

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2 -----

3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4 -----

5 ARASHI VISION (U.S.) LLC (D/B/A INSTA360)

Petitioner,

6
7 VS.

8 GOPRO, INC.,

Patent Owner.

9 Patent No. 10,574,840

10 -----

11 Inter Partes Review No. IPR2024-01186

12
13 LOCATION: Veritext Orlando
800 North Magnolia Avenue
Suite 400
Orlando, Florida 32803
14
15 DATE: July 11, 2025
16 TIME: 10:00 a.m. - 11:36 a.m.

17
18
19 DEPOSITION OF DR. HASSAN FOROOSH

20
21
22 Taken before Julie Giordano, Florida
23 Professional Reporter, Notary Public in and for the
24 State of Florida at Large, pursuant to Notice of
25 Taking Deposition filed in the above case.

Page 1

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I N D E X

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E X H I B I T S
None marked.

1 Thereupon,

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

5 THE WITNESS: I do.

6 DIRECT EXAMINATION

7 BY MS. MAO:

8 Q. Good morning --

9 A. Good morning.

10 Q. -- Professor. Could you please state
11 your full name, please?

12 A. Hassan Foroosh.

13 Q. Do you understand that you're under
14 oath today?

15 A. Yes.

16 Q. Is there any reason you cannot testify
17 truthfully or accurately today?

18 A. No.

19 Q. You understand the depo procedures,
20 right?

21 A. Yes.

22 Q. Okay. And just so we are clear on the
23 record, you're -- you understand that you're here
24 to testify about three IPR proceedings, correct?

25 A. Yes.

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1 Q. And those proceedings are
2 IPR2024-01164, IPR2024-01165 and IPR2024-01186.

3 Do you understand that?

4 A. Yes.

5 Q. And again, just so we are clear,
6 unless I specify, my questions apply to all three
7 proceedings.

8 Do you understand that?

9 A. Yes.

10 Q. Okay. And if you have questions about
11 which proceeding my question applies to, please
12 just ask me.

13 A. I will.

14 Q. Okay. Great.

15 How many depositions have you
16 participated in?

17 A. You mean in the past?

18 Q. Yeah, in the past.

19 A. I don't remember the exact number, but
20 probably somewhere between eight to ten.

21 Q. When was your first deposition?

22 A. When it was my first deposition?

23 Q. Correct.

24 A. A few years back. I don't remember
25 the exact year.

1 Q. Okay. Five years ago or --

2 A. Maybe. Maybe around five years ago.
3 I don't exactly remember.

4 Q. What was the subject matter?

5 A. I'm not sure if I'm allowed to talk
6 about the subject matter, so -- but if it's -- I
7 can tell you that it was -- I was representing
8 Align Technology.

9 Q. Was it in -- about an IPR proceeding?

10 A. Yes.

11 Q. How did you test -- how did you
12 prepare for your deposition today?

13 A. I had, with the counsel, Mr. Schmidt,
14 multiple Zoom meetings. And we went through my
15 declarations and the exhibits that I've cited.

16 Q. How long in total were those Zoom
17 meetings?

18 A. Each meeting was about between two to
19 three hours. We had -- I don't remember -- three
20 or four meetings.

21 Q. Okay. So about ten hours?

22 A. Yeah. Roughly.

23 Q. Did you speak to anyone besides
24 Mr. Schmidt?

25 A. You mean in preparing?

1 Q. Correct.

2 A. No.

3 Q. You did not talk to anyone from GoPro?

4 A. No.

5 Q. And you submitted two declarations for

6 each of the three proceedings, correct?

7 A. Correct.

8 Q. And I represent to you that one

9 declaration is for the patent owner preliminary

10 response and the other one is for the patent owner

11 response, correct?

12 A. Correct.

13 Q. So you submitted six declarations in

14 total for those three proceedings, right?

15 A. Correct.

16 Q. I want to talk to you about your

17 experience a little bit, Professor. What is your

18 current occupation?

19 A. I'm a professor at the University of

20 Central Florida in the computer science department.

21 I also have courtesy appointment with the

22 electrical engineering department.

23 Q. How long have you been a professor at

24 the University of Central Florida?

25 A. I joined in 2002.

1 Q. And what does your research involve?

2 A. My area of research is computer
3 vision, image processing, machine learning and more
4 recently natural language processing, in
5 particular, large language models.

6 Q. Could you briefly walk me through your
7 educational background?

8 A. You mean all the way back to what
9 level? Can you clarify?

10 Q. Maybe undergrad.

11 A. Undergrad, sure. I did my undergrad
12 in England, Kingston University, and I did my first
13 master's degree also -- that was in electrical
14 engineering. I did my first master's degree also
15 over there, same university, Kingston University,
16 also in electrical engineering.

17 Then I moved back to France and I did
18 my second master's degree in computer science, more
19 specialized in computer vision, at the University
20 of Nice. And I did also my Ph.D., same university.
21 I received my Ph.D. in 1996.

22 Q. What area did you receive your Ph.D.
23 in?

24 A. So the general area, computer science,
25 but specializing in computer vision and image

1 processing.

2 Q. When you were at your Ph.D. program,
3 did you work on anything related to video
4 stabilization?

5 A. During my Ph.D. program, I don't
6 recall working exactly what could be referred to as
7 video stabilization, but I did work on video frame
8 alignments which was used as part of another --
9 another problem.

10 Q. What does video stabilization mean to
11 you?

12 A. I mean, you're asking a general
13 question. I'm not sure if I opined on that. If --
14 would you like to refer me to any one of my
15 declarations?

16 Q. No. I'm just talking about as a
17 person who, you know -- who has a Ph.D. in area --
18 image processing and has been a professor in the
19 field of image processing for over 20 years, what
20 is your understanding of video stabilization?

21 MR. SCHMIDT: Objection to form.

22 THE WITNESS: Again, I don't believe I
23 have opined on that, so if you show me
24 where I opine on that, I would be more than
25 glad to go over that in one -- any one of

1 my declarations.

2 BY MS. MAO:

3 Q. Okay. So you didn't opine on what
4 video stabilization means?

5 MR. SCHMIDT: Objection. Form.

6 THE WITNESS: What I'm saying is that
7 I did not provide any constructions, so, I
8 mean, unless you refer me to a specific
9 point where I opined on that or provide a
10 construction, then I would be more than
11 glad to discuss it.

12 BY MS. MAO:

13 Q. If your student asks you what is video
14 stabilization, what would you say to your student?

15 A. Again, this is a hypothetical
16 question.

17 Q. Uh-huh.

18 A. And I see that you're asking me to
19 provide the construction, but I did not provide a
20 construction what video stabilization means, give a
21 definition for that. And if you show me where I
22 did that, I would be more than glad to...

23 Q. I don't think you provided a
24 construction for video stabilization. But sitting
25 here today, you cannot give me an answer as to what

1 in your mind video stabilization means, correct?

2 MR. SCHMIDT: Objection to form.

3 THE WITNESS: Again, that would
4 require me to provide some definition which
5 would -- from my point of view, which would
6 be a construction. I'm saying that I did
7 not provide any opinion, I did not render
8 any opinion what video stabilization means.

9 BY MS. MAO:

10 Q. Do you have an opinion as to what the
11 basic steps of video stabilization are?

12 MR. SCHMIDT: Objection to form.

13 THE WITNESS: Same as before. I did
14 not opine on the steps, if any, required to
15 do video stabilization.

16 BY MS. MAO:

17 Q. Dr. Foroosh, I think in your
18 declarations you said that you've done research
19 using GoPro cameras, correct?

20 A. Correct.

21 Q. Can you tell me -- let's walk through
22 those projects. What was the first project that
23 you did using a GoPro camera?

24 A. They were all the same project,
25 plus -- same projects I received funding from the

1 State of Florida also. They were funded by a
2 company called Jackson Technologies. And I don't
3 remember off the top of my head -- you probably
4 have it in my declaration or my CV -- when that
5 project started. But the problems we were looking
6 at was creating 3D models of the environment of a
7 flying aircraft.

8 Q. Okay. So you're saying you only did
9 one project using GoPro cameras?

10 A. It came through multiple fundings,
11 so -- but it was a continuation of the same
12 project. So it may appear as multiple funding as
13 if, you know -- so let's say an initial funding, a
14 project was completed and, you know, deliverables
15 and reports, and then the company came back,
16 continue -- you may call it a second project, but
17 I -- from my point of view, we were continuing on
18 similar problems expanding on the original project.

19 Q. I understand -- I understand.

20 Do you know when the project started?

21 A. I don't remember off the top of my
22 head. Maybe 2014. I don't remember really, I
23 mean, but I guess you have it in my CV.

24 Q. Okay.

25 A. So I can tell you -- I mean, if we go

1 through my CV, I can show you, or in my
2 declaration, I can -- I can tell you -- I'm not
3 sure if I included the year here.

4 Q. Just for the record, which declaration
5 are you looking at, if you don't mind --

6 A. I'm looking --

7 Q. -- mentioning the IPR number and the
8 exhibit number?

9 A. Yes. I'm looking at the --
10 U.S. Patent '894. The IPR number is 01186, and the
11 exhibit number is 2018.

12 Q. Thank you.

13 A. Again, I don't remember if in my
14 declaration I mentioned what year I did this.
15 Yeah. So -- yeah, I believe on page 5 -- yeah,
16 I'm -- somewhere after halfway through the page,
17 I'm saying that -- on page 5 of that same document,
18 of course, my declaration -- I say from 2013 to
19 2018, I received related funding from the Florida
20 High Tech -- okay. So, originally -- I'm sorry.
21 Go back a few lines back, I say from 2012 to 2018,
22 I received funding from Jackson Technologies. So
23 between 2012 and 2018, I was working on those
24 projects.

25 Q. Which -- do you remember which GoPro

1 camera model that you used?

2 A. Off the top of my head, I don't
3 remember, no.

4 Q. Did you use any GoPro software?

5 A. One of the motivations of using GoPro
6 camera was that we looked at multiple different
7 cameras, and the motivation behind choosing GoPro
8 was specific features that they had.

9 Q. Which specific features?

10 A. Like -- like, you know, wide view,
11 SuperView or -- I don't remember off the top of my
12 head, but we looked at multiple features. And we
13 decided that for the application that we are
14 looking for, it's a better suited camera than the
15 ones -- other ones that were in the market.

16 Q. Which other cameras you looked at?

17 A. I don't remember off the top of my
18 head.

19 Q. Are they similar cameras to -- or --
20 to GoPro's camera that you used?

21 MR. SCHMIDT: Objection to form.

22 THE WITNESS: I don't know what you
23 mean by "similar." What do you mean by
24 "similar cameras"?

25 BY MS. MAO:

1 Q. Yeah, let me rephrase my question.

2 What do you -- does GoPro's cameras
3 fall into a certain category to you?

4 MR. SCHMIDT: Objection to form.

5 THE WITNESS: Again, it's not category
6 of camera that we were looking at. You're
7 asking about this specific project; is that
8 right?

9 BY MS. MAO:

10 Q. Let's talk about this specific project
11 first.

12 A. Yes. So it's not category we were
13 looking at; we were looking at more features, that
14 what features were available on each camera, or
15 different types of cameras that we consider. We
16 decided that GoPro was the best.

17 Q. And which features were you focusing
18 on?

19 A. Well, as I said, we were mounting the
20 cameras -- these cameras on an aircraft on the
21 wings, tail, et cetera, so -- and, of course, the
22 camera on an aircraft is on an agile platform, so
23 fast-moving and changing directions and so on and
24 so forth. So we were looking at a camera with
25 features that could handle a scenario like that.

1 Q. Were you looking at the video
2 stabilization feature?

3 A. Again, off the top of my head, I
4 don't -- I do not remember. But I would be
5 surprised if we didn't. I think we did definitely.

6 Q. And what made you decide that -- okay.
7 Scratch that.

8 Did you decide that GoPro's video
9 stabilization feature was better than the other
10 cameras' video stabilization feature?

11 MR. SCHMIDT: Objection to form.

12 THE WITNESS: Again, this is long ago,
13 2012 or 2013. I don't remember off the top
14 of my head what discussions we had with the
15 engineers from the company and my -- my
16 team, my group. And we compared certain
17 number of cameras. I don't even remember
18 which other cameras. I know that we zeroed
19 in on GoPro based on features that we
20 thought are useful for our application.

21 BY MS. MAO:

22 Q. Did you use the same camera from 2012
23 to 2018?

24 A. I don't think so. I think we -- we
25 purchased different models, so at the, you know,

1 project from 2012 to 2018.

2 Q. But you used the same company GoPro's
3 cameras, just different models?

4 A. We did, yes. We -- we -- we might
5 have thought, Hey, there's a new feature, a useful
6 feature is coming in, and we might have -- I'm --
7 best of my best recollection, we did. We changed
8 and looked at different models later.

9 Q. Do you recall any differences between
10 a later GoPro camera model that you used compared
11 to an earlier GoPro camera model that you used?

12 A. Again, it's too long ago. I don't
13 remember what discussions we had back then with the
14 engineers from the company and my team at UCF. But
15 we benchmarked multiple cameras -- by the way, this
16 wasn't just a single camera mounted. Another
17 aspect that we did -- this was in-house. We built
18 a network of these cameras because we needed to
19 access these cameras simultaneously.

20 Q. What do you mean by "in-house"?

21 A. I mean we developed additional
22 capability of networking them while they're mounted
23 on the aircraft. So let's say we have five, six
24 cameras. We wanted to be able to simultaneously
25 access through a local network these cameras.

1 Q. And this project was done
2 in collaboration with Jackson Technologies, right?

3 A. That's correct.

4 Q. What kind of company is Jackson
5 Technologies?

6 A. It's a very small company. I have
7 lost connections with them. I don't know what they
8 do, if they still exist. It was a small company.
9 The owner of the company -- it was a private
10 company. The owner of the company was an ex-Navy
11 pilot himself. He had a hangar in a local airport
12 here, and he had multiple airplanes, and one of
13 them actually -- he was an interesting guy. He had
14 built his own airplane, and he was flying with it.

15 Q. Interesting.

16 A. Yes.

17 Q. You said earlier that you guys
18 benchmarked multiple cameras. What does benchmark
19 mean?

20 A. We compared the features. That's what
21 I meant, is that we put the -- let's say we have
22 two, three cameras that we are comparing. We put
23 the features side by side and analyzed to see what
24 we are looking for for our application, which one
25 is basically a better fit to our applications.

1 Q. So you benchmarked -- scratch that.
2 So you looked at -- you tested GoPro's
3 cameras' performance against other cameras'
4 performance, right?

5 A. I would say one thing we did, but we
6 also looked at if one camera, for instance, missing
7 some feature or the other one has that feature or
8 they have similar features, we compared them. And
9 literally compared them by experimenting on them.

10 Q. Is benchmarking something that's
11 pretty typical in the industry?

12 MR. SCHMIDT: Objection to form.

13 THE WITNESS: Well, that's a general
14 question. I don't know if it's a typical
15 thing to do in industry or not. But what I
16 was saying is that we compared those
17 cameras -- we wanted to find a camera that
18 best fit our application. So we compared
19 multiple cameras before deciding which
20 camera we want to use.

21 BY MS. MAO:

22 Q. When you are testing a -- a product's
23 performance, you know, so-called benchmarking, do
24 you think that's -- that's -- that constitutes
25 copying of that product's technology?

1 A. I have not opined on that in my
2 declarations. So, I don't know. Your question is
3 a general question. I can tell you, you asked me
4 what we did. We compared cameras and we tried to
5 find which camera best fits our application.

6 Q. I'm just asking you, if you're just
7 comparing different cameras, does that mean
8 copying?

9 MR. SCHMIDT: Objection to form.

10 THE WITNESS: Again, if you are
11 copying the -- I mean, if you're copying
12 something, then it's not benchmarking. If
13 you're copying something, it means that you
14 look at another product and say, okay, how
15 do they do this. And by "copying," I don't
16 mean that you have necessarily access to
17 proprietary information. No, you could
18 copy also by looking at the product and
19 analyzing the product and saying that,
20 okay, I would like to reproduce same
21 features. That's what I call copying.

22 But we were not in this project
23 copying anything. We were looking for --
24 we were not producing any cameras here or
25 trying to compete with any one of the

1 camera companies. We were just -- we were
2 not competitors with these camera
3 companies, so we were just looking at
4 comparing these cameras.

5 BY MS. MAO:

6 Q. Understood.

7 And you said the project is to
8 reconstruct 3D models?

9 A. That's correct. So, I mean, what the
10 owner of the company had in mind -- as I said, he
11 was an ex-Navy pilot --

12 Q. Yeah.

13 A. -- and what he had in mind to create a
14 virtual view capable of visualizing in all
15 directions a panoramic view of the -- of his entire
16 environment of the -- he wanted to be able to
17 create that scenario, and on top of that, a 3D --
18 if not a true 3D model but, you know, at least the
19 impression of 3D.

20 Q. And how -- how were you guys able to
21 create that 3D effect? What's the input?

22 A. Well, the input is multiple images.
23 There are many ways you can do 3D reconstruction,
24 but the input in this case were many images, in
25 fact, video -- video data. But video data --

1 (Reporter clarification.)

2 THE WITNESS: So if you remember, I
3 told you that we had multiple cameras. So
4 they each provided video streams and they
5 were synchronized. If you remember, I said
6 we networked them. They were synchronized.
7 So one method, for instance, in computer
8 vision to create 3D model is stereovision.
9 So multiple -- stereo --

10 BY MS. MAO:

11 Q. Stereo?

12 A. Stereovision.

13 Q. How do you -- how do you spell it?

14 A. S- -- S-T-E-R-E-O. Stereo.

15 Q. Oh, okay.

16 A. Stereovision, like we have two eyes,
17 that allows us to have depth perception. And
18 that's one way we used to create 3D models of the
19 environment of the airplane.

20 Q. Wait. How do you get depth? How do
21 you get the stereovision?

22 A. Well, this is a long -- I take a whole
23 semester to teach my students how to do this.

24 Q. There is a good opportunity for me to
25 nerd out. I was a computer science major.

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1 A. Oh.

2 Q. So this is a good opportunity for me
3 to nerd out.

4 A. Okay. So there are many steps
5 involved. So if you have two views, there is a --
6 there's a phenomenon that's called "parallax
7 effect" between the two views. That parallax
8 effect is depth dependent. And I'm just trying to
9 make it in a nutshell to describe it. That
10 parallax effect gives what is called "disparity,"
11 provides disparity, tells us -- you know, in simple
12 terms, it tells me, you know, each pixel has moved
13 by certain amount by -- and by how much, and that
14 is depth dependent.

15 So just to give you an idea, if you
16 are -- I sometimes use this for my students to
17 understand, is that if you're sitting in a car, you
18 know, maybe your parents are driving, you look
19 outside, you see that objects that are close to the
20 car move very fast, objects that are farther move
21 slower, and if an object is very far away, it stays
22 with you for a long time before it gets out of your
23 field of view. And this is because the motion
24 of -- the motion of the -- let's call it, in the
25 digital case, pixels. In our case, it's not

1 pixels. But motion of the points in our field of
2 view, in our vision system, depends on how far away
3 the object is from our view.

4 And of course, there are other factors
5 that come in play, like, you know, the degrees of
6 freedom of the camera and so on and so forth.

7 There are non-linearities because a typical camera
8 doesn't have to be linear. There are many other
9 factors that come into play.

10 But to simplify it, it really is that,
11 you know, depth affects how fast an object moves in
12 front of your field of view, but because we have
13 two views, stereovision is -- simultaneously allows
14 me to see that motion. And that gives me a depth
15 perception.

16 Q. So, when you were calculating the
17 depth, you were looking at how fast the pixel moved
18 between frames?

19 A. You can -- the better way of
20 describing it, for each pixel, we found that
21 parallax effect or disparity, we calculated
22 disparity, and you need to take additional steps
23 like camera calibration and so on and so forth. In
24 this case, we have multiple cameras. They are a
25 lot more involved, you know, synchronization and so

1 on and so forth.

2 But more or less, you're right in the
3 sense that you look at how much each pixel is
4 moving plus additional information that you have,
5 you convert that into depth information.

6 Q. So in order to have the depth
7 information, you -- you don't need -- okay.
8 Scratch that. Let me try to understand what you're
9 saying.

10 And so base- -- so once you have the
11 depth information, that allows you to construct a
12 3D effect, right?

13 A. Right. Of course, the company was
14 looking beyond just doing 3D reconstruction. They
15 wanted to actually, once they had done 3D
16 reconstruction, map back pixel values, I mean the
17 color values, on top of that 3D representation, and
18 they wanted to be able to visualize that. So there
19 was a whole -- there are whole other aspects in
20 that project beyond just 3D reconstruction.

21 Q. And I think earlier you said it was
22 not a complete 3D model or something?

23 A. Yeah, so not exactly that. I said
24 there are basically different ways you can
25 represent 3D, and one is actually you build real,

1 true 3D model inside your computer, you have -- for
2 every point in space, you have the xyz coordinates.
3 That's -- that's a full 3D model, of course, in
4 some coordinate system. So you establish your
5 coordinate system. In that coordinate system, you
6 have the xyz coordinates of a point in space.

7 That's a full 3D model, but there are
8 other ways of representing for visualization
9 purposes. That's what I mean. There are other
10 ways of representing 3D so that it gives you the
11 perception of depth but you don't necessarily have
12 to work -- work all the way to exact 3D points.
13 But that's still 3D. Don't get me wrong. It is
14 still 3D.

15 Q. So in your projects, how did you
16 represent the 3D effect?

17 A. We represented it with a full 3D
18 model, but we were looking at alternatives. This
19 is a visualization aspect of it you're talking
20 about. So when I say -- when I said that I don't
21 know what your question was exactly how you termed
22 it, when I -- I was talking about the
23 visualization, that there are many ways of
24 visualizing 3D information. So one way is to
25 actually on your -- you could be visualizing, for

1 instance, on a screen of your -- on your computer,
2 you could be visualizing projection of those xyz
3 coordinates back in your 2D display, for instance.

4 Q. But then if I'm looking at my screen,
5 it's 2D, not 3D?

6 A. That's right. So that's what I was
7 talking about visualization. So we were looking at
8 alternatives. For instance, like we were looking
9 at different types of technologies that are there
10 for visualization exactly in 3D. I'm talking about
11 goggles.

12 Q. Oh.

13 A. I'm talking about, you know,
14 head-mounted displays.

15 So in one display is 2D. You're
16 right. But if you have two displays associated
17 with each eye, then you can get 3D perception out
18 of that.

19 Q. Can you explain more about that?

20 A. Sure. So, basically, your -- your
21 brain is processing each visual information
22 provided and combines them in your, you know -- and
23 create the perception of 3D. So that's one way of
24 visualization.

25 We looked at just simple also -- you

1 might know, back decades ago we had -- for
2 instance, you could go to movie theaters and have
3 3D by just through having different types of
4 filters on each -- on each eye. You know, red and
5 blue would create a depth perception.

6 So we looked at multiple options. We
7 even looked at -- I mean, you mentioned that your
8 screen is 2D, but there are 3D screens. And I'm
9 not sure if you're familiar, basically --

10 Q. No.

11 A. Okay. The way -- those technologies
12 are out there, and we actually purchased some of
13 those technologies and used them. So each pixel in
14 your -- on your screen is not pointing -- they're
15 not all pointing in the same direction. So
16 they're -- they create two sets of pixels on your
17 screen, some more pointing -- if you locate
18 yourself correctly in some region in front of the
19 2D -- apparently 2D display, some pixels point in
20 one direction of -- in one -- towards one eye, and
21 other pixels point to a different eye, to the other
22 eye, and by just staying within, certainly, a
23 visual point of view, you always see things in 3D.
24 So, that's another alternative that we were looking
25 at.

1 Q. Interesting.

2 Were you ever looking at the motion of
3 the camera or the motion of the airplane that
4 carries the camera?

5 A. Yes, I mean, that was one of the
6 reasons that we -- we actually zeroed in on GoPro
7 cameras because they were capable of handling -- as
8 I said, we were mounting on an -- what I call an
9 agile platform, like an aircraft that could
10 maneuver in 3D space in different directions,
11 different speeds, and so on and so forth, maybe
12 accelerate, angular acceleration, angular velocity
13 and all these aspects that -- the camera being
14 capable of handling all of these.

15 Q. What do you mean, the camera being
16 able to handle all of these?

17 A. Well, so, for instance, if you take
18 your cell phone, you cannot do that because your
19 cell phone does not have the technology
20 incorporated in it to -- it's designed to handle
21 situations where you have a handheld camera with
22 maybe slight motions of your hands or -- it's not
23 designed to do that. I'm talking about specialized
24 camera that could handle the type of motion I just
25 told you. You know, an aircraft could be rotating

1 and accelerating on an agile platform --

2 Q. Sorry. Are you talking about the
3 durability of the device or how the motion would
4 affect the image quality?

5 A. No. I'm not talking about durability.
6 I'm talking about the features in the camera that
7 are capable of handling a motion of that sort. In
8 other words, motion of a scenario where an object
9 is -- has angular acceleration, angular velocity,
10 even linear acceleration, linear velocity, that can
11 vary from one point in time to another point in
12 time very quickly or even maybe slow down and maybe
13 the aircraft is landing, so different types of
14 motions, basically. The camera having the
15 features, the software features that can handle
16 those things. I'm not talking about durability.

17 Q. Oh, you mean the different motion
18 would not -- would have less of an effect on the
19 image quality?

20 Is that what you're talking about?

21 A. You mean for this project?

22 Q. Yes, this project. Yeah.

23 A. No. I mean, I don't know -- I mean,
24 then we have to define what is image quality. I'm
25 not talking about image quality. I'm just saying

1 that -- the camera being able to have -- I mean the
2 camera having features that can handle a scenario
3 where an agile platform has these types of motions.
4 You know, it can handle in the sense that it can
5 produce images that were useful for us.

6 Q. Because for a phone -- some of the
7 phones that you were looking at, the image quality
8 wouldn't be good?

9 A. Actually, I said phone here. I don't
10 believe we looked at phones. I don't remember
11 looking -- we didn't even consider phones.
12 Because, I mean, you know -- I guess we might say
13 if a POSITA -- as a POSITA, let's say, at the time,
14 I wouldn't think that the phone was -- would be
15 capable of handling a scenario like that. So we
16 were looking at professional cameras that were
17 designed to, you know, handle situations that -- as
18 I mentioned, that we were looking at.

19 MS. MAO: Okay. Sorry. Can we go off
20 the record for five minutes?

21 (A brief recess was taken from
22 10:47 a.m. to 11:02 a.m.)

23 BY MS. MAO:

24 Q. Welcome back, Dr. Foroosh.

25 A. Thank you.

1 Q. During the break, did you discuss with
2 your counsel, Mr. Schmidt, about the substance of
3 the deposition?

4 A. No.

5 Q. Okay. Great.

6 Earlier today you were talking about a
7 peri- --

8 MS. MAO: Sorry. Remind me, what
9 was --

10 THE REPORTER: Parallax effect.

11 THE WITNESS: Thank you.

12 MS. MAO: Yeah.

13 BY MS. MAO:

14 Q. Could you -- could you please spell
15 that, please?

16 A. I think it's P-A-R-A- -- but I don't
17 remember if it's double L -- it's probably double
18 L, -A-X or might be -L-A-X. I don't remember the
19 correct spelling. Sorry.

20 Q. And what is the -- how do you
21 pronounce it?

22 A. Parallax effect.

23 Q. What is the parallax effect?

24 A. So as I was describing earlier, if you
25 have two cameras, two views of the same scene with

1 overlapping field of view, then corresponding
2 pixels are shifted from one view to the other one,
3 that's depth dependent. That's called "parallax
4 effect."

5 Q. So based on the 2D pixel information,
6 you can get depth information.

7 A. You have to go through some process of
8 reconstruction, 3D reconstruction. You need
9 multiple views, multiple images, and go through a
10 reconstruction process.

11 Q. Understood.

12 And earlier you said you chose GoPro
13 cameras because they were able to handle different
14 motions better, correct?

15 A. Yes.

16 Q. And so, when you were using the GoPro
17 cameras, was GoPro cameras' video stabilization
18 feature utilized?

19 A. I believe so. To my best
20 recollection, we did, yes.

21 Q. Have you done other research using
22 GoPro cameras?

23 A. Not to the best of my recollection.

24 Q. Besides this research project, have
25 you used GoPro cameras for anything else?

1 A. I have some GoPro cameras in my lab,
2 but I think we have not been using them for any
3 other projects. I don't remember using them for
4 other projects. But as you can see, as I mentioned
5 the Florida High Tech Corridor was additional
6 funding that was coming from the State of Florida
7 matching -- that was a matching fund to Jackson
8 Technologies' funding. That's not a separate
9 project, but if you look at them as two different
10 projects based on two different fundings, yes, then
11 I used them both in Jackson Technology [sic] and
12 FHTC funding.

13 Q. I think later you said you received
14 funding from Electronic Arts and the goal of the
15 project was to develop algorithms using cameras
16 similar to GoPro systems.

17 Do you see that?

18 A. Can you point me which?

19 Q. Yes. It's on page 5.

20 A. Of which?

21 Q. Of Exhibit 2018.

22 A. Yeah.

23 Q. In the 1186 proceeding.

24 A. Yeah. I see that on the same page.
25 Now I remember the project.

1 Q. What cameras did you use there?

2 A. I don't remember. I don't remember
3 what cameras we used there. Not all the cameras
4 were moving cameras in this case. But we did work
5 both on body-mounted cameras and -- and stationary
6 cameras looking at people who were doing some
7 actions. But off the top of my head, I don't
8 remember which cameras we used.

9 Q. But you used cameras similar to
10 GoPro's, right?

11 A. I think the -- again, this is long
12 ago, but I believe that we used cameras that --
13 that we used different types of cameras, ones that
14 were stationary looking at people or person doing
15 actions, and the bodycam cameras, I -- that's what
16 I mean, the body-mounted cameras might have been
17 similar. But I don't remember what cameras, which
18 cameras. It's too long ago. I think this dates
19 back before -- yes, it's a 2008, 2009. I don't
20 remember which cameras we used.

21 Q. Got it. I'm just trying to understand
22 what you mean by "cameras similar to GoPro's."

23 A. What I meant was that they were
24 body-mounted cameras, so therefore, there was some
25 motion in there. Maybe not as agile a motion as an

1 aircraft, but still, person is a moving object, a
2 moving person.

3 Q. And how does that relate to GoPro's
4 cameras?

5 A. I don't think I said that it relates
6 to GoPro's cameras. I said that we used cameras --
7 you know, it says here "using body-worn cameras
8 similar to GoPro systems." It's just that the fact
9 that its application was for a moving platform; in
10 that sense, similar.

11 Q. Oh, I see.

12 So like a GoPro's camera's used for
13 moving objects. That's what you meant?

14 A. A moving plat- -- mounted -- you know,
15 like the other project, the Jackson Technologies
16 project, it was a moving platform, we had mounted
17 cameras. As I said, a human, a person is a moving
18 platform in that sense.

19 Q. Understood.

20 Have you used GoPro's cameras outside
21 of work?

22 A. No.

23 Q. Do you have a smartphone?

24 A. I do.

25 Q. Have you ever used a smartphone's

1 video stabilization feature?

2 A. I might have. I don't remember.

3 Q. So if I'm -- I ask you, do you know if
4 there are any differences between a smartphone's
5 video stabilization feature and a -- and a GoPro
6 camera's video stabilization feature, do you have
7 any opinion on that?

8 MR. SCHMIDT: Objection to form.

9 THE WITNESS: Did I offer an opinion
10 on that? Did I -- if so, please point me
11 and we can discuss it.

12 BY MS. MAO:

13 Q. No. I'm just saying, do you -- if I'm
14 just asking you, based on your own experience, is
15 there any differences between a GoPro camera's and
16 a smartphone's video stabilization feature.

17 MR. SCHMIDT: Objection to form.

18 THE WITNESS: Again, same answer. I
19 don't know whether -- I don't believe I
20 have opined on that or I might have, you
21 know, in the context of some prior arts.
22 And, yeah, please show me where in my
23 declarations, any one of the three
24 declarations, I have...

25 BY MS. MAO:

1 Q. I'm not sure if you opined on that.
2 I'm just asking you if you have an opinion on that.

3 A. Well, I -- I would not like to,
4 outside my declarations, offer opinion on
5 differences between different cameras because I
6 think, you know, I'd rather stay with whatever
7 subject I have rendered opinion on in my
8 declaration.

9 Q. Have you personally compared a
10 smartphone's video stabilization feature and a
11 GoPro camera's video stabilization feature?

12 A. Again, is there something that I'm
13 discussing in my declarations? I would be more
14 than glad to have a look at it in my declarations.

15 Q. I don't think in your declarations you
16 talked about you personally comparing a smart
17 phone's and GoPro camera's video stabilization
18 feature.

19 A. As I said, I have not used GoPro
20 cameras in my daily usage, so I've used GoPro
21 cameras professionally as a, you know, researcher
22 under certain projects. So I don't remember off
23 the top of my head, but I don't think I sat and
24 made comparisons between a cell phone and/or -- any
25 cell phones and a GoPro camera personally. You

1 said, did I do it personally? The fact that I -- I
2 haven't -- I don't -- I have not used GoPro cameras
3 in my daily life, outside professional projects, so
4 I don't believe so, that I compared or not. So I
5 don't think so.

6 Q. So you don't have any opinion on
7 how -- you don't have any opinion on the
8 differences, if any, of the stabilization features
9 of a GoPro camera compared to a smartphone's,
10 correct?

11 MR. SCHMIDT: Object to form.

12 THE WITNESS: That's not what I said.
13 I just said I don't have any opinion and I
14 might have expressed opinions in the
15 context of some prior arts here in my
16 declarations. You asked me if personally,
17 I have personally gone to compare, and I
18 said, no, I have not personally, because in
19 my -- I don't remember ever using GoPro
20 cameras for any personal applications, you
21 know.

22 I have always used GoPro cameras -- in
23 fact, I used GoPro's cameras between those
24 dates, 2012-2018. Those are the times
25 where I used GoPro's cameras in a -- under

1 a project. So, at the time we compared
2 GoPro cameras with other similar cameras, I
3 don't remember which cameras off the top of
4 my head, but those are comparisons we did.

5 BY MS. MAO:

6 Q. Okay. But do you have any opinion as
7 to, you know, if there are any differences between
8 a GoPro camera's video stabilization feature and a
9 smartphone's video stabilization feature?

10 MR. SCHMIDT: Objection to form.

11 THE WITNESS: Again, I don't believe I
12 have expressed any opinion on that in my
13 declarations in terms of the video
14 stabilization, or if I have, please point
15 me to the location where I have expressed
16 any opinion.

17 But your -- is your question about
18 personally comparing? I mean, earlier you
19 said: Have you personally compared them?
20 And I said, no, not in my personal daily
21 life, I have done -- I have not done such
22 comparisons, and -- because I have not used
23 GoPro cameras in my daily life. I do have
24 GoPro cameras in my lab. We used it under
25 some projects.

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1 BY MS. MAO:

2 Q. Have you done any research about video
3 stabilization?

4 MR. SCHMIDT: Objection to form.

5 THE WITNESS: I have done my research
6 in many areas of image processing, computer
7 vision. You have my CV. If you point to a
8 particular work, I can discuss it. You
9 know, almost 30 years of career, I have
10 done so much. I -- you know, you're asking
11 a general question there, have I done
12 anything with video -- did you say "video
13 stabilization"?

14 BY MS. MAO:

15 Q. Correct.

16 A. So you have my CV. I mean, we can go
17 through that, you know, one by one, papers
18 published and projects.

19 Q. But you cannot remember off the top of
20 your head any research on video stabilization?

21 A. I'm sure I might have done related
22 work, or -- but as I said, I don't remember off the
23 top of my head a particular project or particular
24 publication related to video stabilization.

25 Q. Let's talk about the 1164 proceeding

1 first, and that relates to the '840 patent.

2 A. Yes.

3 Q. You submitted two declarations in the
4 1164 proceeding, right?

5 A. Yes.

6 Q. Did you review those two declarations
7 in preparation for today's deposition?

8 A. I mostly focused on supplemental
9 declaration for today's deposition.

10 Q. Do you have any corrections to your
11 opinions expressed in the supplemental declaration
12 which I take is Exhibit 2018, the declaration in
13 support of the patent owner response?

14 A. No.

15 Q. Do you have any corrections to your
16 earlier declaration which is Exhibit 2001?

17 A. No.

18 Q. Do those two declarations include the
19 entirety of your opinions regarding the 1164
20 proceeding?

21 A. They do, but my supplemental
22 declaration basically was defining my opinion of my
23 original declaration.

24 Q. But you don't have any corrections to
25 your original declaration, right?

1 A. That's correct. That's what I
2 answered earlier. I said no.

3 Q. So you don't have any opinions not
4 identified in those two declarations, right?

5 A. Can you rephrase your question?

6 Q. Yeah.

7 A. I'm not sure if I understand your
8 question.

9 Q. Of course, of course, of course.

10 So, if it's not written or stated in
11 either of those two declarations, then you don't
12 have an opinion on whatever is missing from those
13 two declarations, right?

14 A. That's correct. My opinion is in --
15 my -- all my opinions are included in these two
16 declarations.

17 Q. Great. Thank you.

18 Let's talk about IPR Proceeding 1165.
19 Again, you submitted two declarations in this
20 proceeding, right?

21 A. Correct.

22 Q. And just for clarity of the record,
23 that is Exhibit 2001, which is your declaration in
24 support of the patent owner preliminary response,
25 and also Exhibit 2018, which is your declaration in

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1 support of the patent owner response, correct?

2 A. Correct.

3 Q. Did you review those two documents in
4 preparation for today's deposition?

5 A. Again, in this case also, I mostly
6 focused on my supplemental declaration,
7 Exhibit 2018.

8 Q. Do you have any corrections to either
9 declaration?

10 A. I don't.

11 Q. And again, those two declarations
12 include the entirety of your opinions regarding
13 Proceeding 1165, right?

14 A. Correct. But as I said, in my
15 supplemental declaration, I refined my opinion that
16 was in the -- my opinions in the -- in my original
17 declaration.

18 Q. And let's talk about the last
19 proceeding, 1186, and that concerns the '894
20 patent. Again, for clarity of the record, you
21 submitted two declarations in this proceeding. One
22 is Exhibit 2001, your declaration in support of
23 patent owner preliminary response, and the other
24 one is Exhibit 2018, your declaration in support of
25 patent owner response, correct?

1 A. Correct.

2 Q. Did you review those two declarations
3 in preparation for today's deposition?

4 A. Same as the other IPRs. I mostly
5 focused on my supplemental declaration,
6 Exhibit 2018.

7 Q. Do you have any corrections to either
8 declaration?

9 A. I don't.

10 Q. And those two declarations include the
11 entirety of your opinions regarding the 1186
12 proceeding, right?

13 A. Correct.

14 Q. And let's talk about all three
15 proceedings. Are there any documents or evidence
16 that you considered or relied upon in forming your
17 opinions that are not referenced in your
18 declarations?

19 A. I don't believe so. I -- I have
20 relied on documents that I have referenced in my
21 declaration.

22 MS. MAO: Sorry. I'm having some
23 diffi- -- connectivity issue. Can we take
24 a break for five minutes?

25 (A brief recess was taken from

1 11:28 a.m. to 11:35 a.m.)

2 BY MS. MAO:

3 Q. Welcome back, Dr. Foroosh.

4 A. Thank you.

5 Q. During the break, did you discuss the
6 substance of this deposition with your counsel,
7 Mr. Schmidt?

8 A. No.

9 Q. Did you discuss the substance of this
10 deposition with anyone else?

11 A. No.

12 MS. MAO: I pass the witness. No
13 further questions.

14 MR. SCHMIDT: I have none. We'll
15 reserve the right to read.

16 MS. MAO: Order.

17 (The proceedings were concluded at
18 11:36 a.m.)

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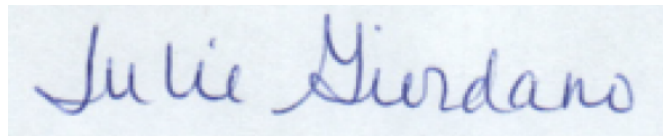
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through 46 is a true record of my stenographic
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I FURTHER CERTIFY that I am not a
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Dated this 15th day of July, 2025.



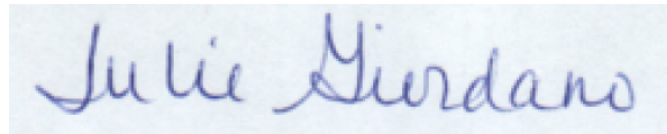
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I, the undersigned authority, certify
that DR. HASSAN FOROOSH personally appeared before
me and was duly sworn.

WITNESS my hand and official seal this
11th day of July, 2025.



JULIE GIORDANO, FPR-C
Notary Public State of Florida
My Commission Expires: 11-27-27

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I hereby declare I am the deponent in the within matter; that I have read the foregoing transcript and know the contents thereof; and I declare that the same is true of my knowledge except as to the matters which are therein stated upon my information or belief, and as to those matters, I believe them to be true.

I declare under the penalties of perjury under the laws of the United States that the foregoing is true and correct.

This declaration is executed this _____ day of _____, 20____, at _____, _____.

DR. HASSAN FOROOSH

PATRICK SCHMIDT, ESQ.

patrickschmidt@quinnemanuel.com

July 15, 2025

RE: Arashi Vision (U.S.) LLC v. GoPro, Inc.

7/11/2025, Dr. Hassan Foroosh, (#7415129).

The above-referenced transcript has been completed by Veritext Legal Solutions and review of the transcript is being handled as follows:

___ Per CA State Code (CCP 2025.520 (a)-(e)) - Contact Veritext to schedule a time to review the original transcript at a Veritext office.

___ Per CA State Code (CCP 2025.520 (a)-(e)) - Locked .PDF Transcript - The witness should review the transcript and make any necessary corrections on the errata pages included below, notating the page and line number of the corrections. The witness should then sign and date the errata and penalty of perjury pages and return the completed pages to all appearing counsel within the period of time determined at the deposition or provided by the Code of Civil Procedure. Contact Veritext when the sealed original is required.

___ Waiving the CA Code of Civil Procedure per Stipulation of Counsel - Original transcript to be released for signature as determined at the deposition.

___ Signature Waived - Reading & Signature was waived at the time of the deposition.

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1 _X_ Federal R&S Requested (FRCP 30(e)(1)(B)) - Locked .PDF
2 Transcript - The witness should review the transcript and
3 make any necessary corrections on the errata pages included
4 below, notating the page and line number of the corrections.
5 The witness should then sign and date the errata and penalty
6 of perjury pages and return the completed pages to all
7 appearing counsel within the period of time determined at
8 the deposition or provided by the Federal Rules.
9 ___ Federal R&S Not Requested - Reading & Signature was not
10 requested before the completion of the deposition.

1 Arashi Vision (U.S.) LLC v. Gopro, Inc.

2 Dr. Hassan Foroosh (#7415129)

3 E R R A T A S H E E T

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24 (Dr. Hassan Foroosh)

Date

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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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Veritext Legal Solutions represents that the foregoing transcript is a true, correct and complete transcript of the colloquies, questions and answers as submitted by the court reporter. Veritext Legal Solutions further represents that the attached exhibits, if any, are true, correct and complete documents as submitted by the court reporter and/or attorneys in relation to this deposition and that the documents were processed in accordance with our litigation support and production standards.

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