysis of that, and there's a very clear reason why. It doesn't determine
25 those background reflectance levels until we get to step F, right? We're in
26 step D. We see Gallagher on the left. It's a very clear order sequence of

1 steps. There's been no articulated motivation to change those order of steps.
2 We haven't even determined the background reflectance levels.
3 This is not saying there's an analysis of whether an object has
4 appeared using background reflectance levels. This is saying, as a general
5 principle, this is a good way to tell the driver where those road markers are
6 going to be, because we know in principle the road is dark and the reflectors
7 are bright. And so just outputting that data we get in step A early on before
8 we're doing analysis and just telling, hey, you got to steer right. That way
9 we're going to collect the quality data that we need when Gallagher actually
10 does decide, hey, there's a road marker there.
11 So this is the step that is identified in the petition for detection.
12 We submit it's plainly not detecting objects of interest. And the other key
13 indication that it's not satisfying this limitation is because this is not
14 something that has any relationship to what comes later in the sense that it's
15 not passing an identification of an object to what happens later in Gallagher's
16 later steps, particularly step G, right? It's setting up quality data collection,
17 but it's not passing some information that we've detected an object and here
18 it is. And we can see that --
19 JUDGE O'HANLON: Mr. Saunders, I guess I'm not really
20 following your argument, Gallagher by detecting the area with the largest
21 reflectance level. I guess I just don't understand why that is not detecting an
22 object of interest.
23 MR. SAUNDERS: So there's a few points in that. One, Patent
24 Owner's expert submitted a declaration explaining what does it mean to
25 detect objects in the field that we're at in this case. We're talking about
26 computer vision, detecting objects, right? So is there a recognition that there

1 is an object there by the computer? And that's not happening here because
2 there's no analysis. There's no thinking. There's a shunting of data from an
3 input into an output of an indicator, right? So there's no recognition or
4 there's nothing that says, hey, you have a road marker here.
5 And the key point is that that indicator is going to be on all of the
6 time. If you read the actual disclosure of step D, you will always have an
7 indicator because it is necessarily the case that you will always have a
8 highest reflectance reading, right? So if you have an indicator on all of the
9 time, regardless of whether there's a raised pavement marker, that indicates
10 that it is not detecting raised pavement markers, right?
11 JUDGE O'HANLON: But that's not what the claim says. The
12 claim says detect objects of interest, and then later on we determine if it's a
13 reflective surface or a road marker. So you seem to be kind of combining
14 the detection of objects of interest with the determination steps. I still don't
15 understand why detecting the brightest feedback, the area of the brightest
16 feedback is not detecting an object of interest.
17 MR. SAUNDERS: Okay. So I'll give you an example, right?
18 Based on these disclosures of Gallagher and you're going down a roadway
19 that has no objects of interest, right? It will still have a highest reading. So
20 the point is what is being output in step D has nothing to do with whether
21 there are any objects of interest at all, right? If there is an object of interest
22 or not, it's going to have a highest reflectance reading. And so, if you're
23 always just outputting that raw data, you've never detected anything. That's
24 the point. It's not actually detecting objects.
25 And the other part that we see is in the claim, you have to have a
26 connection. There's an antecedent basis relationship between the object

1 detected and the object which performs the determination, right? There's no
2 disclosure that there is that antecedent basis relationship between this output
3 highest reflectance reading and the step G step where we actually say, oh,
4 there's a road marker there, right? We're going to see that more in the next
5 slide here, going to slide 9, where we have steps F, G, and H.
6 And what's really important, looking at step G, is that it's not going
7 to anything that was in step D, right? It says it is selecting from data
8 obtained in step A. So it's not using any detection that has occurred. There's
9 no necessary connection between an object being detected in a prior step and
10 what's happening now in step G, because it's just going back to original data,
11 right?
12 There's just an assumption without any evidence in the Gallagher
13 itself or in the analysis by Petitioner's expert that says, oh, if there was an
14 indicator, that is going to be necessarily found and shown in step G.
15 Because they're both going to the same raw source of data, right? They're
16 both going to step A. So we're not having a detection of an object and then
17 that same object having a determination that it is, for example, a
18 retroreflector.
19 JUDGE O'HANLON: But you'd be analyzing the data from that
20 area that you're focusing on that's giving you the highest reading, right?
21 MR. SAUNDERS: Well, it's -- I don't think it has anything that
22 indicates that it's focusing on a particular area. What is described in step G
23 is a very simple thing. We have thresholding, right? We have some
24 threshold. That threshold is the threshold that's established in step F of what
25 is -- what is so dark. We're kind of looking in the background there. The
26 road is so dark. You know, how bright it is.

1 We've got some -- just a threshold level, right? And then all we're
2 doing in step G, we don't know where anything is, right? We just know,
3 hey, this photodiode, it got a blip in its intensity readings above the
4 previously set threshold. And therefore, in step G, we say that must be a
5 road marker. That's all Gallagher's doing.
6 So there's no sense of a particular area or any concept of
7 subdividing or analyzing data at any point, you know, up until you get step
8 G on a road marker, you know, specific level. It just says, finally we get to
9 step G. Let's look at that data after it's been, you know, filtered and
10 calibrated, and we're just going to go and look for those blips. And that's it.
11 And compare it to a threshold. Is it above the threshold? It's a road marker.
12 That's all the Gallagher is disclosing. And so both step G and the step D are
13 looking just at raw data. There's not a detection and then a determination.
14 We also heard from Counsel about step F, and I heard an assertion
15 that step F was a detect step or alternative theory for detect step. That's
16 simply not supported by the petition. That's an improper new argument. In
17 fact, paragraph 65, it's only cited in that detect limitation as an early first or
18 second sentence in the part of the petition among a chain cite of a dozen or
19 so paragraphs. When it actually talks about anything with any detail, the
20 focus is on step D.
21 And so we certainly submit that step F is improper to argue, that
22 step F satisfies the detect limitation at this point. But even if it did, we
23 already did analyze that in the POR and we did explain why step F does not
24 satisfy the detecting is because it's not talking about a road marker in
25 particular, right? Step F is just talking about background levels and non-
26 marker reflective levels. It's setting that threshold we're going to use in step

1 G, but there's no particular marker at all that's being identified or even
2 discussed in step F. So step F clearly can't be detecting an object of interest.
3 Moving on to Schofield, just briefly. It's important to keep in mind
4 when the petition relies on a number of portions of the detailed description
5 of Schofield, which are much narrower than what we saw in the presentation
6 for Petitioner about pattern recognition, particularly the overwhelming
7 majority of Schofield's discussion is about automatically turning on and
8 turning off the brights of a vehicle in response to detecting lights that are
9 either white or red lights that correspond to either headlights or taillights.
10 And in particular, when we get to the location limitations, we can talk about
11 that. That's what they're citing to is specific details of Schofield's method
12 for detecting headlights and taillights.
13 So, let's move on to slide 11 and talk about how Schofield's used in
14 context of Claim 9, which is quite narrow in Claim 9. In Claim 9, they're
15 not using it for the detect or determine limitations. So, if there's a deficiency
16 in Gallagher on detect and determine, Schofield certainly can't save it for
17 Claim 9. What they are relying on Schofield for Claim 9 is this assessment
18 of a discrete location, what I call the location limitation in Claim 9.
19 There's another location limitation in Claim 1. Claim 9, as
20 Petitioner discussed, are alternative theories. They rely on Schofield and the
21 alternative in Gallagher. But you didn't hear a lot of emphasis of their
22 location theory for Schofield for Claim 9 during their presentation, and the
23 reason for that is it simply doesn't make sense.
24 Going back to slide 11, we see the language here, the limitation
25 analyzed at least one light intensity value to determine an assessment of a
26 discrete location of the road marker within the field of view, right? We're

1 looking at light intensity values and that's letting us determine an assessment
2 of a discrete location of the road marker within the field of view.
3 But what do they point to in the petition for this limitation? It's
4 this concept in Schofield that we're going to have a rough breakdown of the
5 areas of the field of view of a camera, periphery versus central. And that's
6 going to determine the threshold that we use for whether or not we are going
7 to detect headlights or taillights.
8 And so, that is the opposite of what this claim limitation is about.
9 The claim limitation says we're going to look at light intensity values to
10 determine -- and this is after, in the language of the claim, the detection of, I
11 understand it's a claim structure scheme, but this is at the end of the claim.
12 It's saying we're analyzing the light intensity value to determine a discrete
13 location of the road marker within the field of view. And what we have in
14 Schofield is really the opposite. Schofield ends its process with detection. It
15 says, hey, you've got headlights. Let's turn off those -- or taillights. Let's
16 turn off the brights on the car. That's the end of Schofield's process.
17 And the use of location they're citing to has nothing to do with
18 telling you where something is, is just giving you this broad is it peripheral
19 or is it central? That's going to give us these thresholds we're going to use.
20 And we're going to change how sensitive we are in our analysis of the
21 intensity of the pixels based on that. But that has nothing to do with telling
22 you where something is. And we didn't hear Petitioner rely on Schofield in
23 its analysis -- in its argument today, because it's simply not a persuasive read
24 of this limitation.
25 So let's turn to the alternative theory for the location information.
26 The alternative theory for Claim 9 is the sole theory for Claim 1. And I'm

1 on slide 13. And there's a fundamental problem here for Petitioner. They
2 have a clear, unambiguous concession in their petition on this very issue.
3 We pointed it out in the Patent Owner response, they ignored it in their
4 reply. But this was talking later on when they get into their Ground 4, and
5 part of their motivation to combine in Ground 4, they make an admission
6 about what Gallagher fails to teach.
7 And they say because the light source is in a fixed location on
8 Gallagher's vehicle, this GPS position of the vehicle corresponds to the
9 location of the active sensor. Accordingly, a POSITA would recognize that
10 additional steps would have been necessary to also determine the location
11 markers.
12 JUDGE O'HANLON: Excuse me, Mr. Saunders. Can you just
13 -- we're going to pause for just a moment. I believe Judge Turner, his feed
14 has been cut off. Judge Turner, are you on with us? I'm sorry, do you see
15 Judge Turner on the screen? I believe he's been disconnected.
16 I apologize for the delay. Judge Turner, I believe we can see you
17 now. It looks like you're back online.
18 JUDGE TURNER: I am here. Sorry about the -- everything
19 blanked out. You can commence if you want.
20 JUDGE O'HANLON: I apologize for the interruption. Please
21 continue.
22 MR. SAUNDERS: I was on slide 13 of our '328 slides. And what
23 we see is this is the omission that is in the petition itself. Gallagher has an
24 absence of disclosure about the location of the markers. That's what it's
25 saying it's lacking. And as Patent Owner herself argued about Claim 1 and
26 9, it's measuring the GPS, not the location of the markers, right? That's what

1 we see in paragraph 48, which is what's cited in the petition. It's a GPS or a
2 gearbox sensor. It's telling you how far the vehicle is.
3 And what we remember is, as I said earlier on, Gallagher is
4 measuring this area A in front of the vehicle. It's a big area being
5 illuminated. That is the test area, right? And so just because you know the
6 GPS of the car is not telling you exactly where the marker is with any
7 precision beyond the vehicle itself. And they admitted that this is not
8 enough. This is not the location of the markers, this is the location of the
9 GPS sensor. They've never responded to this.
10 And in fact, what we see and we heard today was improper new
11 arguments in their reply. There was a focus on Figure 5, and in particular,
12 their expert's interpretation of Figure 5 is somehow necessarily showing that
13 it's actually determining where the locations of the markers are as opposed to
14 the GPS. We also heard a reference to capsule marking and the tagging.
15 Those are new arguments. Those are not a basis for the arguments in the
16 petition for the limitation about identifying the location.
17 The portions of the petition about these location limitations was
18 very short, and it was about essentially this paragraph here of we have a
19 GPS, which they admitted in their own petition later on is not the location of
20 the marker. So it's plainly clear that Gallagher cannot satisfy the location
21 information Claim 1 --
22 JUDGE O'HANLON: But Mr. Saunders, that paragraph there, 48,
23 says can "pinpoint the position of the vehicle and/or markers."
24 MR. SAUNDERS: So I understand, Your Honor, it does say the
25 GPS. Now, we have analysis from our expert where it says, well, a GPS is
26 just going to tell you the location of the vehicle, and you can make some

1 inference about the area, the giant test area in front of it, but it's not actually
2 giving you the location of the marker. And that is what they've admitted
3 themselves lower on. So if in the sense of location of the markers you mean
4 the general vicinity of the markers at a high level based on the GPS, that's
5 what it's talking about.
6 It's not talking about determining the location of the markers in the
7 field of view, right? Because the field of view is that test area A in
8 Gallagher that is ahead of the car, and the GPS the Petitioner itself admits is
9 on the vehicle, right? There's no explanation in the petition or in Gallagher
10 itself how you can actually locate the markers separately from the vehicle
11 itself. There's just not a disclosure of that, and they didn't offer any
12 explanation of that or attempt to explain that in any way until they got to the
13 reply.
14 And even then, they're not really pointing to anything in Gallagher
15 that's saying how Gallagher actually makes any kind of separate
16 determination of the location of the marker as opposed to just outputting that
17 same GPS, right? Because we have one GPS interface 15, that's telling us
18 where that location of that GPS is, which Gallagher says is on the vehicle,
19 right? So it's only telling you that there's a GPS address and it can tell you
20 the time that it's sensing it and it knows that it is, whether or not there has
21 been a marker in the test area at that time. But that's not the location of the
22 marker in the field of view.
23 JUDGE SILVERMAN: How does -- if I may, Counselor, this is
24 Judge Silverman on video. How is that distinguished from what the claim
25 requires you to do?
26 MR. SAUNDERS: Well, I would say that at the very least the

1 claim requires that it be different than the detect limitation, right? So the
2 detect limitation is already talking about detecting objects in the field of
3 view. And so when you're talking about a location, the claim talks about a
4 discrete location, right? That's different than just you have an object in your
5 field of view and only know the kind of approximate area of that.
6 And in the preferred embodiment, what we see is that actually the
7 preferred embodiment does use a laser radar scanner, which is not in
8 Schofield or Gallagher, which shows up later in the Frank reference when
9 they get to Claims 15, 16, and 14, but they don't have a reference with a
10 laser scanner or anything like that that actually tells you what objects are in
11 their combinations for Claims 1 or 9. So I'm not saying the claim is
12 essentially limited to exactly like a laser scanner, but that's an example of
13 something that would actually give you a discrete location, as opposed to
14 being something that is essentially the same as already the concept of
15 detecting an object in a field of view.
16 Moving on to Claim 1 specifically, as Your Honor noted earlier,
17 Claim 1 is a bit different than Claim 9 in the fact that it has two determine
18 steps plus the analyze steps, so there's an extra determine step here. And this
19 is an example of where we see that concession that I've showed earlier on, or
20 concession that we can't be reading these different steps of the claims on the
21 same step in the prior art.
22 And so I'm on Slide 14 here, and what we see in the petition for
23 both limitations 1F and 1G, they're relying on Gallagher's Paragraph 66 or
24 step G, right? That is the step in Gallagher that is the step that says, I have
25 data, and now I believe that there is a road marker, right? But that's very
26 different from what we see in these two different limitations. We see a

1 limitation about determining whether an object of interest includes a
2 reflective surface, and we see a separate step for determining whether the
3 reflective surface is a road marker based on the assessment of the reflective
4 surface, right?
5 So they've admitted that they cannot read two distinct steps on the
6 same step in the prior art, but that's exactly what they've done in the petition.
7 And as I noted, it's improper to go ahead and change from that original
8 reading that's been in the petition, and step f, as I mentioned before, has
9 nothing to do with that because step f is not even talking about any particular
10 marker, right?
11 JUDGE O'HANLON: Mr. Saunders, I believe when I asked Mr.
12 High about this earlier, he pointed to the petition where it talks about
13 distinguishing between painted lines on the road and raised pavement
14 markers. So I believe he pointed to that as being the additional determining
15 step that's required in Claim 1. Do you have any response to that?
16 MR. SAUNDERS: That is an example of an improper new reply
17 argument, Your Honor. If you compare what's in the petition itself to what
18 is in the reply, the petition does not talk about differentiating between
19 painted lines and raised pavement markers, right? That is a new argument
20 raised in the reply. And it comes up in a number of places in the reply, but
21 that is a new reply argument.
22 It's also an argument that's completely unsupported by the
23 disclosures of Gallagher. And the reason for that is Gallagher very early on
24 says, I could adapt this system to a variety of different types of road
25 markers, but from here on out, I'm going to explain this system solely in the
26 context of one road marker, the raised pavement marker, right?

1 So none of the subsequent disclosures in Gallagher, in particular
2 when it goes through all those steps A through L, none of those disclosures
3 in Gallagher can be reasonably interpreted as differentiating among two
4 different types of pavement markers, or between lines and raised pavement
5 markers. Because it said early on, hey, I'm going to give you this example
6 solely in the context of raised pavement markers, but you could adapt it to
7 something else. And it's just clearly a plain stretch to what they've pointed
8 at as interpreting somehow Gallagher is making a differentiation between
9 the lines and pavement markers.
10 Certainly none of the disclosures they've pointed to talk about lines
11 in those individual enumerated steps in Gallagher. So that's clearly lacking a
12 disclosure of differentiating between two different objects.
13 Now briefly about Claim 1 in Schofield, and Schofield has
14 additional relevance to Claim 1 in Petitioner's theories, in particular for both
15 limitations 1A and 1E, they're relying on Schofield and they're relying on it
16 to bring -- excuse me, Your Honor, to bring in this concept that Schofield's
17 going to help detect objects through pattern recognition. And this is an
18 example first of all of an improperly and inadequately disclosed combination
19 of the petition. And we're on Slide 16 here, and we see a citation of the
20 *Personal Web* case.
21 *Personal Web* requires a clear evidence-supported account of the
22 contemplated workings of the combination as a prerequisite for reaching a
23 conclusion of obviousness, in particular for whether it would be predictable,
24 whether it would be a motivation to combine. There have to be enough
25 details of actually saying how we're putting these various pieces together
26 that we can respond to it and have a meaningful discussion about motivation

1 to combine and predictability.

2 And what we can see here on Slide 16 is when we ask Petitioner's
3 expert about how he is proposing, that we somehow misinterpret it. He just
4 keeps saying repeatedly that there are multiple ways of doing it, multiple
5 ways of combining these references.

6 And what we'll point out in our sur-reply is that when we get to the
7 reply declaration of their expert, all of a sudden we get tons of new specific
8 details about different ways he's actually proposing to combine the
9 references. And the problem is, is that is improper. We had to have those in
10 the petition so we could actually submit an expert declaration analyzing each
11 of those proposed combinations with details, with enough details to say why
12 there's a lack of predictability or lack of motivation to combine.

13 We can't just have -- essentially what Petitioner has done is they've
14 thrown a bunch of pieces in the petition and said we're combining them, give
15 almost no details about the nature of the combination until the reply
16 declaration in the reply. And then say, oh, here's actually how the pieces are
17 coming together and specifically, how are we taking a Schofield with a
18 camera based approach to detecting objects and applying it to a very
19 different photodiode based approach that’s in Gallagher.

20 Going on to motivation to combine, we did see, however, Patent
21 Owner's expert address this motivation to combine and he pointed out this
22 very specific issue. We are, in fact -- Petitioner's, whichever one that
23 ultimately they identify in the reply, it is fundamentally performing sensor
24 fusion. It's taking data and it's taking it from data of very, very different
25 types that work in very different ways. We have something that is giving us
26 snapshots of images versus something that is just producing discontinuous

1 data, this photodiode that's just here's a peak and here's a peak and somehow
2 they're supposed to be fused.
3 And that was not a predictable solution no matter how you
4 combine them at the time of the invention, and it particularly notes this
5 problem of sensor fusion at highway speeds was very difficult and both
6 Gallagher and Schofield are systems that are designed to operate at highway
7 speeds. There's been no suggestion of combining them in a different way.
8 And this isn't just Patent Owner's expert saying it. We can see on
9 Slide 18 that we submitted one of Petitioner's expert's own prior papers.
10 This is from 2001, and he says the weakest link is perception. He's talking
11 about mobile robots. You can see in his description of his background, his
12 declaration, he worked a lot on autonomous -- early autonomous driving
13 systems.
14 But in 2001, figuring out at highway speeds where objects are was
15 not a solved problem. It was incomplete. And he identified what had to be
16 worked on to solve that problem in 2001. We had to have improved sensor
17 fusion. It was a dominant theme of his work. He was in progress in an
18 academic setting at that time, and in particular, he noted that no single sensor
19 fusion methodology was suitable for all combinations of sensors, right?
20 So we don't see any basis from Petitioner whether in the petition or
21 in the reply that provides a basis for saying it would be predictable to
22 combine an image based approach like in Schofield with a photodiode array
23 in Gallagher at the time of invention of the '328 Patent. In fact, everything
24 that they cited was combining images with each other or combining images
25 with the different types of sensors. A very different approach and no
26 documented basis for saying this is predictable.

1 We also submitted evidence that it's still a problem today. It's still
2 not a solved problem, this issue of object detection at highway speeds. We
3 submitted this citation to a National Highway Traffic Safety Administration
4 issuing an investigation to Tesla because of problems with object detection
5 with their camera based systems at highway speeds in the real world. So we
6 submit it has certainly not been shown that it would be predictable to
7 combine Schofield and Gallagher in the manner claimed.
8 JUDGE O'HANLON: And Mr. Saunders, is this, the sensor fusion
9 argument, does that require the computer system to take the data from the
10 Gallagher sensors and the data from the Schofield sensors and kind of
11 analyze that together? Is that what the sensor fusion problem is?
12 MR. SAUNDERS: That is what the problem most clearly is, and
13 that comes in Claim 1, right? So in Claim 1, their theory for Schofield is
14 they're adding Schofield's camera, we're adding Gallagher's photodiode and
15 somehow pattern recognition, somehow it's going to work together in a way
16 and let us detect objects better than Gallagher alone. So that's the clear
17 example of sensor fusion.
18 On Claim 9, our position that we've submitted is they've been
19 pretty inconsistent on exactly how they're taking Gallagher -- sorry, taking
20 Schofield's image based approach and combining it with Gallagher.
21 Because it only shows up in that later limitation about analyzing locations.
22 And what we saw in their reply for the first time is now they're saying, oh,
23 well we could take an entire row from Schofield's camera and that would
24 now be the sensor in Gallagher. So it's another new argument. But that's
25 essentially you're taking a camera approach, what Schofield has, and you're
26 having to use Gallagher's photodiode-based sensing system with a camera

1 array of one height.

2 So it's not literally two sensors I think in their combination, at least
3 the best as I understand it after their reply, but it is fusing two approaches.
4 Claim 1, it is literally sensor fusion for their theory. It is -- their theory is we
5 will do a detect step using both together and it will be better than if we used
6 either individually.

7 JUDGE O'HANLON: I ask because I believe in -- and I don't
8 remember if this is in the petition or the reply, but I think they mentioned
9 somewhere it's -- the Schofield system is confirming the readings of the
10 Gallagher system. So I don't think that would necessarily be combining data
11 from the two. You'd be making an initial analysis with the Gallagher and
12 then another analysis with the Schofield, and then confirming the first
13 reading with the second reading. I might be misreading the arguments, but if
14 that is the case, then that wouldn't be fusing the sensor data. It'd be making
15 two separate calculations, I guess, and using the second to confirm the first.

16 MR. SAUNDERS: Your Honor may be referring to one of their,
17 as I said, improper new reply arguments where they're giving additional
18 details about the proposed combination. Just going on what's in the petition
19 itself, they just say that Schofield is going to help with object detection,
20 right? Not object confirmation. So if we focus on the arguments in the
21 petition itself, the petition itself clearly seems to be contemplating some
22 form of sensor fusion.

23 Moving on to Ground 2, we're bringing in Frank down addressing
24 Claims 15 through 16. So going to Slide 21, I'm just going to address at a
25 high level some of the problems we're getting to when we're getting this far
26 down into the petition. One of the most glaring problems is we have a

1 combination in the petition that's supposedly a combination of Gallagher,
2 Schofield, and Frank. You have no discussion of the relationship between
3 Schofield and Frank in this set of claims at all.
4 Remember, so these were depending from Claim 9. We just talked
5 about Schofield. Schofield's one of their alternative two theories for the
6 location information in Claim 9. They're bringing in Frank, which is
7 supposed to be telling us where the locations of objects are with its laser
8 radar, but they haven't said anything about the combination. No meaningful
9 details at all about how Schofield and Frank are interworking.
10 The other part that is pretty glaring is this as part of language,
11 which kind of goes back to the first issue I mentioned. So there's a very
12 specific language in Claim 15 that says "as part of the assessment of the
13 discrete location of the road marker within the field of view," right? So
14 we're in a claim that is calling back and referring to a limitation in Claim 9,
15 the last limitation, that location information. And in the petition in Claim 9,
16 what are we talking about? We're talking about Schofield, we're talking
17 about Gallagher, right?
18 And now in this Claim 15, there's now saying, well, here's how
19 Frank would read on the last limitation in Claim 9. There's none of that
20 attempted in the petition. There's no attempt to explain here's a new
21 combination and here's how Frank is fitting into what we already discussed
22 above in talking about the location information -- the location limitation. It's
23 just assuming somehow that that is performed.
24 And we pointed out in the reply they didn't say anything other than
25 you could basically figure it out from the structure of the petition itself. We
26 submit that's clearly below the standards required for clearly setting forth the

1 grounds in the petition. There has to be some explanation, some written
2 narrative for how Frank is actually in this combination, how this
3 combination is satisfying this as part of the assessment of the discrete
4 location. And that's not satisfied when you're going back to a prior ground
5 that has no discussion of Frank at all.
6 Last, all the problems with sensor fusion, they're getting even
7 worse with adding Frank. We're adding clearly a new device, a laser radar
8 device with its own output and its own input, and it's not described how all
9 those details work in the petition. There's even less details than we have
10 with Schofield, and there's a number of problems to be highlighted about
11 fundamental problems in making it actually work with Gallagher.
12 Going on to Slide 22 though, another specific problem with the
13 failure to prove claim language being satisfied by the prior art in the petition.
14 And so this is Claim 15 and this concept that it is multiple angular
15 displacements for each light intensity measurement from a reference
16 location. And so, this is claim limitation, claim language "for each light
17 intensity measurement from a reference" location. There's just no analysis
18 of that part of the language of Claim 15 in the petition or in their expert's
19 declaration accompanying the petition.
20 Really all the petition and their expert's declaration says is Frank
21 has a laser radar, it gives these distance measurements, it gives these angles.
22 Those angles it says are observation angles, and it doesn't actually compare
23 that to what the language of Claim 15 says. So it's showing -- they've made
24 an effort to show that there's a determination of angular displacements, but
25 not multiple for each light intensity measurement from a reference location.
26 And this is, if there's any doubt about the claim interpretation here,

1 this is very clearly squared here on Slide 22 with what the '328 Patent talks
2 about. It talks about how you do exactly that. And it also has a scanning
3 laser radar, and it talks about the importance of having one that was fast
4 enough to get multiple measurements from a single object, right? So it's
5 talking about getting multiple, fast enough to capture at least several
6 individual discrete measurements from across the object's face. That's in
7 column 14. And again it talks about, in column 15, a series of discrete
8 locations being determined.
9 Going on to Slide 23, Patent Owner's expert talks about this.
10 There's just no disclosure of that, of having multiple measurements for this.
11 There's no disclosure in Frank of even its laser radar being fast enough to
12 have multiple measurements of a single sign, right? There's simply no
13 disclosure in Frank of this. That's what was submitted with the Patent
14 Owner's response.
15 And in their reply, I'm on Slide 24, the only argument that the
16 Petitioner had in their reply was, well, we showed that Claim 16 is proven
17 and therefore Claim 15 must have been proven. That's really an unsupported
18 argument. First of all, if you look at what the petition says, the petition
19 section for Claim 16 is two sentences long. It says, see above for Claim 15,
20 right? There's nothing added in Claim 16 announced in the petition.
21 And so, all they're presuming is saying somehow the fact that we
22 showed that it was an observation angle is enough. But that's not what the
23 Patent Owner's dispute is about the sufficiency of the proof here. We're not
24 disputing the observation angle issue. We're disputing the issue of for each,
25 right?
26 And in fact, if we look at the language of Claim 16, contrary to

1 Petitioner's arguments, looking at Claim 16 makes things worse for them.
2 Because if you had any doubt about the meaning of Claim 15, we see again
3 in Claim 16 this concept of where each of the exemplary angular
4 displacements of incident light, and then we -- I'll read -- go through the end
5 of that claim limitation ends with from the road marker. So Claim 16
6 confirms a relationship of multiple measurements per a single road marker.
7 No attempt to show that that's disclosed or rendered obvious by Frank in the
8 petition at all.
9 Moving on to Ground 3. This is for Claim 14. They bring in
10 ASTM in addition to Frank, but I think really the focus of the dispute is
11 about Frank itself, what's in the petition, by their own Petitioner's expert,
12 doesn't satisfy -- his own, Petitioner's expert's own admission, the angle
13 alpha in Frank does not satisfy this limitation. It's not an entrance angle.
14 We see this on Slide 26. On the left there is what was in the petition and on
15 the right is the Petitioner's expert's admission that that is not the right thing.
16 And the only argument in their reply was, oh, this is a
17 typographical error. We really meant the angle theta. And there's a number
18 of problems with that. First of all, this is not a typographical error. This is a
19 logical error. This appears in the petition, it appears in the Petitioner's
20 expert's declaration, it appears over and over again in text and in image
21 saying angle alpha is the entrance angle for Claim 14. They haven't filed
22 any motion for correction to address that error.
23 They didn't even submit an expert declaration on that. All they did
24 in the reply was point to their expert's deposition as if somehow that's a
25 substitute for having incorrectly presented theory in a petition and an
26 opening expert declaration. And it's clear why that's the case. As I said

1 before, they're relying on angle theta back in Claim 15. Claim 16 is adding a
2 different angle. It doesn't make sense that they had a theory that the one
3 angle was both angles. That would be something that you'd expect to be
4 very clearly explained, how Frank's angle theta could be both angles. And
5 that's not in the petition itself.
6 But briefly addressing the new theory of angle theta as an entrance
7 angle that was raised in the Petitioner's expert's deposition. That's simply
8 just not an entrance angle. We see here on Slide 27 what an entrance angle
9 is. And in column 7, line 55, we have definitional language about an
10 entrance angle. Entrance angle is defined as the angular displacement of the
11 incident light relative to the normal vector from the object face surface.
12 So the object face surface, meaning the normal there in green and
13 the figure on the right, that is part of the definition of an entrance angle in
14 the specification there, right? The entrance angle depends on where the sign
15 is pointing. That's the whole point. It explains how in the specification
16 measuring this entrance angle is going to prove our measurement of the
17 retroreflectivity values.
18 Going on to Slide 28, we see what their theory is. In the new
19 theory that they presented in their reply and in their expert's deposition, it is
20 angle theta in Frank, the same angle that they pointed to in Claim 15.
21 Instead of green, what we saw on Slide 27 here, which is a normal from the
22 sign, we see a normal from the car. That's different. There's absolutely no
23 guarantee that -- this presents no information about where the signs are
24 pointing. Or whatever the marker is, there's no information about a normal
25 from that object that is identified by Frank's angle theta.
26 And that is the definition of entrance angle in the specification. It

1 depends on that pointing of the object. So it's very clear that Frank's angle
2 theta cannot be the entrance angle, therefore they have no theory for that
3 claim.
4 Finally, let's go to Ground 4, Claims 5 through 7. So this is the
5 combination where they go back to Gallagher and Schofield and add
6 Leonard and Popovich. So going to Slide 30, there's simply just a panoply
7 of different problems with this combination. Honestly, this combination
8 doesn't seem to make a lot of sense at all.
9 Starting with Popovich is not analogous art. It's a living room
10 device where a user's head has a tracker on top of it and they're looking
11 around. And somehow that disclosure is being applied to the very different
12 distances involved in highway systems of Gallagher and Schofield with no
13 meaningful explanation from Petitioner's expert, and no real response
14 -- there's no technical response in the reply about the technical issues of, you
15 know, how Popovich is going to work and satisfy the claim limitations in the
16 reply.
17 Going next, the selection of different embodiments of Popovich.
18 It's another problem in the reply brief. They basically just justified this as
19 saying, well, we don't have to. We don't have to identify motivation for
20 picking and choosing from the different disclosures.
21 We submit there has to be some analysis. It can be proper in some
22 cases to identify different disclosures of different embodiments as part of a
23 motivation to combine, but you have to say something about what you're
24 doing, which certainly doesn't show up in the petition.
25 Next, the theory of Leonard, why this is even ending up in the
26 combination. This is honestly just confusing. It appears Leonard was

1 largely introduced in their theory as a reason for them to then introduce
2 Popovich, but Leonard is addressing a problem that is already solved by the
3 Gallagher-Schofield combination, which has a camera-based system. It can
4 see objects at various distances. Leonard is just about using a system with
5 infrared diode and being able to look at objects at various distances. There's
6 no explanation why Leonard's getting added to this combination in a way
7 that creates any benefits or has any motivation.
8 We explain why Leonard would render Gallagher inoperable.
9 That's not been really responded to at all in their reply, and as I mentioned,
10 these close head tracking techniques in Popovich have no applicability to
11 these longer distances involved in Gallagher and Schofield.
12 Turning to the actual claim limitations and the disclosures in the
13 prior art that are alleged to satisfy the claims, again, it makes no sense here.
14 Petitioner points to Popovich and its disclosures about angular intensity
15 distribution profiles. Popovich doesn't talk about -- we see that this
16 limitation is comparing the light vector to one of the plurality of
17 predetermined vectors based on a light source angle characterization.
18 So they point to this disclosure in Popovich of a light source angle
19 characterization, but this is not being compared to anything in Popovich. It's
20 just saying to make Popovich work, you want to have two different lights,
21 one that has a uniform distribution and one that has a non-uniform
22 distribution. That's where the discussion really ends. It's not doing any
23 comparison of those profiles, so that doesn't make any sense.
24 They also point to Popovich's peak of the spot intensity profile. It
25 has absolutely no connection with that prior limitation about the angle -- the
26 prior structure in Popovich, the angular intensity distribution profile.

1 They're unrelated. It says in an embodiment of Popovich, you want to have
2 lights with two different, you know, distribution profiles. But that has
3 nothing to do with the actual disclosure about this measuring the peak.
4 And the output, it's important to mention the output here. We're on
5 Slide 32. The output is a ray vector. It's not comparing a vector with
6 something, another vector. It's just saying, here we're going to give you a
7 way to find where someone's head's pointing using these two interfering
8 light sources. No apparent connection to the claim language, and honestly,
9 the explanations in the petition and Petitioner's expert declaration just simply
10 don't make any sense.
11 Unless Your Honors have any more questions for the '328, I'll
12 move on to the '255 and Patent Owner's slide deck for that presentation. So
13 going to Slide 2 of that exhibit. Just briefly, the '255 Patent is addressing
14 same kinds of issues that we see in the '328. We're focusing on automated
15 detection of objects, and we're focusing on making measurements, and in
16 particular, fulfilling that goal of having retroreflectivity values measured in a
17 useful way. But it's not any way of doing it, particularly the claims that are
18 left, the one claim left, Claim 15. It's doing it in a very particular way, the
19 characterization profile.
20 And so, this is Slide 3 here. We have the parties' competing
21 constructions for this limitation. And Petitioner's argument called this
22 consistent -- its position consistent with the claim. What we would submit is
23 that it renders the construction profile language, it renders unimportant.
24 The language construction profile is in that claim for a specific
25 reason. It's to tell one of skill in the art, hey, you know this well-known
26 concept that's known in the art that I also mentioned in the specification by

1 the phrase characterization, that's what I'm talking about, right? And so
2 having this Petitioner's construction, Petitioner's construction is adding
3 nothing to what's already in the rest of the claim that's not highlighted. So
4 that's not a proper claim construction.
5 And what we see as Patent Owner's construction, the core of the
6 dispute really, in particular how it reads against the Lumia reference, is this
7 issue of the sensor having its measured performance characteristics across
8 the various conditions. And this was an issue in the Board's decision on
9 institution where the Board disagreed with Patent Owner on the claim
10 construction issue, but agreed with Patent Owner on the issue of if Patent
11 Owner's construction were adopted, it doesn't seem that Lumia has a
12 disclosure of that. And I'll explain why that was correct and why it was
13 incorrect on the issue of construction in the institution decision.
14 So, I'll first dispute something that Counsel said about order of
15 evidence. *Phillips* makes very clear that there is no specific order of
16 evidence that you are supposed to do. *Texas Digital* was a precedent from
17 the Federal Circuit that said you look at all of the dictionaries in the world
18 that are relevant to this, and you adopt a construction that is broad enough to
19 encompass all of them, unless something in the specification vetoes it. That
20 is not at all what our claim construction position is. Our claim construction
21 position says we are 100 percent fully supported by what the specification
22 says, and we are a 100 percent fully supported by what the extrinsic
23 evidence says.
24 So I'll start with the specification here, and in column 11, we're on
25 Slide 4, we see a discussion of what the goal is here. We have the
26 importance of background or foreground color of the object of interest, and

1 we see that as important because sensors have a different ability to sense
2 different colors. That's the example of the various conditions in the
3 specification.
4 It's saying you can have various different colors or you're going to
5 have something that addresses how sensors respond to various different
6 colors. Now that's just an example. It's an example because we know in
7 Claim 9 we don't have to have a camera with various different colors, but
8 that's how the concepts of various conditions is illustrated in the preferred
9 embodiments of the specification.
10 And we see lower down the second highlighted part, we see it says
11 intensity sensor characterization is empirical information about the light
12 intensity sensor 280 that is used to create the LUT or look-up-table 475.
13 And we also submit that this is a very important sentence because it
14 highlights a distinction between Petitioner's construction, which is just a
15 conversion factor, and the concept of sensor characterization, because the
16 LUT 475 is the thing that is doing the conversion factor, right?
17 It says in the prior sentence where it's not highlighted the look-up-
18 table LUT 475 is a digital table stored in memory that uses the indexes of
19 intensity and shading color to determine luminance. So the look-up-table is
20 the ultimate thing that's going to output the luminance, and it's going to
21 convert one from the other. The sensor characterization is something that's
22 used to create that, right?
23 So we have empirical information just like Patent Owner's
24 construction. We have measurements under various conditions that are
25 going to -- that provide that empirical information, and that is what is used to
26 create the conversion factor. It's not the same thing as a conversion factor

1 itself.

2 Turning to Slide 5, we see this is also confirmed in the quotation of
3 the '255 Patent, column 10. It says what is the problem here? Why do we
4 need a sensor characterization profile? Because luminance will vary
5 according to the intensity sensor characterization profile 275 of the light
6 intensity sensors and the color of the material from which light is reflected.

7 So we have a problem. These sensors have non-uniform responses
8 to different colors of light, various conditions. How are we going to solve
9 that problem? Well, first, we're going to empirically characterize that
10 sensor, perform the well-known concept of sensor characterization, and then
11 we're going to go ahead and apply that. And in the preferred embodiment,
12 we're applying that by putting that data into a look-up-table, right? So, two
13 different structures in the specification. One about converting and one that
14 is empirical information. Empirical information. We've tested that sensor,
15 and if there's any doubt about that we can look at extrinsic evidence.

16 So on Slide 6 here, we see a quotation from CMOS image sensors,
17 at Exhibit 2011. And we see this is focusing on the same kind of sensors
18 we're talking about in the '255 Patent, electro-optical sensors. It says
19 electro-optical characterization is fundamental and it mentions it aims to
20 experimentally measure the parameters of the sensor under different
21 operating conditions. That's exactly what Patent Owner submits is the
22 appropriate construction. We have to have different operating constructions.

23 Going on to Slide 7. This is where we see we have a problem,
24 because what does the petition point to for this disclosure of this
25 characterization profile? It points to Lumia's calibration. And what Lumia
26 says about calibration is that it is accomplished by acquiring an image, one

1 image, of a calibrated white sheeting material, one sample, and computing a
2 scale factor. That is not sensor characterization. The Board correctly found
3 that that is not sensor characterization as Patent Owner has interpreted it.
4 Briefly, there was an argument from Petitioner about, well, it really
5 could be multiple conditions because of this issue of highway mode versus
6 local mode. So first of all, that's not in the petition itself, that's a new
7 argument. But even beside that, there's nothing in this disclosure of actually
8 taking two different calibrations, right?
9 Now, they didn't have their expert, you know, go ahead and say,
10 all right, there would be a motivation for one of skill in the art to modify
11 Lumia or to implement Lumia in the combination such that we take different
12 distances and put them together, right? That would be a modification of the
13 reference, that'd be something that had to be in the petition itself or at least a
14 way of combining the references together differently than what was in the
15 petition itself. We don't see that. We don't see this -- and we don't even see
16 that in the language of the reference itself. In this example, it's just talking
17 about one distance.
18 Now, it talks about in a much earlier section that doesn't talk about
19 calibration of having two different differences. But that's entirely consistent
20 with having two different modes that don't ever happen at the same time,
21 right? If you have -- I'm going to have one system and that is my highway
22 mode system. I'm going to have another system that is my local mode
23 system, right? That's entirely consistent with having two entirely
24 independent systems rather than actually taking one sensor and
25 characterizing it, right? And finding its performance across various
26 conditions.

1 So there's nothing in Lumia that tells us that we're going to have
2 something that actually has various conditions. That's a late attempt to re-
3 read the reference by Petitioner.
4 JUDGE O'HANLON: I do have one question about Lumia. You
5 know, you mentioned empirical information and using that to create the
6 look-up-table. Isn't that what Lumia does? It measures, you know, takes an
7 example of a white background, measured -- used the sensor to measure the
8 reading, and then came up with the scale factor. So why isn't that the same
9 type of information that's in the look-up-table, that scale factor?
10 MR. SAUNDERS: Well, a lot of that's part of the Patent Owner's
11 construction about various conditions, right? That's --
12 JUDGE O'HANLON: So, yeah, just getting away from the
13 multiple things in the look-up-table, just getting to, you know, what's in the
14 scale factor, why isn't that the same type of information that's in the look-up-
15 table of the challenged patent?
16 MR. SAUNDERS: Well, our position is that the look-up-table of
17 the challenged patent is like the ordinary meaning in the field demonstrated
18 by the extrinsic evidence. An example, something that has various
19 conditions. The various conditions that exist in the preferred embodiment
20 are the various colors, right? So we're going to have to calibrate in the
21 preferred embodiment that sensor according to some number of colors that
22 are sufficient for what we expect to see, right? That's what we have in the
23 preferred embodiment. So that's certainly not what's in Lumia here, where
24 we have a single white sheeting material.
25 JUDGE O'HANLON: So the only argument is plurality, right?
26 MR. SAUNDERS: The various conditions, yes. The idea that

1 you're -- that a single calibration against a single target is not how this claim
2 limitation will be understood based on both the intrinsic evidence and the
3 intrinsic evidence, which we submit are consistent with each other.
4 JUDGE O'HANLON: Okay. Thank you.
5 MR. SAUNDERS: Moving on to motivation to combine. This is
6 the petition, we're on Slide 8. We're quoting the petition itself. There's a
7 fundamental problem with the motivation to combine in the petition. And
8 it's pretty easy to see what we're talking about here with the highlighted
9 portions. What does it talk about the motivation to combine? It says the
10 motivation is to allow Gallagher's apparatus to calculate the retroreflectivity
11 of road markers.
12 And it says a POSITA would be motivated to do so, as was well
13 known at the time, several road authorities specified minimum
14 retroreflectivity values for road marking across the roadway. And it ends
15 with a POSITA would have been motivated to implement Lumia's
16 determining luminance value to allow its apparatus to identify and tag any
17 markers that do not meet predetermined minimum acceptable reflectance
18 levels for countries that require a minimum retroreflectivity level.
19 So we see a real fundamental problem here is Gallagher already
20 expressly states that it is measuring retroreflectivity of road markers and
21 seeing whether they meet the roadway authorities. This is on Slide 9. So
22 paragraph 3 of Gallagher expressly mentions retroreflectivity, right? And it
23 says minimum standards of retroreflectivity. And we're going to calibrate
24 the data and then in step c, in step h of Gallagher, we're going to determine
25 the reflectance level of the road marker and a value, and we're going to
26 compare it to a predetermined standard.

1 So, this is what Gallagher says on page -- that's Slide 9. Going
2 back to Slide 8, that's exactly what the motivation to combine. So they have
3 a fundamental problem here. We have a -- they're bringing in Lumia, they're
4 trying to get a motivation to practice a claim limitation that involves
5 determining a luminance value, but they already have a base argument that
6 does exactly what they're talking about.
7 And so, what we saw in the presentation and also in their reply was
8 an improper new reply argument. It's what we call the units argument. It's
9 somehow we're going to have -- Lumia is somehow going to help us with
10 units that are different from Gallagher. So I put on Slide 11 here, this is the
11 petition on the left, this is the reply on the right. It's very clear that this is an
12 improper new argument. Nothing on the left there says anything about
13 different units. Nothing says that we have different units of retroreflectivity
14 values, and that's why we're bringing in Lumia to help Gallagher calculate
15 retroreflectivity in a different way.
16 Instead, on the left there in the petition, we say to allow
17 Gallagher's apparatus to calculate the retroreflectivity of road markers,
18 period. End of sentence. No discussion of units. There's no dispute that
19 Gallagher already does that, right? So there's a fundamental flaw and their
20 attempt, their late attempt to change their theory about -- to this unit theory
21 is improper. Even if the Board were to consider it though, it's also logically
22 flawed.
23 And so, what Petitioner has to show is both their articulated
24 motivation to combine being we're going to end up at retroreflectivity and
25 also satisfy the claim limitation along the way being determining
26 illuminance value. But they have a problem. Both references, Lumia and

1 Gallagher, both calculate retroreflectivity and they both disclose a way for
2 calculating retroreflectivity without ever determining illuminance value,
3 right?
4 Petitioner's argument today was that Patent Owner is ignoring this
5 page of Lumia with the Equation 2. But we submit when you look at
6 Petitioner's motivation to combine, they are the ones that have -- are
7 ignoring something. They want to run to Equation 2 simply because they
8 need Equation 2 to satisfy the claim limitation, but that has no connection
9 with what they've articulated as the motivation to combine, particularly in
10 the petition itself. Because the motivation to combine in the petition itself
11 doesn't identify a motivation to determine illuminance value. It identifies a
12 motivation to determine retroreflectivity values.
13 And so, somehow they have a theory that, well, we're going to do
14 Lumia and doing Lumia means determining luminance, but no it doesn't.
15 Lumia says there's multiple, at least Lumia says, at the very least, Lumia
16 says there is a way of calculating retroreflectivity without determining
17 luminance. That's that last page of Lumia, right here on Slide 10, that last
18 page of Lumia. I believe this was clear from the record that their expert
19 didn't dispute this, that the 8-bit digital gray levels, those are intensity values
20 and then it's converting it directly to retroreflectivity without determining
21 luminance.
22 So they have to, at very least, articulate a reason why they're
23 deviating from both, both references that they're relying on. Somehow their
24 answer on Slide 12 is Equation 2. And what we saw for the first time in the
25 reply is they're saying Equation 2 is going to give us both of those steps. It's
26 somehow going to let us determine luminance and then use that to determine

1 retroreflectivity, right? It's this two-step because they have one step as their
2 motivation to combine in the petition, is just focused on retroreflectivity.
3 The claim requires luminance, so we have to have a two-step theory
4 basically for them to have some theory consistent with the claim and
5 consistent with what they put in their petition.
6 The problem is, is that Lumia's Equation 2 does not give you two
7 steps, right? It gives a relationship between two variables -- well, three
8 variables. The two that I've highlighted here in Equation 2 are the
9 coefficient retroreflectivity and luminance. And what we pointed out is that
10 if you know luminance, then you can -- and you know the E sub N, which is
11 the normal illumination, then you can calculate the coefficient
12 retroreflectivity.
13 So if they're focusing on their motivation to combine and you
14 knew luminance already, that you could calculate coefficient
15 retroreflectivity. Then the problem is how do you know luminance, right?
16 That's the lacking of the disclosure. But if your goal is to determine
17 luminance, which is what the claim requires, they're going to move that E
18 sub N to the other side, multiply that by the R prime and have luminance as
19 being the thing that they're figuring out, well then they have to already know
20 the coefficient of retroreflectivity, which is the goal of their motivation to
21 combine. It's a circular reasoning.
22 There's no articulated basis anywhere in the petition for why they
23 would take Lumia and along the way of achieving the goal of calculating
24 retroreflectivity, determine a luminance value. So we submit that that is
25 clearly an absence that precludes them from succeeding on their motivation
26 to combine. Unless the Board has any other questions, I will reserve the

1 remainder of my time.

2 JUDGE O'HANLON: Thank you, Mr. Saunders. It's 3:15. We've
3 been going for over two hours. Why don't we take about a ten-minute
4 break? So we'll resume back around 3:25. Let's go off the record.

5 (Whereupon, the above-entitled matter went off the record at 3:15
6 p.m. and resumed at 3:25 p.m.)

7 JUDGE O'HANLON: Let's get back on the record, please. You
8 can stay seated. We'll now hear Petitioner's rebuttal, Mr. High. The clock is
9 counting up, so you have until 40, so just over 36 minutes left -- 34 minutes
10 left.

11 MR. HIGH: Okay, thank you. I wanted to pick up where a Patent
12 Owner left off with the '255 Patent. So the Patent Owner ended with this
13 argument that Equation 2, and I'll pull up Patent Owner's slides, Slide 12,
14 that Equation 2 does not disclose determining luminance and then
15 determining retroreflectivity. It provides luminance if one already has
16 retroreflectivity or vice versa. This is a red herring. What we're pointing to
17 is Lumia's disclosure going back to Petitioner's demonstratives at Slide 46,
18 that Lumia discloses that the average intensity value of each group
19 corresponds to the average luminance when properly calibrated.

20 So you determine luminance separately from Equation 2. What
21 Equation 2 allows you to do is take your luminance value and what Lumia
22 says, assuming the illumination is known, which Patent Owner
23 acknowledges is known in the context of Gallagher, that you can then obtain
24 retroreflectance using Equation 2. So you're not using Equation 2 to
25 somehow back calculate what luminance is. You have that luminance value
26 and Lumia teaches using Equation 2 with your known luminance value that

1 you've determined with your known illuminance value, which Lumia
2 explains how to calculate, and then determining retroreflectance.
3 Next I wanted to turn to an excerpt from the '255 Patent, and
4 Patent Owner raises this argument that, well, there would be no motivation
5 to combine Gallagher and Lumia because Gallagher is already determining
6 retroreflectivity. But if you look at the bottom of column 1 in the '255
7 Patent, it says, starting at line 65, "Currently, specific attributes about each
8 road sign like retroreflectivity (measured in candelas/lux/sq. meter)." That
9 is defining a different value than the CIL value that Gallagher is disclosing,
10 calculating for its reflectivity value that it walks through in its algorithm.
11 And so we agree that ultimately Gallagher is teaching a desire to
12 get to a retroreflectivity value in these units. We disagree that Gallagher is
13 disclosing how to go about doing that. Gallagher teaches the intensity,
14 Gallagher teaches the illuminance. And it would have been obvious to
15 combine Gallagher with Lumia to use the type of processing described in
16 Lumia to take your intensity value, determine the luminance based on the
17 characterization profile, and then use that determined luminance value to
18 then calculate your retroreflectivity using Equation 2.
19 What I also wanted to point out for the '255 Patent is looking at
20 Slide 4 of Patent Owner's demonstratives. So they point out this highlighted
21 portion at the bottom, and this is an excerpt from the '255 Patent at column
22 11. It says the light intensity sensor characterization is empirical
23 information about the light intensity sensor that is used to create the look-up-
24 table 475. The same look-up-table is used for computing foreground and
25 background luminance values. This is entirely consistent with the
26 construction that Petitioner has adopted in this proceeding.

1 The conversion factor is a form of empirical information. That
2 type of empirical information can be determined, for example, from
3 calibration, can be then used to fill out a look-up-table. And Petitioner's
4 expert in his reply declaration explains how this could work. One way to do
5 it would be to take a scale factor corresponding to each of the colors we care
6 about and fill out a look-up-table so that you can say, okay, I'm going to take
7 my index of my light intensity, I'm going to go to a corresponding row based
8 on the color, and then that value will give me the corresponding luminance.
9 That luminance value has then been filled out based on your characterization
10 profile for a particular color.
11 And so that gives you using the characterization profile because
12 you're using something like a calibration factor or a conversion factor, and
13 it's across various conditions because Lumia is teaching doing this for
14 multiple signs. Patent Owner is trying to limit Lumia to just the specific
15 situation disclosed here where you're only dealing with a white sign. But
16 very clearly if you read through Lumia, its disclosure is broader than that.
17 It's talking about a stop sign with red and white colors, in the very first page,
18 it's talking about you want to be able to do this for signs of multiple colors.
19 Petitioner's expert in his reply declaration addressed the Patent
20 Owner's proposed construction and explained how that is met. With the
21 across various conditions, you would want to have different calibration
22 factors, scale factors, for each of the colors that you care about.
23 JUDGE O'HANLON: Mr. High, does it matter that that was not in
24 the petition or the original declaration?
25 MR. HIGH: No, we don't think so. I think we say that we meet
26 the limitation under the proper construction which we've adopted here and

1 that's consistent with what we discussed in the petition. However, we
2 addressed Patent Owner's construction in our reply as we're entitled to do
3 under the APA. We were not noticed of that construction which is cobbled
4 together from various extrinsic sources that are, you know, greatly
5 postdating the alleged priority date here.
6 So that wasn't something that we could have possibly addressed in
7 the petition as Patent Owner's proposed construction, but we addressed it
8 here and explained how the across various conditions portion of their
9 construction is met.
10 And just going back to Judge Silverman's question from my
11 opening regarding the best evidence and the best portions of the record for
12 the determining the luminance value. I point to page 46 of the petition,
13 paragraphs 89 and 116 to 117 of Dr. Thorpe's original declaration, and then
14 paragraphs 35 to 7 -- 35 to 37 of Dr. Thorpe's supplemental declaration.
15 Okay. I'm going to turn back to the '328 Patent now, and these are
16 Patent Owner's demonstratives. And I'll start on their Slide 5 where they
17 say, Patent Owner admits that the detect and determine cannot be
18 simultaneously satisfied by the same step in the prior art. The Patent Owner
19 keeps trying to frame this as a single step that Petitioner has pointed to, but
20 the Petitioner, as well as the portions of Gallagher that the Board pointed to
21 in its institution decision, is consistently pointed to multiple processing steps
22 for the detect and determine steps for each of these claim functions. So this
23 isn't some sort of admission that is relevant here.
24 To the extent that Patent Owner is trying to rely on Gallagher's
25 characterization of something as a step, we think that you need to read
26 Gallagher in context. And just because it calls something a step doesn't

1 mean there aren't multiple sub-steps to that step. And if there are multiple
2 sub-steps then that can be multiple steps satisfying the claim.
3 Now turning to Slide 7 of the Patent Owner's demonstratives here
4 and their corresponding sur-reply, they point to this Figure 4 as suggesting
5 that this says that the steps are taken in order, and that's on page 5 of their
6 sur-reply for the '328 Patent. So that acknowledges that these things are
7 happening sequentially. So step D which would be the visual indicator step
8 in Gallagher which we pointed to as disclosing the detecting objects of
9 interest, Figure 4 is showing that feeds into step E. And step E is disclosing
10 -- pull that up with Petitioner's demonstratives.
11 On Petitioner's demonstratives Slide 12 with paragraph 63, getting
12 data from the vehicle gearbox sensor and determining the distance traveled
13 from the start position road marking test so as to determine the location of
14 each road marking. So this Figure 4 only supports the idea that you've
15 detected objects of interest and now you're getting the vehicle data so you
16 can log the corresponding location of each of those objects of interest.
17 So step D feeds into step E, step E feeds into step F. That's what
18 Patent Owner says Figure 4 discloses from Gallagher. And that's shown in
19 Patent Owner's sur-reply here on page 5 at the top highlighted part. They
20 say Gallagher's Figure 4 demonstrate that the steps are taken in order.
21 And then I also wanted to point out later on down the line on the
22 same page they say that the visual indicator is indicating which light sensors
23 currently reading the highest will usually be good enough for the driver as
24 there is usually a big difference in reflected light intensity between non-road
25 marking sections and road markers.
26 We think that this supports our argument that Gallagher is

1 disclosing detecting objects of interest here. There's not some specific
2 detailed algorithm that is somehow inherent in the language detect objects of
3 interest. They seem to be suggesting that you might need one. That's not
4 supported by the claim language here. Gallagher's visual indicator in the
5 processing that's used to generate it is detecting an object of interest which
6 Patent Owner seems to say is good enough because of the difference
7 between the light intensity of non-road marking sections and road markers.
8 And now just pulling up the Gallagher reference itself and
9 showing. So these are the processing steps that the parties are talking about
10 here, starting at paragraph 60. This is the visual indicator where it's saying
11 that you've got these background reflectance levels and the reflectance levels
12 of road markers are high, and so you're going to show or detect which light
13 sensor is reading the highest reflectance reading and provide that operator
14 with that information.
15 Then you get to 63, and now it's saying so as to determine the
16 location of each road marking. Patent Owner seems to argue that all you're
17 doing in paragraph 63 is just collecting location data, but there's not a
18 separate determine the location step. So at this point, you've got the location
19 of each of the detected objects. So if you're -- if you have collected the
20 location information to determine the location of each road marking, you
21 have detected the objects.
22 Now, Patent Owner makes this argument that, well, the visual
23 indicator in Gallagher is not really detecting an object of interest because it
24 says that you're providing a visual indicator of which light sensor is reading
25 the highest reflectance reading. And there's just, there's always going to be a
26 highest reflectance reading all of the time even if you're going over a non-

1 road marking section. So that's not really detecting an object of interest.
2 This is reading that sentence in isolation.
3 You know, they say that these steps are happening in sequential
4 order. Well, if you go back to step B, step B talks about filtering the data by
5 calculating the average reflectance level from a set of sample data.
6 Gallagher sampling at 10,000 samples per second and smoothing out
7 fluctuations caused by mechanical vibrations, road imperfections, electrical
8 interference, and noise and the like.
9 So there's additional processing going into this. It's not just a raw
10 output of which raw sensor value is the highest. This is happening after
11 you've already done some pre-processing to get rid of noise, to get rid of
12 these fluctuations, so that your visual indicator is giving the driver a true
13 indicator of where the road markers are. And that's supported by paragraph
14 10 here where it says that visual means to provide an indication of the
15 location of said road markings relative to the vehicle. So that is the purpose
16 of this visual indicator is to give the driver an indication of where the road
17 markers are. To do that, you're detecting the objects of interest.
18 JUDGE O'HANLON: Let's pause again. Judge Turner is offline
19 again.
20 Judge Turner, are you back?
21 JUDGE TURNER: I'm back, yeah. Thank you.
22 JUDGE O'HANLON: I apologize for the inconvenience. Please
23 continue.
24 MR. HIGH: Okay, thank you. Okay. So talking about the visual
25 indicator and Patent Owner's argument that, well, it's just always showing
26 the highest reading. The pre-processing shows that that's not the case, that

1 you're filtering out noise. You're not just broadcasting what the highest raw
2 reading is at any given time and Petitioner's expert addressed that argument
3 in his reply declaration.
4 But even if there are some false positives, you know, that doesn't
5 mean that can't be considered an object of interest under the language of the
6 claim. And Gallagher accounts for that by later disclosing that in paragraph
7 66 -- sorry, 65 and 66, that you're determining the background reflectance
8 levels and establishing the non-marker reflectance levels and then you're
9 selecting from the data which reflectance levels are indicating a reflective
10 surface. And then for road markers specifically, you're identifying the peak
11 responses sensed as the highly reflective surfaces of road marker.
12 And so you've got Gallagher saying that, you know, what it's
13 ultimately going to measure are these reflective surfaces and of these road
14 markings. And so, it's the fact that you are going over the road and there
15 might be a false positive. We're not saying that Gallagher is disclosing that,
16 but even if it can be read to do that, there's still Gallagher teaching that, well,
17 you're narrowing it down because you're going to disregard that and then
18 identify only the ones that have the reflective surfaces and then measure
19 those.
20 And Patent Owner also contends that relying on paragraph 65, I
21 believe they said, is a new argument for the detecting objects of interest.
22 This is the step that says determining the background reflectance level on the
23 road and establishing non-marker reflectance levels. At that point, we think
24 that you've already detected objects of interest to the extent you're doing
25 that. That's an additional disclosure showing that it's met.
26 But what Patent Owner didn't mention is that the institution

1 decision specifically pointed to paragraphs 65 and 66 for that limitation in
2 particular. That's shown in Petitioner's demonstratives at Slide 16 where the
3 Board in its institution decision said that on this preliminary record, it
4 appears that Gallagher's system simultaneously performs the steps of
5 detecting objects of interest and determining whether the objects of interest
6 include at least one light intensity value associated with a reflective surface
7 of the road marker. See Gallagher paragraphs 65, 66.
8 So Patent Owner was on notice and they admitted that they were
9 on notice of it because they said that they addressed it in their Patent
10 Owner's response. There's no APA violation there.
11 So, wanted to point out in Patent Owner's demonstratives where
12 they're talking about 9F of the '328 Patent. And they're making this
13 argument that Schofield is doing something different, that it's really just
14 using this to create these different thresholds for headlights and taillights and
15 things like that.
16 And they show this excerpt, and this is an excerpt from the petition
17 at page 23 on Slide 11 of Patent Owner's demonstratives. But then their
18 argument saying that Schofield disclosed something different on Slide 12 is
19 not pointing to the part of Schofield that is cited in the Petition. So the
20 petition cites Schofield 926 to 32 and then Patent Owner shows you
21 Schofield 958 to 61 and Schofield 106 to 12. So they're not showing you the
22 part of Schofield.
23 And if you look at the part of Schofield that is cited in the petition,
24 926 to 32, it starts, additional discrimination between oncoming headlights
25 and leading taillights may be accomplished by taking into account the
26 relative location of the source of light within the scene.

1 So that's consistent with how Schofield's disclosures are being used
2 in a combination to take into account the relative location of the light
3 intensity values within the scene of Gallagher's field of view and make a
4 determination of the discrete location within that field of view by accounting
5 for things like the relative location of the side by side road markers, things
6 like that.
7 And then the next thing that I want to address in Patent Owner's
8 demonstratives is at Slide 13. So this is where they get into the determining
9 a location in terms of the 3D space of the road marker. And they seem to
10 say that, well, we didn't address this in the petition. But we cited paragraph
11 48 and we specifically quoted it. Forty-eight says that a GPS interface can
12 be used to pinpoint the position of the markers as measurements are being
13 taken.
14 So that is, I think, a clear disclosure that it's not just using the
15 location of the vehicle. And in fact, it says it's something different than the
16 location of the vehicle. It's specifically using the GPS interface to pinpoint
17 the position of the markers.
18 And they seem to say that, well, we admitted that Gallagher doesn't
19 disclose doing that. But that is not what is shown here on Slide 13. They
20 have this portion of the petition from Ground 4 where we say the light
21 source is in a fixed location on Gallagher's vehicle. So this GPS position of
22 the vehicle corresponds to the location of the active sensor. Accordingly, a
23 POSITA would have recognized that additional steps would have been
24 necessary to also determine the location of markers.
25 That's, I think, entirely consistent with what Gallagher discloses in
26 paragraph 48. It says you've got this GPS interface. It gives you the

1 position of the vehicle. You can use that to pinpoint the position of the
2 markers. And in Dr. Thorpe's reply declaration, he walks through exactly
3 how you would do that.
4 And that's shown in Petitioner's slides, we have a slide for this,
5 Slide 23 of Petitioner's demonstratives where we show side by side that Dr.
6 Thorpe's opinions are entirely consistent where in his original declaration on
7 the left, he says that the light source is in a fixed location on Gallagher's
8 vehicle. So the position of the vehicle corresponds to the location of the
9 sensor. And a POSITA would have recognized that additional steps would
10 have been necessary.
11 On the right in his reply declaration, he says in the middle, it's
12 highlighted there, and this is from paragraph 43 of his reply declaration. The
13 field of view for measuring reflectivity is fixed relative to the vehicle.
14 Gallagher's computer, in addition to knowing where the vehicle is, knows
15 the geometry of the sensor and the field of view relative to the sensor.
16 So even though the GPS data is directly tied to the position of the
17 vehicle, it would have been a simple matter of translation to convert the GPS
18 location information to the location of the road marker instead of just
19 recording just the vehicle position. So that's entirely consistent with
20 Gallagher's disclosure in paragraph 48 of using the GPS information to
21 pinpoint the location of the markers.
22 Now, in Patent Owner's demonstratives at Slide 14, they're arguing
23 that the petition improperly uses a single step in Gallagher for both the
24 determine steps of Claim 1, but they very neatly have highlighted only part
25 of paragraph 66. We're relying on, as they show in the top left portion of the
26 slide here, paragraph 65 and 66 of 1F, and then paragraph 66 of 1G, different

1 parts of these disclosures to say, you've got to read Gallagher in context. It's
2 driving over part of a road that's got road markers. It's got painted lines in
3 65 and 66. It's identifying or it's detecting reflective surfaces based on the
4 light intensity values.
5 And then in 1G, it's saying in the case of road markers, raised
6 pavement markers, the peak responses sensed are determined as the highly
7 reflective surfaces of the road marker. And they say that this is a new --
8 JUDGE SILVERMAN: Counselor, forgive me. I apologize. I just
9 want to make sure I didn't mishear you. I thought you said that this Slide 14
10 from Patent Owner only had part of paragraph 66. I think that's the whole
11 paragraph.
12 MR. HIGH: Sorry. If I said that, I misspoke. I meant to --
13 JUDGE SILVERMAN: I may have misunderstood. I apologize.
14 MR. HIGH: I just want to point out that they've highlighted the
15 first part and the last part. They say step G involves selecting from data
16 obtained in step A. The peak responses sensed are determined. That's the
17 part that they've highlighted. But what we said in 1F and 1G in our petition
18 is that the first sentence of paragraph 66 in connection with paragraph 65
19 discloses the determining whether the object of interest includes a reflective
20 surface based on light intensity values.
21 And then the second sentence in particular is saying that you can
22 further determine whether the reflective surface is a road marker based on
23 assessment of the reflective surface, because Gallagher disclosed that in the
24 case of road markers, the peak responses sensed are determined as the highly
25 reflective surfaces of a road marker. And so, it's differentiating between the
26 painted lines and the raised pavement markers.

1 JUDGE O'HANLON: Mr. High, I believe Mr. Saunders said this
2 algorithm is disclosed as only pertaining to road markers. And that's why he
3 was saying there's no separate differentiating between painted lines and road
4 markers. How do you respond to that?
5 MR. HIGH: To the extent the Board reads the algorithm that way,
6 I would say that that's improperly limiting Gallagher to a single
7 embodiment. And I can show you in Gallagher where it's saying that this
8 can be adapted to measure all these different things. In paragraph 33, the
9 apparatus can test the reflectivity of a wide variety of reflective road
10 markings. And it says, for example, road signs and posts, reflective painted
11 lines, whether continuous or broken, and more particularly raised pavement
12 markers.
13 And towards the beginning, it's referring to these broadly as road
14 markings and include colored lines of varying composition and markers such
15 as raised pavement markers. So this road markings, it uses a broad term.
16 And I think reading all of these in context shows that Gallagher shouldn't be
17 read limited to just only being able to detect raised pavement markers and
18 saying that you can do both. And that's how we argued it in the petition. I
19 think Patent Owner has separately argued that this is somehow a new
20 argument.
21 But if you look at, I think it is page 40 of the petition. What I have
22 highlighted here in the middle of the page, this is for the 1F step. They
23 determine whether the object of interest includes a reflective surface. We
24 say, "Accordingly, Gallagher uses the light intensity values from the light
25 sensors 6 to determine whether lane markers, including the painted lines of
26 the lane and raised pavement markers fastened along the lane, include a

1 reflective surface by distinguishing their reflectance levels from the 'non-
2 marker reflectance levels.'"
3 And then in 1G, we say that in the case of road markers, peak
4 responses sensed are determined as the highly reflective surfaces or the road
5 marker. And so, that's entirely consistent with what we've argued from the
6 beginning for that claim.
7 Patent Owner is also arguing that the petition didn't adequately
8 explain the intricate details of how you would combine Gallagher and
9 Schofield together. But the details that they were asking for, things like,
10 well, what kind -- specific kind of light intensity sensor would you use?
11 That's giving it bodily incorporation. And I think the case law is pretty
12 consistent that there's no need to show bodily incorporation. You just need
13 to show that the disclosures are known and that it would have been obvious
14 to a person of ordinary skill in the art to combine them.
15 And so in response to these arguments, we have elaborated on how
16 that combination would have been obvious. But it's entirely consistent from
17 the beginning of our petition that we have shown a motivation to combine
18 and Claim 1, Schofield's image capture system with Gallagher's light
19 intensity sensor and to use that information to improve the object detection.
20 And they did into this sensor fusion as well, and I want to touch on
21 that briefly. And so they make this argument that, well, the sensor fusion,
22 it's just -- it's too complicated, wouldn't have been known. Petitioner's
23 expert comes back in his declaration, in his reply declaration in response to
24 that and explains why that's wrong. He says that object detection using
25 sensor fusion was well known and dated back to at least 1972. This is not a
26 new concept.

1 What they were pointing to as this paper that supposedly shows
2 sensor fusion wouldn't have been possible is in an entirely different context
3 where it's dealing with an autonomous robot that is going through an
4 unpredictable situation and it needs to be able to adapt to this unpredictable
5 situation and identify things in real time. That is not the situation that we
6 have in the Gallagher-Schofield combination.
7 Here you're dealing with a very predictable situation. You've got a
8 driver driving over a road. You have lane markings and raised pavement
9 markers at predictable intervals with predictable colors. You have the driver
10 specifically positioning the vehicle so that you're measuring that area. This
11 is not the kind of situation where you have an unpredictable environment
12 and it's too difficult for an autonomous robot to be able to, with 100 percent
13 accuracy, combine all this data to identify objects. It's a completely different
14 situation and it's well within the knowledge of a person of ordinary skill of
15 the art. And if you read through Dr. Thorpe's reply declaration, he explains
16 that.
17 JUDGE O'HANLON: Mr. High, you've used up your time. Do
18 you want to take just another minute to summarize briefly?
19 MR. HIGH: Yes. Thank you, Your Honor. I apologize for going
20 over. I just noticed that. So with that said, I didn't address the additional
21 grounds, Grounds 2 through 4, but I'll rest on the arguments in our petition
22 and our reply for those grounds. We think that we've adequately shown for
23 the '328 Patent that Gallagher and Schofield renders all of the challenged
24 claims obvious, and for the '255 Patent, that Gallagher in combination with
25 Lumia, renders Claim 15 obvious. Thank you, Your Honors.
26 JUDGE O'HANLON: Thank you. Mr. Saunders, you have just

1 under 20 minutes left for your sur-rebuttal.

2 MR. SAUNDERS: Is it going to count up to a particular number?

3 JUDGE O'HANLON: I think I set the clock wrong, but it is

4 counting up to 20.

5 MR. SAUNDERS: To 20, okay. Thank you, Your Honor.

6 JUDGE O'HANLON: I'm sorry, to 25.

7 MR. SAUNDERS: Okay, thank you. I won't be putting up slides

8 again. I'll just address a few arguments from Counsel. So, Counsel started

9 with an argument about motivation to combine for the '255 Patent.

10 Patent Owner does not dispute that the Gallagher and Lumia

11 systems measure different units. That's clear from the disclosures. What the

12 dispute is, first of all, is that a theory in the petition? I don't think a fair

13 reading of the petition says anything about different units. I think a fair

14 reading of what in the petition is saying measure retroreflectivity. There's

15 no real dispute that those different units are both different measures of

16 retroreflectivity. And so, this is clearly an example of an improper new

17 reply argument.

18 Two, even if we have the argument about different units in Lumia

19 and Gallagher, that doesn't actually get Petitioner to where they need to go.

20 Where they need to go is a motivation to determine luminance on the way to

21 determining retroreflectivity. Because their motivation to combine theory is

22 we want to determine retroreflectivity in a particular set of units. Why are

23 we determining luminance on the way to do that? They don't answer the

24 question that Lumia itself -- sorry, Lumia and luminance. Lumia itself has

25 in its preferred embodiment going directly from intensity to retroreflectivity

26 without determining luminance, right? That's how Lumia's preferred

1 embodiment works.

2 So, their new units theory doesn't give us a reason to ignore that
3 and instead somehow go to Equation 2 and do an additional calculation.
4 That's what they're saying. They're saying we're going to do an additional
5 calculation. The motivation to combine is somehow units. They don't even
6 explain how going to Equation 2 is necessary to solve that, because if we go
7 down to the bottom of Lumia, go to the experimental results section, it's
8 giving the very units, those coefficient of retroreflection units. It's not
9 giving a different set of units than that's in Equation 2.

10 So we still have a complete gap in the theory. The theory is
11 somehow we're going to determine luminance because that's what Claim 15
12 requires and somehow that's ultimately going to help us achieve a goal of
13 retroreflectivity, but we're not explaining why in any way we're going to do
14 it that way. It's just pure hindsight reasoning to meet a claim limitation, not
15 anything that's a faithful interpretation of a motivation or the disclosure of
16 the references.

17 Going on to claim construction for the '255 Patent. Counsel had a
18 discussion of column 11 and the theory of -- that characterization profiles
19 could be multiple characterization profiles. I understand the argument for
20 different colors having different characterization profiles. That's not what
21 the specification has. The specification mentions only a single
22 characterization profile, and that characterization profile is used for creating
23 the LUT that handles both background and foreground colors.

24 So when we look at the specification, it is a single characterization
25 profile that handles multiple colors. That's completely consistent with
26 Patent Owner's construction about handling, about performing sensor

1 characterization under various conditions.

2 As to the theory from Petitioner's expert, in particular in his reply
3 declaration about Lumia and that Lumia satisfied the Patent Owner's
4 construction, we do submit that that is improper because it's not a theory that
5 what was cited in Lumia in the petition actually satisfies Patent Owner's
6 construction. Of course they're entitled to do that.

7 It really is, if you read what the cited part of the Petitioner's expert
8 reply declaration, it's about, it would be nice or it would make sense for
9 Lumia to do this. It is in essence a modification of Lumia or a new way of
10 combining Lumia and Gallagher to arrive at a way that satisfies Patent
11 Owner's construction. It's in essence saying, well, you have multiple colors
12 talked about in this one section of Lumia. It would make a lot of sense to
13 implement Lumia to calibrate multiple colors.

14 That's not what Lumia mentions when it mentions calibration,
15 which is what's cited in the petition. Similarly, he says it makes a lot of
16 sense to deal with multiple distances, but that's not what Lumia actually
17 says. So just because it would make a lot of sense, that could be a basis for a
18 motivation, but that's a motivation to modify or a motivation to combine
19 argument of the type that needs to be in a petition.

20 The scope of what can be in a reply is what did we say about the
21 references, what are the cited portions, what are the stated motivations to
22 combine and the proposed combination in the petition, how does that satisfy
23 the claim limitation? And that is not something that they've shown. You
24 can't simply just fill in a gap with new theories about stretching the
25 references in a reply declaration, which is the essence of what they're doing.

26 Turning to the '328 Patent, as to the issue of Gallagher's step G and

1 whether or not that's a single step or not. We submit if you read step G, it's
2 very clear it's a single step. We've already done the threshold in the
3 immediately prior step, and we're just looking at the data from step A and
4 applying that threshold and identifying peaks. That's a single step.
5 And Your Honor has correctly noted that their argument here about
6 Gallagher in step G doing multiple steps in what Gallagher itself labels a
7 single step is based on their argument that Gallagher somehow distinguishes
8 among painted lines and road markers. If Gallagher had that disclosure, it
9 certainly would be clearer than that.
10 The fact that Gallagher expressly says early on, the rest of this
11 discussion is about raised paint markers is a very clear example that it's an
12 unreasonable interpretation of step G of being multiple steps, one step about
13 deciding whether something's a peak and one step about deciding whether
14 it's a pavement marker or a raised line. That's just not a reasonable
15 interpretation of step G of Gallagher.
16 And as to the issue of whether that was in the petition, in the
17 Petitioner's rebuttal there, we saw them point to a disclosure in step F of the
18 petition about painted markings. There was nothing, though, that they
19 pointed to in step G about raised painted markings. If they were going to
20 make an argument that supported the idea that step G of Gallagher is really
21 two steps, they would need to make that more clearly.
22 There was nothing in talking about differentiating between
23 pavement markers and painted lines in the petition in the discussion of step
24 G. And that's where they're now saying that it's okay that we point to step G
25 for multiple different parts of Claim 1 because it's more than one step. That
26 is something that should have been clearly disclosed in the petition if that

1 was the theory.

2 Next, I'll talk a little bit about step D, which is obviously step D of
3 Gallagher was a big emphasis of their argument. And the focus of their
4 argument, they mentioned step D happens before step E. Patent Owner does
5 not dispute that step E happens after D. What we dispute is what they are
6 inferring from what step E says, right? They're saying that step E is logging
7 the location of an object detected during step D. We don't think that that's a
8 reasonable interpretation of what Gallagher is saying at all.

9 First of all, step E says, so as to determine the location, right? That
10 is clearly in the language of something that is going to happen, right? And
11 we see where that does happen later on in Gallagher. After step G, step G is
12 the step that identifies using those peaks whether or not we have a pavement
13 marker, right? And then in the following step, then it goes ahead and takes
14 -- it correlates that location data that it previously collected in step E with
15 the identification of a road marker based on its peak in step G.

16 Nothing -- Petitioner's theory that step D is doing some kind of
17 object detection and that that's shown in step E as locating -- determining a
18 location of the road marker, that makes no sense because it contradicts what
19 step G says. What is happening in step G if we've already detected that
20 there's a road marker, right? Apparently the only story we have of what step
21 G is adding is that it is making the differentiation between a road marker and
22 a painted line. Of course, if that's true, then step G would only be one step,
23 which is a problem with our other argument. But as I said, that's just not a
24 reasonable interpretation of step G.

25 So we know that the detection is not happening earlier because
26 step G is saying, exactly reading step G, that is the step that Gallagher is

1 doing, the both simultaneous one step. It says, I have data and I've now
2 detected and determined it's just a road marker. I know it because of the
3 peak. I'm not doing two steps.
4 There's also some discussion of handling false positives. There's
5 no disclosure in Gallagher about handling false positives. We see how
6 Gallagher handles things in step G. It just sets, in step F, it's going to set a
7 threshold. In step G, it's going to say, is this above or below the threshold,
8 right? And so, if something is above the threshold, it's going to get recorded
9 as a peak. It's going to get recorded as a road marker. There's nothing in the
10 disclosures of Gallagher about handling false positives. That's another
11 example of them wishing that there was more in Gallagher that would be
12 useful, but it's not actually in the reference.
13 And again, there was a reference of trying to read step F on these
14 detect and determine limitations. Step F doesn't talk about any particular
15 marker in Gallagher. It's about setting a particular threshold, the threshold
16 that's later applied in step G. Just saying here's a threshold based on the
17 ambient light readings is not anything to do with detecting a marker. It's not
18 anything to do with determining a marker. It's just allowing for that later
19 step of looking at peaks that happens in step G. So it cannot be reasonably
20 interpreted to satisfy the detect and determine limitation.
21 Also briefly about detection of objects, I believe Counsel made
22 some argument about what that means. There certainly was testimony from
23 Patent Owner's expert that object detection is a well-known concept in
24 computer vision. That's in the record. He opined about that and explained
25 why step D is not object detection as that term's meant. The Petitioner's
26 expert in his reply declaration had a very brief response where he said, I'm

1 not going to actually address the substance of this opinion other than to
2 quibble about the distinction between object detection and object
3 recognition.
4 So we submit certainly that there's no basis for interpreting object
5 detection so broadly as Petitioners are interpreting step D of Gallagher to
6 mean anything that creates any kind of indication. That's not what that term
7 means in the field. And we submit that the only evidence of what that term
8 means in the field on point is Petitioner's expert -- sorry, Patent Owner's
9 expert as well as what the '328 Patent talks about, which is, for example, a
10 Laumeyer patent and actual recognized known techniques for detecting
11 objects, which are not anything like outputting the raw output of the highest
12 sensor reading that's in Gallagher's step D.
13 Turning next to Schofield and the location limitation. Again, I'll
14 note that wasn't in the original presentation from Petitioner's Counsel today.
15 They brought it up in the rebuttal presentation. It seems to be primarily a
16 backup to their Gallagher argument now for Claim 9. There is a criticism
17 that I showed the language of column 9 instead of column 2. We showed
18 the language that's explaining what was in the earlier portions of Schofield.
19 Schofield has an earlier discussion of what this subdivision is, and we
20 presented the actual later parts of what -- explain what it means.
21 But all of the discussions of Schofield about this concept of
22 subdivision have the same problem, including the portion that Counsel
23 showed during their rebuttal. It's the opposite of this claim limitation. It's
24 saying we're going to have -- the language that they highlighted was
25 language about discrimination about headlights or taillights, telling us
26 whether a headlight or taillight is present using this separation of the zone.

1 But that has nothing to do with what this claim limitation is about, which is
2 we're taking this information about this intensity information.
3 We've already detected object of interest, and we're going to
4 determine where that object is located. That's just the reverse order from
5 what Schofield has, and there's no really meaningful response from Counsel
6 on that argument.
7 Lastly, the issue about Gallagher and the location limitations of
8 Claim 9 and Claim 1. Again, there was no attempt to meaningfully explain
9 away from their admission that's in Ground 4 about what Gallagher
10 discloses. In fact, what I heard and what I saw was the citation to their
11 expert's reply declaration that would say it was a simple matter of
12 translation. That is a new reply argument of a motivation to modify. That is
13 not Gallagher teaches how to actually find where a road marker is. He can't
14 say that because he said in his opening declaration in Ground 4 that
15 Gallagher doesn't tell you how to do it.
16 So what they put in their reply, rather than saying, oh, this is how
17 Gallagher actually does disclose determining a location road marker is, oh,
18 here's a simple way to modify Gallagher to do that. And that's an argument
19 that's clearly a new argument, should have been in the petition, is improper
20 for the reply, and therefore is not appropriate for basis for their arguments
21 for Gallagher and location information.
22 Going to the issue of claim limitations 1F and 1G and their
23 argument that Gallagher's step G are two steps. I've already discussed, this
24 is entirely based on their unreasonable interpretation of step G of Gallagher
25 as involving some discrimination about raised pavement markers and lines.
26 If Gallagher was going to say that, it would be much clearer in Gallagher. If

1 their petition was going to make the argument, it had to be a lot clearer in the
2 petition. It's a new argument, and it's an argument not supported by
3 Gallagher itself.
4 Gallagher's reference in step G is very clear. I'm just going to take
5 that existing threshold that I've just set up in my prior step. I'm going to
6 apply it to the data from step A, and it's above it or below it. That is exactly
7 one step. It's doing one step in Gallagher's step G, and therefore it's
8 improper for them to identify and rely on that for two different limitations,
9 Claim 1 and -- 1F and 1G, given that they admitted in their reply that they
10 agree that it's an inappropriate claim construction to determine or detect
11 limitations on the same single step in the prior art.
12 Certainly, if they were going to make an argument about step G
13 being two steps, that one step involves differentiating between road markers
14 and painted lines and one step about making that threshold, and that's
15 something that, at the very least, they were obligated to make with clarity in
16 the petition. It's certainly not in the petition.
17 Briefly about the motivation to combine and the arguments about
18 bodily incorporation. I believe that this is a red herring. Patent Owner's
19 argument is not about bodily incorporation. We are not saying the only way
20 to combine Schofield and Gallagher is to take Schofield's exactly X and
21 exactly Y and patch them on. That is when the Federal Circuit says those
22 are improper arguments because those are bodily incorporation. But what
23 we can see from the *Personal Web* case is you still have to, as a Petitioner,
24 articulate how you are combining the references with sufficient detail to
25 have a meaningful analysis of predictability and a meaningful analysis of
26 reasonable expectation to combine.

1 And the fact that in their expert's deposition and his reply
2 declaration, all of a sudden we get a panoply of new and different theories to
3 respond to the specific criticisms that Patent Owner and expert were able to
4 guess, try to guess the theories that were in the petition, that only proves that
5 they did not articulate a clear enough combination to satisfy *Personal Web*
6 in the petition itself.
7 Lastly, a brief comment about sensor fusion. Counsel argued that
8 sensor fusion that Dr. Thorpe was talking about in his paper was just
9 completely unrelated to what's at issue in this case. I submit that's incorrect.
10 He very clearly stated one of the key problems of sensor fusion at the time
11 was highway speed. There's no dispute that's exactly what the proposed
12 combination of Schofield and Gallagher is a highway speed system. And it
13 is a system where public safety matters. That's what the '328 Patent, that's
14 what Gallagher and what Schofield, they're all systems about public safety.
15 Schofield is about recognizing lights to determine the brights and
16 turn them on and off. That's a public safety issue. Determining whether
17 those reflective road markers have adequate retroreflectivity, that is, again,
18 serving this public safety goal.
19 So it certainly has been an inadequate showing that Dr. Thorpe's
20 contemporaneous statements in 2001 should hold a lot more weight when it
21 comes to the predictability of sensor fusion for this particular application
22 than his current statements that happen now, especially as we show that
23 sensor fusion continues to be a problem in the example of highway speed
24 devices. And unless the Board has any other questions, I have nothing
25 further.
26 JUDGE O'HANLON: No further questions, thank you.

1 Thank you both for your presentations today. They're very
2 thorough. I appreciate that. So the case is submitted. A final written
3 decision will be issued in due course. And the hearing is adjourned. Let's
4 go off the record.
5 (Whereupon, the above-entitled matter went off the record at 4:22
6 p.m.)

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