

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARASHI VISION (US) LLC (D/B/A INSTA360)

Petitioner,

v.

GOPRO, INC.

Patent Owner.

CASE NO. IPR2024-00984

US PATENT NO. 10,015,413

DEPOSITION OF

DR. AGGELOS KATSAGGELOS

August 7, 2025

10:00 a.m CST

Taken via Zoom by agreement

Diana G. Rodriguez, RPR, Certified Shorthand Reporter

Page 1

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I N D E X

WITNESSES

ALL WITNESSES: PAGE:

DR. AGGELOS KATSAGGELOS

Examination by Mr. Schmidt 4:6

EXHIBITS

NO.: DESCRIPTION: PAGE:

For Katsaggelos:

Exhibit 1 Katsaggelos Reply Declaration:

For Identification 4:19

Exhibit 2 '413 patent:

For Identification 9:3

1 (Witness sworn)

2 DR. AGGELOS KATSAGGELOS,
3 called as a witness herein, having been first duly
4 sworn, was examined and testified as follows:

5 EXAMINATION

6 BY MR. SCHMIDT:

7 Q Good morning, Doctor. We've met before.

8 A Yes. Good morning.

9 Q I'm just going to get right into it. Can
10 you just confirm that you understand that you're under
11 oath?

12 A Yes, I do.

13 Q And if any of my questions are at any time
14 ambiguous or unclear in any way, I invite you to ask me
15 to rephrase the question. I'm interested in getting
16 your best testimony and answers to my questions. Is
17 that fair?

18 A That's fair.

19 (Exhibit 1 marked for identification)

20 BY MR. SCHMIDT:

21 Q Before we started the deposition, I marked
22 Exhibit 1 which is your Reply Expert Declaration in the
23 Exhibit Share. Can you just go into that system and
24 confirm that that is your reply declaration.

25 A I don't see anything in the Exhibit Share

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1 right now for some reason.

2 Q You might have to refresh. Have you
3 refreshed?

4 A No. Shall I refresh?

5 No. It's still empty. Let me refresh
6 myself.

7 Yes, I do see it, yes. Thank you. So
8 I should download it and open it, right?

9 Q Yes, sir.

10 A Okay. I get a message here that I do not
11 have permission to perform this action of downloading.
12 Wait. I need to -- let me see. Yes, still I have this
13 error message. Anyway, I get the message that I do not
14 have permission to do this.

15 Q Are you able to open it in the viewer just
16 click on it?

17 A Yes, yes. I did manage to open it.

18 Q And if you just scroll through it in the
19 viewer can you confirm that what I've marked as Exhibit
20 1 to the deposition is the reply declaration that
21 you've submitted in this IPR proceeding?

22 A Yes. This seems to be the declaration I
23 submitted.

24 MS. NGUYEN: Sorry. Can I interrupt. Court
25 reporter, is there any way I can receive the real time

1 link? I requested it and I still have not received it.

2 (Discussion had off the record)

3 BY MR. SCHMIDT:

4 Q Doctor, I understand that you have some
5 hard copy documents in front of you. Can you identify
6 those for the record, please.

7 A Yes, I do. I have my declaration, Exhibit
8 1, and then I have a copy of Dr. Foroosh's preliminary
9 response, Dr. Foroosh's supplemental declaration, and
10 then copies of the Meulen Patent, Obara, Fleming, Liu,
11 and Chao. I'm sorry. And my initial declaration.

12 Q Do you have a copy of the patent, the '413
13 patent in front of you?

14 A Looked through this pile.

15 No, I don't.

16 Q Are all of the documents that you have in
17 front of you unannotated?

18 A Yes, they are.

19 Q And other than what you've mentioned on
20 the record, you have no other hard copy documents or
21 notes in front of you at this time?

22 A That's correct, no other notes.

23 Q And other than the Zoom interface that
24 we're using to conduct this deposition do you have any
25 other windows or applications open on the computer in

1 front of you?

2 A No, there is the Veritext application,
3 registered Veritext, the remote proceedings, and this,
4 so no other application.

5 Q Okay. And if anybody tries to gesture or
6 signal to you or communicate with you in any way during
7 the deposition can you commit to me that you will
8 inform me of that when it happens?

9 A I should inform you you're saying?

10 Q Yes.

11 A Yeah. Of course, yes.

12 Q Because we're appearing remotely and this
13 should be testimony based on the record that we have in
14 front of us and nothing else. You understand that,
15 correct, sir?

16 A I do understand that.

17 Q The first topic I want to ask you about is
18 paragraph 10 of your supplemental declaration so why
19 don't you go ahead and turn to that and let me know
20 when you're there.

21 A I'm there.

22 Q Paragraph 10 begins on page 4 but on
23 paragraph 5 you have a figure that you've excerpted.
24 Do you see that?

25 A Yes, I do.

1 Q This is Figure 2B from the '413 patent,
2 correct?

3 A It shows 216, 216, but it's part of 2B,
4 that's correct.

5 Q It essentially is Figure 2B with your
6 annotation over the center circle, is that correct?

7 A That's correct.

8 Q And I just want to confirm, Doctor, that
9 Figure 2B in the '413 patent is the result of what the
10 patent describes to be a nonlinear warping
11 transformation, correct?

12 A I don't have the '413 in front of me to be
13 able to precisely answer your question.

14 Q Well, when you included this figure in
15 your supplemental declaration were you aware that
16 Figure 2B of the '413 patent is described as the result
17 of a nonlinear warping transformation?

18 MS. NGUYEN: Objection to form.

19 BY THE WITNESS:

20 A The figure is presented here in relation
21 to this but without '413 patent in front of me I cannot
22 say with certainty what 2B and 216 here is part of 2B
23 or what is demonstrated by Figure 2B so if I can look
24 at the '413 I can confirm that.

25 MR. SCHMIDT: Sure. I just entered it into the

1 Exhibit Share so this will be Exhibit 2 to the record,
2 which is the '413 patent.

3 (Exhibit 2 marked for identification.)

4 BY MR. SCHMIDT:

5 Q Let me know when you can see that.

6 A Okay, I just opened it.

7 Q You have Exhibit 2 in front of you, sir?

8 A Yes, I do, yes.

9 Q And this is the '413 patent, correct?

10 A That's correct.

11 Q Now, with the benefit of the '413 patent
12 in front of you could you confirm for me that the
13 figure that you excerpted on page 5 of your reply
14 declaration is the result of what the patent describes
15 to be a nonlinear warping transformation.

16 A I cannot download the file. I cannot
17 search the file.

18 So in the specification of the '413,
19 it mentions that in another embodiment the scaling and
20 warping are combined into a single function such that
21 only a single transformation is applied to the image
22 that achieves both scaling and warping and, for
23 example, in 2B, image 212 may be converted directly to
24 image 216 by a single function without producing the
25 intermediate image 214.

1 Q And in the embodiment you described, the
2 transformation would involve a nonlinear warping,
3 correct?

4 A As I already mentioned, in 2B they
5 demonstrated with a single function both scaling and
6 warping can be performed.

7 Q And when the patent describes warping, the
8 patent tells us that warping is a non-linear
9 transformation. Do you agree with that?

10 MS. NGUYEN: Objection, form.

11 BY THE WITNESS:

12 A Can you point me to where this is
13 mentioned in the patent?

14 BY MR. SCHMIDT:

15 Q Column 4 line 9 reads (reading):
16 "In the warping step 206, a
17 non-linear warping is applied which
18 results in circles being
19 stretched/compressed by different
20 amounts depending on their horizontal
21 and vertical positions resulting in
22 example image 216."

23 Do you see that?

24 A Yes, I see that. So the way it reads is
25 that the warping step here 206 might have a non-linear

1 warping but it might leave the possibility that the
2 warping is linear as well.

3 Q But that's not what Figure 2B shows, is
4 it, sir?

5 MS. NGUYEN: Objection, form.

6 BY MR. SCHMIDT:

7 Q Let me rephrase the question.

8 Isn't it true, Doctor, that Figure 2B
9 is clearly showing a non-linear warping function?

10 A The objective of 2B is I just read from
11 the specification is to combine the scaling and warping
12 into one step so going from 212 to 216 we see both the
13 warping and scaling being applied.

14 Q And the warping that's being applied in
15 the transformation from 212 to 216 is a non-linear
16 warping, isn't that true?

17 MS. NGUYEN: Objection form.

18 BY THE WITNESS:

19 A Yeah, this seems to be the case that the
20 warping is non-linear as demonstrated in Figure 2B.

21 BY MR. SCHMIDT:

22 Q And you agree that Figure 2B is an
23 embodiment of a non-uniform transformation?

24 A I'm sorry. Non-uniform transformation?

25 Q Yes, sir.

1 A I'm not sure if I know exactly what a
2 non-uniform transformation is.

3 Q Okay. Let's turn to a new topic. I'm at
4 paragraph 48 of your declaration. You're describing
5 Figure 5?

6 A I'm sorry. Which paragraph?

7 Q Paragraph 48.

8 A Okay.

9 Q You're describing Figure 5 of the Meulen
10 prior art. Do you see that?

11 A Yes, I do.

12 Q And you mention the box in Figure 5
13 labeled Display Controller 504. Do you see that?

14 A Yes, I do.

15 Q Now, it's your opinion, Doctor, that the
16 determining a portion step of the '413 claims is
17 performed in the display controller of Meulen, is that
18 correct?

19 A One of the places that the determination
20 of the portion within the image that this is taking
21 place is the display controller.

22 Q You say one of the places. Does the
23 determining a portion occur at multiple places in the
24 Meulen prior art in your opinion?

25 MS. NGUYEN: Objection form.

1 BY THE WITNESS:

2 A Meulen processes images that are captured
3 by the camera on the device so these are images
4 internal you might say but also can process images that
5 are not captured by the device.

6 BY MR. SCHMIDT:

7 Q I'm asking you about the determining a
8 portion step of the '413 patent claims. Do you know
9 what I'm talking about when I say determining a
10 portion?

11 A Yes, I do.

12 Q What I wanted to confirm is is it your
13 opinion that determining a portion step of the '413
14 claim process is performed by Meulen in the display
15 controller 504 or is it your opinion that it's
16 performed somewhere else?

17 MS. NGUYEN: Objection form.

18 BY THE WITNESS:

19 A It's performed at multiple places.

20 BY MR. SCHMIDT:

21 Q Where all is it performed?

22 A It's also performed by the processor 510.

23 Q So in your opinion processor 510
24 determines a portion and display controller 504 then
25 also determines a portion of the images that Meulen

1 captures, is that correct?

2 MS. NGUYEN: Objection form.

3 BY THE WITNESS:

4 A 504 performs determining a portion to the
5 images that are in the frame buffer that are captured
6 and are in the frame buffer while processor 510
7 performs determining a portion to images that are
8 external to the device.

9 BY MR. SCHMIDT:

10 Q I see. So for images that are captured by
11 Meulen's on board camera, in your opinion the
12 determining a portion is only done by the display
13 controller 504?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A What I'm saying is that both the processor
17 510 and the display controller 504 can perform the
18 determining a portion.

19 BY MR. SCHMIDT:

20 Q And if I understood your prior testimony,
21 you drew a distinction between images that are captured
22 by Meulen's camera and images that are obtained from an
23 external media source, is that correct?

24 MS. NGUYEN: Objection form.

25 BY THE WITNESS:

1 A What I mention in my report in paragraphs
2 24 and 25 is that Meulen discloses receiving media
3 source content from an external media source through a
4 communication interface 512 but also describes internal
5 media sources.

6 BY MR. SCHMIDT:

7 Q And is it your opinion that determining a
8 portion of the image is done in a different place in
9 Meulen based on whether it's an internal or external
10 media content source?

11 MS. NGUYEN: Objection form.

12 BY THE WITNESS:

13 A Can you repeat the question, please.

14 BY MR. SCHMIDT:

15 Q Is it your opinion that the determining a
16 portion step is performed in a different place in
17 Meulen based on whether the content is derived from an
18 internal or external media source?

19 MS. NGUYEN: Objection form.

20 BY THE WITNESS:

21 A So in paragraph 26 I state that 504 the
22 display controller processes the media source content
23 from the frame buffer and it's built in camera so
24 that's a logical description of what is depicted in
25 Figure 5.

1 BY MR. SCHMIDT:

2 Q So in your opinion the determining a
3 portion step is performed at a different place by
4 Meulen based on whether the content comes from an
5 internal media source or an external media source,
6 true?

7 MS. NGUYEN: Objection form.

8 BY THE WITNESS:

9 A As I stated in paragraph 20, the processor
10 510 is a processor included within the camera that
11 processes the transformation to the input image
12 captured by the built in camera so 510 can apply the
13 transformation to the images captured by the camera and
14 the display controller can do the same thing.

15 BY MR. SCHMIDT:

16 Q So just so I have a clear answer to my
17 question, I'll ask it one more time. Is it your
18 opinion that determining a portion is performed at a
19 different place by Meulen based on whether the content
20 comes from an internal media source or an external
21 media source?

22 MS. NGUYEN: Objection form.

23 BY THE WITNESS:

24 A Based on what I just mentioned here in
25 paragraph 20, the data captured by the camera can be

1 processed by the processor 512 or the controller 504.

2 BY MR. SCHMIDT:

3 Q When you say data captured by the camera
4 can be processed by the processor or the controller, do
5 you mean that the determining a portion step can be
6 done in either place?

7 MS. NGUYEN: Objection form.

8 BY THE WITNESS:

9 A Both processors 510 and 504 can process
10 the data including determining a portion of linear
11 transformation.

12 BY MR. SCHMIDT:

13 Q So in your view it's redundant
14 functionality in the processor 510 and the display
15 controller 504?

16 MS. NGUYEN: Objection form.

17 BY THE WITNESS:

18 A This is what Meulen describes that this
19 processing of the images can be performed by both
20 processors in the different embodiments of the
21 invention.

22 BY MR. SCHMIDT:

23 Q What about the transformation step, is
24 that able to be performed in both the processor 510 and
25 display controller 504 as well?

1 MS. NGUYEN: Objection form.

2 BY THE WITNESS:

3 A Meulen in 11:66 mentions that in various
4 embodiments the display controller may be arranged to
5 apply image compression and does scaling to the media
6 source content stored in the frame buffer so the answer
7 is, yes, that 504 can apply transformation of the
8 process controller 504 and similarly Meulen discloses
9 that the processor 510 may be arranged to run an
10 operating system in various mobile applications such as
11 a camera, a digital camera, a video camera application,
12 and therefore the processor 510 can also apply a
13 transformation to the image.

14 BY MR. SCHMIDT:

15 Q And I'm sorry. Were you referring to
16 something specific in Meulen?

17 A Yeah. I'm reading from paragraph 20 in my
18 report and the first part is in 12:62.

19 Q So just so I understand, it's your opinion
20 that both the determining a portion step and the
21 non-uniform transformation step can be performed in
22 either one of the processor 510 or the display
23 controller 504 of Meulen. Do I have that right?

24 A Yeah, depending on the embodiment that the
25 operations can be performed by either/or.

1 Q And is it your opinion that either the
2 processor or the display controller can do either one
3 of those steps for either types of media content either
4 internal or external?

5 MS. NGUYEN: Objection form.

6 BY THE WITNESS:

7 A Can you repeat your question, please.

8 BY MR. SCHMIDT:

9 Q Sure. Let me try to break it down.
10 I think we established that it's your
11 opinion that both the determining a portion step and
12 the non-uniform transformation step can be done in
13 either one of the processor 510 or the display
14 controller 504 of Meulen, correct?

15 A That's correct.

16 MS. NGUYEN: Objection form.

17 BY MR. SCHMIDT:

18 Q And is it further your opinion that either
19 one of those components can do either one of those
20 functions with respect to both internal media source
21 content and external media source content?

22 MS. NGUYEN: Objection form.

23 BY THE WITNESS:

24 A Meulen discloses external and internal
25 media sources. Meulen discloses that the processor 510

1 can run camera applications and it's clear to a POSITA
2 that in the frame buffer 506 there's content from the
3 internal media sources so based on this information
4 depending on the different embodiments, the media
5 source and the media content from internal sources can
6 be processed by both either/or the controller and the
7 processor 504 and 510 respectively.

8 BY MR. SCHMIDT:

9 Q And can the content from the external
10 media sources be processed by either one of the
11 processor 510 or the display controller 504?

12 MS. NGUYEN: Objection form.

13 BY THE WITNESS:

14 A I can't answer without being able to
15 download the PDF here but it seems like that's not the
16 case.

17 BY MR. SCHMIDT:

18 Q Which PDF are you trying to download?

19 A My reply declaration.

20 Q I thought you had it in front of you.

21 A I have a printed copy, yes.

22 Q Doctor, are you able to answer my
23 question? Just for the record the question is can
24 content from the external media sources be processed by
25 either one, the processor 510 or display controller

1 504?

2 MS. NGUYEN: Objection form.

3 BY THE WITNESS:

4 A I would need to read the Meulen patent to
5 be able to answer your question precisely. Since
6 Meulen considers as far as the internal data media goes
7 there's different embodiments and they might be
8 processed by the processor 510 or 504, one possibility
9 is that depending on the embodiment that either 510 or
10 504 might be able to, you know, perform this since it
11 can perform for internal images. The other embodiment
12 is since the communication interface 512 is connected
13 to the processor 510 is that 510 is taking care of the
14 processing of the external images.

15 MS. NGUYEN: Counsel, can we take a break? It's
16 been about an hour.

17 MR. SCHMIDT: Let me finish up this line.

18 BY MR. SCHMIDT:

19 Q Doctor, you can't tell me which one of
20 those is the case sitting here today, is that true?

21 MS. NGUYEN: Objection.

22 BY THE WITNESS:

23 A Again, I would need more time to go
24 through the fine details of Meulen but we established
25 that both processor 510 and 504 have this capability of

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1 determining a portion, a portion applying the
2 transformation for the internal data acquired by the
3 internal camera based on the various embodiments so a
4 POSITA would be -- the possibility that the external
5 data could be processed by either processor. On the
6 other hand, since the communication interface is
7 connected to 512, it would make sense to process the
8 data, the external data, by the processor 510.

9 BY MR. SCHMIDT:

10 Q Okay. You had mentioned the frame buffer
11 in Meulen. Do you agree that external media source
12 content could be stored in Meulen's frame buffer 506?

13 MS. NGUYEN: Objection form.

14 BY THE WITNESS:

15 A Meulen states in 11:45 that in various
16 embodiments the frame buffer 506 may be arranged to
17 store media source content.

18 BY MR. SCHMIDT:

19 Q And you agree that media source content
20 would include content from external media sources,
21 correct?

22 A Yeah, the language does not distinguish
23 between internal and external, the passage I read.

24 Q So we could agree that Meulen's frame
25 buffer 506 would store external media source content,

1 correct?

2 MS. NGUYEN: Objection form.

3 BY THE WITNESS:

4 A Yeah, based on what I just read, no
5 distinction is made between internal and external so it
6 couldn't store both external and internal media source
7 content.

8 BY MR. SCHMIDT:

9 Q And there's nothing about the existence of
10 the frame buffer in Meulen that inherently requires
11 internal media source content, correct?

12 MS. NGUYEN: Objection form.

13 BY THE WITNESS:

14 A As I state in paragraph 25, a POSITA would
15 have understood that frame buffer 506 stores content
16 from other sources such as internal media sources and
17 this media is processed by the display controller.

18 BY MR. SCHMIDT:

19 Q But my question is the mere fact that
20 Meulen has a frame buffer doesn't necessarily mean that
21 the frame buffer is limited to internal media source
22 content, correct?

23 A If the external media needs to be stored
24 somewhere, then the frame buffer would be the place to
25 store this media, the external media as well.

1 Q So we could agree that there's nothing
2 about the existence of the frame buffer in Meulen that
3 inherently requires internal media source content,
4 correct?

5 MS. NGUYEN: Objection form.

6 BY THE WITNESS:

7 A What I'm saying is in the frame buffer
8 both internal and external media source data are
9 stored.

10 BY MR. SCHMIDT:

11 Q So the mere existence of a frame buffer in
12 Meulen does not inherently require internal media
13 source content, correct?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A What we see in Figure 5 is that frame
17 buffer 506 is not directly connected to the
18 communications interface 512.

19 MS. NGUYEN: Counsel, we've been going well over
20 an hour. Can we take a break, please?

21 MR. SCHMIDT: I've been trying to wrap up this
22 line of questioning but it's taking a while.

23 BY MR. SCHMIDT:

24 Q Doctor, I can't tell if you're agreeing
25 with me or not. My question is does the mere existence

1 of a frame buffer in Meulen inherently require internal
2 media source content? Can you answer that question?

3 MS. NGUYEN: Form, asked and answered.

4 BY THE WITNESS:

5 A As I mentioned, because the frame buffer
6 is not directly connected to the communications
7 interface 512, a POSITA could have understood that the
8 frame buffer stores content from other sources such as
9 internal media sources.

10 BY MR. SCHMIDT:

11 Q So are you agreeing with me that the mere
12 existence of a frame buffer in Meulen does not
13 inherently require internal media source content?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A I think I gave you an answer based on what
17 I have in my declaration.

18 BY MR. SCHMIDT:

19 Q I can't tell if you agree or disagree.
20 Does the mere existence of a frame
21 buffer in Meulen inherently require internal media
22 source content, yes or no or can you not say?

23 MS. NGUYEN: Objection form.

24 BY THE WITNESS:

25 A As I mentioned, a POSITA would have

1 understood that the frame buffer 506 stores content
2 from other sources not just internal media sources.

3 MR. SCHMIDT: Let's take a break.

4 (Brief recess taken)

5 BY MR. SCHMIDT:

6 Q Doctor, when you were preparing your
7 expert declarations in this matter were you given any
8 legal instruction on what it means for a prior art
9 reference to inherently disclose a feature as opposed
10 to expressly disclose a feature?

11 MS. NGUYEN: Objection form.

12 BY THE WITNESS:

13 A I think I have some basic understanding of
14 this but I'm not obviously a lawyer.

15 BY MR. SCHMIDT:

16 Q So when you were preparing your expert
17 analysis and your declarations in this case the lawyers
18 didn't give you any instruction on the distinction
19 between a prior art reference expressly disclosing a
20 concept and inherently disclosing a concept?

21 MS. NGUYEN: Objection. This is privileged
22 information. Dr. Katsaggelos, I instruct you not to
23 answer.

24 MR. SCHMIDT: You're claiming privilege over the
25 legal instructions this expert was provided?

1 MS. NGUYEN: It's a communication. It's also
2 work product.

3 MR. SCHMIDT: This is the legal instruction that
4 this witness was provided in order to form expert
5 opinions. You're claiming privilege over that?

6 MS. NGUYEN: Yes.

7 MR. SCHMIDT: Okay.

8 BY MR. SCHMIDT:

9 Q Doctor, you said you have original
10 declaration with you. Is that right?

11 A Yes, I do.

12 Q Do you see on page 10 of your original
13 declaration you have Section 5 Relevant Legal Standards
14 and Definitions?

15 A Yes.

16 Q Was that information provided to you by
17 the lawyers for Insta360 in this case?

18 MS. NGUYEN: Objection form.

19 BY THE WITNESS:

20 A Yes. The legal aspects of information was
21 provided by the counsel, yeah.

22 BY MR. SCHMIDT:

23 Q And in order to form your expert opinions
24 in this case you needed guidance from the lawyers on
25 what the law required, correct?

1 A By and large that's correct.

2 Q And in Section 5 you include a complete
3 articulation of the legal instruction that you were
4 provided by counsel for purposes of forming your expert
5 opinions?

6 MS. NGUYEN: Objection form.

7 BY THE WITNESS:

8 A That was the intention.

9 BY MR. SCHMIDT:

10 Q But there was no instruction about the law
11 that you were given by counsel that you didn't include
12 in Section 5 of your original declaration, is that
13 fair?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A Not intentionally, I did not exclude
17 anything intentionally.

18 BY MR. SCHMIDT:

19 Q You mentioned before that you weren't a
20 lawyer but you had maybe a layman's understanding of
21 what the difference is between an express and an
22 inherent disclosure in the prior art. Why don't you
23 tell me what that is.

24 MS. NGUYEN: Objection form.

25 BY THE WITNESS:

1 A Can you repeat your question, please.

2 BY MR. SCHMIDT:

3 Q Sure. I was asking you before whether you
4 had an understanding about the difference between a
5 prior art reference expressly disclosing a feature as
6 opposed to inherently disclosing a feature and you said
7 that you had some understanding about that and I would
8 like to understand what that is.

9 MS. NGUYEN: Objection form.

10 BY THE WITNESS:

11 A Yeah, my basic understanding is expressly
12 disclosed is that this item A is there and inherently
13 disclosed is an item B is there but in order to
14 accomplish B I need to utilize A.

15 BY MR. SCHMIDT:

16 Q And in the example you gave where B is
17 there but in order to accomplish B you need to utilize
18 A, in that example your understanding is that A would
19 be inherently disclosed?

20 MS. NGUYEN: Objection form.

21 BY THE WITNESS:

22 A Yes, that would be my understanding.

23 BY MR. SCHMIDT:

24 Q And if B is there but in order to
25 accomplish B you could utilize, say, C, then A would

1 not be inherent. Do you agree with that?

2 MS. NGUYEN: Objection, form, seeks a legal
3 conclusion.

4 BY THE WITNESS:

5 A I'm not following the logic to be honest.

6 BY MR. SCHMIDT:

7 Q I was just trying to play off your
8 analogy.

9 A I mean, I'm sorry. I don't mean to
10 interrupt you.

11 Q You said before that if the prior art
12 disclosed B but in order to use B you needed A, then A
13 would be inherent, right?

14 MS. NGUYEN: Objection, form.

15 BY THE WITNESS:

16 A That's the simple explanation that I can
17 provide right now.

18 BY MR. SCHMIDT:

19 Q And my question is, just playing off that
20 analogy, if B is there and there are other ways to
21 implement B besides A, like C for example, then A would
22 not be inherent in that situation, right?

23 MS. NGUYEN: Objection form.

24 BY THE WITNESS:

25 A I'm not sure if I can give an answer that

1 gets into legal aspects. The example I had in mind, if
2 it's disclosed that compression is taking place, for
3 example, image compression, and no encoder is
4 disclosed, I know that to compress an image I need an
5 encoder so the encoder is inherently disclosed. That's
6 my basic understanding.

7 BY MR. SCHMIDT:

8 Q Let me ask you this. In forming your
9 expert opinions in this proceeding with regard to the
10 '413 patent did you rely on any feature in any of the
11 prior art that you analyzed being inherently disclosed?

12 MS. NGUYEN: Objection form.

13 BY THE WITNESS:

14 A I'd have to look through the whole
15 document, the initial declaration, this second
16 declaration to see if this is the case.

17 BY MR. SCHMIDT:

18 Q But nothing comes to mind right now?

19 MS. NGUYEN: Objection form.

20 BY THE WITNESS:

21 A I cannot point to something specifically
22 right now.

23 BY MR. SCHMIDT:

24 Q Okay. Let's turn to paragraph 47 of your
25 supplemental declaration.

1 A Okay.

2 Q About five lines down you cite an
3 embodiment where the center of linearity and/or center
4 of compression of the Meulen display shifted to the
5 left or the right. Do you see that?

6 A Yes.

7 Q And then you cite to column 9 of Meulen.
8 Do you see that?

9 A Yes, I do.

10 Q And if you turn to column 9 of Meulen, do
11 you see that there is a Table 4?

12 A Yes, I do.

13 Q And do I understand correctly that Table 4
14 is an example of what you believe is this left shifted
15 center of linearity and/or compression?

16 MS. NGUYEN: Objection form.

17 BY THE WITNESS:

18 A Table 4 shows non-symmetric to the center
19 compression ratios. So, in other words, I'm looking at
20 the center, the left part is receiving like region 2 is
21 receiving a much higher compression ratio than region 4
22 at the other end.

23 BY MR. SCHMIDT:

24 Q And if you compare Table 4 to the
25 non-asymmetrical embodiments like in Table 2, for

1 example, the only difference between Table 2 and Table
2 4 is that the compression ratio has changed, correct?

3 MS. NGUYEN: Objection form.

4 BY THE WITNESS:

5 A The main difference between Table 2 and
6 Table 4 is that in Table 2 the compression ratios are
7 symmetric with respect to the central region while in
8 Table 4 they're asymmetric.

9 BY MR. SCHMIDT:

10 Q But there's no difference in Table 4 in
11 how the source pixels are allocated to regions as
12 compared to Table 2, correct?

13 A I am not sure I understand the question.

14 Q Well, just do you see the last line in
15 Table 4 source pixels?

16 A Yes.

17 Q Do you see the same number of source
18 pixels are being allocated to regions 1, 2, 3, and 4 as
19 are being allocated to those same regions in Table 2?

20 A Yes, I do. They're symmetric with respect
21 to the center.

22 Q So with respect to allocating portions of
23 the source image to the display regions in Meulen,
24 there's no difference between the symmetrical and
25 asymmetrical embodiments, fair?

1 MS. NGUYEN: Objection, form.

2 BY THE WITNESS:

3 A The difference is in the output image how
4 the pixels are displayed on the screen and, for
5 example, out of the 28 pixels on the right in the
6 source image, 4 pixels will be displayed in the screen
7 on the right-hand side while out of the 28 pixels in
8 the source image only two will be displayed on the
9 screen for the leftmost image.

10 BY MR. SCHMIDT:

11 Q That's the result of applying a different
12 transformation for those respective regions between the
13 two embodiments, correct?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A Can you repeat the question.

17 BY MR. SCHMIDT:

18 Q Sure. The reason why the output image has
19 different pixels in those regions is because there's a
20 different transformation being applied to those regions
21 between the two embodiments, correct?

22 A Again, in Table 2 in that embodiment the
23 compression ratio is symmetric so 28 input pixels map
24 into 4 output pixels for the left, right outmost
25 regions, while in Table 4 this is not the case and the

1 28 pixels, source pixels on the left are having higher
2 compression ratio 14:1 versus the 28 on the very right
3 that only have a 7:1 compression ratio.

4 Q My question is that's not because the
5 regions are being drawn differently between the two
6 embodiments, that's because a different transformation
7 is being applied in each of the respective regions
8 between those two embodiments, correct?

9 MS. NGUYEN: Objection form.

10 BY THE WITNESS:

11 A The user specifies how the image will be
12 displayed so the user has control over this
13 magnification or how many, again, pixels will be
14 displayed from the leftmost and coming from the
15 rightmost region.

16 BY MR. SCHMIDT:

17 Q My question was just that the reason why
18 the output image is going to have less pixels on the
19 left-hand side in the asymmetric embodiment is because
20 the compression ratio is higher in the asymmetric
21 embodiment for the left-hand side, correct?

22 MS. NGUYEN: Objection form.

23 BY THE WITNESS:

24 A The compression ratio results in a
25 different number of pixels but that's part that the

1 user controls.

2 BY MR. SCHMIDT:

3 Q The regions remain the same between the
4 two embodiments, fair?

5 MS. NGUYEN: Objection form.

6 BY THE WITNESS:

7 A The reason is the user says that for this
8 region I want the higher compression ratio than for
9 this region in effect.

10 BY MR. SCHMIDT:

11 Q But the relationship between the regions
12 and the source pixels is exactly the same between the
13 two embodiments, correct

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A The user controls something, right, and
17 the user controls, you might say, the compression ratio
18 or controls the magnification effect, controls how much
19 compression and therefore how many pixels will be
20 displayed at the output so this is the user control.

21 BY MR. SCHMIDT:

22 Q Let me ask one more time. Comparing the
23 symmetrical embodiment in Table 2 to the asymmetric
24 embodiment in Table 4, the relationship between the
25 regions and the source pixels is exactly the same,

1 isn't that true?

2 MS. NGUYEN: Objection, asked and answered.

3 BY THE WITNESS:

4 A What I'm saying is the user controls this
5 mapping. This is the whole point here that Meulen
6 discloses that through the navigation button, for
7 example, 122, the user controls if the image will be
8 shifted right or left, will be magnifying, so that's
9 the important point here so that's what the user
10 controls.

11 BY MR. SCHMIDT:

12 Q I couldn't quite hear your answer at the
13 beginning. Did you say yes and agree with my question
14 or did you just provide your response?

15 A No, no. I said that what Meulen discloses
16 is that the user has control through this navigation
17 button of shifting the regions right or left so that's
18 the determination that the user is doing after the
19 input image is obtained.

20 Q Let me ask you this. Comparing the source
21 pixel line in Table 2 to Table 4, do you see that in
22 Table 2 the center region, region 5, has 200 source
23 pixels?

24 A Yes, I do.

25 Q And in Table 4 the center region, region

1 5, has 230 source pixels. Do you see that?

2 A I see that.

3 Q Do you interpret that to be a mistake in
4 Meulen? The reason I ask is because if you sum the
5 pixels in Table 4 it adds up to more than 480.

6 MS. NGUYEN: Objection form.

7 BY THE WITNESS:

8 A If that's the case, if the number of
9 pixels, the source pixels do not add up to 480, there's
10 probably a typo, but the main point is that the center
11 region there has one-to-one correspondence so 230 to
12 230.

13 BY MR. SCHMIDT:

14 Q And that center region, the way you
15 understand Meulen, is going to be the same portion of
16 the display in both the symmetrical and asymmetrical
17 embodiments, correct?

18 MS. NGUYEN: Objection, form.

19 BY THE WITNESS:

20 A These are all different embodiments here
21 and the main point is that in this embodiment the
22 central region is uncompressed but in another
23 embodiment there might be compression in the central
24 region as well and the number of regions changes and so
25 on and so forth.

1 BY MR. SCHMIDT:

2 Q But do you understand in Meulen whether
3 the difference from Table 2 to Table 4 results in the
4 center region being any different with respect to the
5 physical space on the screen or is it the same center
6 region between the two embodiments?

7 MS. NGUYEN: Objection form.

8 BY THE WITNESS:

9 A Yeah, these are embodiment examples and
10 if, again, there's a typo in Table 4 as you mentioned
11 in the center region and it's a typo, yeah, if it's
12 over 480 we can distribute the pixels any way we want,
13 I guess, but these are examples. I have four regions
14 of 5 or 7 or N in general and going to a very, very
15 large number, but the main point is that the user can
16 control how much compression to perform on the left or
17 the right of the image and therefore if the compression
18 ratios are not symmetric you end up shifting the image
19 to the left or to the right. That's what is disclosed
20 here.

21 BY MR. SCHMIDT:

22 Q In the asymmetric embodiment in Table 4
23 that you rely on, what's the portion?

24 MS. NGUYEN: Objection.

25 BY THE WITNESS:

1 A So we have here an input, an output, and a
2 compression ratio. So if I define the compression
3 ratio, I define the input/output relationship, I can
4 define the output, and if I know the compression ratio
5 I can find the input, so we need to understand what is
6 the user, you know, what is the user controlling here
7 and then the compression ratios, depending how they're
8 implemented, can be a continuum or it can be a discrete
9 set of the compression ratios so all of this has to gel
10 together for this to make sense. I cannot just pick
11 all these three independently. Right?

12 BY MR. SCHMIDT:

13 Q Well, in paragraph 47 you say that this
14 embodiment in column 9 teaches determining a portion as
15 claimed by the '413 patent, correct?

16 MS. NGUYEN: Objection form.

17 BY THE WITNESS:

18 A 47 is determining a portion of regions
19 based on user control. That's the main emphasis in 47.

20 BY MR. SCHMIDT:

21 Q And you cite the embodiment in column 9
22 which describes Table 4, correct?

23 A 9:1 to 10:6.

24 Q So focusing on Table 4 of Meulen, can you
25 tell me what portion has been determined?

1 A So in this embodiment of Table 4 the
2 portions in the input image are those ones that show
3 the source pixels there of 28, 32, 32, and so on.

4 Q So is it your opinion that the allocation
5 of the source pixels to the display region in Meulen is
6 the determining a portion?

7 MS. NGUYEN: Objection form.

8 BY THE WITNESS:

9 A The determining a portion is determining
10 the regions of the image corresponding to the central
11 region, the lateral regions of the display.

12 BY MR. SCHMIDT:

13 Q And that's reflected in the source pixel
14 line of Table 4?

15 MS. NGUYEN: Objection form.

16 BY THE WITNESS:

17 A In 42 I have the whole analysis that
18 Meulen determines the regions of the image
19 corresponding to the central region and lateral regions
20 of the display.

21 BY MR. SCHMIDT:

22 Q And does your opinion in 42 about
23 determining the regions corresponding to the central
24 region and lateral regions of the display, do those
25 opinions apply equally to the opinions you express in

1 paragraphs 47 and 48?

2 MS. NGUYEN: Objection form.

3 BY MR. SCHMIDT:

4 Q And 49?

5 A I'm sorry. Can you repeat the question.

6 Q You know, I'll withdraw the question. Let
7 me just ask you this.

8 In Figure 4 with respect to -- I'm
9 sorry strike that.

10 With respect to your opinions in
11 paragraph 47, do I understand correctly that
12 determining a portion is the allocation of the source
13 pixels to these nine display regions?

14 MS. NGUYEN: Objection form.

15 BY THE WITNESS:

16 A The determining a portion, as I state in
17 42, Meulen determines the regions of the image
18 corresponding to a central region and lateral regions
19 of the display so the display is what -- the dimensions
20 of the display is what they're known and the regions
21 are determined with respect to the display.

22 BY MR. SCHMIDT:

23 Q Let me just ask you this about Table 4.
24 Before I pointed it out to you had you recognized that
25 there was a typo in the number of source pixels in

1 region 5?

2 A I think I had seen that. It's probably in
3 my notes in the version of the patent that I used.

4 Q But the fact that region 5 in Table 4 says
5 230 rather than 200 wasn't a factor in forming your
6 expert conclusions in this case?

7 MS. NGUYEN: Objection form.

8 BY THE WITNESS:

9 A It does not change anything in my
10 opinions. It's a typo.

11 BY MR. SCHMIDT:

12 Q Let's turn to paragraph 82 of your
13 declaration.

14 A Okay.

15 Q In paragraph 82 you cite new evidence for
16 a variety of cameras that you claim were on the market
17 prior to the critical date of the '413 patent, correct?

18 MS. NGUYEN: Objection form.

19 BY THE WITNESS:

20 A This is not new evidence. In my opening
21 declaration I had stated, and I'm reading from what's
22 in 82, some cameras at the time had an image sensor
23 having one aspect ratio such as 3:2 or 4:3 and
24 displayed the stored files of the captured images
25 having another aspect ratio such as 16:10, 16:9, or 4:3

1 and this was what I stated in my opening declaration.

2 BY MR. SCHMIDT:

3 Q But for purposes of your reply
4 declaration, you've gone out and found some actual
5 documentation that supports those points, correct?

6 MS. NGUYEN: Objection form.

7 BY THE WITNESS:

8 A I list here the different cameras in
9 response to the request by the Board to provide
10 evidence of that statement I had in my declaration but,
11 indeed, there were cameras in the market back then and
12 based on that request I'm providing here examples of
13 cameras.

14 BY MR. SCHMIDT:

15 Q And you cite some documents like Exhibit
16 1027, 1028, et cetera. Correct?

17 A Yeah, I don't have memorized what 1027 and
18 1028 is.

19 Q That's fine. My question is where do
20 those documents come from?

21 MS. NGUYEN: Objection form.

22 BY THE WITNESS:

23 A The documents that relate to these
24 cameras?

25 BY MR. SCHMIDT:

1 Q Yes.

2 A This was something that was done working
3 together with the counsel.

4 Q Did you personally search for those
5 documents?

6 A I had proposed some cameras and some were
7 proposed so it was a collaborative effort I would say.

8 Q When did the search for documentation
9 about publicly available cameras start?

10 MS. NGUYEN: Objection form.

11 BY THE WITNESS:

12 A I don't recall the exact time.

13 BY MR. SCHMIDT:

14 Q Do you know how much time was spent
15 carrying out this search for documentation about these
16 publicly available cameras?

17 A It's hard to estimate. We had considered
18 even cameras that when the statement was made in the
19 opening report that there were cameras at that time
20 that were doing aspect ratio conversion, yeah, I had
21 looked for some cameras but I don't know the specific
22 time frame as to when it started and when it ended.

23 Q Do you believe that an exhaustive search
24 for documentation relating to publicly available
25 cameras was carried out?

1 MS. NGUYEN: Objection form.

2 BY THE WITNESS:

3 A I don't know if a search is exhaustive.
4 There may be other models out there, these are just
5 some examples we were able to find.

6 BY MR. SCHMIDT:

7 Q Do you believe that the examples in the
8 documentation that you cite in your declaration are
9 representative of what was available in the prior art
10 prior to the '413 patent's critical date?

11 MS. NGUYEN: Objection form.

12 BY THE WITNESS:

13 A What do you mean by representative?

14 BY MR. SCHMIDT:

15 Q Do you think they represent the state of
16 the art prior to the '413 patent?

17 A That's a hard to evaluate question. Some
18 of the brands like Canon is a well known camera brand,
19 for example. Olympus is another known brand, Fuji
20 Film, and so on.

21 Q So by my count you've cited four publicly
22 available cameras: The Canon PowerShot G15, the
23 Olympus PEN E-PL5, the Fuji Film XF1, and the Casio
24 Exilim, is that correct?

25 A That seems to be the case, yes.

1 Q And you're not willing to say that these
2 four examples you provided were representative of the
3 state of the art prior to the '413 patent?

4 MS. NGUYEN: Objection form.

5 BY THE WITNESS:

6 A I cannot define what the state of the art
7 is. These are well known brands in cameras that most
8 people would recognize, Canon, Olympus. Typically
9 these are the brands that have good models out in the
10 market but I cannot define what the state of the art is
11 at that point in time.

12 BY MR. SCHMIDT:

13 Q That's not something you did as part of
14 your expert analysis?

15 MS. NGUYEN: Objection form.

16 BY THE WITNESS:

17 A It's not a straightforward task to define
18 what the state of the art in a camera or any product
19 for that matter is.

20 BY MR. SCHMIDT:

21 Q You mention in paragraph 84 that each one
22 of these four examples that you've identified have what
23 you call downsides, right?

24 A Yes, I mention possible downsides as
25 reported by two products, the Canon and the Olympus

1 one.

2 Q For example, the Canon would crop images
3 so that what was shown on the display had a smaller
4 resolution than uncropped images, correct?

5 MS. NGUYEN: Objection form.

6 BY THE WITNESS:

7 A Yeah, the cropped images resulted in
8 smaller resolution than uncropped and that can be
9 thought of as a downside.

10 BY MR. SCHMIDT:

11 Q And you point out that the Olympus product
12 when it would display images would have black bars from
13 cropping, correct?

14 A Yes, that's what I mention with respect to
15 the Olympus.

16 Q And are you familiar with the term pillar
17 boxing?

18 A I'm sorry?

19 Q Pillar boxing?

20 A I'm not sure.

21 Q You never heard the term pillar boxing?

22 A How do you spell it?

23 Q P-i-l-l-a-r, space, b-o-x-i-n-g.

24 A I'm not familiar with that.

25 Q Basically two black bars on the side of an

1 image when you change the aspect ratio. Are you
2 familiar with that concept?

3 A The concept, yes.

4 Q And then sometimes you have to put two
5 black bars at the top and bottom, that's called letter
6 boxing. Have you heard that?

7 A I understand the concept, yes.

8 Q And that's how the Olympus dealt with a
9 mismatch between aspect ratios between the image sensor
10 and the display, correct?

11 MS. NGUYEN: Objection.

12 BY THE WITNESS:

13 A Yeah, with reference to the 16:9 display
14 that is what the report mentioned here.

15 BY MR. SCHMIDT:

16 Q And then you also mention that other
17 conventional cameras would introduce perceivable
18 distortion from linear scaling. Do you see that?

19 A Yes, I see that.

20 Q And that's mentioned in some of the
21 documents related to the publicly available cameras as
22 well, right?

23 MS. NGUYEN: Objection form.

24 BY THE WITNESS:

25 A I don't have a reference here for linear

1 distortion.

2 BY MR. SCHMIDT:

3 Q Do you recall?

4 A This cropping and linear distortion are
5 techniques that were used, yeah, in these cameras,
6 maybe other products, yeah, they kind of put all three
7 together.

8 Q And those were all what you call downsides
9 with the conventional approach to aspect ratio
10 conversion, correct?

11 A For the reasons stated, you reduce
12 resolution, you have black bars that produce
13 perceivable distortions, yeah, this was what was known.

14 Q Turn to paragraph 53 Of your supplemental
15 declaration or reply declaration.

16 A Okay.

17 Q In the first sentence of paragraph 53 you
18 describe a passage in Meulen that discusses image
19 compression and/or scaling being applied progressively.
20 Do you see that?

21 A Yes, I do.

22 Q And this is the embodiment where Meulen
23 talks about increasing the number of display regions,
24 for example, 30 or more, correct?

25 A Yes.

1 Q And those embodiments are reflected in
2 Figures 4A through 4C of Meulen, correct?

3 A That's correct.

4 Q Let's just take a look at those figures
5 which you've reproduced on paragraph 30. On those
6 figures, the Y axis is compression factor. Do you see
7 that?

8 A I'm sorry. Paragraph 30?

9 Q No. Page 30.

10 A Sorry.

11 Q And the question is the Y axis for Figures
12 4A through 4C is compression factor, correct?

13 A That's correct.

14 Q And that's how much the pixels within a
15 particular display region are going to be compressed.
16 Fair?

17 MS. NGUYEN: Objection form.

18 BY THE WITNESS:

19 A Yes. So the tables we were looking at
20 earlier, this is compression ratio in those tables.

21 BY MR. SCHMIDT:

22 Q And what's plotted on the X axis is the
23 corresponding display region, correct?

24 A That's correct.

25 Q And those are the regions that comprise

1 some number of pixels from the source image, fair?

2 A These are the pixels on the display.

3 Q The X axis is the pixels on the display?

4 A It says display regions.

5 Q Display region is like the regions 1
6 through 9 in the tables that we saw before, correct?

7 MS. NGUYEN: Form.

8 BY THE WITNESS:

9 A The regions is composed by pixels on the
10 screen, right, so it says that the central region, for
11 example, display region, the compression ratio is 1:1
12 so that's one pixel there or a hundred pixels there on
13 the screen would correspond to a hundred pixels in the
14 source image.

15 BY MR. SCHMIDT:

16 Q But the Meulen prior art reference draws a
17 distinction between display regions and pixels. Do you
18 agree with that?

19 MS. NGUYEN: Objection form.

20 BY THE WITNESS:

21 A In the display region the region consists
22 of pixels.

23 BY MR. SCHMIDT:

24 Q Right. So any one display region in
25 Meulen is comprised of multiple pixels, correct?

1 A Screen pixels, right?

2 Q Yes.

3 A Yeah.

4 Q And what's being plotted on the X axis?

5 A Sorry to interrupt. Is it possible to
6 take a break?

7 MR. SCHMIDT: Sure. We can take a break.

8 THE WITNESS: Sorry about that. Thank you. Like
9 10 minutes.

10 MR. SCHMIDT: 5 minutes?

11 THE WITNESS: 5 minutes is fine. Thank you.

12 MR. SCHMIDT: All right.

13 (Brief recess taken)

14 BY MR. SCHMIDT:

15 Q Doctor, during your short break did you
16 have any discussions with counsel regarding the
17 substance of any of your testimony?

18 A No. I just run to the bathroom.

19 Q All right.

20 We were talking about Figures 4A
21 through 4C. Can you we agree, Doctor, that the X axis
22 is labeled display regions?

23 A Yes.

24 Q And display regions are something
25 different than pixels in Meulen, correct?

1 MS. NGUYEN: Objection form.

2 BY THE WITNESS:

3 A I don't see it that way. I see that the
4 display region is comprised, constituted, includes
5 pixels, so when I see a display region there, the
6 central region, it consists of a number of pixels.

7 BY MR. SCHMIDT:

8 Q Each point on the X axis of Figures 4A
9 through 4C consist of some number of pixels, fair?

10 A Or a pixel. I mean, we say continuously,
11 it's a continuous line, but if we were to put ticks
12 there it would be the location of the pixels.

13 Q But all of the display regions in Meulen
14 are regions that are comprised of multiple pixels. Do
15 you agree with that?

16 A The regions have pixels but if the number
17 of regions becomes very, very large, we would have only
18 one pixel in a region possibly as we say when it
19 becomes very large.

20 Q So what Figures 4A through 4C are showing
21 is a plot of some finite number of display regions and
22 the corresponding compression ratio for the pixels in
23 each of those regions, fair?

24 MS. NGUYEN: Objection form.

25 BY THE WITNESS:

1 A These figures show continuous curves.
2 They show a compression factor that increases
3 asymptotically to very, very large, right, so we have
4 to take into account that in life we have discrete
5 pixels, discrete regions, discrete compression factors,
6 so we have to do this conversion in the back of our
7 mind when we look at a picture like this. So the main
8 point is that the compression factor increases
9 asymptotically to infinity if we are to interpret this
10 becomes very, very, very large as we approach the edges
11 of the display and it can be done symmetrically or
12 asymmetrically.

13 BY MR. SCHMIDT:

14 Q But you can't have infinite display
15 regions on a display. Can we agree on that?

16 A Of course not, but I'm interpreting the
17 continuous curves we see here in Figures 4A, B, C.

18 Q So we agree Figures 4A through 4C are
19 showing some finite number of display regions of the
20 screen, correct?

21 A Well, finite but potentially very large.

22 Q And for each one of those display regions
23 the curves will tell us what the corresponding
24 compression factor is for the pixels within that
25 region, fair?

1 MS. NGUYEN: Objection form.

2 BY THE WITNESS:

3 A This is the intention of the curves but
4 these are being continuous curves if somebody is to
5 implement these curves. These are to indicate the
6 concept and the potential of having a very large number
7 of regions but in practice, as you said, we could have
8 an infinite number of display regions, and I agree with
9 that, but, you know, a million is not infinite, it's a
10 very large number, so depending on the size of the
11 screen and also the compression ratios is not a
12 continuum, it's not like you have 19.5 over 1
13 compression ratio, right, it's an integer of course,
14 but also, you know, have a certain set. So if one is
15 going to implement these curves, all of these things
16 are worth mentioning and some others have to be taken
17 into account.

18 BY MR. SCHMIDT:

19 Q Okay. In paragraph 55 you mention the
20 concept of sample rate conversion. Do you see that?

21 A Yes, I see that.

22 Q In general what does a POSITA understand
23 sample rate conversion to mean?

24 A Sample rate conversion is a term used in
25 signal processing and it means that something great

1 changes. So if I have a speech signal, for example,
2 the standard bandwidth of spoken speech is 4 kHz, you
3 sample twice that at 8 kHz so you have a signal at 8
4 kHz, which means 8,000 samples per second, and let's
5 say you want to change this to 7,000 samples per second
6 or 1,000 or double it, 20, 18, 16, so changing the
7 sampling rate, that's the meaning of this changing, the
8 number of values you have over time or over space, so
9 that's the meaning of the term sample rate conversion,
10 presenting a signal with a larger or smaller number of
11 samples.

12 Q And in Meulen is it the case that the
13 sample rate conversion relates to how many finite
14 display regions the screen is divided into?

15 MS. NGUYEN: Objection.

16 BY THE WITNESS:

17 A The sample rate conversion in Meulen
18 refers to how to implement the compression of the
19 signal for a specific ratio.

20 BY MR. SCHMIDT:

21 Q In paragraph 55 you point out that Meulen
22 talks about implementing the sample rate conversion in
23 registers rather than random access memory. Do you see
24 that?

25 A Yes, I do.

1 Q What is the significance of that?

2 A He's talking about past implementations of
3 this sample rate conversion which is the compression
4 that Meulen teaches.

5 Q Does implementing the sample rate
6 conversion in registers rather than random access
7 memory have any impact on your invalidity opinions?

8 MS. NGUYEN: Objection form.

9 BY THE WITNESS:

10 A This is an example of an implementation
11 that Meulen proposes. In other prior art, yeah, they
12 might propose other implementations but this is one of
13 the many ways to perform the sample rate conversion
14 which will give us the compression that Meulen is
15 talking about. He's also talking about using polyphase
16 filters, for example, to do sample rate conversion.

17 BY MR. SCHMIDT:

18 Q What I'm really trying to understand is
19 why you're pointing this out in the declaration. Does
20 implementing sample rate conversion in registers rather
21 than random access memory have anything to do with
22 whether or not Meulen renders the claims obvious in
23 your mind?

24 A This is an example of an implementation
25 that Meulen brings up to indicate that some of his

1 operations can be done in a faster way than others but
2 it doesn't change anything from the arguments I'm
3 presenting. But as I state there, the memory and
4 processing discussed in Meulen refer to the memory and
5 processor included within the wireless device so that's
6 the whole meaning of 55 there.

7 Q And when Meulen performed sample rate
8 conversion, is that just referring to applying more
9 compression factors for an increasing number of display
10 regions?

11 MS. NGUYEN: Objection form.

12 BY THE WITNESS:

13 A Sample rate conversion is what Meulen
14 teaches to be applied in each of the display regions
15 independently of how many regions we have. It's one of
16 the ways to perform this compression.

17 BY MR. SCHMIDT:

18 Q I see. You point out in paragraph 56 that
19 implementing a polyphase filter is one example of
20 sample rate conversion. Do you see that?

21 A Yes.

22 Q And implementing a polyphase filter is
23 the--strike that.

24 Implementing a polyphase filter is the
25 sample rate conversion technique that is expressly

1 taught in the Meulen reference, correct?

2 A Yeah. A polyphase filter is one example
3 that Meulen brings up in performing sample rate
4 conversion.

5 Q But your contention is that sample rate
6 conversion can refer to any one of a number of
7 different techniques?

8 A Yeah. Sample rate conversion is a general
9 term in signal processing which means really what the
10 words say how to change the sample rate. This is the
11 sample or sampling rate, the rate by which a sampling
12 continues signal, that's where it originates, but at
13 the end of the day you have a discrete signal that has
14 so many samples either in one region as in an image,
15 like here I have a hundred pixels, a hundred values, a
16 hundred samples, and can I represent this hundred with
17 50, that's the example that is pertinent to this, but I
18 gave another example if we have a speech signal or so,
19 so it's a specific term in signal processing that
20 includes a number of techniques to perform sample rate
21 conversion.

22 Q And the mere mention of sample rate
23 conversion doesn't necessarily imply any one particular
24 technique for doing the sample rate conversion in the
25 context of image processing, is that fair?

1 MS. NGUYEN: Objection form.

2 BY THE WITNESS:

3 A Yeah, image processing borrows a lot of
4 things from signal processing, it's a signal image, we
5 don't have time, we have space, but it refers to a
6 number of ways one can use to perform the sample rate
7 conversion.

8 MR. SCHMIDT: Okay. Those are all of my
9 questions, Doctor, so thank you for your time and I'll
10 pass the witness.

11 MS. NGUYEN: Can we take a break?

12 MR. SCHMIDT: Sure.

13 (Brief recess taken)

14 MS. NGUYEN: We have no questions. Thank you.

15 MR. SCHMIDT: Okay. Off the record.

16 (Adjourned at 12:49 p.m.)

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UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
ARASHI VISION (US) LLC (D/B/A INSTA360)
Petitioner,

v.

GOPRO, INC.
Patent Owner.
CASE NO. IPR2024-00984
US PATENT NO. 10,015,413

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DR. AGGELOS KATSAGGELOS

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Diana G. Rodriguez, RPR

CSR No. 084-002945

1 JEAN NGUYEN, ESQ.

2 jnguyen@mofo.com

3 August 14, 2025

4 RE: Arashi Vision Inc. v. Gopro, Inc.

5 8/7/2025, Dr. Aggelos Katsaggelos, (#7526228).

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Federal Rules of Civil Procedure

Rule 30

(e) Review By the Witness; Changes.

(1) Review; Statement of Changes. On request by the deponent or a party before the deposition is completed, the deponent must be allowed 30 days after being notified by the officer that the transcript or recording is available in which:

(A) to review the transcript or recording; and

(B) if there are changes in form or substance, to sign a statement listing the changes and the reasons for making them.

(2) Changes Indicated in the Officer's Certificate. The officer must note in the certificate prescribed by Rule 30(f)(1) whether a review was requested and, if so, must attach any changes the deponent makes during the 30-day period.

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THE ABOVE RULES ARE CURRENT AS OF APRIL 1, 2019. PLEASE REFER TO THE APPLICABLE FEDERAL RULES OF CIVIL PROCEDURE FOR UP-TO-DATE INFORMATION.

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