

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

IMMERVISION, INC.,
Patent Owner

IPR2023-00471
Patent 6,844,990 B2

Record of Oral Hearing
Held: April 11, 2024

Before JOHN D. HAMANN, STEVEN M. AMUNDSON, and STEPHEN
E. BELISLE, *Administrative Patent Judges*.

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The above-entitled matter came on for hearing on April 11,
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P R O C E E D I N G S

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JUDGE HAMANN: This is a hearing in IPR2023-00471, Apple Inc. v. Immervision, Inc. I'm Judge Hamann. Also on the panel are Judges Amundson and Belisle. I'd like to start with an introduction of the parties. And so, who is here on behalf of Petitioner, please?

MR. HOLT: I'm David Holt, Your Honor, and I'm joined by my colleagues Karl Renner and Karan Jhurani, on behalf of Petitioner.

JUDGE HAMANN: Thank you. And for Patent Owner, who is appearing on its behalf?

MR. MURRAY: Good afternoon, Your Honor. On behalf of Patent Owner, Stephen Murray. And with me is Dennis Butler, as well as my colleague.

JUDGE HAMANN: Welcome to you all. I also want to point out that we also have a public line today. So, the public may be joining, listening in, or potentially watching it. And so I remind the parties not to convey any confidential information. I don't believe we have protective order in this proceeding, but I provide that reminder, nonetheless. Now, per our hearing order, each side is going to have one hour to present. We're going to begin with Petitioner as it bears the burden as to unpatentability, followed by Patent Owner's response, followed by any time reserved for rebuttal and sur-rebuttal.

I'd like to also remind the parties of a few things. Obviously, this is a virtual hearing. So, when you're speaking, make certain you unmute yourself, please. And then when you're also done presenting please make

1 certain to mute yourself, so we don't get any background noise that's not
2 needed. If during the course of the hearing you have any technical
3 problems, we expect you can let us know immediately. There's still some
4 level of connection during the hearing please do that. To the extent that
5 you've lost connection entirely or can't let us know otherwise, the
6 information that was provided in setting up for you all's connection to this
7 hearing, you should reach out to those folks.

8 We have a copy of all the relevant papers and exhibits here, so we
9 ask that, for if we're following along, as well as provide for a clearer record,
10 that you refer to a slide number or exhibit number or page number or
11 whatever is relevant in presenting your arguments as you present them.

12 Lastly, as I said, each side will have an hour to present their
13 arguments. I will try to give you time warnings towards the end, but you
14 may find it helpful to also track your own time. Therefore, you can better
15 pace the arguments you want to present. With that, before we turn to the
16 Petitioner and to be getting into the arguments, I just want to ask one quick
17 question of Patent Owner's counsel, Mr. Murray. Am I correct that Patent
18 Owner did not file or is not relying on demonstratives for today's hearing?

19 MR. MURRAY: That's correct, Your Honor.

20 JUDGE HAMANN: Okay. Thank you. With that, I turn to hear
21 Mr. Holt, and if you'd let me know how much time you would like to reserve
22 for rebuttal.

23 MR. HOLT: Thank you, Your Honor. We'd like to reserve 20
24 minutes, please.

25 JUDGE HAMANN: Okay. Thank you. You may begin when
26 you're ready.

1 MR. HOLT: May it please the board? Mr. Renner and I will be
2 discussing the case with Your Honors today. I will be starting with a brief
3 discussion of the relevant claim language and the overall technology, which
4 should take about 12 to 15 minutes. Thereafter, Mr. Renner will be focusing
5 on how the combination of Baker and Shiota renders the claims obvious.

6 If we turn to slide 4, we see Independent Claim 27, which is the
7 focus of this proceeding. Claim 27 has two main limitations. The first
8 relates to the capture of a panoramic image via a specific type of objective
9 lens. The lens is one of the primary purposes of Immervision's purported
10 invention. It's a panoramic lens with a nonlinear distribution function that
11 includes at least one excluded zone, and at least one compressed zone. We'll
12 talk a bit more about the nonlinear distribution function and the zones in a
13 moment.

14 The second limitation relates to displaying a corrected version of
15 the image obtained through the panoramic lens. In essence, the nonlinear
16 zones in the lens cause a type of distortion to the obtained image and this
17 step includes correcting for that distortion based on two things. First, the
18 nonlinear distribution function of the lens and second, the size L of the
19 obtained image. There are a fair number of words to these two limitations,
20 but you'll likely have noticed that this proceeding is focused in on only the
21 last eight words. There is no argument in this proceeding that the
22 combination of Baker and Shiota teaches everything that doesn't teach
23 everything recited other than those final eight words. Nor is there any
24 argument that a POSITA would not have been motivated to combine Baker
25 and Shiota, or whether they would have had a reasonable expectation of
26 success in doing so. With this in mind, I'd like to take a brief look through

1 the '990 Patent and its file history to understand the eight words that are the
2 focus of the proceeding and why we focused on them.

3 On slide --

4 JUDGE HAMANN: Mr. Holt?

5 MR. HOLT: Yes, sir, Your Honor.

6 JUDGE HAMANN: This is Judge Hamann. Just as we -- to
7 follow up on what's not in dispute, am I correct that there's nothing that we
8 need to construe in this proceeding?

9 MR. HOLT: That's correct, Your Honor. The parties have not
10 focused on any of the claim constructions. There was some claim
11 construction that happened in prior proceedings and in parallel, but none of
12 these arguments today focus on any of this claim construction.

13 JUDGE HAMANN: So, we can apply the plain and ordinary
14 meaning to the claim terms?

15 MR. HOLT: Yes, Your Honor.

16 JUDGE HAMANN: Thank you.

17 MR. HOLT: So, on slide 5, we see that the '990 Patent's
18 description of its invention generally aligns with the first limitation of Claim
19 27. We see a panoramic lens with a nonlinear distribution function that
20 includes zones of expansion and compression. Here, the '990 Patent
21 explains that the expanded zones of the image cover a higher number of
22 pixels of the image sensor to provide higher definition in those zones.
23 Notably, there's no mention of utilizing the size of the obtained image and
24 whether that's a discovery made by these inventors or is otherwise a key
25 focus of the purported invention. In fact, as we see on slide 6, the only
26 discussion of using the size L of the obtained image as part of the correction

1 process is two lines, 18 and 19, at the end of the second algorithm for
2 correction. You can see the variable L boxed in red at the lower right of the
3 slide. As we'll see in just a bit, this was confirmed by Immervision in its re-
4 exam when it added Claim 27. In doing so, Immervision was required to
5 identify the Specification's support for this limitation, and these lines of the
6 algorithm are the only support that they cited in the re-exam. Thus, there's
7 no prose in the '990 Patent Specification that explains why using size L
8 obtained of the image is important or why it needs to be done. Instead, the
9 algorithm simply presents L's use. Frankly, that's likely because the drafters
10 recognize that a POSITA would understand the usage of size L of the
11 obtained image, and that its use is a necessity of the process. But let's talk
12 about why that is.

13 If you'll jump with me to slide 10, we see a standard linear
14 distribution function. Figure 4A on the upper left is the image disk projected
15 by the lens onto an image sensor. Light in the real world enters the lens at
16 one angle of incidence at the surface and then lands on this image disk at a
17 related position. The graph in Figure 4B is the distribution function and
18 effectively maps where on the radius of the image disk light that enters the
19 lens at a specific degree of field angle is projected onto the image disk. The
20 field angle at which the light enters the lens is on the X-axis and moves from
21 0 degrees to 90 degrees. The corresponding location on the radius of the
22 image disk that the light enters the lens at a given angle is projected is on the
23 Y-axis. Here the distribution function is linear such that as you move from a
24 field angle of 0 degrees to a field angle of 90 degrees, every degree of the
25 field corresponds to an equal amount of the image disk. What does this
26 mean practically? If, for example, light enters straight into the lens from the

1 center of the field, this graph of the distribution function shows that it will
2 land at the center of the image disk. And if that image disk gets centered on
3 an image sensor as it is assumed to be, the light will land at the center of the
4 image sensor. On the other hand, if light enters the lens from a field angle of
5 45 degrees, about halfway between the center of the field of view and the
6 outer edge of the field of view, the graph of the distribution function shows
7 that it will land at 0.5 of the radius of the image disk, or halfway between the
8 center and the edge of the image disk. Importantly noticed here is the image
9 disk radius is between 0 and 1 for the description of this distribution
10 function, and we'll return to the importance of this in a moment.

11 On slide 11, we see a nonlinear distribution function. Here, some
12 angular positions of the field of view entering the lens are allotted more real
13 estate on the image disk and thus on the image sensor that captures the
14 image disk. We see an initially steep slope of the distribution function in
15 Figure 7B from about 0 to 20 degrees of the field of view, followed by a
16 shallower slope than a standard linear distribution function from about 20
17 degrees to the edge of the field at 90 degrees. The steep slope means that
18 light entering from the center of the field of view from 0 to 20 degrees is
19 allotted more of the image disk creating a zone in which this portion of the
20 real world image is expanded and ultimately allotted more pixels on the
21 image sensor. On the other hand, a shallower slope creates a zone of
22 compression in which the light from 20 to 90 degrees of the field is allotted
23 less of the image disk and therefore fewer pixels than it would otherwise get
24 in a linear distribution function. This means that you get more detail
25 captured at the center and less detail captured out past 20 degrees of the field
26 of view. It also means that if you were to view the real world image disk as

1 its projected onto the image center, it would appear distorted from the real
2 world, with the image looking particularly expanded at the center and
3 compressed at the edge. Why might you do this? Well, column 3, lines 43
4 through 61 of the '990 Patent give several examples of use cases where a
5 zone of expansion may be useful, including video conferencing like we're
6 doing today.

7 As you'll notice in today's Webex here, each person's face is in the
8 center of the image captured by your camera, and your background is
9 towards the edge of the image. By using the nonlinear lens, we just
10 discussed, more pixels and therefore detail and definition could be devoted
11 to the user's face and fewer pixels dedicated to the background, which is of
12 less interest. In fact, the lens designer would be trading detail at the edges of
13 the image for details at the center. Any questions about that, Your Honors?

14 JUDGE HAMANN: Yeah, and this is Judge Hamann. I just had
15 one question. Could you explain the meaning you're providing as to the
16 terms field angle and field of view in the context that you just used them, so
17 you have it here in the record?

18 MR. HOLT: Certainly, Your Honor. So, the field of view is the
19 amount of the real world that the lens effectively is able to capture of light
20 and then project back onto the imaging plane. And so, for instance, in a
21 panoramic lens like the one we're talking about here, it has a 180 degree
22 field of view, which means that if you pointed the lens forward from you, it
23 would be able to see from that optical axis kind of straight out and then 90
24 degrees to either side of you. So, if you had the kind of camera as your eyes,
25 you'd be able to see straight out, and the field would be 180 degrees field of
26 view from that center axis all the way out to kind of your right and your left

1 directly to your side. And then the field angle is the angle at which light
2 would enter into any part of the lens from that position in the field. So, we
3 consider the example of light entering the center of the lens, the very kind of
4 middle of the lens, light from all objects around that 180 degree field will be
5 coming at all parts of the lens or at least most parts of the lens, depending on
6 the curvature. But all light can hit the center, for example, and as it hits the
7 center of the lens, it's going to be coming into the lens at that point of the
8 lens from the various angles related to where that object exists out in the
9 field of view. And so that angle is called the field angle. Does that answer
10 your question, Your Honor?

11 JUDGE HAMANN: Yes. Thank you.

12 MR. HOLT: Excellent.

13 JUDGE AMUNDSON: This is Judge Amundson. I had just a
14 question. I'm making sure I'm understanding this. So, with regard to Figure
15 7 of the '990 Patent, as I understand the unpatentability theory, Baker, you
16 rely on Baker for something analogous to Figure 7, where you've got a
17 nonlinear function of the light coming in and striking the disk. Is that right?

18 MR. HOLT: Yes, Your Honor, that's correct.

19 JUDGE AMUNDSON: Okay. So, now when Baker goes to
20 display something, did Baker correct for that nonlinearity?

21 MR. HOLT: Baker describes a correction for that nonlinearity,
22 yes, Your Honor. But it does not provide details of the process by which
23 you would actually, from a mathematical, conceptual perspective, do that
24 translation. And Shiota is a reference that provides some of those more
25 granular details, Your Honor.

26 JUDGE AMUNDSON: Okay. I got it. All right. Thank you.

1 MR. HOLT: So, before I move on from this slide, which is slide
2 11 we were looking at, I just want to note again with respect to figure 7B of
3 the '990 Patent that the image disk radius is between 0 and 1 for the
4 description of this distribution function. And so, you might be asking
5 yourself, why does the '990 Patent describe the radius of the image disk as
6 being between 0 and 1? And on slide 12, we see that Dr. Kessler, Apple's
7 expert, explained that the '990 Patent's description of its image disk is being
8 between zero and one, and as a relative distance, means that the image
9 distribution function is a normalized function. In other words, the '990
10 Patent's image transformation function that gets utilized to transform the
11 image that's captured assumes a relative or normalized size of the image
12 pickup device, and that normalization effectively is dimensionless. And this
13 ultimately we'll learn later when Mr. Renner is talking to Your Honors about
14 Baker and Shiota simplifies the math. In effect it represents a radial location
15 on the image expressed at the percentage of the distance between the center
16 and the edge of the image disk that's created by the lens and picked up by the
17 sensor. Mathematically we see that represented in the equation in red on the
18 bottom right of this slide. But practically, what all this means is that if the
19 normalized or relative distance on the Y-axis is 0.3, for example, it is 30
20 percent of the distance between the center of the real world image disk and
21 its outer edge. If the relative distance on the Y-axis is 0.67, it's 67 percent of
22 the distance between the center and the edge.

23 On slide 13, we see that Mr. Munro, Immervision's expert, agrees.
24 Mr. Munro explains that relative distances and normalized distances are the
25 same thing, and they both are just percentages of the radial location on the
26 image plane. As we see, Mr. Munro provides an example where the relative

1 or normalized distance is 0.5, which would mean that it's halfway or 50
2 percent of the radial distance between the center of the image disk that's
3 created by the lens and projected onto the image pickup device, and the edge
4 of that image disk. On slide 14, we see that Mr. Munro also confirms that
5 the size L of the obtained image that is recited in the last eight words of
6 Claim 27 is the same distance between the optical axis of the image
7 produced by the lens and the outer edge of that image, which he also calls
8 the extent of the image. So, Mr. Munro was saying that here to measure the
9 size L of the obtained image, you would measure the radius of the circular
10 image projected by the lens onto the image plane where the image pickup
11 device is generally positioned. To be clear, Mr. Munro is acknowledging the
12 link between the size of the image projected by the lens and the claimed size
13 L of the obtained image from the image sensor.

14 Turning to slide 15, we see Mr. Munro explaining that because the
15 output of the image transformation function is relative or normalized, as it is
16 in the '990 Patent, you would need to scale that output based on the actual
17 size of the image. This stands to reason and, frankly, is perfectly
18 straightforward and logical. If you have a normalized and unitless quantity
19 in order to utilize it in the real world, you need to apply that normalized
20 value or percentage to some quantity. And you apply it by simply
21 multiplying the percentage by the quantity to which the percentage applies,
22 which in this case is the size of the image disk. That's what we see in lines
23 18 and 19 of the second image transformation algorithm that we looked at
24 earlier. Given how straightforward this concept is, it's unsurprising why the
25 '990 Patent simply includes this operation at the end of the code and
26 otherwise spends no time focusing on its importance or explaining the

1 operation to the reader of the Patent. In each a POSITA would have
2 understood that in order to utilize this normalized value, this is what you
3 must do. Nonetheless, if we go back to slide 7, we see that this
4 straightforward feature that gets very little attention in the '990 Patent itself
5 becomes the focus of Immervision's arguments about why new Independent
6 Claim 27 distinguishes the Baker and Shiota combination. In the clip at the
7 top left, we see Immervision acknowledging that Baker and Shiota were in
8 the same field of endeavor and that it would have been obvious for a
9 POSITA to consult Shiota when implementing Baker's system. In the clip at
10 the center, we see that Immervision explained that the final eight words of
11 the new Claim 27 were supported by the last two lines of code from the
12 second algorithm that we were looking at earlier. And in the last clip on the
13 lower right, Immervision focused on those last eight words of Claim 27, and
14 thus those two lines of code to try to differentiate their claim from the
15 combination of Baker and Shiota. They distinguished the combination by
16 specifically saying that the image size of the image disk is not utilized to
17 correct the image but did so here without citing to or otherwise explaining a
18 key teaching in paragraph 23 of Shiota that a POSITA clearly would have
19 read as teaching or at least rendering obvious, what we just discussed as the
20 straightforward way to account for normalized output of an image
21 transformation function.

22 And with that, Mr. Renner will now walk you through the key
23 paragraphs and the other relevant teachings of Shiota, unless Your Honors
24 have any further questions for me about the general technology.

25 JUDGE HAMANN: Mr. Holt, this is Judge Hamann. I just had a
26 couple of questions looking at slide 15 in particular, for example.

1 MR. HOLT: Yes, Your Honor.

2 JUDGE HAMANN: And it looks like here, pages 37 and 39 of
3 Mr. Munro's deposition, Exhibit 1025 I believe it is, are cited. I assume that
4 these portions are cited in Petitioner's reply, because I did not see the
5 reference to where on this slide.

6 MR. HOLT: Yes, Your Honor. Yes, Your Honor. I believe that
7 they are. I will find that. I don't have that directly in front of me at this
8 moment, but I can find that for you, Your Honor. It is cited though.

9 JUDGE HAMANN: And similar as to the arguments I think you
10 were making; was it slide 17 you were referring to when you were talking
11 about the re-examination?

12 MR. HOLT: Yes, Your Honor. There was a discussion in the
13 Petition itself actually about the re-examination history in the prosecution
14 history section of the Petition.

15 JUDGE HAMANN: Thank you.

16 JUDGE AMUNDSON: This is Judge Amundson. I think just to
17 make sure that the record is clear, I think he referred to slide 7, not 17, for
18 the re-exam. Is that right?

19 MR. HOLT: Yes, Your Honor. You're asking about the question
20 or my reference to the slide?

21 JUDGE AMUNDSON: It may have been something Judge
22 Hamann said, okay, that's all. I think he may have -- that's all.

23 MR. HOLT: Yes, Your Honor, though, the re-examination is
24 discussed in our slide 7. You're correct, sir.

25 JUDGE AMUNDSON: Okay. I got it. Thanks.

26 MR. HOLT: Okay. Thank you, Your Honors.

1 JUDGE HAMANN: Mr. Renner?

2 MR. RENNER: Yes, Your Honor.

3 JUDGE HAMANN: This is Judge Hamann. You have about 20
4 minutes left if I'm doing my math correctly in your initial allotment.
5 Obviously, you could bleed over if you prefer, and we can just do the math.

6 MR. RENNER: Thank you, Your Honor, appreciate that.
7 Hopefully, that will do. We'll get moving and see what happens. So, if we
8 look at slide 16, please, Your Honors. This is Karl Renner on behalf of
9 Apple, Petitioner. I'll be addressing, as Mr. Holt had indicated, the
10 combination and the applicability of the combination of Baker and Shiota in
11 particular, and how it feels, in particular, given the dispute that the parties
12 have had with the features correcting the non-linearity of the initial image, as
13 well as in doing sort of the correction using the size L of the obtained image.
14 And to the point, let's look at slide 17, if we could. You'll recall in the
15 Petition the Petition looks to Shiota, really, with respect to establishing a
16 POSITA's knowledge of non-linear image distribution functions to
17 compensate for distortions in a captured image. And on this slide, we can
18 see evidence speaks to this issue.

19 The evidence here in the upper left would be paragraph 36 of
20 Shiota, as well as on the upper right, paragraph 201 from Dr. Kessler's first
21 declaration. We see this really is not a disputed point. And we can see that
22 when we look even at the Patent Owner's acknowledgement of the use of
23 nonlinear functions and '990 re-examination as it relates to their
24 conversation of this reference, the Shiota reference. So, I just wanted to
25 make the point, since it's a fundamental one, that Shiota is bringing forth the
26 details, Judge Amundson, on the nonlinear correction.

1 If we look at slide 18, we also note that from Shiota we have a
2 reference to normalization another generally understood concept we'll get
3 into as it relates to image processing and a POSITA's knowledge of
4 normalization as an image transform operation. On this slide, upper left,
5 we've got paragraph 23. It's a paragraph that's gotten a lot of attention. On
6 the upper left in that paragraph, we know that a fisheye image projected in
7 circle of radius one is described in the yellow text here, a fisheye image
8 projected in a circle of radius one. Not unlike what you see in the '990
9 Patent because it's just normalization really. On the right you've got
10 testimony from Dr. Kessler that speaks in greater detail and analyzes this
11 section of paragraph 23 and that is found in his original dec. at 205.

12 Also, he provides further testimony on this is his supplemental
13 dec. at 55 for Your Honors' reference. Basically, what he's saying as it
14 relates to each, is it normalizing to a size of one an image processing is a
15 well-known concept, and there are various reasons to do it. But it's well-
16 known. It's common in optics to do it. Staying with that for maybe a couple
17 slides for it to give you a rounded out since that the record on this slide 19
18 shows you what is cited to by Dr. Kessler providing his -- his testimony on
19 the point. That is the Fisher reference up top. And that's just corroborating
20 this concept that normalization because you can see the scale of 0 to 1 on the
21 left. It's something you could find regularly in optics. We'll talk a little
22 more about that when we talk about some testimony from the Patent Owner's
23 expert, but this is confirmed as we see on the right as we begin that
24 conversation by the testimony from the Patent Owner's expert. And if we
25 look at slide 20 we see it a larger excerpt from that testimony which we --
26 we definitely commend to Your Honors. Here, we had a conversation with

1 their expert about normalization in particular and we talked about the
2 perspectives that a POSITA has a normalization in the field, as well as
3 motivations that they bring to the table while they're thinking about
4 normalization. And we hear from him things we expect to hear, consistent
5 with what Dr. Kessler had indicated, that normalizing is commonly done he
6 says throughout the field of optics and lens design. And the reasons for that
7 are several.

8 One, for instance when you normalize from a 0 to 1 scale, the math
9 is just simply made more generic. It actually simplifies while they're being
10 more generic, it becomes more applicable to a wider range of lens
11 configurations. And it becomes applicable to them without regard for actual
12 image size. So, the computation becomes easier to do regardless of what
13 scale is applied and then you can apply the scale after and correct and make
14 it applicable. And in this sense he says it's possible to genericize or
15 generalize across different types of lens configurations when you use
16 normalization. So, we don't see any dispute from the Patent Owner that
17 these benefits and these motivations would have not been applicable when
18 thinking about Shiota or the Baker-Shiota combination.

19 But that returns as we go to slide 21 and bringing this back into
20 Shiota itself. Paragraph 23 we show you here. We wanted to explore it a
21 little bit. The blue text here, we notice a focus on a term, this image circle
22 diameter. You can see it's the upper part of the blue text highlighted. That's
23 really in size. It's diameter. When I looked at it a couple times it took me,
24 but the words image circle diameter you can see it's really an image size.
25 And that size is said by Shiota in this blue text to differ to vary and to vary
26 on what? Continuing in the blue text to vary on sensor size. It says the size

1 of the image pickup device. So, it's Shiota that's making a suggestion for
2 relating these concepts. They don't have to be the same necessarily, they
3 just have to be relating to one another. And we know with one we see the
4 other, and we see variances between them called out.

5 So, variations in fact in physical dimensions with that of the image
6 sensor, per Shiota's teaching itself, are said to lead the variations in its size.
7 You know when you continue on in what Shiota was telling you in this
8 paragraph in the yellow text, again it tells you the fisheye image is projected
9 in a circle of radius one but notice that just before that it begins with the
10 word consequently. It's pretty important word because it's telling you
11 consequently. What are you looking? You're looking at what just happened
12 to inform what's about to happen, right? So, what's just happened in blue
13 text do you remember, was we talked about the diameter of the image size
14 varying based on the sensor size.

15 Consequently, you have a projection in a normalized sense. In
16 other words right here you have Shiota itself telling a POSITA who can read
17 it, that because you have the dimensions varying, is what you'd contemplate
18 as a Shiota writer, that you'd want to normalize to in fact make it easier to do
19 your computations, make them more generally applicable and make it so that
20 when you have a variation of the type they contemplate the math does not
21 have to be completely redone. You just have to skip. This as a word choice
22 is pretty important we can see because normalizing here is pretty purposeful,
23 it consequently tells us that. That image size and the center are tied together
24 as well.

25 Slide 23 if I may. So, a point of suggestions by Shiota, what we
26 see is that a person of ordinary skill would find it obvious to apply the

1 nonlinear distribution functions and to apply normalization together. And
2 more to point, as suggested by Shiota, a POSITA would find it obvious in
3 the context of the Baker-Shiota combination that the image distribution
4 function that would result would apply these two points drawn from the
5 captured image. To the left, we can see a discussion that relates to that in
6 paragraphs 36, 37, and 41 of Shiota. Those paragraphs discuss an output of
7 an applied in its distribution function, and importantly, they speak to the
8 corrected, transformed points, P1 and Q1. They call those points out P1 and
9 Q1.

10 These, of course, being the object of, or the image there being the
11 object of the function, those points being in, ultimately, that image, you'd
12 know that they were normalized. There's no dispute on this point. And in
13 fact, on the right, you can see the Patent Owner's sur-reply acknowledging
14 the same, trying to make a different point, but they're acknowledging the
15 same that P1 and Q1, these points that are in the product of the functions
16 applied by Shiota are in fact normalized, P1 and Q1. And that's at pages 6
17 and 11 for the record of the sur-reply.

18 So now with that in mind, when you look at slide 24, we're
19 reminded that normalized values by definition, they really aren't speaking to
20 or useful in a use in an application specific context. You have to do
21 something to them to activate them. This matters because in optics, a
22 POSITA as a consequence of knowing that normalized means you took the
23 real world applicability away from them, they would anticipate the need to
24 apply a scale or something to change a normalized value to enable it to be
25 useful in an actual real world application.

26 Now we see that in Dr. Kessler's testimony. We didn't reproduce it

1 here, but we cited to it here. Apple-1023, you can see paragraphs 57, 59, 86,
2 and 91 are cited to if you wanted to look at what he had to say about it.
3 What we did cite to is he referenced a third-party reference. We threw that
4 on the screen here, it's Smith, it actually says similarly, it says that scaling
5 and adjusting lens designs for applications, actual applications is something
6 that it talks about doing. And to the right, what we definitely wanted you to
7 get a look at was a bit of a question and answer that we did with the Patent
8 Owner's expert on this very point. Here, we discussed at length, actually,
9 this issue with them at the deposition. And if we focus at line 22, the bottom
10 yellow, I think it's probably the better focal point here for our point. We
11 asked specifically a very generic question. We said, so when you are
12 considering an actual application, then you would have to scale up to
13 account for actual image size. Okay.

14 So, you're in the context of something is normalized, you're
15 looking at it. What would you do if it (INDISCERNIBLE) a POSITA? And
16 we asked would you have to, and would you have to scale up to account?
17 His answer, not surprisingly, yes, you would need to do something for an
18 actual application to make a normalized value useful. And it wasn't a
19 complicated question, it wasn't bound by a particular context, and it wasn't in
20 the context talking about the programming or the normalization functions
21 that are done specifically in the reference of the '990 Patent. It was instead
22 talking about the prior art part of the Patent, the '990, and what happens
23 when you talk about some of the functions that Mr. Holt had discussed
24 earlier, just the normal translations. Here you're just recognizing something
25 we all know is true in order to make use of a normalized generic value,
26 you're going to have to take account of the actual size or dimension that is

1 necessary to make sense of it. And it's true --

2 JUDGE AMUNDSON: I'm sorry, this is Judge Amundson. I just
3 had a question about Shiota and Shiota Figure 1, and maybe we could go to
4 your slide -- yeah, your slide 29. Okay. Thank you. Right, and I'm looking
5 at Shiota, Figure 1 on slide 29 where you've got a parallelogram outlined in
6 orange, and then you've got the disk represented by an ellipse with a PQ axis
7 outlined in green. What I'm trying to understand is if Figure 1 shows this L
8 correction, or if the circle, the ellipse with the PQ axis, if that's normalized
9 and the parallelogram outlined in orange if that's also normalized.

10 MR. RENNER: Thank you, Your Honor, excellent. What we're
11 really talking about the normalizations applying to if you look at the green.
12 The green, I guess rectangle, it's there in the PQ dimension, that's where the
13 sensors are located, and that's where you're going to go to the scale. You
14 remember Mr. Holt had mentioned there was the axis with what would be
15 either an even distribution, a linear distribution, or a non-linear distribution.
16 It was to recognize what would be on that sensor array effectively, the image
17 that is there.

18 And so, when you think about normalizing, that's where you're
19 really talking about, and then functions bring away from that a useful, a
20 more useful representation of the points that are there so that you can get this
21 to be something that would be displayed in. In a display like the one we
22 might look at, the one in front of us. You don't know what scale you're
23 working with while they're in the normalized state. You don't care too
24 much. You don't know how far away, for instance, things are or what focal
25 lengths are used, but you want to have normalized so you can adjust and
26 make them available to be adjusted to whatever the application that you're

1 using. And that's what Shiota is telling us. It's wanting to make things
2 useful in that sense.

3 JUDGE AMUNDSON: Well, okay, but correct me if I'm wrong,
4 but I thought that the parallelogram that you've got outlined in orange, that's
5 the display. That's supposed to represent the display.

6 MR. RENNER: That's correct.

7 JUDGE AMUNDSON: And so, is that a normalized display or is
8 that the real world display, corrected by a size?

9 MR. RENNER: This is a great question. I'm really glad you're
10 going here. It's the real world display. The user is looking at what is in
11 orange there. When we thought about this slide, we're going to mention that
12 paragraph 23 is really about the fisheye image. It's the image that is where
13 the sensors are. That's not being viewed specifically by a user. That's in the
14 computer if you will. That's somewhere removed. And it's that
15 representation that you're going to do a lot of math on to manipulate to deal
16 with the kinds of translations that Mr. Holt had talked about. Then you take
17 from that the image, and now you adjust it so that you can get to a display
18 like the ones that we look at together. And the display that we look at
19 together is the display that's shown in that pink on the upper portion.

20 JUDGE AMUNDSON: All right. Thank you.

21 MR. RENNER: Of course. And to be -- just one more point on
22 that is the references, you know, there's a lot of things being talked about in
23 these references. And just to help maybe as you're looking at them, there's a
24 zooming function that a user might actually do as it relates to their
25 perception relative to the orange that you're looking at. That's an entirely
26 different kind of scaling and magnification that's purposefully done by a

1 user. And that's what you're going to find when you look at Shiota. It's
2 being talked about in paragraph 24 to 26. It is irrespective of, in addition to,
3 different than the normalization that we're talking about happening at the
4 scaled level, there's the normalized level on the green in this figure, which
5 has to be corrected for in order to make a real world use of what Shiota is
6 giving you mathematically. And that's really important when you get to how
7 you think about paragraph 23 relative to 24. And we'll -- I'll move you
8 through a little of that before we finish, but we're certainly -- I'm happy to
9 take more questions if they help.

10 JUDGE HAMANN: Mr. Renner? This is Judge Hamann. And
11 you have about five minutes left in your initial 40 minute allotment that you
12 wanted. But let me if I could take you to slide 25. And here you have
13 provided, among other things, you've provided Paragraph 23. And
14 obviously, I think a certain portion, the last portion of this paragraph at the
15 time of actually use magnification adjustment is performed. Now,
16 obviously, I think a lot of the attentions are being given to that phrase, but
17 I'm trying to understand that phrase, some of the choice of words used there.
18 It seems that the Petitioner's position is that this sentence refers to de-
19 normalizing. And the word magnification in that context just seems -- I
20 don't understand why that word was chosen.

21 MR. RENNER: Thank you, Your Honor. And you're correct on
22 your understanding of where we are. And I, just so it'll inform this point, I
23 will mention to you the last part of our slide 24. On the right, you saw a
24 question and answer. I didn't want you to miss that because it speaks really
25 to this point. People of skill is what we found with our conversation with
26 their expert. We were confirmed, in our understanding, people of skill know

1 that when you see normalization applied as you do in these references, that
2 you de-normalize is the word you use, and I think it's a pretty good one, that
3 you return it to a scale that accounts for actual image size. It's the last
4 question, I'll just read it. And so, when you're considering an actual
5 application and you have to scale up to account for the actual image size,
6 answer yes. So, now when you look at 23, we believe you look at this in
7 context, and you read the whole paragraph in context, and yes, you end with
8 the language in yellow, so let me go to that first, but what you'll find is we're
9 going to want to return and make sure it fits in that context. Here you'll see
10 that the word that's used, magnification is in here, it's an adjective for the
11 word adjustments.

12 So, the real thing being done here is adjustments. It's a
13 magnification adjustment. And we think it's quite -- it's hard to find maybe
14 better words for what's being done here, because when you think about the
15 context I think has become apparent to you in 23 is, you go through a
16 process where you recognize the image size might change based on the
17 sensor size, then you recognize, based on Shioti, that you could normalize to
18 help you with some of the mathematics, now you're sitting in because you
19 have a nonlinear function and you've got normalization of it, you've got to
20 do something with that to make it useful, you want to de-normalize, but you
21 stopped at the end of the red and you haven't talked about de-normalizing
22 yet, have you? The person of skill is waiting for that. They're looking at
23 this paragraph and they're saying, huh, I know I've got a normalized item
24 here, I don't know what to do with it and I ran into this last sentence, it's in
25 the context, in that context that we believe you read the sentence.

26 It then follows and says, at the time of actual use. So now it's

1 speaking to, if you want to put into gear, you want to make useful that which
2 you've done, what do you do? You do something called, and it's a word that,
3 it's just two words, we say plain meaning. So, magnification adjustment is
4 performed. So, you adjust, and in doing so, you magnify. We believe you
5 adjust to put dimensionality to it. You account for what we already heard
6 from their expert himself one slide earlier. You account for the actual size
7 of the image that was taken away through normalization. And in accounting
8 for it, you of course change by magnification, either up or down or over the
9 size. So, we think those words are actually quite accurate here. They're
10 words we don't see used as a matter of like lexicography or in the art as
11 special meaning, but they seem to be pretty accurate.

12 And they contrast with the word magnification that you'd see in
13 paragraph 26 by the same author, where he speaks to magnification of the
14 image, not in the magnification adjustments, magnification of the image.
15 So, he's clearly talking about size, translation, and both, but it seems here
16 he's talking about something that's more than a pure just magnification. And
17 that speaks to a point that Patent Owner was trying to make in the record that
18 magnification they say is typically used by people of skill on this art to mean
19 a size, dimensionless size change. Well number one typically doesn't mean
20 in all contexts, its context driven. But number two is, even though we're the
21 case magnification adjustment being as it is, would account, we believe in
22 this case, knowing that a person of skill is looking at this and seeking
23 meaning, Shiotu tells you to, for these -- it's going to understand what this
24 means. Does that help, Your Honor?

25 JUDGE HAMANN: Yes. Thank you, Mr. Renner. Let me also
26 just point out you're at your initial allotment, and at this point here we had

1 you at 20 minutes, but proceed how you'd like to please.

2 MR. RENNER: Thank you. And I'll say just maybe I'm going to
3 speed up a little bit here to slide 26. I of course will slow down to take any
4 questions if you don't hear me otherwise. But I take you to slide at 26
5 perhaps and point out that what we see from Patent Owner here, I want to
6 make sure you see it from our perspective before going further, and that is at
7 paragraph 51 upper left you see their expert speaking to the language in
8 question. This is the citing from paragraph 23 that you just were focusing
9 with me on. And in his citation he's asked, you can find in the red him
10 talking about the fisheye image is projected. And then he goes on to talk
11 about magnification adjustment. You start this whole thing out with the
12 three ellipses you can see this right? We think that's pretty important, and
13 we think it's pretty important because he's left out the entirety all the blue
14 text you saw on slide 25 all that. That the preliminary text tells you all about
15 the context which is this is a normalized -- it's normalized for a purpose and
16 it's a normalized image that you're going to be encountering the yellow
17 reference to magnification adjustment with respect to.

18 And we think that starts off with the wrong footedness. Context
19 does matter. The context of the intrinsic record and of the specific
20 paragraph where you find the statement may be the most important place to
21 look for context. And instead, attempting to profess confusion that would
22 take you to a reference to other parts of the specification, he says it's not
23 clear. And he references that we referenced, our expert actually referenced,
24 in this original declaration, paragraphs 24 to 26 of Shioti. And he did. He
25 said, see also. He didn't say interpret 23 based on 24 to 26. He said, hey,
26 there's something else in this reference. Maybe you take a look at that as

1 well. We've come to understand that's not as relevant as it could be.
2 Twenty-three stands well on its own. And we saw that from Your Honors
3 when we went with the 325 issues at the outset.

4 So, he tries to take you to 24 to 26, and tried to inject your
5 confusion as it relates to this term in doing so, or as a basis for doing so. But
6 when we see 25 -- 24 to 26, and I take you to slide 28, I suppose, 28, you can
7 see them. What you would have here is a discussion, if we had the time to
8 go through it, is a discussion of manipulations that happen, and this goes
9 back to Judge Amundson's earlier question. It happened on the display
10 image, not on the image that we are concerned with where the sensors lie.
11 And that's going to be scaling as it relates to zooming. This is quite clear
12 when you look at the Patent Owner's briefing, where they talk about input
13 from a user being a predicate to the kinds of manipulations that are drawn
14 out in 24 to 26. This is a different part of the manipulations that are
15 contemplated by Shiotu. Twenty-three stands on its own, and that's what we
16 want you to hear from us, is absolutely where we were and where we
17 remain. I think, given the timing, I would probably wrap up, but I'm happy
18 to take questions if you have any further that you'd like to hear from me on,
19 before I --

20 JUDGE BELISLE: Counsel, this is Judge Belisle. Before you
21 leave, in the context of Claim 27, is there anything in the record that says
22 whether you could correct the non-linearity of an image without addressing
23 the size of the image? Without using L, if you will, the size of the obtained
24 image?

25 MR. RENNER: I don't believe so, Your Honor. I think it's calling
26 for that in Claim 27. And what we see is, even though Patent Owner's

1 expert tells us that that's something a person of ordinary skill would expect.
2 And we believe, again, this stands to reason. If you're going to normalize
3 something by taking the dimensions out of it, and to use it in the real world,
4 again, you'd reintroduce those dimensions or a scale that relates to them. In
5 this case, it was actual size that got taken out of the image, and its image
6 size, so you'd introduce those back into it. But I don't think so, Your Honor.
7 If I'm hearing your question correctly, I don't believe so.

8 JUDGE BELISLE: Thank you.

9 MR. RENNER: You're welcome. Any other questions? Okay.
10 With that, we'll reserve. May I have the time, Your Honor?

11 JUDGE HAMANN: Thank you, Mr. Renner. I believe you have
12 16 minutes left.

13 MR. RENNER: Thank you, Your Honor.

14 JUDGE HAMANN: Mr. Murray, whenever you're ready, you may
15 proceed, but if you'd let me know how much time today would you like to
16 reserve for sur-rebuttal?

17 MR. MURRAY: Thank you, Your Honor. I think I'd like to
18 reserve about 15 minutes if I may.

19 JUDGE HAMANN: Yes. Thank you. And you may proceed
20 when you're ready.

21 MR. MURRAY: Okay. Thank you. Good afternoon, Your
22 Honors. I've heard several times during Petitioner's presentation that what's
23 going on in Claim 27 with using the size L of the obtained image to obtain
24 the image points is something we all know is true and is well-known to the
25 person of ordinary skill in the art. But I would challenge that by saying, if
26 that were the case, you would think Petitioner could have put forth a

1 document showing that to be true. And I think when we go through the
2 records, you'll see that nothing in the record, other than what their expert
3 says, magnification adjustment in paragraph 23 of Shiota means, nothing
4 shows that operation being performed. The case, as we've been discussing,
5 essentially turns on what does Shiota mean with magnification adjustment is
6 performed in paragraph 23. And the question is, what does the evidence say
7 to support Petitioner's interpretation, which is, it's the same thing as using
8 the size L of the obtained image, or does the evidence support something
9 else?

10 I'm going to start with paragraphs 24 to 26. That's where you
11 ended with Petitioner. And I think it's fairly enlightening what's going on
12 with that portion of the text. When Petitioner was discussing magnification
13 adjustment in paragraph 23, allegedly meeting this claim feature in the
14 Petition, both the Petition and Dr. Kessler's original declaration, both
15 specifically cited also to paragraphs 24 through 26 in support. And as
16 you've heard, those paragraphs do discuss magnification of the image and
17 scale factor, and those terms are explicitly quoted in the Petition and Dr.
18 Kessler's original declaration on this claim feature. And if you look at slide
19 34 of Petitioner's presentation, they reproduce paragraph 205 of Dr. Kessler's
20 original declaration there. And the key language you see, and it starts about
21 halfway through the yellow highlighting.

22 It says, a POSITA would have thus understood that this reference
23 to magnification adjustment refers to an adjustment that accounts for the
24 actual size of the image pickup device and by extension the actual size of the
25 image as part of the image transformation. And that's a phrase that's
26 repeated often throughout the briefing. But what's cited in support of this

1 sentence? Paragraphs 25 to 26 are cited with reference to magnification of
2 the image, and paragraph 24 is cited quoting the scale factor zoom ratio.
3 Nothing else that are cited in support of that conclusion. And then we get to
4 the pre-institution briefing which Petitioner says, well we now know
5 paragraph 23 stands on its own, and Dr. Kessler wasn't saying interpret
6 paragraph 23 in light of paragraphs 24 through 26. But Petitioner's
7 preliminary reply says otherwise, and in fact on slide 33 of Petitioner's
8 presentation from today, in the bottom righthand corner, we have a portion
9 of page 5 of --

10 JUDGE HAMANN: Mr. Murray.

11 MR. MURRAY: Yes.

12 JUDGE HAMANN: Mr. Murray, this is Judge Hamann. I'm
13 trying to understand. You're referencing the preliminary documents, the
14 preliminary reply?

15 MR. MURRAY: Correct, Your Honor.

16 JUDGE HAMANN: Okay. Could you characterize your purpose
17 of doing that? And generally, in my view, it may not be shared by everyone,
18 you know, so those preliminary documents certainly, they usually don't carry
19 over to the trial in and of themselves. But you may be using them in such a
20 way that it's appropriate. I'm not saying you're not. I'm just trying to
21 understand what your justification for citing to a preliminary document.

22 MR. MURRAY: Certainly. So, you are correct. Ordinarily, the
23 preliminary documents aren't as relevant. However, I think what the
24 preliminary documents in this particular case show is that Petitioner and Dr.
25 Kessler have changed position, which goes to the credibility of their
26 arguments on the support that can be found for their interpretation of

1 magnification adjustment in paragraph 23. Does that answer your question,
2 Your Honor?

3 JUDGE HAMANN: Thank you.

4 MR. MURRAY: Okay. So, looking at Petitioner's slide 33, where
5 they quote from their own preliminary pre-institution reply, at the bottom,
6 they've quoted page 5, and they've got some highlighted text there. But if
7 you look just two lines up from where the highlighted text starts, it says, the
8 examiner did not identify any of Shiota's disclosures. Paragraphs 23 through
9 26, that are relied on in the Petition for the relevant Claim 27 feature. That
10 can't be clear. That's just like page 3 of the reply which we quoted in our
11 main trial sur-reply. It said the examiner did not consider related disclosures
12 in paragraphs 24 to 26 for this same feature, again referring to the using the
13 size L of the attained image feature. And also, you have the sentence in the
14 preliminary reply bridging pages 1 to 2 which is cut off in slide 33 here, but
15 where it says Dr. Kessler offered expert testimony explaining how the
16 context of paragraphs 24 to 26 leads the person of ordinary skill in the art to
17 understand magnification adjustment in paragraph 23 to mean what they say
18 it to mean.

19 So, despite what Petitioner says now, at least until the Patent
20 Owner responds, Petitioner believed paragraphs 24 to 26 supported its
21 interpretation of magnification adjustment in paragraph 23. Now, after
22 institution, Patent Owner and our expert Mr. Munro demonstrated that
23 references to magnification and scale factor in these subsequent paragraphs
24 had to do with the separate facets of image display, which as Mr. Renner did
25 correctly explain, has to do with how much of the image is actually being
26 shown in that parallelogram in Figure 1 of Shiota, which is effectively the

1 same as the zoom parameter that the '990 Patent also explains with respect to
2 its display window, DW. And then Dr. Kessler, in his second declaration,
3 now agrees with that understanding. So, we are all in agreement that
4 paragraphs 24 to 26 have to do with that parallelogram. So where does that
5 leave us? Petitioner, based on Dr. Kessler abandoning his original position
6 has now lost a chunk of support for its interpretation of magnification
7 adjustment in paragraph 23. The only other occurrences in Shiota of
8 magnification or similar type word support the second interpretation, not
9 petitions.

10 And then if we go to Shiota also puts its algorithm out there in
11 paragraphs 27 to 42. And as Mr. Renner or Mr. Holt or Mr. Renner, I don't
12 recall which agreed that algorithm ends with dimensionless coordinates, P1
13 and Q1 in paragraph 41. When you end with P1 and Q1 that are
14 dimensionless, that shows that the algorithm doesn't include any operation
15 which corresponds to the magnification adjustment language in paragraph
16 23. And Judge Amundson, to your question on Figure 1, whether that shows
17 the use of the size L of the attained image, it does not. It's all the same as
18 the algorithm. We go through the entire algorithm in Shiota, and there is not
19 one portion of it which refers to the paragraph 23 magnification adjustment
20 if that's what it's supposed to mean. Patent Owner's understanding of
21 magnification, however, is reflected in the algorithm, as the algorithm uses
22 variables Delta Ux, Delta Uy, et cetera, which are called out in paragraphs
23 24 through 26 as relating to a magnification. So, the algorithm supports our
24 interpretation of magnification adjustment and not Petitioner's.

25 So, at this point, all Petitioner has is what's in Paragraph 23. And
26 we have the discussion about the fisheye image being assumed to be

1 projected to a radius of one, which you've heard shorthand today as
2 normalization, that's how the experts refer to it. And Petitioner once the
3 explained magnification adjustment to mean you are backing that
4 normalization out using the size of the obtained fisheye image. But as I
5 mentioned, and I think Judge Hamann recognizes, magnifications are really
6 odd words to be using in this situation if you're trying to reestablish the
7 actual image size. Magnification --

8 JUDGE AMUNDSON: This is Judge Amundson. If I could
9 interrupt you, if I could go back a minute or two. When you said that the, I
10 think that the Shiota algorithm supports your position. Could you like
11 explain which paragraphs in Shiota you're talking about, between whatever
12 it is, 27 and 41?

13 MR. MURRAY: Certainly. So, in Shiota the algorithm starts,
14 there's a heading right before paragraph 27 that says calculating a procedure
15 for image transformation. And if you go down to paragraph 29, you see
16 three equations given there for X_1 , Y_1 , and Z_1 . And we'll take X_1 for
17 example, it's equal to X_0 plus U_1 multiplied by ΔU_X plus V_1 multiplied
18 by ΔV_X . So that's one example. And if you refer back up earlier in the
19 page, you see X_0 , Y_0 , ΔU_X , ΔV_X , ΔU_Y are referred to in
20 paragraph 25 as necessary parameters. And then paragraph 26 talks about
21 these parameters can be easily obtained from the information of the angle,
22 information of the viewpoint, and the magnification of the image. So,
23 magnification of the image there is tied to the parameters that are cited in
24 paragraph 25, which are included in the algorithm in paragraph 29.

25 JUDGE AMUNDSON: All right. I think I understand. All right.
26 Thank you.

1 MR. MURRAY: Okay. So, we were talking about paragraph 23
2 and the normalization aspect. And Judge Hamann (INDISCERNIBLE) on
3 the fact that magnification is not really the word you would understand to be
4 used in this context. And Petitioner hasn't disputed that magnification is
5 typically a dimensionless value. And so, if paragraph 23 says we have a
6 dimensionless magnification and we have dimensionless P1 and Q1
7 coordinates, the product of that is also going to be dimensionless, which
8 doesn't make sense as meaning the same thing as using an actual image size,
9 which is why Mr. Munro looked elsewhere within Shiota for his
10 interpretation. And it's why Petitioner keeps having to isolate on paragraph
11 23. And when you look at it, the wording, it just doesn't stand up to
12 scrutiny.

13 So, Petitioner then in the reply has introduced a bunch of other
14 references relating to normalization. And Patent Owner does not dispute
15 that normalization in optics is done for a variety of different methods. But
16 it's not just image size you can normalize. You can normalize many
17 different things. And indeed, some of the references introduced by
18 Petitioner don't have anything to do with normalizing image size. So, they're
19 functionally irrelevant. The ones that do don't actually show the actual
20 image size being used to back out that normalization, which is what
21 Petitioner wants magnification adjustment to mean. And Mr. Renner
22 referred to slide 24 of his presentation.

23 If you look at the Smith's excerpt on the lefthand side in the box
24 right under the heading 5.4, Scaling and Design, it talks about a lens
25 prescription can be scaled to any desired focal length simply by multiplying
26 all of its dimensions by the same constant. So, one, it's not talking about a

1 normalized image size at all. And two, it's not using an actual image size to
2 reverse the normalization. And this is what I'm talking about when I say if it
3 was so well-known to be true, and it was a person of ordinary skill in the art
4 would absolutely know that you need to always reverse the normalization
5 using the actual image size, you think the Petitioner would find something
6 similar to what Smith has here to show it. But it's not. The normalization
7 references all stop short of proving Petitioner's point that going an extra step
8 off of magnification adjustment reverses the normalization using the actual
9 size of the image disk or the obtained image.

10 JUDGE AMUNDSON: This is Judge Amundson. On this -- on all
11 these other options, what I'm trying to understand is with regard to the
12 magnification adjustment referenced in paragraph 23 of Shiota, what are the
13 other possibilities besides adjustment based on image size?

14 MR. MURRAY: Well, it's just what Mr. Munro testified as, which
15 is if you continue reading on, that sentence leads directly into paragraph 24
16 and the image transformation discussion. And so that's one possibility.

17 JUDGE AMUNDSON: Okay. So, zooming, scaling, that's one
18 possibility. Are there any other possibilities?

19 MR. MURRAY: There may be. Those are the two you have in the
20 record.

21 JUDGE AMUNDSON: Okay. But well, you talked about other
22 references introduced with the reply. Do they suggest any other possibilities
23 for the magnification adjustment referenced in paragraph 23 of Shiota?

24 MR. MURRAY: I would say they all talk about normalization, but
25 none of them, certainly none of them use magnification in the way Shiota is
26 using it, first of all. Second of all, they're not reversing an image-sized

1 normalization using the actual size of the image. And in slide 24, for
2 example, in the Smith reference, it talks about using a constant to scale to a
3 desired focal length. So, none of these new references do or explain what
4 Petitioner wants magnification adjustment to mean here in paragraph 23.

5 JUDGE AMUNDSON: All right. Thank you.

6 JUDGE HAMANN: Mr. Murray, this is Judge Hamann. I want to
7 make sure I understand Patent Owner's position focusing on paragraph 23.
8 Patent Owner agrees that paragraph 23 teaches normalization. Is that
9 correct?

10 MR. MURRAY: That's correct.

11 JUDGE HAMANN: Okay. And it also teaches that the image
12 circle diameter differs according to the sensor. Would Patent Owner agree
13 with that?

14 MR. MURRAY: Patent Owner agrees that there's a suggestion
15 there that the size of the image pickup device can, in some instances, lead to
16 a change in image circle diameter. We don't believe they are necessarily
17 linked in all instances. And I would point out that the sentence also goes on
18 and says, and the focal distance of the fisheye lens, which has been
19 completely ignored by Petitioner.

20 JUDGE HAMANN: And what meaning has Patent Owner
21 provided to image circle diameter in paragraph 23 of Shiota?

22 MR. MURRAY: I'm sorry, I'm not sure I understand the question.
23 What meaning have we provided to --

24 JUDGE HAMANN: Well, I didn't mean to cut you off, but let me
25 try to clarify a common question and see if this is clear. Petitioner has put
26 forward, I believe, that image circle diameter relates to image size, actual

1 image size.

2 MR. MURRAY: Correct. Correct. We don't disagree with that.

3 JUDGE HAMANN: Okay. Patent Owner agrees with that?

4 MR. MURRAY: Correct. Yes.

5 JUDGE HAMANN: Okay. So, if there's a recognition in
6 paragraph 23 that actual image size can vary depending on the particular
7 sensor, and as you point out here, it's also referenced on the focal distance,
8 then there's a discussion of normalization. Do you understand why then this
9 references one of ordinary skill in the art would understand, or would need
10 to be at some point be, a denormalization if there was already a
11 normalization depending on the actual use of a particular sensor or focal
12 distance?

13 MR. MURRAY: We don't -- other than what Petitioner is saying
14 as it relates to that last sentence, I don't think we have any credible evidence
15 that suggests that Shioti desires it or how it would be done.

16 JUDGE HAMANN: Thank you.

17 MR. MURRAY: Okay. Just a little bit more on the image size
18 versus image sensor size just for to make sure that's clear. It's an odd part of
19 Petitioner and Dr. Kessler's analysis because it -- their argument is well you
20 have to do this magnification adjustment to account for image size directly?
21 They say you have to account for the image -- the magnification adjustment
22 accounts for the image sensor size which by -- I don't, I forgot the word it
23 is -- by connection refers to image size. So, there's this indirect link between
24 the two. And why is magnification adjustment specifically accounting for
25 image sensor size particularly where that in and of itself doesn't necessarily
26 lead to a difference in image size is part of the reason why Petitioner's

1 position is a little confusing. Dr. Kessler has admitted that a lens can project
2 an image onto an image plane regardless of whether the image sensor is
3 present or not.

4 So, what that practically means is if you take a camera and all you
5 do is swap out the image sensor for a larger one, but you change nothing
6 else, the image size is going to be exactly the same even though you've
7 changed the image sensor size. And the corollary is you could have one
8 image sensor that can support multiple image sizes. So, for example, you
9 have Dr. Kessler's example where the diameter of the image circle equals the
10 diagonal of the rectangular sensor. That's one possibility. You have
11 another where the sensor is under-filled, and you have blank pixels. So,
12 you'd see the entire circle on the sensor, and you'd see dark areas around it.
13 Baker is one example of an under-filling. And then you can have one where
14 the image circle is much larger than the image sensor. And all of this is
15 different image circle sizes with the same image sensor size. So, the point
16 is, Dr. Kessler tied magnification adjustments to account for size of image
17 sensor, but that doesn't necessarily mean the size of the image is going to
18 differ. And so that's where some of his analysis begins to sort of break
19 down.

20 Ultimately, the only evidence we have to support Petitioner's
21 interpretation is the word of its expert, who changed his mind between the
22 Petition and the reply on how relevant paragraphs 24 to 26 were, which go to
23 his credibility on the subject. And this is -- Shiota is a reference that Patent
24 Owner addressed in the previous re-examination, and Petitioner, in our
25 opinion, has not demonstrated that a person of ordinary skill in the art would
26 have understood using the size L of the obtained image feature to be in this

1 reference. And based on this record, we don't believe Petitioner has met their
2 burden of unpatentability. Unless Your Honors have any further questions, I
3 can reserve the rest of my time.

4 JUDGE BELISLE: Counsel, this is Judge Belisle. I'd like to just
5 pose the same question I did to Petitioner in the context of the claimed
6 invention. You know, it says displaying the obtained panoramic image by
7 correcting nonlinearity. Can you correct nonlinearity of an image without
8 using the size of the obtained image?

9 MR. MURRAY: I don't know that there's any evidence in the
10 record of that. Certainly, it's -- regardless --

11 JUDGE BELISLE: No expert, sorry. No expert talked about that
12 at all?

13 MR. MURRAY: No expert talked about that. From our
14 perspective, the Petitioner, regardless of how many options there are, the
15 Petitioner's burden to show definitively that Shiotu, by saying magnification
16 adjustment, means what they say it means. And we don't believe the
17 evidence supports that. But there's no evidence of record for other means.
18 And again, I go back to if there -- if that was the way to do it, you would
19 think, and the only way to do it, you would think that would show up in
20 some documents that Petitioner could have put forth, but they have not.

21 JUDGE BELISLE: Okay.

22 JUDGE HAMANN: Mr. Murray, this is Judge Hamann. There's
23 no other questions at this point. Okay. I believe you have about, if I'm
24 doing my math correctly, about 37 minutes. I will note, however, generally,
25 you know, we don't allow more time for sur-rebuttal. We don't -- panels
26 differ when you use less time in your initial presentation and your sur-

1 rebuttal. If that'll be an issue, the panel can discuss that during your sur-
2 rebuttal. But I assume you don't anticipate using 37 minutes during your
3 sur-rebuttal.

4 MR. MURRAY: I wouldn't anticipate using that much time
5 anyway, but I appreciate that. And I'll definitely keep it as brief as possible
6 in sur-rebuttal.

7 JUDGE HAMANN: Okay. Fair enough. With that, Mr. Renner,
8 you have 16 minutes for rebuttal.

9 MR. RENNER: Thank you, Your Honor. A few points and one
10 maybe to start with the last question that was posed to me as well. I
11 reflected a little further on that. I thought you were asking is the language of
12 claim -- is the language of the claim requiring consideration of the actual
13 size of the image. Not is there -- and now I understand the question a little
14 better. I think you're asking whether it's possible to actually perform the
15 function without accounting for size. My apologies for not grabbing that in
16 front end. But I'll answer it best I can with that better understanding in
17 mind, and then say no. The answer is no. And I think we know that
18 definitively in this record if only to look at the deposition transcripts of the
19 Patent Owner expert when we took it. If you look at slide 24 again, you
20 know, you can see, and I'll quote and I kind of rushed through this little
21 before by just saying it out loud. But let me actually give it to you the way
22 that I look at it, which is it's the last lines 22 to the first three lines on the
23 next page. I believe that that's page 23 of Apple 1025. We asked, and so
24 when you are considering an actual application.

25 So contextually you're going to move from what is a normalized
26 data representation into an actual application. The question says, then you

1 would have to, the words have to, it's not you might consider, you might
2 think it's obvious. You'd have to, we're asking him, scale up to account for
3 the actual image size. And the answer is that's true because it is true. If you
4 took out the dimension of size in order to normalize, not only do we think
5 it's obvious to put it back in, it's definitively right here in the record proven
6 that you do. You can also see that if you look at that testimony from Dr.
7 Kessler. I'll go to slide 25 where we reproduce slides -- paragraphs 205 and
8 206. You can see that in the explanation that's given by Dr. Kessler as he's
9 walking through paragraph 23. And by the way, just to be clear, and I can
10 try to get a cite for you. We ended will start my counterpart into a little
11 quicker than I thought. But I want to get a because paragraph 205 here is
12 intended to be, you can see, a correlation and a walk-through paragraph 23
13 of the Shiota reference. It's quite clear. At the very end of it, we reference
14 different paragraphs. But I do notice here, this doesn't say it, and it should
15 have said it, after the balloon text of the last sentence. That's something
16 we've seen in the briefing, but I can hear in the commentary from my
17 counterpart that if there's some confusion about that perhaps.

18 This is quite clearly, and I think quite apparently, oriented towards
19 the very text that exists in the end of 23, because after all, that's what it's
20 speaking to. And I think in the supplemental declaration, if I were to find it,
21 you see conversation, much more conversation, in fact, following up on
22 further briefing, to develop these points further. Point being, when you
23 interpret paragraph 23, it's not only natural, we believe it's necessary in light
24 of what you've just heard from their expert, that you conclude with a
25 circumstance where the data is normalized, and you expect to use it for real
26 world applications which showed is not shy about saying and you put it into

1 Baker, or you call for a real world application as well.

2 And so, you would know, even if it said nothing, which it does say
3 something, that you're looking for normalization. But now you look at what
4 it does say and we're trying to figure out what these words mean, and it's in
5 that context that you've got a lot of clues. You've got the words themselves.
6 Magnification adjustment. What do those words mean? Adjust,
7 dimensionalize. Magnitude, make it right per the very thing you took away
8 before the dimension size the image. More than that it's in the context of the
9 paragraph that is squarely about the image space. The only relevant image
10 space under the circumstances, and that image space is the image space that
11 we looked at in paragraph -- in slide 29 together earlier with the Judge
12 Amundson, and that it seems based the PQ space.

13 That's what paragraph 23 is all about. It's talking in fact about
14 image circle diameter that appears right here. It's talking about the sensor
15 side that's right here. It's PQ space quite clearly 23 is about PQ space. All
16 the operations that my counterpart was talking about in 24 to 26, they're all
17 as acknowledged by and everyone agrees. They all relate to UV space. That
18 pink, tilted dimension, the one where the user is looking at a different
19 dimension, different manipulations. If you had seen in the transition
20 between 23 and 24 of Shioti where it talks about new transmission -- new
21 translations that are being addressed next effectively. So, the C also here
22 isn't something that has ever been by Petitioner something that is said to be
23 the bridge to understanding as it relates to the magnification adjustment. We
24 think it's right there (INDISCERNIBLE) there.

25 So, you have what's before you of a pretty defined dispute we think
26 about whether or not you can read paragraph 23 in the last sentence of it, and

1 whether or not you must, as a POSITA, when reading that, consult other
2 paragraphs than 23 to figure out what it means. And if so, where would you
3 turn? And would you turn to 24 to 26? I think you've heard from us, but I
4 want to make really sure that we're being clear here, that we believe that
5 there is no reason to go outside of 23. So, it's not that we're stuck with 23,
6 it's that it's a perfectly acceptable articulation by the writer of this document.
7 And we think that when you turn to 24 to 26 and you start talking about a
8 translation that are in entirely different space, as you can see from slide 29 in
9 the dimensions there, that you're distorting, you're actually running a risk
10 here, you're not interpreting something using something that's useful to
11 interpret it, you're actually changing its meaning, and that's the concern that
12 we have with it.

13 I will return to, if I could, slide 25 with you. I do want to focus on
14 paragraph 206, and don't let that get lost in the shuffle. It's not something
15 that heeds a lot of attention in the Patent Owner's briefing, but it's been here
16 since the beginning, and we continue to talk about it in our briefing because
17 in paragraph 206, we have what is consistent with their patent, for their
18 expert acknowledgments in the testimony we've seen from them on
19 deposition, and that is if you look at the moreover sentence in the middle, it
20 tells you that moreover, given that the size of the image pickup device, and
21 by extension the size of the image, remember this differs, puts those things
22 in relationship with one another, but they vary depending on the
23 implementation. So now that you know there's a variation a POSITA that
24 says, would have found it obvious to use the actual size of the image as
25 applicable in Baker's system as part of the image transformation to generate
26 a properly compensated or transformed image for display.

1 Notice, while this is consistent with what is in paragraph 205
2 immediately preceding, and the discussion of that last sentence in paragraph
3 23 of Shiota, this independently stands free and establishes that a POSITA
4 having the understanding that we have seen their expert confirm through
5 deposition, that is that normalization is normal after all is useful, and when
6 you have it, you correct to go into the real world by consulting the very
7 parameters that were normalized out. But while it's consistent with all that,
8 it doesn't hang on the disclosure of that. What it does is it hangs on the idea
9 that Shiota gives you normalization, and it says a POSITA seeing this, just
10 like their expert said, and it's confirmed if you want to see it again, the Q
11 &A in slide 24, that they're going to correct for normalization by accounting,
12 he says here, for actual image size.

13 So even if you were to escape this hearing and this record, which
14 we don't believe would be appropriate, confused about the meaning of
15 magnification and adjustment in that final sentence, you still have in this
16 case record evidence that a POSITA absolutely sees obvious and a basis for
17 obviousness. Of de-normalizing and doing it by accounting for the very
18 dimension (INDISCERNIBLE).

19 JUDGE BELISLE: Okay. Counsel, perhaps we can stay on that
20 just for a moment.

21 MR. RENNER: Certainly.

22 JUDGE BELISLE: Let's assume -- assume that Shiota's paragraph
23 23 does not include that very last sentence, at the time of actual use
24 magnification adjustment is performed. If that were not there do you have a
25 case for obviousness and teachings and fair suggestions out of this reference
26 for how it would render obvious the claim?

1 MR. RENNER: We believe so, Your Honor. We think this record
2 isn't even close to quiet about that. We think that this record shows you not
3 only evidence that we brought to bear, but evidence that we've gathered
4 through testimonial evidence or testimony -- deposition testimony from their
5 expert. It tells you that there is normalization, and they tell you what a
6 POSITA thinks when these normalization occur. And we know that the
7 normalization here, it's not even in dispute that the normalization that occurs
8 here is with regard to the image and it's to remove the dimensionality of the
9 image out of the image, and how you normalize it. And we've got their
10 expert telling you that to make a real world application in use, you've got to
11 put, you've got to consult that very dimension. And he's not saying that you
12 might even think it's obvious. He says that's what has to happen.

13 So, I don't think that's even -- I don't think it's beyond, or I think
14 it's beyond the question that there's a case for it, but we don't need that case,
15 to be honest with you, right? Our position is you aren't without that. It's
16 with that perspective that you read 23. Because remember, we're talking
17 about what POSITAs think. So, when they're reading Shiota, they're not
18 reading it devoid of what they would understand generally. They're reading
19 with that in mind. Now, you encounter that last sentence. You're not
20 confused. You know what it means. And we're talking about, by the way,
21 POSITAs here that are physics, electrical engineering, or somewhere in the
22 third of the degree, they might have five years of practical experience that's
23 very well outlined. These aren't people that are new to the space, they're
24 POSITAs. And their expert is false, but those would be distinct. And it
25 would make the very case that you're talking about, Your Honor.

26 JUDGE HAMANN: Mr. Renner, this is Judge Hamann. Focusing

1 on paragraph 23 still. Patent Owner has pointed out that paragraph 23
2 teaches that the image circle diameter differs according to also the focal
3 distance of the fisheye lens. What is Petitioner's response to Patent Owner's
4 argument as to that?

5 MR. RENNER: Oh certainly, Your Honor. Your Honor, there's a
6 variety of things we think are involved here. At the end of the day, what you
7 have is 23 telling you though there is a relationship between the image size
8 which makes sense, and the orientation, I'll call it, of the devices, the lenses,
9 the focal length, and the size of the image sensor themselves. We don't think
10 that's really a moment. We think all those things are related. There's an
11 equation out there that would tell you what that is. And when you're going
12 to look at that equation, you're going to see a relationship. One way or the
13 other, it's much like the last conversation we just had. We think that bears
14 out through the Shiota disclosure, sufficiently well to meet the claims that
15 have demonstrated obviousness. But here again is a situation where we've
16 heard on this record what people of skill think.

17 We know people of skill how they understand the relationship
18 between these items to be. And image size is the dimension that was
19 removed. It would be the dimension you put back. So, whether you start
20 with a teaching and you look at it as one, the first is informed by sensor size,
21 and then you move from that to the image size. Or you look at it from the
22 perspective of a person who understands that when you normalize, you got
23 rid of that one you mentioned (INDISCERNIBLE). So, you put that
24 dimension straight back in. Either way, you get to a place where you're
25 accounting how to (INDISCERNIBLE) of the image.

26 JUDGE HAMANN: Okay. You have just short of four minutes

1 left.

2 MR. RENNER: Your Honor, I'm (INDISCERNIBLE) a sense of
3 context here, and I wanted to make sure that we had that, and this isn't going
4 to be the overall summation or anything, right? It's just, what we're trying to
5 get here is a real world application. Shiota tells you that he demands that,
6 that's what it's all about, and it's put into Baker. Baker also is about that.
7 Okay. So, you have a situation where you're trying to resolve from these
8 teachings a useful output. In order to buy in to what the Patent Owner wants
9 you to believe, you have to believe that Shiota would be understood by a
10 personal ordinary skill to end with normalization, and that's it. You can't
11 account for that actual image size. You can't go back. That wouldn't be
12 something that a POSITA would understand. And that defies, not only
13 Shiota, it defies Baker. It defies the whole notion of the combination's
14 natural (INDISCERNIBLE). We think that context is really important
15 because how can you think that a POSITA would look in on this paragraph
16 and escape the reality that there has to be denormalization? And since that
17 which was normalized was the actual image size, that you'd find a way back,
18 and it's not going to take a lot to do as a POSITA to getting that back on the
19 map.

20 I just want to make sure we didn't lose track of that because there's
21 a lot of equations and things that appear that you could read it and attribute
22 value to. I think I'm actually finished. Let me just look at my notes for one
23 moment if I could. I'm happy to take questions meanwhile if you have any
24 further. I think that's all from us. So, Your Honor, we'd close out our
25 hearing if you don't have any further questions for us. And thank you for
26 your time.

1 JUDGE HAMANN: Thank you, Mr. Renner. I believe there are
2 none unless Judge Amundson has any other questions. He does not and we
3 thank you for your presentation. And Mr. Murray, you may begin. Like I
4 said before, I think you used 23 minutes in your initial allotment. I don't
5 think there's much question if you used up to 23 minutes for your sur-
6 rebuttal. Past that may be an issue.

7 MR. MURRAY: Thank you, Your Honor. Again, I don't think we
8 need to go that long. I do want to touch -- Petitioner had said multiple times
9 that context is important. And then referring to slide 24 and the deposition
10 testimony of Mr. Munro, we have an excerpt there, but if you actually look
11 at that entire discussion in context, you'd find that the entire discussion is
12 stemming out of the discussion of the '990 then. It is not discussed as a
13 general proposition. And I would also point out that the question is, you
14 would have to scale up to account to the actual image size, but it doesn't ask
15 how. So, Mr. Munro has not given any general proposition testimony in that
16 regard. And it's all confined within the '990 Patent's disclosure.

17 The next thing I would say is Mr. Renner said there's no reason to
18 go outside of paragraph 23. And I would just reiterate that the Petitioner's
19 preliminary reply indicates otherwise, and in fact, leans heavily on 24 to 26
20 as context for a person of ordinary skill in the art understanding paragraph
21 23. So, ultimately without a document showing that it was known to be
22 using the size of the image to back out a normalization, I think what it comes
23 down to is the testimony of two experts, one who says a person of ordinary
24 skill in the art will understand magnification adjustment in Shiotu to mean
25 this, and the other saying that's not how I would read it. And I would
26 suggest that credit should be given to the expert who has not misinterpreted

1 paragraphs 24 to 26 in Shioti.

2 And unless you have any further questions, Your Honors, that's all
3 I have on sur-rebuttal. But if not, thank you for your time. We appreciate
4 you taking the time to hear our arguments today.

5 JUDGE HAMANN: Just hold on a moment, counsel. This is
6 Judge Hamann, can I be heard?

7 MR. MURRAY: You can now.

8 JUDGE HAMANN: Yes. I apologize. Mr. Murray, I don't know
9 if Mr. Renner is still on. Mr. Murray, you dropped off right after saying you
10 had nothing further. So, I apologize, I lost audio at that point. And
11 someone.

12 MR. MURRAY: Your Honor, I -- sorry. I have nothing further
13 unless you have any additional questions and if not, we thank you for taking
14 the time to hear our arguments today.

15 JUDGE HAMANN: Thank you. And I believe that might
16 (INDISCERNIBLE) Patent Owner still had any additional questions. So,
17 with -- and Mr. Renner is back on, or is on I see so, I apologize for that
18 disconnection. I'm not sure what happened.

19 With that, I thank you both for your presentations. I ask that you
20 stay on after we adjourn the hearing long enough to interact with the court
21 reporter to the extent that there's any questions about spelling or whatnot.
22 So, with that, this hearing is adjourned. Thank you.

23 (Whereupon the above- entitled matter went off the record at 2:36
24 p.m.)

IPR2023-00471
Patent 6,844,990 B2

P E T I T I O N E R :

W . K a r l R e n n e r
K a r a n J h u r a n i
D a v i d H o l t
F I S H & R I C H A R D S O N P . C .
a x f - p t a b @ f r . c o m
j h u r a n i @ f r . c o m
h o l t 2 @ f r . c o m

P A T E N T O W N E R :

S t e p h e n M u r r a y
J o h n S i m m o n s
D e n n i s B u t l e r
K e i t h J o n e s
P A N I T C H S C H W A R Z E
s m u r r a y @ p a n i t c h l a w . c o m
j s i m m o n s @ p a n i t c h l a w . c o m
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