

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSARA, INC.,
Petitioner,

v.

MOTIVE TECHNOLOGIES, INC.,
Patent Owner.

IPR2025-00574
Patent 11,875,580 B2

Record of Oral Hearing
Held: May 27, 2026

Before JUSTIN T. ARBES, MICHELLE N. WORMMEESTER, and
DANIEL J. GALLIGAN, *Administrative Patent Judges*.

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The above-entitled matter came on for hearing on Wednesday, May 27, 2026, commencing at 11:55 a.m., via video teleconference.

P R O C E E D I N G S

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JUDGE GALLIGAN: Good afternoon, everyone. Welcome to the USPTO Southwest Regional Office here in Dallas, Texas. This is an oral hearing for IPR 2025-00574. The Petitioner is Samsara, Inc. Patent Owner is Motive Technologies, Inc. I'm Administrative Patent Judge Galligan, and Administrative Patent Judges Arbes and Wormmeester are joining from our USPTO headquarters in Alexandria and are on video. Can we have appearances of Counsel starting with Petitioner, please?

MR. DUTTON: Yes, Your Honor. This is Tyler Dutton here from Sterne, Kessler on behalf of Samsara. And with me today is Lead Counsel, Jason Eisenberg, and Jean Selep from the law firm of Sterne, Kessler, and Allen Kathir here, also representing Samsara, from the law firm of Gibson Dunn.

JUDGE GALLIGAN: Thanks. And will you be presenting today, Mr. Dutton?

MR. DUTTON: Yes, Your Honor.

JUDGE GALLIGAN: Great, thanks. And Patent Owner?

MR. RIBERA: Good afternoon. My name is Hector Ribera from Martin Ribera Schumann & Chang, Counsel for Motive Technology, Patent Owner.

JUDGE GALLIGAN: Thank you. Thank you, Mr. Ribera. In the hearing order, we granted each side 60 minutes of argument time. We'll go through some housekeeping items first. Recording of any PTAB hearing is prohibited. The Court Reporter will provide a transcript of the hearing that will become part of the record in this proceeding. For transcript clarity,

1 please identify yourself when you speak so the transcript accurately reflects
2 the speaker. When referring to an item in the record, please do so with
3 specificity, so the panel can follow along and for clarity in the transcript.
4 We have everything on our computers, the record here. If you're using the
5 overhead, I don't know if the Judges in Alexandria will see that, so please
6 just refer to the slide number, and I'll try to remind you if you don't. There's
7 a public line, but I don't think there's any non-public information in the
8 record. I looked at it and didn't see it. Can you please confirm, Petitioner,
9 that you don't plan to discuss anything non-public?

10 MR. DUTTON: That's correct, Your Honor.

11 JUDGE GALLIGAN: And Patent Owner?

12 MR. RIBERA: Patent Owners, nothing.

13 JUDGE GALLIGAN: Great, thank you very much. And
14 Petitioner has the ultimate burden of establishing unpatentability by a
15 preponderance of the evidence and will proceed first. After Petitioner goes,
16 Patent Owner will respond. Petitioner may have a rebuttal if it has time
17 remaining, and if Petitioner has a rebuttal, Patent Owner may have a
18 surrebuttal, if it has time remaining.

19 One more thing. Patent Owner submitted objections to certain of
20 Petitioner's demonstratives. That was a paper 32 in the record. We've
21 reviewed the objections. They relate to claim construction issues. Several
22 of the objections relate to Exhibits 1086 and 1087, which are claim
23 construction briefs from the related District Court litigation. We asked the
24 parties to file the District Court claim construction briefing in this
25 proceeding to ensure a complete record, and that email exchange was
26 Exhibit 3001 and memorializes that instruction.

1 That occurred after Patent Owner's sur-reply in this case, and thus,
2 after the briefing on the merits. Given that background, we overrule the
3 objections. Petitioner may present the slides on those. Other objections
4 related to citations of case law on the challenged patent, that Patent Owner
5 represents, were not previously presented in the paper.

6 We are familiar with the intrinsic record and claim construction
7 case law. We'll permit the slides. Thus, the objections are overruled, and
8 we remind the parties that the demonstratives are not evidence of any kind.
9 They're just to aid the presentation here. With that, we will begin.

10 Petitioner, would you like to reserve any time for rebuttal?

11 MR. DUTTON: Yes, Your Honor, I'd like to reserve 20 minutes
12 for rebuttal.

13 JUDGE GALLIGAN: Twenty minutes. Okay, let me get my
14 setup here. All right. Now, we have a timer here that you can look at. It'll
15 blink when you're getting close, and I'll try to remind you, but it'll keep track
16 of your time. And do you need time to set up the overhead?

17 MR. DUTTON: Yes, just a moment.

18 JUDGE GALLIGAN: All right. Petitioner, you may begin.

19 MR. DUTTON: Good afternoon, Your Honors. This is Tyler
20 Dutton on behalf of Samsara, and there are three main topics that I would
21 like to discuss today. The first is Ground 3, which is Choe in view of
22 Workman, and that's -- I want to start there because there's no dispute that
23 Workman discloses a predictive model under both parties' constructions.

24 The second issue I'd like to address is the claim construction for
25 predictive model, and our understanding that predictive models should not
26 exclude geometric calculations, and Patent Owner wants to include that

1 negative limitation, but we disagree. And then the third topic I would like to
2 discuss is Ground 2, which is Choe in view of Khan and Ali. And our
3 position is that Khan and Ali discloses the predictive model in at least three
4 ways, one of which meets limitation under Patent Owner's construction as
5 well.

6 So, if we could just start with Slide 5. Slide 5 is Claim 1. And I
7 just want to highlight that the main dispute between the parties relates to
8 what's highlighted, which is step 1B, which is identifying one or more lines
9 in the video using a predictive model, the one or more lane lines -- one or
10 more lines, including a horizon line.

11 And if we go to Slide 9, these are the parties' constructions for that
12 limitation. It's our position that the plain and ordinary meaning should apply
13 here. And it's Motive's construction that there should be an exclusion of
14 geometric calculations, where their construction is, "a model that predicts
15 values using non-geometric calculation."

16 So, I'll cycle back to the claim construction point, but if we go to
17 Slide 48, what's shown here on the right is Exhibit 1011 at page 1, and this is
18 the abstract of Workman. Under Ground 3, there is no dispute that
19 Workman discloses the predictive model under Patent Owner's construction,
20 and it's because it teaches it in spades, Your Honor. It states that, using this
21 dataset, we investigate the application of convolutional neural networks for
22 directly estimating the horizon line without requiring any explicit geometric
23 constraints. So, it has that negative limitation taught here, and there's no
24 dispute that a convolutional neural network is a predictive model.

25 The main issue with respect -- of dispute between the parties with
26 respect to Ground 3 is the motivation to combine. And we submit that the

1 motivation to combine is pretty robust in this case. The full record is at
2 petition, pages 47 through 49, and the reply at pages 26 through 28, but I'd
3 like to walk through just some of the evidence here today.

4 If we could go to Slide 50. Here on Slide 50 is disclosure that
5 comes directly from Workman, where Workman states that it significantly
6 improves performance for vanishing point-based horizon line estimation.
7 And that's important, Your Honor, because this is the precise type of
8 algorithm that Choe discloses, this vanishing point-based estimation. And
9 you can see that in Choe, the first step of Figure 7, as well as its abstract, and
10 throughout the disclosure.

11 And so, Workman itself states that it improves the performance of
12 those types of algorithms, and it also teaches that the CNN-based approach
13 that's disclosed in its paper is fast, requiring only milliseconds per image.
14 It's accurate, and it achieves state-of-the-art performance. And so, these are
15 just some of the reasons why a person of ordinary skill in the art would have
16 applied Workman to Choe. And under KSR, we just need to show that there
17 is a reason to combine and these provide ample reasons.

18 And Your Honors, you cited a case in your institution decision at
19 page 12, which is the Intel v. Qualcomm case, and I think that's instructive
20 here, where you don't need to find the best suitable combination, the best
21 possible combination. You just need to find a suitable combination and a
22 reason to make that combination. And these improvements over the
23 vanishing point estimation approaches is that reason to combine Choe and
24 Workman.

25 So, unless Your Honors have any questions about the motivation to
26 combine, I'd like to address one other limitation with respect to Ground 3,

1 and that limitation is the video limitation. Patent Owner also argues that
2 Workman in view of Choe -- or Choe in view of Workman does not disclose
3 overlaying lines on a video. We disagree. So, if we start at Slide 16, which
4 is Choe.

5 Choe, paragraph 22, which is shown here on the top right side of
6 the slide, states that cameras 211 may be still cameras and/or video cameras.
7 And that's reflective in its examples in the figures as well, because it
8 discloses using multiple frames -- Frame ID 1109, frame ID 1110. So, these
9 are a set of image frames that come from a video. We appreciate that Choe
10 may have other embodiments that use still cameras, but the embodiment that
11 we're relying on for our combination and is cited in our petition is the one
12 that uses video camera.

13 And if we go to Slide 20, this is also consistent with what the '580
14 patent discloses, because in the bottom right of this slide, the '580 patent
15 states that a camera records a video comprising one or more image frames.
16 And Patent Owner has maintained in this proceeding that a video is a set of
17 image frames, and that's precisely what Choe discloses, is a set of image
18 frames, and it uses a camera explicitly -- a video camera.

19 JUDGE ARBES: Counsel, this is Judge Arbes. Can you explain
20 why you consider the two frames that are shown in Figures 6A and 6B to be
21 a set of frames? It does appear that the disclosure of Choe is talking about
22 them just as representative examples for purposes of showing a line that's
23 too high and a line that's too low. Why are those a set of image frames that
24 constitutes a video, in your view?

25 MR. DUTTON: Your Honor, because a set requires two or more.
26 And actually in the '580 patent, a video can be met by one image, but even if

1 a set is required for video, it discloses two separate frames because they're
2 labeled 1109 and 1110. And that's consistent with Choe's disclosure on the
3 slide that I was discussing previously that uses a video camera.

4 JUDGE ARBES: But you would agree, there's no disclosure in
5 Choe of showing those two images in sequence, for instance? A video
6 normally is a set of images shown in a sequence, someone looking at those,
7 one after another. There's no disclosure in Choe of that, right?

8 MR. DUTTON: Other than the fact that the frame IDs are labeled
9 in consecutive numbers, we would submit that that would be indicative of a
10 sequence of images, because you have 1109 and 1110. Presumably, the next
11 frame would be 1111.

12 JUDGE ARBES: Well, I guess I see your point about possibly
13 receiving those images in sequence, but what we're talking about is the later
14 limitations of the claim, of actually overlaying the lines on a video, and then
15 transmitting that overlaid video. And I guess I'm not seeing much disclosure
16 in Choe of that sort of putting those frames together in a set to be a video.

17 MR. DUTTON: Well, I think the parties -- and opposing Counsel
18 will correct me if I'm wrong -- but my understanding is that the parties have
19 taken the position that the images that originate from a video are themselves,
20 the video. That's been the -- their understanding, I believe, in the District
21 Court, and it's been the understanding here, is that a video only requires a set
22 of image frames. And so, I guess I disagree with the premise that the video
23 at the later stages of the claim has to be like a video file, kind of like put
24 together.

25 The claim only requires -- and if we could go to Slide 5 -- it's
26 identifying one or more lines in the video, and that's -- and Choe is doing

1 that by its process of kind of taking the video frame by frame. And that's
2 also consistent with how Khan and Ali function. It goes frame by frame
3 within the video file.

4 JUDGE GALLIGAN: Counsel --

5 JUDGE ARBES: And where does Choe disclose the latter part of
6 limitation D of generating an overlaid video, in your view?

7 MR. DUTTON: It's the collection of image frames, when it's
8 going frame by frame and adding the horizon line to the set of image frames,
9 that is effectively a video. It might not be a video file, but the claim doesn't
10 require that. It requires that the frame -- that the video be a set of image
11 frames. And that -- again, just to make the point one more time on Slide 20.

12 This is how the '580 patent operates. It records a video comprising
13 one or more image frames, and if you go through the disclosure of the '580
14 patent, it refers to overlaying the lines on images. It's operating on the
15 image frames from the video, and that's consistent with Figures 4A, 4B, 5A,
16 5B, and 6, where if you look at the first step, it refers to images and not like
17 a video file.

18 JUDGE GALLIGAN: And Counsel, you mentioned -- I think you
19 said that the '580 patent would, at some point, it indicated that a video could
20 be one frame. Where were you referring to there?

21 MR. DUTTON: Right here on Exhibit 1001 --

22 JUDGE GALLIGAN: Oh.

23 MR. DUTTON: -- column 1, lines 53 through 55, and we cite this
24 in our petition at page 2, where a camera records a video comprising one or
25 more image frames. So, it contemplates that a video can be a single frame.

26 JUDGE GALLIGAN: And then in the claim, though, we -- it

1 requires a set of image frames. Did you ever allege that that set could be
2 one? I mean, it's plural. It's a set of image frames.

3 MR. DUTTON: No, we haven't made that argument, Your
4 Honor. The set of image frames is like -- we believe is met with those two
5 frames that we show in Choe.

6 JUDGE GALLIGAN: Okay, and following up on Judge Arbes's
7 question. So, there was some deposition testimony when Petitioner deposed
8 Mr. Andrews or Dr. Andrews -- I forgot what it is -- but he talked about that
9 these are just exemplary, kind of like what Judge Arbes said. It was at page
10 101, I think it was, of the deposition. Choe is talking about in, for instance,
11 in Figure 6A and 6B, in paragraph 59, it says -- it gives you an example of a
12 horizon line too low and a horizon line too high. Is there any disclosure in
13 Choe of -- because when you read it, it does seem like it's doing individual
14 image analysis. So, for instance, it would say here's a video, can we pick
15 one image out of that video, and overlay a line, and then we correct the
16 camera based on that? Other than 6A and 6B, is there any disclosure of
17 doing this overlay on multiple frames in the same video, like the
18 -- overlaying the line? Because it seems like they're different lines in 6A
19 and 6B.

20 MR. DUTTON: Right. So, yes, Your Honor. So, Figure 6A, to
21 kind of remedy the confusion -- part of this I think is because the image
22 quality in the issued patent is less than the submitted figures. Figure 6A is
23 frame 1110 where it overlays a horizon line on one image, and Figure 6B is
24 the prior frame 1109, which also overlays a horizon line on that image. And
25 so that's two separate images that both have a different horizon line overlaid
26 on it.

1 JUDGE GALLIGAN: Okay, thanks.

2 MR. DUTTON: So, unless Your Honors have -- if there aren't any
3 other questions with respect to Ground 3, I'd like to kind of move to the
4 predictive model claim construction. So, if we could go to Slide 9. This is
5 again the slide that shows the parties' constructions. I will note that the
6 construction on the left is the current construction that's applied in District
7 Court as well. We've been consistent with what we've submitted to
8 Markman, with the plain ordinary meaning with predictive model as what
9 we had in the petition. Patent Owner is going to likely show you an out-of-
10 date construction, but this is the current construction. It's what we submitted
11 in our Markman briefs, and that's shown at Exhibit 1087, page 10.

12 JUDGE ARBES: Counsel, I know we'll probably get to that point,
13 but do you now believe that that original construction that you proposed is
14 not the plain and ordinary meaning? I guess, please explain why that
15 changed.

16 MR. DUTTON: Your Honor, just to clarify, the original one,
17 from the joint claim construction statement?

18 JUDGE ARBES: Yes.

19 MR. DUTTON: Okay. We did not advance that forward. Our
20 position is that the plain and ordinary meaning is a model that makes
21 predictions. So, we don't have an argument that the construction that was
22 applied in that joint claim construction preliminary statement is the plain and
23 ordinary meaning. Our position is that the plain and ordinary meaning is
24 what's shown on Slide 9.

25 JUDGE ARBES: Okay, so the original construction, as I
26 understand it, was a deep learning or other AI model trained to directly

1 identify the one or more lines. You don't believe that's correct anymore? Or
2 you would disagree if we were to adopt that interpretation?

3 MR. DUTTON: Yeah. Yes, that's correct, Your Honor. Our
4 position in the District Court and here is that the plain and ordinary meaning
5 is a model that makes predictions. If that construction is adopted, we don't
6 have an issue with that, with respect to the grounds, because for example,
7 Workman would still disclose that. If you go to Slide 48, it has the direct --

8 JUDGE ARBES: Before we talk about the prior art, in that joint
9 claim construction statement, you submitted that construction to the court,
10 and you cited a lot of intrinsic evidence from the patent. I guess I'm trying
11 to figure out, of all the different constructions that have been proposed in
12 this forum and in the District Court, why that one is now incorrect.

13 MR. DUTTON: Yeah, so that construction was proposed to kind
14 of differentiate between the non -- not requiring -- or not allowing geometric
15 calculations. That's been the dispute between the parties in the petition and
16 in the District Court, and we proposed that construction as -- in the District
17 Court, as kind of a basis to differentiate there, but it's not our position
18 standing here today that that is the construction that should be applied. We
19 haven't argued that in the papers, Your Honor. But even if that construction
20 is correct, I just want to make the point that Slide 48 shows that there is a
21 direct convolutional neural network which would meet that construction as
22 well. And we also believe that the Khan and Ali reference would directly
23 determine the horizon line under one of our theories, and I'll get to that in a
24 bit.

25 All right. So, if we go to Slide 10, Patent Owner's argument for
26 why there should be this negative limitation in the claim, is disclaimer and

1 disavowal from the specification and the prosecution history. And we're just
2 not seeing the clear and unmistakable disclaimer in either. So, in the
3 statements in the patent, it refers to embodiments where a geometric process
4 can be performed, but if you look and read the patent clearly, it never says
5 that a model itself cannot use geometric calculations. It's clear that you can
6 use a geometric approach without a convolutional neural network or a
7 model, but it never says that you have to exclude geometric calculations
8 from a model. And that makes sense because logically you're identifying a
9 line, which is intrinsically a geometric feature. And so, to define that line,
10 you're going to be using some sort of geometric calculations.

11 And that's how a person of ordinary skill in the art would have
12 understood the technology, as Dr. Darrell explains. And Patent Owner's
13 own expert, when I asked him during deposition -- and this is Exhibit 1061,
14 starting at page 13, line 8 -- I asked him where this -- whether a predictive
15 model can use geometric calculations, and he was really wishy-washy.

16 So, they're kind of leaving this door open to still being able to use
17 geometric calculations, just not like to the nth degree, and it's really unclear
18 where the delta is between what a predictive model is and what a predictive
19 model that uses geometric calculations would be.

20 JUDGE GALLIGAN: Can we take a step back? We've been
21 talking -- or in the papers, the parties talk a lot about the negative sort of
22 construction, the not using geometry or not excluding the use of geometry.
23 What is it -- when it says a predictive model, is it just the idea that you have
24 these machine learning algorithms that suck up a ton of information and they
25 can just sort of figure out where the horizon line is?

26 MR. DUTTON: So, the examples that they have in the

1 specification is really all that we have, and the example that they use is a
2 convolutional neural network. And that's kind of where our construction in
3 the District Court kind of originated is trying to kind of find where this line
4 with model and algorithm is. And that's not really like in dispute between
5 the parties anymore because it's all about the geometric calculations. And
6 it's just not clear that a model can never use geometric calculations, which is
7 what Patent Owner is proposing in its construction.

8 And if we go to Slide 12, or let's go to Slide 11, this excerpt at
9 column 8, lines 39 through 46 is one of the main excerpts that Patent Owner
10 cites for the disclaimer argument. And here, it's not even talking about not
11 using geometric calculations, it's talking about relaxing the constraints of
12 having to have 3 or more lane lines. And so that's very different from this
13 geometric calculations or no geometric calculations issue. It's all about
14 whether the algorithm can be used to detect missing lane lines, which is
15 something that Khan and Ali can do, for example, which they're saying does
16 geometric calculations.

17 It's also pretty unclear that you would exclude geometry when the
18 title of the patent itself says that it uses geometry. We've included a case
19 here, Ruckus Wireless, 824 F.3d 999, where the title of the patent has been
20 used for claim construction in prior cases. And so, with the record as a
21 whole, we don't see any clear and unmistakable disclaimer. And we also
22 don't see clear and unmistakable disclaimer in the prosecution history.

23 So, if we go to Slide 12, the argument that they raised in the
24 prosecution history was to distinguish this Kwant reference, and they argue
25 that Kwant uses a geometric approach. Your Honor, geometric approach is
26 not in the terms of their claim construction. And so, we really have not been

1 able to identify what this delta is between a geometric approach and
2 geometric calculations. And we submit that there's no clear and
3 unmistakable disclaimer of having to -- having geometric calculations
4 excluded from the scope of predictive models. It doesn't say that.

5 And in fact, on the next slide, Slide 13, the examiner even agreed
6 -- or disagreed with their argument with respect to this limitation and
7 determined that Kwant1 still discloses the predictive model limitation
8 despite this argument. And so, a person of ordinary skill in the art reading
9 this prosecution history could reasonably conclude that the Kwant1 approach
10 would be encompassed by the claims because the examiner said so in their
11 notice of allowance.

12 So, yeah. If Your Honors don't have questions with the claim
13 construction topic, I can move on to Choe v. Khan and Ali. So, if we could
14 go to Slide 35. It's our position that Khan and Ali discloses the predictive
15 model in three different ways. The first is that Ali's horizon estimation
16 algorithm is itself a predictive model because it estimates and predicts the
17 horizon line. The second one is that Khan's CNN, which both parties agree
18 is a predictive model, is used in Ali's horizon estimation algorithm. And
19 then the third is that the entire end-to-end algorithm is a predictive model
20 that would identify the horizon line because it's using convolutional neural
21 networks.

22 If we go to Slide 36, here on this slide, Dr. -- this is Dr. Darrell's
23 testimony, where he relies on Ali's horizon estimation algorithm for the
24 predictive model. And he refers to this predictive modeling tool called
25 RANSAC, which is used to determine the horizon line. And he says that
26 that's a basis for concluding that the algorithm that estimates the horizon line

1 is itself predicting -- a predictive model to identify the horizon line.

2 So, if we go to Slide 40, just to show kind of where this RANSAC
3 is happening, this is the horizon estimation algorithm in Ali. At line 16, it
4 uses RANSAC for best fitting the horizon line across the video. And so, this
5 is basically modeling the best fitting line across multiple frames in the video,
6 and that itself is the model that Dr. Darrell points to for the predictive model
7 under theory 1.

8 And just to kind of subdue the issues with video, Ali is crystal
9 clear that it's doing this in each frame in the video. It says this at line 1 and
10 also, at line 16, because it's fitting the horizon across the video. And so, the
11 video limitation shouldn't be an issue with respect to Ground 2.

12 So, the second theory is that Khan's convolutional neural network
13 is the predictive model. And I want to first start with the claim language
14 because that's really important for this limitation. So, if we go to Slide, I
15 believe 5. The claim requires identifying one or more lines using a
16 predictive model. It says using. It's a broad word. It doesn't say, for
17 example, wherein the output of a predictive model is a horizon line. It just
18 has to use a predictive model to identify one or more lines in the video. And
19 that's precisely what Khan and Ali does. And let me walk through that.

20 So, if we go to Slide 37, Khan and Ali's flow diagram is here on
21 the left. This is at Exhibit 1007, and the lane boundary marker detection in
22 the upper left-hand corner is where Khan has his CNN, and it states that we
23 use a simple encoder/decoder-based convolutional neural network, CNN, to
24 detect key points or markers along the lane boundaries. And when we asked
25 Mr. Andrews whether that's a predictive model, he agreed that that CNN that
26 detects the lane lines is a predictive model.

1 The dispute now is whether that predictive model is used to
2 identify the horizon line. And so, if we go to Slide 40, here on the right, is
3 algorithm 1, and the input of algorithm 1 is the detected markers by lane
4 detector. That's the CNN. So, the CNN, the convolutional neural network,
5 that predictive model, is an input and a predicate that's required in order to
6 perform this algorithm. And so, Dr. Darrell explained why that would be
7 use, and Mr. Andrews actually agreed with Dr. Darrell's opinion here
8 because he's -- on Slide 38, we asked him if algorithm 1 would use the
9 convolutional neural network and he said yes, that it would.

10 I asked, to be clear, Algorithm 1 of Ali would use the CNN of
11 Khan or the CNN of Khan plus the missing boundaries approach of Khan,
12 right? And then the Court Reporter read back the question, and Mr.
13 Andrews responded yes, end stop. And this is at Exhibit 1061, page 44,
14 lines 16 through 22. And so, both experts agree that that algorithm uses a
15 predictive model.

16 JUDGE ARBES: Counsel, can I ask, if I have a process that
17 receives a lot of different inputs and one of those inputs used a predictive
18 model, but there are a lot of inputs that go into this separate process that's
19 used to estimate the horizon line, is the claim limitation met in your view
20 then, just because one of those inputs used the predictive model? And why
21 is that appropriate?

22 MR. DUTTON: So, if we go to Slide 38, the facts here are a little
23 different because the only input is what is generated by the predictive model.
24 And so, you're not -- the issue in front of the Board is not like how many
25 inputs would be allowed. Here, the only input is the convolutional neural
26 network output. And I know like Patent Owner had an analogy in their, I

1 believe, sur-reply about how this would be like cooking a fish.

2 And if I recall it correctly, they said that use of a pan -- or using a
3 fishing rod is not part of the process of cooking a fish because -- even
4 though it's used as like an earlier stage of the process, but we submit that this
5 is more like using a reel of a fishing rod. It's one of the components that's
6 necessary in order to cast and catch the fish. Using the reel is an input to
7 catch the fish. And so that that's kind of how we viewed, kind of that
8 argument. But to answer your question, Your Honors, I don't think we've
9 briefed how many -- if they had like 10 inputs and one was a predictive
10 model, that that would still be using.

11 JUDGE ARBES: Well, let me ask it in a little bit different way
12 then. On Slide 39, you show Figure 3, and the claim requires that you are
13 using a predictive model for a particular purpose, to identify the horizon
14 line. And so you -- we have the box there, the blue box of horizon
15 estimation, and that is clearly the purpose of the processing there, but on the
16 left, the lane boundary marker detection in orange, that has a different
17 purpose, right? That has the purpose of identifying the vanishing points to
18 get the lane lines, right? So, that processing that does use the CNN is for a
19 different purpose.

20 MR. DUTTON: Not quite, Your Honor. I think it's the same
21 purpose of identifying the one or more lines. And so, if we go to the claim
22 language, you identify one or more lines using a predictive model, and that's
23 the same purpose that the lane boundary marker detection is doing. It's
24 identifying one or more lane lines. And it's -- just to correct one point in
25 your question, it's not doing the vanishing line point. It's doing key points
26 along the lane lines, which is basically the same thing the '580 patent is

1 doing.

2 JUDGE ARBES: But that lane boundary marker detection, that
3 process is -- the purpose of that is not to find the horizon line, right?

4 MR. DUTTON: That's correct. It's not directly determining the
5 horizon line at the CNN, but that CNN lane boundary marker detection is
6 required in order to do the horizon estimation, which is the purpose of Khan
7 and Ali, generally.

8 JUDGE ARBES: Let's say for instance that that lane boundary
9 marker detection occurred and then 10 other steps happened, and eventually
10 in the sequence, you got to the horizon estimation. Is the claim still met in
11 your view then? I guess my question is, how far away from the actual
12 process of finding the horizon line can I be to still be considered part of that
13 process?

14 MR. DUTTON: So, like, not to push back too much, but, we're
15 not deciding like three, four steps in the past. It's a direct input into the
16 horizon estimation algorithm. I don't think we need to decide that issue,
17 respectfully. And I think that would be highly fact-dependent on the specific
18 algorithm that's used. Here, all it's doing is the CNN output is directly input
19 into the horizon estimation algorithm. You don't have the horizon
20 estimation algorithm without it because there would be no input. It wouldn't
21 work. So, you're using it.

22 JUDGE ARBES: Just one more question about that. I believe that
23 Khan did mention at one point -- on page 1825 did mention that the
24 contribution of this paper is the post-processing pipeline shown in Figure 3
25 following the lane boundary marker detection. And that the -- what happens
26 to the right of the orange box in Figure 3 was what was being contributed

1 there. Doesn't that, in some sense, kind of separate the two, that there is a
2 particular purpose to the lane boundary marker detection, and then there is a
3 particular purpose to everything else on the right?

4 MR. DUTTON: I mean, like, it's correct that both have their
5 purpose within the chain. The lane boundary marker detection is -- its
6 purpose is to detect the lane lines using the key points along each of the
7 lines. And it's also true that the horizon estimation, that purpose is to detect
8 the horizon line. So, I guess I agree that they have different purposes, but
9 what the issue in front of Your Honors is to decide, is whether that lane
10 boundary marker detection CNN is used in the horizon estimation, and the
11 algorithm of Ali says that it is because it is input into the horizon estimation
12 algorithm. I mean, both experts agreed that it uses it, and that's what the
13 claim language requires.

14 JUDGE ARBES: I think the disagreement -- perhaps the
15 disagreement is not over whether it is used. It's whether it is used to identify
16 the horizon.

17 MR. DUTTON: That's a fair characterization of it. Yes, Your
18 Honor. But again, we -- the whole point of the horizon estimation is to
19 identify the horizon line. So, if it's used in that algorithm, it's used to
20 identify the horizon line. All right. So, we also argue that the end-to-end
21 algorithm as a whole is a predictive model, but just to kind of -- since my
22 time is running here, I'd like to go to the motivation to combine for Ground
23 2.

24 And here again, Dr. Darrell provided pretty robust arguments for
25 why there would be a motivation to combine with Choe, and Khan and Ali.
26 His motivation to combine comes directly from the references, where the

1 references state that it's faster and more accurate. It improves occluded and
2 missing lane lines. So, that's a benefit for it. It's computationally
3 inexpensive, so it's an improvement there, as well, and it's simple and
4 intuitive, which is another factor KSR appreciates for motivation to
5 combine.

6 And we can go to Slide 32, which is some of the evidence that we
7 cite in this case. Again, the models provide a robust and efficient lane
8 detection algorithm. It provides scores over the state-of-the-art, so it shows
9 more accurate results. It improves occluded and missing lane lines. This is
10 all from Dr. Darrell's testimony at paragraph 123 of Exhibit 1003. And
11 Khan itself states that its algorithm can be combined with other lane
12 detectors to improve their potential. And that's at the abstract of Khan.

13 If we go to Slide 33, Ali similarly argues that or presents data
14 showing that it outperforms other algorithms and it is computationally
15 inexpensive and it is domain -- data domain invariant. That's in its abstract.
16 So, Dr. Darrell is pointing to the references themselves to provide the
17 teaching, suggestion motivation. That's not even required under KSR, but
18 here it is present that you have a suggestion of using these types of CNN
19 approaches.

20 JUDGE GALLIGAN: Counsel, Mr. Dutton, I do have a question
21 on Choe alone as a ground -- or sorry, Choe. And so, we talked a little bit
22 about what a model means and putting aside the geometric aspect of it. So,
23 under your plain and ordinary meaning that it's a model that predicts horizon
24 line -- I think that's -- is that right?

25 MR. DUTTON: Yes, a model that predicts it.

26 JUDGE GALLIGAN: Okay. Under that, is the imposition or is

1 the determination of a horizon line based on a camera's hardware settings, a
2 model that predicts the horizon, or is that -- are you going with just the
3 combinations for that then?

4 MR. DUTTON: So, we rely primarily on the combinations. We
5 agree that Choe is a little less on the details with respect to the predictive
6 models. It refers to it in that one paragraph.

7 JUDGE GALLIGAN: And I want to ask about that because it
8 seems like the perception process in Choe is what does some image
9 processing in terms of horizon lines. The result of that is in paragraph 45,
10 the result of the perception processing, can be utilized by other modules such
11 as the prediction module 303 and then of course predictive model, which it
12 was mentioned above, but just in terms of the mapping, I found it a little
13 confusing because I didn't ever see that predictive model word being
14 associated with determining a horizon line. It was taking the result of
15 something else. Is that your understanding?

16 MR. DUTTON: That's close to our understanding, Your Honor.
17 If we go to Slide 18, it's our understanding that when it refers to 124, it can
18 be rules, algorithms, and/or predictive models. And Choe states that
19 algorithm 124, which could be a predictive model under Dr. Darrell's
20 analysis, may further include sensor calibration algorithms. And the sensor
21 calibration algorithms is what is the umbrella of calibration that Choe
22 describes with respect to the horizon line.

23 JUDGE GALLIGAN: Okay, all right. Thank you.

24 MR. DUTTON: And Mr. Andrews -- this is on the bottom right
25 -- is his POPR declaration. He has since kind of walked this back, but he
26 also read this initially as predictive models 124 being used for sensor

1 calibration.

2 JUDGE GALLIGAN: Okay, thank you. You're in your rebuttal
3 time, but feel free to use what you want.

4 MR. DUTTON: Yes, so unless Your Honors have further
5 questions, I'll reserve the remaining time for rebuttal.

6 JUDGE GALLIGAN: Thank you. You have 19 and a half
7 minutes left. And Patent Owner, would you like to reserve any time for
8 rebuttal?

9 MR. RIBERA: Yes, if I could reserve 15 minutes.

10 JUDGE GALLIGAN: Sure. Thank you. I'll put 15 minutes up
11 here. Okay, Mr. Ribera. You may begin.

12 MR. RIBERA: Good afternoon, my name is Hector Ribera,
13 Counsel for the Patent Owner, Motive Technologies, Inc. And I would like
14 to start with sort of talking about the first issue regarding the Revvo rule and
15 the failure for the Petitioner to comply with the Revvo rule. So, when the
16 petition was filed, the Petitioner took the position that all the terms of the
17 claims were entitled to the plain and ordinary meaning, and that no term
18 required any specific construction.

19 On the Revvo and Tesla, the Board has set a rule that when a
20 Petitioner adopts different claim constructions at the Board and the District
21 Court, at the very minimum, there should be an explanation of why those
22 different constructions should be appropriate. And here, it's pretty clear that
23 the Petitioner in District Court provided claim constructions in January of
24 this year that are not the plain and ordinary meaning of several of the key
25 terms at issue in the IPR.

26 So, here we have the predictive model, and the Board already

1 mentioned this construction of being a deep learning or other AI model,
2 trying to directly identify the one or more lines. They also took the position
3 that camera parameters -- a property of the camera itself. Yeah, there's some
4 arguments made in the reply where apparently different aspects of camera
5 properties, whether it's an intrinsic camera property or an extrinsic property
6 of the camera, impact the analysis that they presented. So, at the very
7 minimum we should have an explanation of what these claim interpretations
8 are and how they differ from the plain and ordinary meaning.

9 It's very clear with the order of the steps where the -- in the District
10 Court, the Petitioner made this argument that there's a very specific -- and
11 they still maintain this argument -- that there's a very specific order required
12 of the steps of Claim 1. Yet in the petition, they argue that the claims
13 themselves and the specification do not require any specific order for -- and
14 they were making an argument for element 1C, but I don't think they've
15 provided any explanation of why there is an order required for any element.

16 JUDGE GALLIGAN: Counsel, let me ask you about that.

17 MR. RIBERA: Yes.

18 JUDGE GALLIGAN: I noticed in the District Court briefing that
19 the parties submitted, that the Patent Owner argues that there's no -- it
20 appears Patent Owner argues there's no order of steps, but I noticed in the
21 Patent Owner response -- let me get you the page here -- I think it was at 28,
22 29 -- was it that -- it mentioned that 1C had to be after 1D because it says,
23 based on the one or more lines. I can get you the cite for that, but I thought I
24 saw that. I was just curious, so if Patent Owner thinks that there's an actual
25 order required for the claims. Oh, it's 17 -- Patent Owner's response 17 to
26 18. Order of the steps inside limitation 1C requires the parameter be based

1 on element 1B, but I would think -- so it sounds like you're arguing that
2 there's no order of steps required, but that 1C has to be after 1B?

3 MR. RIBERA: We're arguing that the claim requires that the
4 lanes -- that the camera parameters be based on the lane lines. So, you have
5 to have the lane lines.

6 JUDGE GALLIGAN: Okay.

7 MR. RIBERA: Not specifically that the step is performed before
8 or after, but you have to have the lane lines to compute this camera
9 parameter. That's our argument, that the claim language requires that.

10 JUDGE GALLIGAN: Okay. So, there's some order required
11 there, once the --

12 MR. RIBERA: There's definitely some relationship between the
13 steps, but there's no specific order that should be required in construing the
14 steps. Just whatever the claim language itself requires.

15 JUDGE GALLIGAN: I'm confused. Are you saying that you
16 could compute a camera parameter based on one or more lines before you
17 identify the one or more lines?

18 MR. RIBERA: No, I'm not saying that.

19 JUDGE GALLIGAN: All right, okay. All right, thanks.

20 MR. RIBERA: So, we believe that it's pretty clear that the Board
21 has set forth a rule in the Revvo and Tesla cases, where if a Petitioner is to
22 take different claim constructions at the Board and in District Court, at the
23 very minimum, the Petitioner is required to explain why those constructions
24 are necessary. And we believe that the Petitioner has violated that rule here,
25 and that the appropriate remedy for that is to withdraw institution of this
26 proceeding.

1 JUDGE GALLIGAN: Are they still -- my understanding though is
2 now Petitioner is arguing, for instance, on predictive model plain and
3 ordinary meaning, so they're not -- there's no inconsistency as of now in
4 front of the District Court; is that right?

5 MR. RIBERA: Well, we don't know because they've never
6 explained what their positions are with -- there's no claim construction that
7 was provided in the petition whatsoever. So, what they did happened after
8 they filed the reply. In their reply, they already had a claim construction
9 filed in District Court that was different than what they had in the petition.
10 At that point, they should have provided an explanation of what those two
11 different constructions relied upon in the two different forums, and they
12 didn't.

13 And we believe that in the more recent cases, the Ford case and
14 -- let me give you that -- yeah, the Ford v. AutoConnect and the Terumo IPR
15 decisions from the director, there was additional guidance there where, like
16 here, the Petitioner tried to subsequently change their position, the claim
17 construction, to harmonize their position between the District Court and the
18 Board. And the director made the point that that's insufficient. It's too late.
19 There's a rule set forth in Revvo, once a rule is not complied with, the proper
20 remedy for that is to withdraw the institution.

21 So, now turning to the substantive grounds, I would like to address
22 three main issues that we've been talking about today. Obviously, we stand
23 by all of our arguments in the briefing, but the first point we want to discuss
24 is that there's no horizon line determination with a predictive model in Choe
25 or Khan and Ali. There's no transmission or generation of an overlaid video
26 in any of the prior art references, and there is no motivation to combine with

1 Choe.

2 Now, first, with respect to the predictive model in Choe, I think
3 Petitioner just sort of agreed that there's no disclosure in Choe that -- of the
4 use of a predictive model to identify a horizon line. This is the paragraph 30
5 that they relied upon throughout their entire briefing, and it only mentions
6 predictive model, along with a set of rules and algorithms, but it never goes
7 into detail on how those predictive models are then used.

8 Our expert explained how Choe explains how the set of rules are
9 used and also explains how the algorithms are used, but there's nothing in
10 Choe that actually describes how the predictive models are then used for any
11 purpose. So, all we're left with is this inference from the Petitioner that
12 these algorithms that are subsequently described in paragraph 44 of Choe
13 -- and I'm on Slide 15 at this point -- are used to determine a set of
14 calibration parameters, but there's never a linkage between these algorithms
15 and the predictive models that I mentioned earlier in paragraph 30. So, Mr.
16 Alexander, in his declaration, concluded that nothing in Choe teaches or
17 suggests any predictive model that is trained to identify any lines in video.
18 So, nothing in Choe teaches a predictive model that identifies horizon lines.

19 JUDGE GALLIGAN: Is it -- I'm sorry -- Mr. Alexander, or is it
20 Mr. Andrews?

21 MR. RIBERA: Oh, Mr. Andrews, yeah. I'm sorry.

22 JUDGE GALLIGAN: Andrews, okay. I was making sure I --

23 MR. RIBERA: Just a typo. Yeah.

24 JUDGE GALLIGAN: Okay.

25 MR. RIBERA: Yes.

26 JUDGE GALLIGAN: I wanted to make sure I had it right.

1 MR. RIBERA: Yes.

2 JUDGE GALLIGAN: Thank you.

3 MR. RIBERA: Then the other issue -- so, there's the reference to
4 predictive model in Choe, but we believe that that has nothing to do with the
5 determination of a horizon line, which is entirely done based on the
6 hardware parameters of the camera itself. There's nothing in Choe that talks
7 about using a predictive model to come up with the horizon line, and instead
8 the only approach that is disclosed in Choe to come up with that horizon line
9 is just based on the preset pitch angle and the hardware settings of the
10 camera itself. So, we have all the references herein Exhibit 2005 that -- or
11 1005 -- that show how the horizon line is determined in Choe, and it's never
12 based on a predictive model or even on the algorithms 124, that were
13 referenced earlier.

14 Now, in Choe, we also see that once that horizon line is
15 determined, there's never a disclosure of generating or transmitting that
16 horizon line applied to video. As Your Honors mentioned earlier, Choe
17 operates on an image-by-image basis, and at no point is there any description
18 of applying even the hardware-based horizon line indeterminate to a video
19 of any sort. And the claim not only requires -- I think all the references we
20 saw earlier from Petitioner regarding video and video cameras, it's to
21 determine the initial frame, or one frame or two frames from the video. But
22 the claim further requires that once a horizon line and the lane lines are
23 determined in step 1B, those are overlaid to a video, and it's got to be those
24 lines.

25 So, for example, in Figure 6A and 6B of Choe that the Petitioners
26 rely upon, we see that different horizon lines are shown in those different

1 images. So, it's not the horizon line that's determined that's been applied to a
2 video and then generating an overlaid video that is subsequently transmitted
3 to the annotator device. There's nothing like that describing the order.

4 JUDGE GALLIGAN: And in that regard, you heard your
5 colleague's argument that, look, it's frames 1110 and 1109, they're sequential
6 or they're adjacent frames. Why isn't that a video?

7 MR. RIBERA: Right. So, it's still a single image. It shows a
8 horizon line in each of those two images, which the patent clearly talks
9 -- those are just examples of having one with the horizon line high, one with
10 the horizon line low. So, those are different horizon lines, not the lines
11 determined by the prior step. And there's no connection between those two,
12 other than they were taken from a set of videos that came from the same
13 video camera. That does not show that the generation of a video with the
14 overlay line determined in step 1B and into that video, and then multiple
15 frames of the video. And I think, as Your Honor noted, the claim requires a
16 video that includes a set of frames, not one frame. So, doing it on one frame
17 does not meet the claim requirements.

18 JUDGE ARBES: Counsel, can you respond to Petitioner's
19 argument that those two frames, 1109 and 1110, they both have a horizon
20 line overlaid on them, and they are transmitted. And maybe not as a video
21 file, but they are two images that constitute a video. Can you respond to that
22 argument?

23 MR. RIBERA: Yeah. So, first of all, that does not -- even if that
24 was accurate, that does not meet the claim requirements. So, the claim
25 requires identifying one or more lines in the video using a predictive model,
26 the one or more lines including a horizon line. And then overlaying the one

1 or more lines -- the one or more lines on the video -- to generate an overlaid
2 video.

3 So, if you have one line that's generated by one approach and then
4 another line that's generated later by a different approach, that is not the one
5 or more lines that are determined in the earlier step. So, we don't think that
6 that would meet the claim limitation. And also, at no point is it an overlaid
7 video generated. So, it's just one image at a time, and a video has to be more
8 than one image. So, just doing one image at a time, when you're
9 transmitting that overlaid image, you're not transmitting a video. It's just one
10 image.

11 JUDGE ARBES: And is it your position then, if I have a video
12 with an overlaid horizon line -- let's say the video is a minute long, and
13 there's a lot of frames in the video, that those frames of the video have to
14 have the same horizon line? It can't change over time?

15 MR. RIBERA: For at least a set of frames, it has to be the line,
16 right? The one that was determined in the earlier step, because that's what
17 the claim requires.

18 JUDGE ARBES: I see. And the two images in Figures 6A and 6B
19 of Choe show a different horizon line for each one.

20 MR. RIBERA: Right, because those are examples of a horizon
21 line that's too low and a horizon line that's too high, and then how the user is
22 going to use the manual approach to move that up or down depending on
23 what the need is.

24 JUDGE ARBES: I see. And when the user is doing that, they're
25 just looking at a static image and they press a button to move the line up or
26 down.

1 MR. RIBERA: Exactly.

2 JUDGE ARBES: Okay.

3 MR. RIBERA: Right. And Choe has all these other images that
4 are displayed at the same time from the LiDAR and the 3D overview. All
5 those things are one frame only at a time. The user cannot be shown the
6 corresponding -- or there's no description in Choe that any of the
7 corresponding displays within the user interface are for a video. They're just
8 static single images.

9 So, that's sort of what I have here on Slide 19. I think the
10 Petitioner relied on this closure on the user interface for the annotation when
11 it's clearly a single image. The first image is displayed, and there is a first
12 display area with a single image. And then the position of the line is
13 updated by the user within that first image.

14 And then when we look at the petition with respect to this video
15 issue, I think in a way the Petitioners acknowledge that there is no disclosure
16 of video in Choe, and so they relied on their expert to provide this limitation.
17 So, because Choe does not talk about video, the expert testified that a person
18 of ordinary skill in the art would have found it obvious that a collection of
19 video frames having the horizon lines superimposed thereon is an overlaid
20 video, but no such thing is actually disclosed in the prior art -- in the text of
21 the prior art.

22 And as we noted in our briefing, an expert testimony cannot be
23 used to supply this missing claim limitation. So, we think that, that is
24 inappropriate. So, because of this lack of disclosure of overlaid video in
25 Choe, and because the Petitioners rely in their petition on Choe for all the
26 overlaid video limitations, I think none of the grounds can be met.

1 Now, turning on Slide 22 to Khan and Ali, I think this issue has
2 been already discussed. It's the notion that using the output of a CNN is the
3 same thing as using the CNN. We just disagree on that point. It's pretty
4 clear that Khan uses a -- it's included on Slide 24. This is a diagram from
5 Khan. It's very clear that the horizon line, it's computed using the geometry
6 of the lane lines, not using a predictive model. And I think that's the horizon
7 estimation approach box that we saw in the end-to-end algorithm. So --

8 JUDGE GALLIGAN: Mr. Ribera, can you speak to the meaning
9 of predictive model? And I know that there's a dispute about use or non-use
10 or exclusion of geometric points or geometry in general.

11 MR. RIBERA: Yes.

12 JUDGE GALLIGAN: What is it a predictive model in, as this
13 patent would inform?

14 MR. RIBERA: I think it's a model that's used to predict the lines.
15 And I think the Petitioners have kind of tried to take the burden and flip it on
16 its head by arguing that a predictive model includes a geometric approach
17 and places a burden on us to say that it's disclaimed. I don't think that's
18 right. I think --

19 JUDGE GALLIGAN: So, if I -- because I was reading some of the
20 Patent Owner's -- I read all the briefing, but some of the Patent Owner's
21 statements in, for instance, the sur-reply at page -- I think it was page 11, it
22 says, a predictive modeling tool is not a predictive model. And it says, in a
23 RANSAC -- I think it says RANSAC is not a predictive model, but
24 RANSAC is an algorithm by which you iterate, and it would give you an
25 outcome. So, is the Patent Owner's position that it's somehow non-
26 deterministic, like a model is sort of like a black box that you put stuff into

1 and it'll give you something out?

2 MR. RIBERA: Yeah, you said -- for example, the CNN example
3 is you just train the model with a bunch of images and the model learns to
4 recognize where that horizon line is in those images. So, you feed a new
5 image with an unknown location of the horizon line, it will give you a
6 probability of where that horizon line is within that image. So, that's
7 predicting where the horizon line is within the image. I think that our expert
8 explained that what RANSAC has used in Ali is not to predict the horizon
9 line because the horizon line is computed geometrically. So, that's why
10 we're disagreeing that that is a predictive model used to identify the horizon
11 line.

12 JUDGE GALLIGAN: I guess it predicts -- maybe it's the meaning
13 of predict, but it gives you -- it iterates or does something -- I mean, it's a
14 while statement, so I'm guessing it's some kind of loop. And it iterates and
15 then it gives you an output, which I would think would be a prediction of a
16 horizon line because without having confirmed it, I wouldn't know, but
17 you're saying that it's -- like the geometry is what makes it non-predictive?

18 MR. RIBERA: No, no. I think in Ali -- you're talking to algorithm
19 1 of Ali?

20 JUDGE GALLIGAN: Yeah, algorithm 1. And then the use --

21 MR. RIBERA: Right.

22 JUDGE GALLIGAN: -- of RANSAC in that, which RANSAC is
23 for the best-fitting horizon.

24 MR. RIBERA: Right, but that's after you already have the horizon
25 line in one frame. How do you move that to multiple frames? That's where
26 RANSAC is used.

1 JUDGE GALLIGAN: Okay, okay.

2 MR. RIBERA: So, the horizon line is computed geometrically.
3 So, I mean, it's the -- I think it's Figure 5 in Ali. That's how you compute the
4 horizon line. You have the triangles, you have the three lane lines, and you
5 use the trigonometry equating the two triangles to be the same. And that is
6 how the horizon line is determined.

7 Now, how do you put that in multiple frames of video? That is
8 where the RANSAC approach comes in. And again, this is part of the issue
9 with lack of disclosure in Choe because Choe doesn't tell you how do you
10 put -- once you have a horizon line in one frame, if you do it on every single
11 frame, if you do every 10 frames, do you estimate where the line is and use
12 the same line across multiple frames -- there's no disclosure like that in
13 Choe.

14 JUDGE GALLIGAN: So, in the predictive model of the patent, so
15 if it -- I have a general understanding of machine learning, but -- and I think
16 Workman actually has a pretty good description of it, how it provides a lot
17 of -- I think they call them -- call these like training images. It provides --

18 MR. RIBERA: Right.

19 JUDGE GALLIGAN: -- like hundreds of thousands of training
20 images.

21 MR. RIBERA: Right.

22 JUDGE GALLIGAN: But if in that, I mean -- if the model
23 decides, oh, we can also look and see certain patterns, and there's a triangle
24 in there, then all of a sudden, it becomes not a predictive model because
25 there's some use of geometry -- and that's where I'm just -- the exclusion of
26 all geometry is what concerns me. I don't know if that's justified. Also, I

1 don't know if that's even practical or --

2 MR. RIBERA: I appreciate that question. So, I don't think we're
3 trying to exclude all geometry.

4 JUDGE GALLIGAN: Okay.

5 MR. RIBERA: I think when you look at the specification, it talks
6 about the known geometric approach to determine horizon lines. That's
7 what we're saying. It's not the predictive model, because the specification
8 talks about as an alternative to using the predictive model.

9 JUDGE GALLIGAN: Okay.

10 MR. RIBERA: So, in column 7 on the '580 patent, it talks about,
11 instead of using a geometric approach known in the art, you can use a
12 predictive model. So, it's an alternative to that geometric approach to
13 determine a horizon line. It's not that you cannot use any geometry. When
14 the inventors are using the term "predictive model", they're not referring to
15 that known geometric approach of the prior art.

16 JUDGE GALLIGAN: Okay.

17 MR. RIBERA: And I think that this is where we take issue with
18 Petitioner's approach. They try to impute the burden of excluding this
19 geometry from the definition of -- or the plain and ordinary meaning of
20 predictive model. I think the plain and ordinary meaning of predictive
21 model does not include that geometric approach, because the inventors talk
22 about it as being an alternative to the predictive model approach. And they
23 specifically distinguish the Kwant prior art, where it's basically the same
24 thing that Khan and Ali does. They use a CNN to determine the lane lines
25 and then the geometric approach to determine the horizon line. And they
26 distinguish that as being different.

1 JUDGE GALLIGAN: Now, the tricky part about that is that the
2 examiner didn't seem to agree, and so we're left with sort of this
3 indeterminate prosecution history --

4 MR. RIBERA: Well, but we've got to look at what the inventors
5 say, right? The inventors view their invention as being a predictive model,
6 being different than that geometric approach. So, that's really what the law
7 says that we should be looking at.

8 JUDGE GALLIGAN: Right. And then Workman, just to ask you
9 -- and so, Petitioner's Counsel said there's no -- doesn't seem to be dispute,
10 and I think this is right, that Workman itself discloses -- and I'm reading the
11 abstract -- it says, the application of CNNs were directly estimating the
12 horizon line without requiring explicit geometric constraints. So, Workman,
13 just in the simple sense of using a -- identifying -- let me make sure I get the
14 claim language right -- identifying the horizon line using a predictive model,
15 there's no dispute that Workman itself would teach that one little thing.

16 MR. RIBERA: There's no dispute that Workman teaches a
17 predictive model to identify the horizon line in one image.

18 JUDGE GALLIGAN: Okay, great.

19 JUDGE ARBES: Counsel, I understand your position about the
20 known geometric process that is discussed in the specification. How do we
21 know that Ali's description about Figure 5 is referring to that thing that's
22 described in the spec, that that is the known geometric process that is not
23 being claimed here?

24 MR. RIBERA: So, Ali is one of the inventors, and the disclosure
25 of Ali is part of the file, the disclosure in the '580 patent. So, this is their
26 own approach, and in the '580 patent they came up with something different,

1 and that's why they distinguish this approach. And you see, the approach is
2 -- it requires these three lane lines of basically equidistant lanes. And I think
3 we also have -- Mr. Andrews testified -- there's books written about this
4 approach, and it's pretty well understood in the art.

5 JUDGE ARBES: One more question about the combination with
6 Khan and Ali. Can you respond to Petitioner's argument about Figure 2 and
7 the -- actually, I'm sorry, Figure 3 -- where there is a singular input to the
8 horizon estimation process? The immediately preceding process has the
9 CNN and that has one input into the horizon estimation, and therefore, the
10 CNN is used as part of an overall process. Can you respond to that?

11 MR. RIBERA: Yeah, I think our point there, or our position there,
12 is that there's a prior step that uses a CNN, and there's an output of that use
13 -- I mean, if we call that CNN to be the model, we would agree with the
14 CNN being a predictive model. So, the predictive model is used to
15 determine those lane lines. Now the lane lines are used in the geometric
16 approach to determine the horizon line, but the predictive model, which is
17 the CNN, that is not being used anymore.

18 That was ceased being used when the output of the lane lines came
19 out. Now, we're moving on to the next step, and we're using these geometric
20 computations using those lane lines, which could have been computed in any
21 way. They could have been given as an input. It doesn't matter that a
22 predictive model was used to generate those at this point. We're just using
23 the lane lines themselves to use geometry or trigonometry to compute the
24 horizon line. So, that's just totally different than what the claim requires.
25 And again, also expressly distinguished by the inventors as being something
26 different than using the predictive model to identify the horizon line.

1 JUDGE ARBES: Putting aside the question of the geometric
2 process, I believe Petitioner also argued that that horizon estimation
3 wouldn't work without that initial input, would not work unless it got the
4 input of the lane boundaries from the immediately preceding step. And
5 therefore, we should consider them all together. You disagree with that, I
6 assume?

7 MR. RIBERA: Yes, we definitely disagree with that. I think the
8 input to the geometric approach is the lane lines. How you computed them
9 is irrelevant at this point. The algorithm to compute the lane lines is going
10 to work regardless of whether a CNN was used earlier or not. So, the CNN,
11 which is the model, is not necessary to compute the horizon line.

12 Now, turning to the motivation to combine issue on Slide 27, I
13 think KSR provides us the key question that we need to ask us when
14 determining whether there's a motivation to combine. And it's, in this
15 instance, would be whether an automotive sensor system designer of
16 ordinary skill, starting with Choe's camera hardware-based approach to
17 determine the horizon line, would find it obvious to replace that with Khan
18 and Ali's geometric algorithms or Workman's image-trained predictive
19 model to determine the horizon line.

20 So, we're starting with Choe and the approach describing Choe,
21 and then why would a person of ordinary skill in the art be motivated to
22 replace what Choe teaches with respect to how the horizon line is
23 determined, with either the Khan and Ali approach, or the Workman
24 approach? And we believe that there's no answer to those questions
25 provided by the Petitioner.

26 Instead, using hindsight, they start backwards and they go to a

1 reference that discloses -- for example, with Workman, a reference that
2 discloses how to identify a horizon line using a predictive model, and then
3 they try to fit it into the Choe approach. But Choe never said that there was
4 an issue with using its hardware-based approach to determine the horizon
5 line. And then the benefits that the Petitioner points to in terms of speed and
6 what actually came from Workman's description, Workman was not
7 comparing its approach to the approach of Choe. So, the benefits that
8 Workman is talking about is based on, for example, other performance on
9 the same image set.

10 So, other algorithms were using the same image set that
11 Workman's algorithm was using, and Workman's algorithm was better than
12 those other algorithms, not better than Choe's hardware-based approach.
13 There's just no -- nothing in Choe gives us a reason to replace that hardware-
14 based approach to determine the horizon line with anything else. Definitely,
15 the Petitioner did not identify that.

16 And I think the case law we provide -- ample case law for this
17 -- starting with KSR, all the cases that we cited show some sort of deficiency
18 in the primary reference or known problem that needs to be addressed. And
19 the Petitioner did not identify any known problem in Choe that needed to be
20 addressed. And whether Khan and Ali or Workman provide a suitable
21 solution, first, we need to know suitable solution for what is the problem that
22 needs to be fixed.

23 JUDGE GALLIGAN: Let me ask you this. So, in some of those
24 cases, I'm thinking to the -- I think it's the Intel v. PACT case, but I could be
25 wrong. It was a discussion -- I think it was a Board case, but the Circuit
26 said, look, one has a cache and the other has a cache, and they're

1 interchangeable to some extent. They didn't use that word, but they said,
2 they didn't have to show that there was a categorical improvement. They're
3 both kind of looking at how to deal with primary or secondary caches,
4 whatever. So, they're both suitable, and that's, in itself, a reason to combine
5 because that's the problem being addressed.

6 So, why isn't the problem -- and I may have gotten the case wrong.
7 I thought it was Intel v. PACT. It could have been another one, but why isn't
8 the case law just saying, look for the issue, which is identifying a horizontal
9 line or the horizon? And so, Choe does it with hardware settings, but there's
10 also -- Workman does it with a CNN, and it's fast and it's accurate and things
11 like that. Why isn't that the problem, the approach -- the problem addressed
12 or whatever KSR says?

13 MR. RIBERA: I'm not recalling exactly what case you're
14 referring to, but I think in general, using an approach where you're just
15 trying to replace two known approaches, I think that's -- and we do cite
16 cases for this proposition, that just knowing that something is known doesn't
17 give you motivation to combine because you're basically relying on
18 hindsight to replace the model that it's like the claim approach, with the prior
19 art approach, without a reason to do so. The only reason is you're trying to
20 invalidate this patent, so it's just -- I think the quote is, "It's fraught with
21 hindsight."

22 So, that's why we think that would be inappropriate. Without
23 having a motivation in Choe saying, hey, there's these issues with this
24 hardware-based approach, it would be better if we could do it another way,
25 or it's well known in the art, even though Choe may not disclose this, but it's
26 very well known in the art that this hardware approach is slow or some

1 known problem that needs to be addressed, then that prevents the hindsight
2 bias.

3 JUDGE GALLIGAN: And just for the record, it was Intel Corp. v.
4 PACT XPP Schweiz, and it was 61 F.4th 1373 in 2023 from the Circuit.
5 That's what I was referring to.

6 MR. RIBERA: Okay.

7 JUDGE GALLIGAN: Just wanted you to know. Thanks.

8 MR. RIBERA: Thank you.

9 JUDGE GALLIGAN: I did have another question if now's a good
10 time.

11 MR. RIBERA: Yes.

12 JUDGE GALLIGAN: It was about Dr. Darrell's credentials. In
13 the Patent Owner response at the bottom of page 9 and the top of page 10,
14 the Patent Owner says that we should scrutinize his testimony because he's
15 not an expert in, quote, computer vision and artificial intelligence. And I
16 just wanted to clarify, is Patent Owner saying that he's not qualified to testify
17 for a person -- from the perspective of a person of ordinary skill in the art, as
18 in Kyocera and Osseo Imaging? Is Patent Owner making that argument?

19 MR. RIBERA: So, we're making the argument that in the petition,
20 the Petitioner did not highlight any basis for Dr. Darrell to testify as to what
21 an automotive designer of ordinary skill would be motivated to do. That's
22 our argument.

23 JUDGE GALLIGAN: Okay, so it's not --

24 MR. RIBERA: It's not that -- it's not an expert, but that he did not
25 provide any factual basis for him to provide that testimony as to an
26 automotive system designer.

1 JUDGE GALLIGAN: Okay. So, just to clarify, is it Patent
2 Owner's contention that he didn't provide a basis for his own credentials to
3 provide that testimony, or that his testimony didn't provide a basis in fact
4 for, for instance, combining Workman with Choe?

5 MR. RIBERA: More the second than the first.

6 JUDGE GALLIGAN: Okay.

7 MR. RIBERA: His background is included with his declaration,
8 but he didn't provide any basis for how a -- because his person of ordinary
9 skill in the art was defined differently, he never provided a basis for why an
10 automotive system designer would be motivated looking at Choe to replace
11 that horizon line determination with the Khan and Ali, or the Workman.

12 JUDGE GALLIGAN: Okay. And in that vein, it sounds like
13 you're making an analogous art argument, but I didn't see that in your
14 papers, so I just want to clarify. You're not saying that Khan, Ali, and
15 Workman and Choe are not analogous to the claimed invention, are you?

16 MR. RIBERA: We believe Workman -- so this is in response to
17 the Board's institution decision, it talked about the notion of a suitable
18 solution to a known problem. And we're pointing out that Workman does
19 not describe being a suitable solution or a known solution to any problem
20 because there's no problem identified in Choe, but for vehicle sensor systems
21 altogether. Nothing in Workman says that it's a known approach for vehicle
22 sensor systems. The only thing that the Petitioner pointed to is an image that
23 shows a road with buildings, and that's what Workman says. It's an image
24 with roads and buildings. It doesn't mention anything about automotive
25 systems or using its approach in automotive systems in any way.

26 JUDGE GALLIGAN: I mean, it does say in the introduction,

1 "Knowledge of the horizon line enables a wide variety of applications,
2 including... geometrically biased pedestrian and vehicle detection." I kind of
3 look at that and say, someone -- I mean, from what I see, detecting the
4 horizon line is a preeminent issue in autonomous driving. So, it seems to
5 -- it would at least seem to commend itself to the -- or be reasonably
6 pertinent to the problem that an artisan might be wanting to solve here,
7 right?

8 MR. RIBERA: Seems like a kind of a vague, high-level approach
9 and not really what the Petitioner pointed to in terms of what is the known
10 problem in the art that Workman provides a solution to with respect to
11 automotive systems.

12 JUDGE GALLIGAN: Okay, all right. Thank you. I understand
13 your position.

14 MR. RIBERA: And going back to Slide 28, I think that in the
15 petition, the main argument that the Petitioner presents for the motivation to
16 combine with Choe is its lack of disclosure with respect to the predictive
17 model, and just basically the assumption that there was some disclosure in
18 Choe of using a predictive model, with respect to the horizon line, which
19 there isn't. So, we think that the petition definitely failed to provide any
20 motivation to combine Choe with either Khan and Ali, or Workman.

21 I think we've discussed a lot of the same issues that I have in my
22 slides, so -- I think Slide 31 kind of addresses the question you had earlier of
23 simply being known and being compatible, does not suffice as a motivation
24 to combine. And that's in KSR, under the correct analysis, any need or
25 problem known in the field, and addressed by the patent can provide a
26 reason for combining the elements in the manner claimed. So, the only way

1 you get to using the Khan and Ali or Workman approach in Choe for the
2 horizon line, is based on hindsight. There's nothing in Choe that says use a
3 different approach than the hardware-based approach that we described.

4 JUDGE GALLIGAN: Now, I want to be careful with that -- this is
5 Judge Galligan -- because we don't want to go back to a TSM test where we
6 have to look at Choe, and Choe says, by the way, look at these other things.
7 And that's where we do have to consider the art as a whole and whether, for
8 instance, if there's a field or a problem to be addressed, meaning identifying
9 a horizon line. Maybe one would say, why wouldn't you also -- why
10 wouldn't a person of skill in the art or a hypothetical person is
11 knowledgeable about all these things, and knows about Workman, why
12 wouldn't you say, oh yeah, I'll use the CNN to do this? I mean, that's just
13 something to think about, but I kind of hear your argument more of a TSM
14 test, maybe too constrained. And am I misunderstanding?

15 MR. RIBERA: Not necessarily.

16 JUDGE GALLIGAN: Okay.

17 MR. RIBERA: I mean, definitely TSM is still part of the equation.

18 JUDGE GALLIGAN: But we're not -- it's not limited --

19 MR. RIBERA: No, it's not required.

20 JUDGE GALLIGAN: Yeah.

21 MR. RIBERA: No, I agree. It's not. It's definitely not required,
22 but you still need to find some issue that you're addressing in the art. And
23 without any hint in Choe to replace that hardware-based approach with
24 anything, it's pretty clear that the only reason we're looking to replace it is
25 hindsight.

26 JUDGE GALLIGAN: Okay, thank you.

1 MR. RIBERA: And I think that concludes what I wanted to
2 discuss.

3 JUDGE GALLIGAN: Any other --

4 MR. RIBERA: Any other questions? Oh.

5 JUDGE GALLIGAN: Any more questions? You have 17 and a
6 half minutes left --

7 MR. RIBERA: Okay.

8 JUDGE GALLIGAN: -- for your surrebuttal. I don't think there's
9 any other questions. Let me stop you there. Let me stop your clock. All
10 right, great. 17:16 left.

11 MR. RIBERA: Thank you.

12 JUDGE GALLIGAN: Thank you, Counsel. Petitioner, you have
13 19 minutes and 35 seconds. I'll get it started when you're ready.

14 MR. DUTTON: (INDISCERNIBLE)?

15 JUDGE GALLIGAN: Yes.

16 MR. DUTTON: Okay.

17 JUDGE GALLIGAN: Ready?

18 MR. DUTTON: Yes, Your Honor.

19 JUDGE GALLIGAN: Go ahead.

20 MR. DUTTON: Just to address the de-institution argument real
21 quick. We believe that there are three reasons why de-institution is not
22 appropriate here. First, the claim constructions do not conflict. As Your
23 Honor asked in your question, the predictive model limitation, we don't have
24 a conflicting construction in this IPR versus what has been proposed in
25 District Court. We've also been consistent with not reading the claims to
26 require this negative limitation about the geometric calculations. I think it's

1 important to note that the three cases that they cite -- Cambridge, Revvo, and
2 Tesla -- all involved cases where the Petitioner adopted the Patent Owner's
3 District Court constructions as their own to avoid indefiniteness, means-
4 plus-function, or other limitations. That's not the case here. We've been
5 proposing what we believe is the proper constructions in this case.

6 With respect to the camera parameter, if we can go to Slide 24 for
7 this term. There hasn't been a dispute that the Khan and Ali -- or Choe's
8 pitch, yaw, and roll would be camera parameters under any construction.
9 There also hasn't been a dispute that camera height and the road plane
10 normal are camera parameters. Those are defined in the dependent claims.
11 And so, this is really a dispute that is relevant to the District Court case. It's
12 not relevant here. There hasn't been anything that hinges on the construction
13 of camera parameter.

14 With respect to the order of steps, Slide 6, we've laid out what the
15 order of steps are in the District Court. That is not inconsistent with what
16 we've presented in this petition. So, if we go to Slide 14, which is the
17 excerpt that Patent Owner raises as the alleged inconsistency, the point is
18 that step 1C does not need to occur after the manual calibration step, which
19 is step 1F. So, when we say that neither the claims themselves, nor the
20 specification requires specific order for this element, we refer to the step 1C
21 in relation to step 1F, and that's understood when you read that passage in
22 context.

23 So, if we can go back to Slide 6, that's wholly inconsistent with
24 what we proposed in District Court, where step C does not have a relation
25 required with respect to step F. It just has to occur after step B, which is the
26 logical flow of the claims.

1 JUDGE ARBES: Counsel, just so we know the status of the
2 District Court case, there has not been a Markman hearing or any further
3 briefing on claim construction beyond what's been submitted here, right?

4 MR. DUTTON: That's correct, Your Honor. The District Court
5 did have a planned Markman hearing late last week, but that was continued
6 and there hasn't been a re-docketing of that Markman hearing.

7 JUDGE GALLIGAN: Was that all you had on that one point,
8 Counsel?

9 MR. DUTTON: For the order of steps? Yes.

10 JUDGE GALLIGAN: Or, I'm sorry, for the conflicting language.

11 MR. DUTTON: I do have two other points real quick there. The
12 second point is that Motive has not actually requested director review, so
13 this issue is not ripe for the Board's consideration under 35 USC 318(a), as
14 well as SAS. And then third, Motive has forfeited this argument because the
15 deadline for requesting director review is eight months ago. The deadline
16 was September 10th, 2025.

17 And they also have waited now over 4 months since the joint claim
18 construction statement has been exchanged. And according to Central
19 Square v. Carbine, IPR 2025-01179, paper 19, which is instructive here,
20 four months was enough to not constitute good cause for extending the
21 deadline for reconsidering the institution decision. Four months past a
22 change in facts or law. So, at the oral hearing, I think it's way too late to
23 consider the institution in this proceeding.

24 Moving to Choe and its disclosure of video. We submit that Choe
25 does disclose video, and we showed that on Slide 16 with its use of video
26 cameras. If it's using video cameras to capture image frames or video

1 frames, we submit that that is disclosure of video. And with respect to this
2 argument about having -- needing the same horizon line on both image
3 frames, I'm not sure that that argument has been preserved in the briefing.
4 But even to address that, the horizon line on the multiple image frames is the
5 same horizon line because in paragraph 49, the annotator is moving that
6 horizon line with respect to those images, uses the up and down arrow keys.
7 And so, it's effectively the same line, even though it's at different positions,
8 but the claim --

9 JUDGE GALLIGAN: Let me talk -- I want to ask you about that,
10 because my understanding was that -- it's like in -- it's at paragraph 57. It
11 says -- or even starting before then in Choe -- so, it sends an image. It says,
12 for instance, 55 image 601 was captured by the camera to be calibrated and
13 processed. That's sent to the manual. There's some perception processing
14 and the horizon line is put on there. And then it is sent over to the manual
15 reviewer, right? So, I didn't -- you say it's the same image, just the person's
16 manually adjusting, but I know that's true, but I -- are you saying that line
17 started the same and those two images show what the manual adjuster did?

18 MR. DUTTON: That's correct, because it shows the change of the
19 horizon line on those images. In paragraph 49, Choe is pretty clear that the
20 annotator is moving the line in real time when it's doing the manual
21 calibration.

22 JUDGE GALLIGAN: But if that's the case, then it would have
23 sent one image over and then the manual adjustment is to one image, right?

24 MR. DUTTON: The adjustment applies to future images, as well
25 because that saves the annotator from having to annotate every single image.
26 It recognizes that the second image is going to be similar to the first. I don't

1 have the precise insight on that, but that's how the art refers to the manual
2 annotation. So, you're not annotating every single image frame, you're just
3 annotating a select few, and then that horizon line will carry through all the
4 frames that are related to it.

5 JUDGE ARBES: Okay. So, Counsel, to make sure I understand,
6 let's say that an image is displayed, the user determines that the line is too
7 low and clicks the button to raise it. You are saying that multiple images
8 with the same horizon line would be sent to the sensor calibration system.
9 Why is that?

10 MR. DUTTON: Well, the horizon line of where it has been
11 initially predicted or identified, that's going to be in all the image frames.
12 And then when the annotator is adjusting with respect to one frame, it's
13 going to move them all. I think that's consistent with what Choe explains
14 with respect to the overlaying happening before it reaches the annotation
15 device.

16 JUDGE GALLIGAN: Well, let's follow up on that because I
17 thought in Choe -- and I know there's a dispute about whether there's video,
18 and I know there's video that's captured in Choe, but I thought it sends an
19 image to the manual reviewer for confirmation of the position of the horizon
20 line. And of course, it has the planar view showing -- you basically want to
21 get to where the lines are parallel in the planar view so that you -- and that's
22 where your horizon line is.

23 So, you get the -- you see the road and all that stuff. And I thought
24 then that's what -- that image is what calibrates the camera. Are you saying
25 it -- then they populate that -- after the annotation, you populate that line and
26 you send it back to the annotator to put in a video.

1 MR. DUTTON: So, if we go to Slide 21, what we're saying is that
2 what's circled here on the top arrow on the right, that will be the overlaid
3 video that is being sent for feedback and adjustment. This is really like
4 basically the workstation computer monitor and input device of the
5 annotator is using, but that will be receiving the image to render on the
6 screen, for example.

7 JUDGE GALLIGAN: Yeah, and so, it sends an image over, and
8 that's confirmed by the human operator that that's an image. And I think
9 that's what Patent Owner's point is, it sends an image over of a video, but it's
10 in one image.

11 MR. DUTTON: It sends the video frames over. And that's -- so
12 the 2D view module and the 3D view module is what's projecting -- and the
13 reprojected view module is what's projecting and overlaying the line on
14 those video frames. And then those are being sent to the annotation device.

15 JUDGE GALLIGAN: Okay. All right, thanks.

16 MR. DUTTON: And with respect to the argument that the line
17 would be overlaid on a video, I guess I'm not quite following Patent Owner's
18 argument because a video is just a combination of video frames, and so,
19 you're not like overlaying a line on anything but video frames. And so,
20 you're working with images, and that's consistent with what the '580 patent
21 explains and its embodiments.

22 So, if you look at the top step of Figures 4A, 4B, 5A, 5B, and then
23 6, it's always referring to images, video frames. That's what it's doing its
24 processing on. It's not having some combined video that it's looking in the
25 video and going image by image.

26 JUDGE GALLIGAN: I also had a question about RANSAC, but I

1 don't want to -- whenever you get a moment.

2 MR. DUTTON: No, sure, Your Honor.

3 JUDGE GALLIGAN: Okay. So, I want to understand this
4 perfectly, or as best I can. Patent Owner's Counsel said RANSAC actually
5 doesn't predict the horizon line. It fits it across frames in a video.

6 MR. DUTTON: Yeah, that --

7 JUDGE GALLIGAN: Can you explain -- or can you explain your
8 side of it, and then I'll ask Patent Owner.

9 MR. DUTTON: Yes. Yes, Your Honor. So, if we go to Slide 40.
10 And I think our understanding is slightly different than Patent Owner's
11 because on line 16, it's fitting the horizon line across the video, and then the
12 steps before that, what it's -- what those steps are doing is it's determining
13 the vanishing points in the images. And so, it's not fitting a horizon line, like
14 averaging the horizon line to a bunch of horizon lines. It's fitting the horizon
15 line to estimate where the horizon line would be in the video as a whole,
16 based on the vanishing points on each of the images. And so, it's modeling
17 where the horizon line would be.

18 JUDGE GALLIGAN: Okay, I'll follow up with the Patent Owner
19 on that, too. So, but you're -- so Petitioner's position then is that it's
20 predicting the horizon line because it's using certain vanishing points, even if
21 in each frame, and then it does predict or model -- you would say that's
22 predicting or modeling a horizon line?

23 MR. DUTTON: That's correct.

24 JUDGE GALLIGAN: Okay, thanks.

25 MR. DUTTON: With respect to the motivation to combine, Your
26 Honor, you're absolutely correct with your cite of Intel v. PACT. And again,

1 Intel v. Qualcomm is also instructive for this point. The operative question
2 isn't -- you don't have a requirement of showing that the reference itself
3 discloses a problem. That was the issue in KSR, and KSR removed the
4 TSM test as being a requirement. What Intel v. PACT and Intel v.
5 Qualcomm, which is cited at page 12 of the institution decision, what they
6 basically stand for is that you just have to find a reason that you would
7 utilize the secondary reference.

8 And Intel v. Qualcomm, for example, cites a case called DyStar,
9 which says you just basically have to show that it would -- the combination
10 would result in faster, more efficient, stronger benefits that would have
11 motivated a person of ordinary skill in the art to make the combination.
12 We've shown that in this case. We've walked through that in my opening.
13 So, we submit that our burden has been met under KSR. We don't have to
14 show that Choe discloses a specific problem within the reference.

15 Patent Owner pointed out that during Mr. Andrew's deposition, he
16 recognized that the Khan and Ali equations were known, and were derived
17 from textbooks. That testimony, for Your Honor's review, is starting at page
18 42 of the deposition transcript, which is Exhibit 1061. For example, I asked,
19 so the Ali algorithm is derived from a textbook that was well known? And
20 he said yes. And under KSR, combining well-known algorithms with
21 similar systems is sufficient for motivation to combine under obviousness.

22 If we go to Slide 9, Patent Owner argued that their construction of
23 predictive model does not in whole exclude geometric calculations. I think
24 that's counter to what their claim construction explicitly says. I think they're
25 trying to walk that back by saying, geometric approach, because that's what's
26 said in the prosecution history, but that's not their proposed construction.

1 Their proposed construction is a model that predicts values using non-
2 geometric calculation.

3 So, it's been their position in this case that if you use geometric
4 calculation to determine the horizon line, you don't meet the claims. For the
5 reasons I explained, we disagree with that, but they're not arguing that the
6 construction is a geometric approach. They're trying just with geometric
7 calculations.

8 JUDGE GALLIGAN: And Counsel, so following up on what a
9 predictive model is, I think -- and Patent Owner can speak to this -- but I
10 think I had asked Patent Owner about whether, like, deterministic versus
11 non-deterministic way to think about it is appropriate. So, is that Petitioner's
12 understanding, that it's sort of this non-deterministic model, a CNN or
13 something like that, that gives an output as opposed to a distinct algorithm
14 that iterates and is deterministic? Is that your -- in which case, maybe
15 RANSAC isn't a model, a predictive model.

16 MR. DUTTON: Our view is that a predictive model is simply a
17 model that makes predictions. RANSAC would be a -- it's a modeling tool
18 that is used to predict where the line would be. Dr. Darrell explains that that
19 is a model, under his understanding, as a person that far exceeds the person
20 of ordinary skill in the art. And he understands that as a person of ordinary
21 skill in the art, that's how you would understand that term in the full context
22 of the specification and the prosecution history. Whether it requires
23 deterministic or non-deterministic, that hasn't been an issue that I think
24 we've briefed, and I'm, frankly, not an expert to opine on that, standing here
25 today.

26 JUDGE GALLIGAN: Okay, thank you.

1 MR. DUTTON: I think one other point that Patent Owner made
2 was that disclaimer should be based on what the applicant believed. I think
3 that's an error in our understanding of the law, that disclaimer should be
4 clear and unmistakable from the record, and as a person of ordinary skill in
5 the art would have understood that record. So, I think it's irrelevant of what
6 the subjective belief of the applicant was. It's what the words on the page
7 say to a person of ordinary skill in the art. And here, there's just not clear
8 and unmistakable disclaimer.

9 And then one other point -- pretty minor -- but Slide 8. We
10 prepared kind of a list of some of Dr. Darrell's expertise within the
11 automotive industry, just to make the record clear. He far exceeds the level
12 of a person of ordinary skill in the art, even under Petitioner's, or Patent
13 Owner's definition, that it requires automotive industry experience. And he
14 testified in his reply declaration that the difference in definitions of a person
15 of ordinary skill in the art have no meaningful difference in his analysis. He
16 was the chief science advisor of Nexar. He discloses that in his initial
17 report. It's also in his CV. That's a dash cam automotive company.

18 He's collaborated with NVIDIA on deep learning and autonomous
19 driving applications. He's an affiliated director of California's Partners for
20 Advanced Transit & Highways, again, helping them with autonomous
21 driving applications. He has numerous publications in the automotive
22 industry. He's been invited to talks on computer vision for autonomous
23 vehicles. So, he's well qualified to provide expert opinions. I think his
24 expert opinions are well supported.

25 JUDGE GALLIGAN: Thank you, Counsel. You're out of time.
26 Does the panel have any further questions? I don't think we do. All right,

1 thank you.

2 MR. DUTTON: Thank you, Your Honors.

3 JUDGE GALLIGAN: Patent Owner, when you're ready, you may
4 begin. You have 17 minutes and 16 seconds.

5 MR. RIBERA: Thank you, Your Honor.

6 JUDGE GALLIGAN: Do you need the overheard?

7 MR. RIBERA: I don't think so.

8 JUDGE GALLIGAN: Okay. Thanks.

9 MR. RIBERA: Again, Hector Ribera for the Patent Owner.

10 Starting with the Revvo issue, I think it's wholly inappropriate, and we
11 object to, the Petitioner, for the first time, providing an explanation of his
12 inconsistent claim construction at oral argument. We don't think that's
13 appropriate or that meets the Board's requirement.

14 In terms of the timing that they mentioned, it was not until they
15 filed the reply where they had an opportunity to provide an explanation on
16 the Revvo, of why their claim construction positions were different, and they
17 didn't do it at that point. And I think that's what we believe the issue is. So,
18 and we argue this point on our sur-reply, not at the oral hearing for the first
19 time. So, we disagree with that argument also.

20 Now turning to the video and horizon line issue, I think in Choe,
21 paragraph 57, is what's describing that, Figure 6A and Figure 6B, and I don't
22 see anything in there that says that that's the same horizon line. It's just one
23 example of the horizon line being too low, and then the user gets to fix it by
24 adjusting the top view. And then Figure 6B is another example where the
25 horizon line is too high, and again, the user gets to fix that by pushing the
26 keys. I don't see any, like -- they point in Figure 4, a circle, saying that that's

1 the overlaid video. I don't see any discussion in Choe of that being anything
2 but a single image being transmitted to the display device to be displayed so
3 the user can move the line up and down.

4 With respect to the RANSAC issue, I would point to Exhibit 1008
5 at page 1104. And the very bottom of the first column, it talks about after
6 getting the two vanishing points per frame, so that the vanishing points are
7 computed geometrically per frame. Then we collect all the sets of vanishing
8 points across all the frames in the video clip, and then the horizon is found
9 as the best fitted line to all those vanishing points across the entire video.

10 So, on each frame, the horizon line points are determined using the
11 geometric approach, and RANSAC is just a fitting algorithm to make it fit
12 across the different frames of the video. So, instead of using basically the
13 manual approach that Choe talks about, this uses an automated approach, but
14 it's basically just moving that line across the frames in the video, but the
15 line's already determined, using the geometric approach.

16 Now, with respect to the construction of a predictive model, the
17 notion about geometric calculation, we're distinguishing the geometric
18 calculation to calculate the horizon line from using a predictive model to
19 predict the line. So, that's the issue. We're not trying to say there's no
20 geometry at all. There's some inherent geometry, because we're talking
21 about lines. We're not saying that there can be no geometry whatsoever.
22 We're saying that the horizon line cannot be calculated using the geometric
23 calculation that is known in the art.

24 With respect to the statements in the prosecution, we never said
25 that the inventor's subjective belief that controls. It's actually the statements
26 made by the inventor in the prosecution. We're not talking about beliefs.

1 So, that's also a point of disagreement with their argument. And I don't
2 know if the panel has any other questions.

3 JUDGE GALLIGAN: I can check, but I don't have any further
4 ones. You both have been very, very good at answering our questions.
5 Judges Arbes and Wormmeester, do you have anything?

6 JUDGE ARBES: No, thank you.

7 JUDGE WORMMEESTER: Nothing from me.

8 MR. RIBERA: All right. Thank you very much.

9 JUDGE GALLIGAN: Okay, great. All right, we'll finish a little
10 early. Well, we greatly appreciate your traveling to Dallas, being in person.
11 It's always nice to see Counsel here, and we appreciate your preparedness
12 for the hearing and the ability to answer our questions. That was excellent.
13 The case is submitted and the final written decision will issue in due course.
14 We can go off the record now.

15 (Whereupon the above-entitled matter went off the record at 2:02
16 p.m.)

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