

1 UNITED STATES PATENT AND TRADEMARK OFFICE
2 BEFORE THE PATENT TRIAL AND APPEAL BOARD
3 APPLE INC. AND GOOGLE LLC,
4 Petitioners,
5 vs. Case Nos.
6 IPR2023-00343
7 IPR2023-00344
8 SPACETIME3D, INC.,
9 Patent Owner.

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12
13 The Virtual Deposition of SCOTT SCHAEFER, Ph.D.
14 Taken Via Remote Zoom Videoconference
15 Commencing at 10:39 a.m.
16 Tuesday, January 9, 2024
17 Stenographically reported by:
18 Joanne Marie Bugg, CSR-2592, RPR, RMR, CRR
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25 Job No. 6405535

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Scott Schaefer's Declaration

1 Zoom Videoconference

2 Tuesday, January 9, 2024

3 10:39 a.m.

5 SCOTT SCHAEFER, Ph.D.,

6 was thereupon called as a witness herein, and after
7 having first been duly sworn to testify to the truth,
8 the whole truth and nothing but the truth by the
9 stenographer, was examined and testified as follows:

10 EXAMINATION

11 BY MR. KHAN:

12 Q. Thank you. Good morning, Dr. Schaefer. My name is Usman
13 Khan. I am here on behalf of the petitioner, and will
14 be asking you questions related to your declarations.
15 Before we just get started, I wanted to check the
16 transcript. It's not updating realtime. Can we just
17 check that quickly, please.

18 (Off the record at 10:39 a.m.)

19 (Back on the record at 10:40 a.m.)

20 BY MR. KHAN:

21 Q. Okay. Great. Good morning again, Dr. Schaefer. Thanks
22 for your patience. I'll start off today with some
23 questions, general questions before getting into
24 specifics. I'll provide some breaks periodically, and
25 should you need to take a break, please let me know.

1 I'll just request that when you do ask for a break,
2 maybe give me a few minutes advance notice so that I
3 can wrap up my line of questioning upon the pause. Does
4 that work for you?

5 A. Yeah, that should be fine. Thank you.

6 Q. Great. During the breaks, you understand that you're
7 not allowed to discuss the substance of your testimony
8 today until your cross-examination has concluded.

9 A. That's right.

10 Q. And we agree to let me know if at any point anyone does
11 communicate with you in any manner during the course of
12 our deposition today regarding your testimony?

13 A. Sure.

14 Q. And do you agree that we'll be discussing your
15 declaration submitted in the IPR proceedings
16 IPR2023-00343, which relates to U.S. patent number
17 9,304,654, and IPR proceeding IPR2023-00344 which
18 relates to U.S. patent number 9,696,868?

19 A. Yes.

20 Q. For purposes of brevity, I'll refer to the patents in
21 question as the '654 and '868 patents, and the
22 proceedings as the '654 and '868 proceedings. Is that
23 okay?

24 A. Yeah, should be fine.

25 Q. Okay. And do you agree that your declarations in these

1 proceedings correspond to Exhibit 2015 in the '654
2 proceedings, and Exhibit 2016 in the '868 proceedings?

3 A. I'm not sure. I don't remember the exhibit numbers. It
4 doesn't sound incorrect, but I don't know for sure what
5 the exhibit numbers are.

6 Q. Okay. And because this is a consolidated deposition,
7 my questions will generally apply to both the
8 declarations unless I specify that a particular
9 question is directed to one of the declarations.

10 A. Okay.

11 Q. And for the purposes of convenience or ease, I'll refer
12 to the paragraph numbers that are used in your '868
13 declaration if that's okay. Please let me know.

14 A. Yes, that should be fine.

15 Q. Great. Do you understand that your testimony today is
16 sworn testimony taken under oath?

17 A. Yes.

18 Q. And do you understand that your oath, that the oath
19 you've taken in this deposition is as solemn as the
20 oath you would take as if you were testifying at trial?

21 A. That's my understanding.

22 Q. Do you understand that the deposition today, the
23 testimony from the deposition today can be used at
24 trial and in subsequent briefs in these proceedings?

25 A. Yeah, I believe that's true.

1 Q. Are you taking any medications that would prevent you
2 from answering the questions completely and truthfully
3 to the best of your ability today?

4 A. No.

5 Q. Is there anything else that would prevent you from
6 answering the questions completely and truthfully to
7 the best of your ability today?

8 A. No.

9 MR. CORDREY: Can I ask one quick question?
10 I just want to confirm this is being transcribed, and
11 we're not recording this by video means.

12 MR. KHAN: That's correct. We're not doing
13 any video recording today.

14 MR. CORDREY: Thank you.

15 BY MR. KHAN:

16 Q. Dr. Schaefer, did you write the '868 and '654
17 declarations yourself?

18 A. I met with counsel. We discussed things. I wrote an
19 initial draft there. Actually, originally parts of the
20 text are from the '048 declaration, which we can see if
21 you compared them, for example. So that was sort of the
22 starting point.

23 Q. And how long, approximately, did it take for you to
24 write these declarations?

25 A. Oh, I don't remember exactly. This is months ago. It

1 was probably over a period of a few weeks is my
2 recollection, but I don't know for sure.

3 Q. And was there anyone else other than counsel for patent
4 owner who was involved in the preparation of your
5 declaration?

6 A. No.

7 Q. Did you have any assistance from any other person, for
8 example, a student or somebody else in reviewing any of
9 the documents for preparing your declarations?

10 A. No.

11 Q. Have you been deposed before?

12 A. Yes.

13 Q. Approximately, how many times would you say you have
14 been deposed?

15 A. Oh, I don't know numbers exactly. I'd say probably on
16 the order of maybe 20 times or something is a guess. I
17 don't know. I'd have to check my records to be sure.

18 Q. Okay. And do you have an idea or sense of how many of
19 these depositions were in IPR proceedings?

20 A. I do.

21 Q. Could you give me an approximate of the number of
22 depositions you're involved with for IPR proceedings?

23 A. You want me to include this deposition or not?

24 Q. Sure.

25 A. Then two.

1 Q. So before the '048 and this deposition today, were you
2 involved in any other depositions for IPR proceedings?

3 A. Not to my recollection.

4 Q. Did you review the '654 and '868 declarations that you
5 wrote prior to our deposition here today?

6 A. Yes.

7 Q. Did you review the board's institution decisions in
8 these cases?

9 A. I have reviewed those documents, but it's been a while
10 since I looked at them.

11 Q. So I wanted to ask you a few questions about your
12 background, if that's all right, beginning with your
13 professional background. Is it correct that you
14 received a BS in computer science and mathematics from
15 Trinity University in the year 2000?

16 A. That's correct.

17 Q. And after that, you received a Master's in computer
18 science from Rice University in 2003?

19 A. Yes.

20 Q. And after that, a Ph.D. in computer science from Rice
21 University in 2006?

22 A. Yes.

23 Q. Can you tell me a little bit about your Master's
24 thesis?

25 MR. CORDREY: Objection. Form.

1 A. One second. I'm trying to remember what the title of my
2 Master's thesis was actually. Interpolatory subdivision
3 for surfaces of revolution. Sure. Subdivision is a
4 process that uses some geometry as input. In this case,
5 I was focusing on surfaces, and uses a set of
6 refinement rules to create more refined geometry as
7 output. It's a recursive process, so you repeat this
8 process repeatedly.

9 This has been used to generate various types
10 of curves or surfaces that we call splines that are
11 usually polynomial or piecewise polynomial in nature.

12 Surfaces of revolution are surfaces whose
13 cross-section's a circle. And so a circle is not made
14 out of polynomials. It's made out of a set of perhaps
15 rational polynomials, but then they don't have what we
16 would call arc length parameterization. Basically the
17 dots that you would generate that are part of the
18 surface are not evenly spaced is what would happen.

19 You can use trigonometric functions for
20 surfaces of revolution like cosine and sine, but these
21 are not polynomial, and not rational in that case
22 either. And so what I did is I developed a set of
23 refinement rules that would place vertices in locations
24 such that you could actually generate surfaces of
25 revolution.

1 They're called interpolatory surfaces
2 because we call them control points. The points that
3 control the shape of the surface actually lie on what
4 we would call the limit surface, which is the limit if
5 you repeat this recursive process an infinite number of
6 times, it generates a surface in we call it the limit.
7 The end result where the points actually lie on the
8 surface, and this is opposed to shapes like B splines
9 where they are approximating the control points, and
10 actually do not lie on the surface. They just
11 approximate the shape. And we can make that what
12 approximate the shape means like mathematically precise
13 if you'd like.

14 Q. And was your Ph.D. dissertation a continuation of this
15 research, or was it a separate project altogether?

16 A. It was mostly a separate project, although there were
17 sort of three aspects of my dissertation. One was
18 related to subdivision, but it was in this case it was
19 a volumetric subdivision scheme that was based off of
20 tetrahedra and octahedra, and made up a portion of my
21 dissertation, so it was related in that there was some
22 subdivision aspect.

23 Q. According to your CV, your Ph.D. dissertation title was
24 Intuitive Methods for 3D Shape Deformation. Can you
25 tell me a little more about the intuitive methods that

1 were the subject of your dissertation?

2 A. Sure. There were multiple things covered by my
3 dissertation, as I said. There was a tetrahedra
4 octahedra subdivision scheme, or actually octahedral
5 subdivision scheme.

6 Tetrahedra, they're just pyramids basically
7 in 3D. Octahedra have sort of a square pyramid, so four
8 triangles touching a point, and then reflect that over
9 it, and it generates the same type of thing on the
10 bottom basically. So it's one shape. And you can tile
11 space using alternating tetrahedra and octahedra, and
12 so I built a subdivision scheme. Actually, the first
13 volumetric subdivision scheme for dealing with these
14 sort of mixed types of shapes. And you could use it to
15 deform surfaces.

16 So the way this works is you create a whole
17 bunch of tetrahedra around a shape that you want to
18 deform, and put the shape inside of it. And then the
19 points on the shape actually can be represented as a
20 weighted combination of the vertices of the tetrahedra.
21 So more laymen's terms, if you take those tetrahedra
22 and now move them, the shape and side moves as well.

23 Okay. And so it's a type of deformation that
24 we call a preform deformation that are used to
25 manipulate shapes, so this was a new form of preform

1 deformation. That was one part of my dissertation.

2 Another part of my dissertation was to
3 develop a 3D form of what's called new value
4 coordinates which are a type of barycentric coordinate.
5 And so these points -- barycentric coordinates go back
6 to Mobius, which is -- what was he, in the 17 or 1800s,
7 or something like that. But we generated a generalized
8 form. And so the way this works is in this case you
9 have a high resolution surface, and you build a polygon
10 approximation, so not tetrahedral approximation, which
11 requires volumes, but a surface that approximates the
12 shape. And then you can represent the vertices of the
13 surfaces of the combination of what then has been
14 called a cage since then. And so if I manipulate the
15 vertices of the shape, it produces a deformation of the
16 underlying surface.

17 So this is actually a technique that's been
18 implemented by Pixar as part of their movies. They used
19 it as part of production since the movie Ratatouille, I
20 believe. And so you can take -- like the example that
21 they did for testing is Dash from the movie The
22 Incredibles, and you put sort of a polygonal low
23 resolution cage around Dash. And then if you move that
24 low resolution cage, it causes Dash to perform
25 different animations basically.

1 And so Pixar ended up liking this because it
2 divorced the geometry from the animation. A lot of
3 their tools, the animation is embedded in the geometry.
4 And so if the director, for example, says later I want
5 to change the look of Dash's face, or something like
6 that, you have to throw away those animations and redo
7 them. So if you divorce them from the geometry, you can
8 change the geometry and leave the animations in the
9 end.

10 And then the last aspect was about a
11 technique for moving these squares to perform -- this
12 one was an image deformation technique. And it used
13 both points and lines for deforming images. It was a
14 mathematical technique that I developed for creating
15 such deformations.

16 The example that I did it was taking a
17 picture of the Leaning Tower of Pisa, and like
18 straightening it basically so that it was vertical, you
19 know, fixing an architectural problem. And it's
20 through the perception in the image of doing that,
21 yeah.

22 Q. Thank you. Now, you finished your Ph.D. in 2006, and MS
23 in 2003, on Bachelor's in 2000; is that correct?

24 A. Yes.

25 Q. So were you at this point basically continuously

1 working on your research, and Master's, and Ph.D. from
2 the year 2000 and 2006?

3 A. Yes and no. I was also employed by some companies
4 during that time period. Sometimes that was related to
5 my research that I was working on. Well, almost all it
6 related to my research, but usually it was related to
7 computer graphics, or computer science in some way.

8 Q. What were your employments at this time?

9 A. What do you mean by at this time?

10 Q. So between 2000 and 2006, you just told me that you
11 were employed by some companies. My question is what
12 were the companies, and what was your employment?

13 A. Sure. So in -- I think it was around 2003 time period,
14 I was employed by a company in Boston called SensAble
15 Technologies. They make a -- or at least at the time, I
16 don't know if they still do, they made a 3D haptic
17 feedback device called the Phantom. It's a pan on the
18 robotic arm that you can move in space, and you can
19 actually feel objects basically with it, even though
20 there's nothing there. They hired me to implement some
21 of my research on a topic called dual contouring as
22 part of their 3D modeling software that I think that
23 they were building.

24 I think they had a customer in the
25 automotive industry, and so they were interested in

1 utilizing my research as sort of the core part of their
2 modeling algorithm. So they employed me during that
3 time period.

4 Around, it's probably around 2004, I'm not
5 100 percent sure on the date just sitting here, I was
6 employed by a company called MAC3. It was a startup
7 company that was spun out of MIT. Again, I was in
8 Boston, this time right outside of MIT. And it was a
9 computer vision company. So they hired me to implement
10 the core computer vision algorithms as part of their
11 product.

12 The basic idea was you took photos of
13 different objects. Maybe they were buildings, or
14 statues, or something like this from different
15 perspectives. Those photos would have to be aligned
16 pairwise from one another in sort of the three
17 dimensional space to get the camera parameter's
18 position, location, orientation that the camera took
19 the picture of. And then there was a process of
20 bringing them all into alignment together through
21 something called bundle adjustment. That was the
22 algorithm.

23 And they were having trouble finding MIT
24 students and graduates that could understand the
25 algorithms, and so forth, to actually implement these

1 things, so they hired me to implement them as sort of
2 the core part of their computer vision modeling system.

3 I spent some time at Microsoft Research in
4 2005. And I worked for them working on some algorithms
5 for it was the next generation of graphics hardware
6 that was being produced. The research that I did there
7 ended up making a change to the direct X11 standard
8 which they were working on at the time to include
9 something called a test later unit.

10 And so that was -- the idea there was we
11 were trying to bring -- this is the way we told
12 management, it was to bring movie quality graphics to
13 realtime applications. And so that created a change to
14 every GPU produced since I think it was 2009 is the
15 first time DirextX 11 GPU started being produced. And I
16 also worked there a little bit after I got my Ph.D. in
17 2006 as well.

18 Q. Just to be clear, when you said you worked there after
19 you got your Ph.D., did you mean you worked with
20 Microsoft?

21 A. Yeah, Microsoft Research.

22 Q. How long was your employment with SensAble
23 Technologies?

24 A. I don't remember. I think I was there maybe three
25 months, maybe it was four. I don't really remember.

1 Q. Was it full time or part time?

2 A. During the time that I was there, I was full time, but
3 it was just going to be for a short time period,
4 because I was still working on my Ph.D.

5 Q. How long was your employment with MAC3?

6 A. MAC3 I think was two or three months. I remember it
7 snowed in Boston at the time, and I thought it was one
8 of the coldest places on earth.

9 Q. I can certainly empathize. I was there at the same
10 time.

11 A. Were you?

12 Q. Okay. And was that full time or part time?

13 A. I mean, while I was there, it was part time, but there
14 that was -- I was going sort of back and forth, because
15 I was still doing -- that was when I was at SensAble.
16 It was mostly over the summer. And so it was sort of a
17 break in the whole academic schedule. Whereas, when I
18 was at MAC3, it was not. It was over the regular
19 semester. So they were flying me back and forth to
20 spend, you know, a week working full time there, and
21 then I'd fly back for a time period, and then come
22 back.

23 Q. And your work at Microsoft Research in 2005, how long
24 did that last?

25 A. That was about three months.

1 Q. And was that full time or part time?

2 A. Full time.

3 Q. Do you recall when in 2005 you started your work with
4 Microsoft Research?

5 A. It was either probably May or June. Not exactly sure
6 what month.

7 Q. In your CV you mention that you were a visiting
8 researcher with Microsoft Research starting as of
9 August 2006; is that correct?

10 A. Yes.

11 Q. At the same time were you also assistant professor at
12 Texas A&M?

13 A. I started in the same month.

14 Q. Were you teaching any classes in 3D graphics when you
15 were appointed as assistant professor in the fall of
16 2006, or after your appointment? Sorry.

17 A. Once I started that first semester in the fall of 2006,
18 I did have a class on -- I think it was a special
19 topics class on deformation methods in computer
20 graphics, or something to that effect. I don't remember
21 the exact title.

22 Q. Did that involve 3D graphics?

23 A. It involved graphics in different dimensions, but 3D
24 was part of it.

25 Q. What parts of 3D did you cover in that special topics

1 class?

2 A. I don't necessarily remember off the top of my head.
3 That class is a -- it's sort of a one time type of
4 class, you know, that was taught. I think, what is that
5 now, over 17 years ago at this point. They were
6 techniques, I think, related to different types of
7 deformations. Sometimes those are specific to 3D. Other
8 times they work in other dimensions, or sometimes
9 they're specific to 2D in that case. It just depends on
10 the technique.

11 Q. Did you hold any post-doc positions, or did you
12 transition straight into an assistant professorship
13 role after your Ph.D.?

14 A. I mean, technically I think my advisor employed me as a
15 post-doc for a few months after my Ph.D. Maybe it was
16 even part time. I don't really remember, but it was a
17 very short time period. It wasn't something that I
18 applied for, and I don't even typically list it on my
19 CV. It was more just a continuation of our Ph.D.
20 relationship after I graduated for a short time.

21 Q. Do you recall what the nature of the research was
22 during your post-doc?

23 A. Yes. We were working on medical data from the medical
24 center in Houston. And specifically it was looking at
25 volumetric data that came from -- I think they were CT

1 scans typically of patient's lungs. And the idea was to
2 perform CT scans sort of continuously while a person
3 was breathing. You know, the lungs don't stay
4 constant. You can tell someone to stay still, but
5 you've got to keep breathing, basically, so your lungs
6 keep moving.

7 And so the idea was to track the movement of
8 the lungs, basically, through this volumetric data
9 while someone is breathing to sort of register. It's
10 called registration, the data together. And so I worked
11 on both image and sort of surface techniques for doing
12 the registration and tracking of lung tissue as
13 somebody was breathing.

14 Q. Up to the year 2006, were you familiar with any
15 SpaceTime3D products?

16 A. No.

17 Q. In searching for literature during your research up to
18 2006, did you come across any publications that discuss
19 SpaceTime3D products?

20 A. No.

21 Q. Are you a named inventor in any patents?

22 A. There's been a few patent applications that I think
23 I've been listed on, but I don't think any of them were
24 issued as patents.

25 Q. Do you recall why those applications did not issue as

1 patents?

2 A. I wasn't really involved with much of those. One I
3 think was submitted by Microsoft. I had a meeting with
4 an attorney, and that was the last I think that I dealt
5 with that. There was another Microsoft employee on
6 that. Maybe he dealt with it more after that, but I
7 don't know. That was something Microsoft was pursuing.

8 Another one was one that a faculty member at
9 Georgia Tech wanted to pursue. I was not very
10 interested in pursuing. But, you know, as these things
11 happen to go, when Georgia Tech said that they were
12 going to pursue it and cut the university out, Texas
13 A&M got pretty upset about the whole thing. All of a
14 sudden wanted to be a part of it. So Georgia Tech
15 handled that. I was just, you know, one of the people
16 that worked on the project, so I don't really know what
17 happened.

18 Q. Have you ever been involved in the prosecution of any
19 patent?

20 A. What do you mean by involved in the prosecution of the
21 patent?

22 Q. Thanks for letting me clarify that question. Have you
23 reviewed any communication from an examiner during the
24 course of prosecution of one of your patent
25 applications?

1 A. I do not recall seeing anything from an examiner for
2 any of the patent applications that I had.

3 Q. Were you involved in providing any kind of feedback to
4 the patent office with respect to any rejection an
5 examiner may have provided for one of your patent
6 applications?

7 A. No. Like I said, in those applications, I was only
8 involved in the very initial aspect. I don't really
9 know what happened after that.

10 Q. Prior to the year 2006, were you involved in research
11 -- scratch that.

12 Prior to the year 2006, were you involved in
13 any research that involved transitioning from 2D
14 displays to 3D displays? I'm sorry. Let me paraphrase
15 that. Let me rephrase that.

16 By 2006, were you involved in any research
17 that involved display systems that were capable of
18 transitioning from 2D displays to 3D displays and vice
19 versa?

20 MR. CORDREY: Objection. Form.

21 A. Can you clarify what you mean by 3D display?

22 BY MR. KHAN:

23 Q. So I'll rephrase that question. Prior to 2006, working
24 you involved in any research that involved display
25 systems that were capable of displaying 3D data and 2D

1 data, and transitioning between the display of 2D data
2 and 3D data?

3 MR. CORDREY: Objection. Form.

4 A. I mean, I think you'd need to -- it depends on how you
5 interpret some of the terms that you just provided
6 here. So we talked about like my computer vision work
7 at MAC3, for example. Computer vision is often thought
8 of as an inverse rendering problem. You're given a two
9 dimensional image, and the goal is to sort of recreate
10 the geometry that produced the image.

11 And so computer vision could be thought of
12 as taking an image that's, you know, just at a standard
13 two dimensional shape, and trying to recreate sort of
14 three dimensional geometry.

15 Rendering, on the other hand, is often
16 considered the opposite problem where you're given some
17 geometry. The dimension of the geometry could vary, I
18 suppose, but the goal's to produce an image of that
19 geometry. So, I mean, in that sense, I guess I have
20 been involved, but it depends on how you interpret the
21 terms that you just mentioned.

22 BY MR. KHAN:

23 Q. In preparing your opinions provided in the '868 and
24 '645 declarations, what materials did you review?

25 A. Well, I reviewed a lot of the materials, I suppose.

1 Anything that's cited in those declarations is
2 something that I reviewed. I may have reviewed other
3 documents. I don't really remember.

4 Q. In your declaration, you mention a priority date. What
5 is the priority date that you use for purposes of the
6 '868 proceedings?

7 A. Can you tell me where in my declaration you're
8 referring to?

9 Q. Sure. Paragraphs 18 and 19 in the '868 declaration.

10 CONCIERGE: Do you want me to move that to
11 the public folder, counsel?

12 BY MR. KHAN:

13 Q. Dr. Schaefer, do you have a copy of the declaration, or
14 would you like us to provide you one?

15 A. If you could provide me an electronic copy, that would
16 be useful. I have a paper copy here, but multiple forms
17 is good.

18 MR. KHAN: Okay. So, Jarame, for purposes
19 of the record, this is Exhibit 2016 in the '868
20 proceedings that is Dr. Schaefer's declaration.

21 DEPOSITION EXHIBIT 2016

22 Scott Schaefer's Declaration

23 11:26 a.m.

24 A. So the section you referred to in my declaration is
25 under the legal principles of validity, and has not

1 specified a date associated with it. I may have a date
2 somewhere in here. But on paragraph 30 I state that it
3 has further been explained to me by counsel for patent
4 owner that the relevant timeframe is in or around
5 September 13th, 2005. So without looking further, I
6 would probably estimate that that's the priority date,
7 but I may have it listed somewhere in here.

8 Q. And what is the priority date that you used for
9 purposes of the '654 proceedings?

10 A. I believe it would be the same date. Again, paragraph
11 30 of my '654 declaration also indicates it has been
12 further been explained to me by counsel for patent
13 owner that the relevant timeframe is in or around
14 September 13th, 2005.

15 Q. In your declaration you mention secondary
16 considerations of nonobviousness. I can refer you to
17 paragraph 24 of the '868 declaration.

18 A. Yes.

19 Q. What is your understanding of secondary considerations?

20 A. My understanding is as stated here. It has further been
21 explained to me by counsel for patent owner that the
22 following factors are used to make an obviousness
23 determination. One, the scope and content of the
24 private art. Two, the level of ordinary skill in the
25 art. Three, the differences between the claimed

1 invention and the prior art. And, four, objective or
2 secondary considerations of nonobviousness. Any
3 relevant objective factors or secondary considerations
4 of nonobviousness, which may include commercial success
5 of a product using the invention, if that commercial
6 success is due to the invention, long felt need for the
7 invention, evidence of copying of the claimed
8 invention, industry acceptance, the taking of licensees
9 under the patent by others, initial skepticism, failure
10 of others, and praise of the the invention.

11 I understand that when a patentee can
12 demonstrate commercial success, usually shown by
13 significant sales in a relevant market, and that the
14 successful product is the invention disclosed and
15 claimed in the patent, it is presumed that the
16 commercial success is due to the patented invention. I
17 also understand that courts may find the commercial
18 success of the infringer and other members of the
19 industry persuasive, even though the patentee was not
20 successful with a product governed by the patent.

21 MR. CORDREY: We've been going about an
22 hour. When he gets to a point, can we take a quick
23 break, maybe 10 minutes?

24 MR. KHAN: That sounds good. Thanks. I'll
25 just wrap up this line of questioning, and then we can

1 take a break.

2 BY MR. KHAN:

3 Q. Dr. Schaefer, why did you include a paragraph on
4 secondary considerations in your declaration?

5 A. There's paragraphs about a lot of legal principles
6 regarding validity. It's one of the legal principles
7 regarding validity, I think.

8 MR. CORDREY: And I'll object to the extent
9 it calls for attorney-client and privileged
10 communications, and attorney work product. So I would
11 caution the witness not to reveal any conversation with
12 counsel as to why certain things were included in the
13 declaration, and why things were not.

14 BY MR. KHAN:

15 Q. Okay. We can take a break now. Would 10 minutes work?

16 A. That'd be fine.

17 Q. Okay. Great.

18 A. What time do you want to come back? Let's be specific.

19 MR. KHAN: 11:42 a.m. Eastern time.

20 A. All right. Sounds good.

21 (Break at 11:32 a.m.)

22 (Back on the record at 11:43 a.m.)

23 BY MR. KHAN:

24 Q. Dr. Schaefer, prior to the break, we were talking about
25 secondary considerations. In your answer you had

1 mentioned that this was part of the legal section of
2 your declaration; is that correct?

3 A. Yes.

4 Q. You do not offer any additional evidence of secondary
5 considerations in your declaration; is that correct?

6 A. That's correct.

7 Q. Were you aware of any other secondary considerations?

8 A. It's not something I looked into.

9 Q. If secondary considerations were not something you had
10 looked into, why did you mention it in your
11 declaration?

12 A. So I should be clear. It wasn't something I looked into
13 as part of this declaration. It's just part of the
14 legal principles. I think that section, it may have
15 actually been copied from the '048 declaration.

16 Q. So why include the secondary consideration as part of
17 the legal principles in your declaration?

18 A. You know, typically with these declarations there's
19 usually a section on legal principles, and it's fairly
20 boilerplate text.

21 MR. CORDREY: Also objection as to form and,
22 again, I'll caution Dr. Schaefer not to reveal any
23 conversations with counsel about the reasons for
24 including or not including sections in this
25 declaration.

1 BY MR. KHAN:

2 Q. So you noted in one of your earlier answers that
3 secondary considerations were only mentioned in the
4 legal principle section of your declaration. Is it your
5 opinion that this particular legal principle did not
6 apply to the '654 or '868 patents?

7 A. I haven't rendered an opinion on that at all.

8 Q. In section four of the '868 declaration entitled person
9 of ordinary skill in the art, you provide an opinion of
10 who that POSITA may be. How did you arrive at that
11 description of a POSITA?

12 A. It's a fairly standard description of a POSITA, and I
13 don't think it necessarily differs significantly from
14 any of the other experts in this case. Usually you look
15 for someone that's, as I said here, I defined the
16 POSITA as a Bachelor's degree in computer science or
17 related field, and two years of experience working in
18 the field of computer graphics or graphical user
19 interfaces for GUIs. An individual with less technical
20 education, but more experience or vice versa could also
21 qualify as a person of ordinary skill in the art.

22 Q. Are you also serving as an expert in the co-pending
23 district court litigation involving these patents?

24 MR. CORDREY: Objection. Relevance.

25 A. If you're asking whether I'm serving as an expert in

1 the -- well, I'm serving as a validity expert in the
2 patent trials.

3 BY MR. KHAN:

4 Q. Are you aware of the claim construction standards in
5 the IPR proceedings?

6 A. Well, as I say in the claim construction section, I am
7 informed that claim terms are construed under the
8 standard provided by the U.S. Court of Appeals for the
9 federal circuit in Phillips versus AWH Corp., and
10 informed that under this standard claim terms are
11 presumed to have their ordinary and customary meaning
12 in light of the patent's specification as understood by
13 a person of ordinary skill in the art at the time of
14 the invention unless, one, the patentee acts as its own
15 lexicographer by setting out the definition in the
16 specification. Or, two, the patentee disavows the full
17 scope of a claim term in either the specification or
18 during the prosecution of the patent.

19 Q. So what does the term ordinary and customary mean?

20 A. I think exactly what it says, what ordinary and
21 customary mean.

22 Q. So how would you determine what the ordinary and
23 customary meaning is?

24 A. How would I determine? Just the ordinary meaning in
25 terms of the words that are provided.

1 Q. So how would you determine the ordinary meaning?

2 MR. CORDREY: Objection. Form.

3 A. Maybe I'm not understanding the question. I interpret
4 them in terms of just the way that we would use terms
5 in everyday speech, the English version.

6 BY MR. KHAN:

7 Q. In the claim construction section of your declaration,
8 you also mention a Markman order, for example, in
9 paragraph 61 of your '868 declaration. Do you see
10 that?

11 A. Yes.

12 Q. Did you review the Markman order?

13 A. Yes.

14 Q. You listed the constructions of 3D space and 2D space
15 in paragraph 61 of your '868 declaration. Do you agree
16 with those constructions?

17 A. Those are the constructions that I've applied.

18 Q. My question was do you agree with those constructions?

19 A. I don't -- I don't see necessarily anything wrong with
20 these constructions, but these are the constructions
21 that I've applied to the patents.

22 Q. I understand that these are the constructions you
23 applied. But my question was whether you agree with the
24 constructions?

25 MR. CORDREY: Objection. Form.

1 A. Again, what I just said was I don't see anything
2 necessarily wrong with the constructions, and these are
3 the constructions that I've applied.

4 BY MR. KHAN:

5 Q. Now, Dr. Schaefer, can you explain to me how a computer
6 system typically displays data on a screen?

7 MR. CORDREY: Objection. Form.

8 A. Well, how a computer system would display data on a
9 screen, a screen is made up of a set of pixels. These
10 are just dots on the screen. Typically they're too
11 small. We started using computers, when I did, the dots
12 were visible on the screen, but today they're very
13 small, and basically invisible. But the goal is to
14 determine what color every pixel is on the screen to
15 produce an image. Depending on how you're rendering
16 things, then that determines algorithms that you might
17 use to determine what the color of those pixels are.

18 BY MR. KHAN:

19 Q. So how did the colors -- sorry. How did the pixels know
20 what color to output?

21 A. Depends on the rendering algorithm that you're
22 utilizing. There's a lot of different rendering
23 algorithms.

24 Q. Where does the rendering algorithm -- sorry. Scratch
25 that.

1 Is the rendering algorithm something that is
2 stored in the computer?

3 MR. CORDREY: Objection. Relevance.

4 A. Stored? I mean, in the end, an algorithm is usually
5 thought of as a set of instructions. And those
6 instructions are going to exist at some point if it's
7 executing on the computer in the memory of the
8 computer. And so, I mean, if you consider that to be
9 stored, it just depends on what you mean by stored.
10 It's going to be a set of instructions basically.

11 BY MR. KHAN:

12 Q. So how does the computer access the set of
13 instructions?

14 MR. CORDREY: Objection. Relevance.

15 A. Well, in general in terms of how a program executes is
16 you have a compiled version of the program. Typically
17 it's a binary file that is loaded into memory through
18 the operating system. The operating system they only
19 load part, depending on how the application's develop.
20 There's a program counter that tells the CPU where it
21 is executing, or what instruction it is currently
22 executing, and that's advanced and manipulated through
23 various sets of instructions to the processor that
24 cause it to perform various actions.

25 BY MR. KHAN:

1 Q. So if a device were to display a web page on a computer
2 screen, what's the computer's process for rendering
3 that web page onto the screen?

4 MR. CORDREY: Objection. Relevance.

5 A. So, I mean, in general it's going to depend upon the
6 web browser and how the web browser implements its
7 techniques. But you can talk about sort of generalities
8 that a web browser will utilize various protocols,
9 usually HTTP to download a web page from a website. It
10 will then parse the text of that web page. Again, it
11 depends on the web browser and how it operates. But
12 usually it creates some form of sort of usually called
13 document object models. That's sort of a programmatic
14 or data structure representation of the web page.

15 These things are then parsed, and
16 potentially more files are downloaded, depending on
17 what's referred to in the web page to attempt to create
18 an image on the screen. But the specifics of how that
19 happens, it's going to be dependent on web browser.

20 BY MR. KHAN:

21 Q. If an application such as Microsoft Word were to be
22 displayed, is this process of displaying a Microsoft
23 Word window similar to that of displaying a web
24 browser?

25 A. I mean, there's similarities, but there's also

1 differences, right. These are different types of
2 applications displaying different types of application
3 specific data.

4 Q. Can you explain what some of the differences may be if
5 you were to display a Microsoft Word window and a web
6 browser?

7 MR. CORDREY: Objection. Form. Objection.
8 Relevance.

9 A. For example, one is displaying a web page versus a Word
10 document, and those are different types of documents at
11 different capabilities to render different things as
12 part of the document.

13 BY MR. KHAN:

14 Q. I should probably rephrase that question. What I would
15 like to ask you is can you explain what some of the
16 procedural differences may be if in a computer if you
17 were to display a Microsoft Word window versus a web
18 browser?

19 MR. CORDREY: I'm going to object to this
20 line of questioning. This is outside the scope of Dr.
21 Schaefer's declaration in these two proceedings.
22 Unless you can tie this to his opinions in those
23 declarations, we're going to shut down this line of
24 questioning, and I'll seek a conference with the board
25 today about whether these are relevant.

1 MR. KHAN: Counsel, you're more than welcome
2 to approach the board. I think these questions are
3 relevant because the applications are -- sorry. The
4 times in question are all about rendering applications
5 on display, and I'm trying to understand how that
6 process works, and what Dr. Schaefer's understanding is
7 of those process. That's directly related to the
8 claims.

9 MR. CORDREY: You're not directing any of
10 your questions to his opinions in his declarations.

11 MR. KHAN: Well, I'm not going to run by my
12 phrasing of the questions with you, but the relevance
13 is there. And if you'd like to pick up and call the
14 board, I'm happy to discuss it with them. But this is
15 my questions, and I'd appreciate it if I could be given
16 the opportunity to speak to your expert about his
17 understanding of how this technology works.

18 MR. CORDREY: Well, with that limited
19 explanation, we'll indulge this line of questioning a
20 little further.

21 MR. KHAN: I appreciate that. Thanks.

22 A. Can you repeat the question, because I'll be honest
23 I've forgotten it at this point.

24 BY MR. KHAN:

25 Q. The question was can you explain what some of the

1 procedural differences may be in a computer that were
2 to display Microsoft Word window versus a web browser
3 window?

4 MR. CORDREY: Objection. Form.

5 A. I'm not sure I completely understand what you mean by
6 procedural differences. There are different rendering
7 algorithms that exist, and they may implement different
8 rendering algorithms.

9 BY MR. KHAN:

10 Q. Okay. And is the rendering algorithm different because
11 the application is different?

12 A. Typically, different rendering algorithms may focus on
13 different types of objects, or different
14 considerations, for example. It just depends on what
15 the developers were interested in when they implemented
16 the application.

17 Q. You mentioned that there's some similarities as well in
18 the process of displaying a Microsoft Word window
19 versus a web browser. Can you explain what some of
20 those similarities are?

21 A. Well, as I mentioned, these rendering algorithms are
22 all trying to determine what the color of dots are on
23 the screen. That's the output of these algorithms. They
24 both do that.

25 Q. And so if you have a data that -- sorry. Scratch that.

1 When you have data to be output on a screen
2 from say a Microsoft Word file, how is that data
3 communicated to the pixel?

4 MR. CORDREY: Objection. Form.

5 A. Typically there's going to be a rendering algorithm.
6 It's going to take data, and it's going to determine
7 what the pixels are on the screen. Again, as to how
8 that happens, it depends on the algorithm.

9 BY MR. KHAN:

10 Q. Is the rendering algorithm for when outputting the data
11 in 3D the same as the rendering algorithm for
12 outputting data in 2D?

13 MR. CORDREY: Objection. Form.

14 A. Not always. There can be differences.

15 BY MR. KHAN:

16 Q. Can you explain what the differences are?

17 A. Well, it does depend on your rendering algorithm, for
18 example, and what your data is. Often we discuss sort
19 of a pipeline that happens in 3D of different
20 operations, but they may not all actually be necessary.
21 Depends on what your data is, and how it's being
22 processed, so it really depends.

23 Q. Is the execution of these rendering algorithms, is that
24 part of a generation process for an image that is to be
25 displayed on a screen of a computer device?

1 MR. CORDREY: Objection. Form.

2 A. Usually. It's usually part of the output of an image,
3 whether it's being displayed or not.

4 BY MR. KHAN:

5 Q. And when you're working on a Microsoft window, how does
6 the computer display like a character that you have
7 just input on your keyboard?

8 MR. CORDREY: Objection to form.

9 A. What do you mean by Microsoft window?

10 BY MR. KHAN:

11 Q. I'm sorry. Microsoft Word.

12 A. Oh, okay. Well, a character in Word is actually defined
13 by something called a TrueType font typically. It could
14 potentially be a bitmap font, but those are very rare
15 these days. A TrueType font is a shape that is bounded
16 by a sequence of what are called Bezier curves. These
17 are polynomial curves. Typically these are represented
18 as quadratic Bezier curves which have three control
19 points per point. These TrueType fonts, the way that
20 they're often specified is with on curve and off curve
21 points. But then those are actually converted into
22 quadratic Bezier curves. And then the process is
23 basically determining which pixels fall within the
24 sequence of curves that defines the outline of the
25 shape. And I should caveat that a little bit, TrueType

1 fonts were originally defined as quadratic Bezier
2 curves, but there's been some push to use cubic Bezier
3 curves also. And so I actually don't know right now if
4 TrueType fonts utilize cubic Bezier curves, but various
5 vector graphics programs like Inkscape, and so forth,
6 actually do.

7 Q. So I understand from your answer that TrueType font may
8 be used. But my question was perhaps more related to
9 the process, right. And so what I wanted to understand
10 was when a user selects a key on the keyboard, then how
11 does the computer know that a key has been selected,
12 and where a corresponding point should be activated in
13 the display?

14 MR. CORDREY: Objection.

15 A. Some of the stuff is going to be -- I'm sorry, okay.
16 Some of the stuff is going to be dependent on an
17 operating system. When the user selects a key, it
18 generates an interrupt typically in an operating system
19 that is caught. Now, that is delivered then to -- and
20 how it does this depends on the operating system, I
21 guess, but delivered typically to a running
22 application. In your example, I think you were
23 utilizing Microsoft Word in this case.

24 There is a -- in Windows there's typically a
25 function that catches the keyboard input. And so an

1 ascii character would be delivered to the program. How
2 Word goes about processing from that point it depends
3 on the execution of Word. But it's going to utilize
4 that character.

5 You asked where it's going be spaced. That's
6 actually a fairly complicated process about where you
7 place characters, and there's a whole host of work
8 about like spacing characters and so forth, because
9 they're all variables spaced between one another.

10 If you look all the distance between
11 characters in Word, it varies, actually, for example,
12 in what's placed on the screen. And so it's going to
13 try to determine using various algorithms as to where
14 that character goes. And then it's going to utilize
15 those curves, as I mentioned previously, to determine
16 which pixels are going to be placed. But this is --
17 placement of characters in Word is not something I'm
18 addressing in my declaration here.

19 BY MR. KHAN:

20 Q. I understand, and thank you for the background. Have
21 you used Microsoft Word in the past?

22 A. Yes.

23 Q. Have you used it in a 2D display?

24 A. Yes.

25 Q. Have you used it in a 3D display?

1 A. I don't have a 3D display.

2 Q. Are you aware of Microsoft Word being used in a 3D
3 display?

4 A. What do you mean by 3D display? Maybe I should ask
5 that question.

6 Q. Yeah, that's the question. So are you aware of a system
7 that renders Microsoft Word for -- scratch that.

8 That renders web pages in a 3D space?

9 A. In a 3D space? For example, the asserted patents?

10 Q. Sure. I believe the asserted patents use the term 3D
11 space, yes. I'm sorry. Are you waiting for me to ask a
12 question, or are you thinking?

13 A. I am waiting for you to ask a question.

14 Q. I'm sorry. Okay. So let me ask the question again. Are
15 you aware of a system that can render a web page in a
16 3D space?

17 A. Yes.

18 Q. And are you aware of a system that can render Microsoft
19 Word application in 3D space?

20 A. Yes.

21 MR. CORDREY: Object to relevance.

22 BY MR. KHAN:

23 Q. In the systems that can render a web page in 3D space,
24 can the user browse the web?

25 A. Can the user --

1 MR. CORDREY: Objection. Form.

2 A. I mean, I suppose it depends on what you mean by browse
3 the web. Web browsers display web pages. So, I mean, in
4 that sense, yes.

5 BY MR. KHAN:

6 Q. How about to do a search like a Google search?

7 MR. CORDREY: Same objection.

8 A. When you do a Google search, it's rendering a web page,
9 so we just decided -- I just specified that you can
10 render a web page. So in that sense it would be yes.

11 MR. KHAN: Okay. We can take a five minute
12 break now. We can go off the record and take a five
13 minute break.

14 MR. CORDREY: Okay.

15 MR. KHAN: Thank you.

16 (Break at 12:23 p.m.)

17 (Back on the record at 1:05 p.m.)

18 BY MR. KHAN:

19 Q. Dr. Schaefer, can I ask you to turn to paragraph 34 of
20 your declaration, please. If you could let me know when
21 you're there. This is the '868 declaration.

22 A. Yes, I'm there.

23 Q. In paragraph 34 the first sentence reads, However,
24 there are times when it is difficult to operate in 3D
25 space, and you provide an example. I'll quote what you

1 said here, In certain cases it may be difficult to
2 interact with a file, document, application, desktop or
3 other input within a 3D virtual space. Are there times
4 where it is difficult to operate in 2D space?

5 A. Well, I don't think that's something I address in my
6 declaration. You're asking me for a hypothetical that I
7 haven't really considered here. But I can't necessarily
8 think of something right now, but that doesn't mean
9 that there's not times. I don't know.

10 Q. So you didn't consider times when it would be difficult
11 to operate in 2D space?

12 MR. CORDREY: Objection. Form.

13 A. Oh, as I said, I can't think of a case right now
14 sitting here. But, you know, it's not something that I
15 spend a lot of time trying to consider.

16 BY MR. KHAN:

17 Q. Are there any other examples when it might be difficult
18 to operate in 3D space?

19 A. I'm not sure. I mean, the quote that I have here is
20 directly.

21 Q. I understand, but in the first sentence you said that
22 there are times when it is difficult to operate in 3D
23 space, so I'm trying to understand what examples are
24 there of those times that you mention in the first
25 sentence?

1 A. Sure. I give examples right here. I say, for example,
2 in certain cases it may be difficult to interact with a
3 file, document, application, desktop or other output
4 within a 3D space. This can be the case if the end user
5 is occupying an unfavorable viewpoint in the virtual
6 space.

7 Q. Yes. And are there any other times that it is difficult
8 to operate in 3D space?

9 A. Well, the patent gives another example where it says
10 objects are drawn in skew within the virtual space.

11 Q. Can you explain what you mean by objects are drawn in
12 skew within the virtual space?

13 A. Well, that's a quote directly from the patent. But if
14 objects are drawn in skew, then they may be at an angle
15 such that it might be difficult to discern individual
16 pieces of the application.

17 Q. In the next paragraph, paragraph 35, under item 2B you
18 note displaying the objects including application
19 specific data in 2D space. Do you see that?

20 A. I see that text.

21 Q. What do you mean by objects?

22 A. I mean the objects that are specified in the claims.

23 Q. What does it mean to be an object?

24 A. Well, for example, in paragraph 35 I talk about
25 objects, for example, a window.

1 Q. How would you define an object?

2 A. Just the plain ordinary meaning. It's not a term that
3 was construed here. But in the context of the patent,
4 an example was window.

5 Q. So I understand that you are saying a window is an
6 example of an object. But the question is what your
7 definition of an object is.

8 A. My definition is plain and ordinary meaning.

9 Q. And what is that?

10 A. An object.

11 Q. And I'm asking you what an object means, and you're
12 telling me that it means an object.

13 A. I mean I'm giving it its plain and ordinary meaning,
14 and I gave you an example as a window.

15 Q. Is the example a definition?

16 MR. CORDREY: Object to form.

17 A. Something that I'd need to think about as to how broad
18 that necessarily could be, but I gave you an example,
19 which is a window.

20 BY MR. KHAN:

21 Q. Did you not think about this when writing your
22 declaration?

23 A. I thought about a lot of things. But in the context of
24 the patents, I looked at what I was supplied, and I
25 gave an example here as a window how it applied.

1 Q. You mentioned you thought about a lot of things. Among
2 these things that you thought about, did you think
3 about what the plain and ordinary meaning of an object
4 is?

5 A. I mean, in general, I gave all the terms that were
6 construed as to plain and ordinary meaning.

7 Q. Sorry. If I could ask you to answer the question, that
8 wasn't my question. The question was among these things
9 that you thought about, did you think about what the
10 plain and ordinary meaning of an object is?

11 MR. CORDREY: Objection. Form.

12 A. I mean in general for all of the terms, I am
13 interpreting them in terms of plain and ordinary
14 meaning, and how they're used in the patent themselves.
15 For an object I gave you its plain and ordinary
16 meaning, and I gave you an example of an object.

17 BY MR. KHAN:

18 Q. Dr. Schaefer, I understand you gave an example, but I'm
19 asking you what the plain and ordinary meaning of an
20 object is, which you said you used in writing your
21 declaration.

22 A. In general, I didn't come up with my own definition of
23 an object. I'm just giving you its plain and ordinary
24 meaning. But as the claims say, an object is displayed
25 in said 2D space on the fixed resolution display. I

1 gave you an example of an object, for example, a
2 window.

3 Q. So I'm not asking generally. I'm asking specifically
4 regarding an object what was the plain and ordinary
5 meaning of an object that you used when you used this
6 term in your declaration?

7 MR. CORDREY: Objection to form.

8 A. I didn't ascribe it any particular special meaning.
9 It's not a term that is construed. I simply gave it its
10 plain and ordinary meaning interpreted it in the
11 context of the patent.

12 BY MR. KHAN:

13 Q. You haven't told me what that meaning is, and I'm
14 asking you what that meaning is?

15 A. As I said --

16 MR. CORDREY: Objection. Asked and answered.

17 A. I didn't ascribe any particular definition or special
18 meaning to the term. It's not a term that was
19 construed.

20 BY MR. KHAN:

21 Q. Thank you. In the same paragraph, paragraph 35 of the
22 '868 declaration, in the last sentence you state, The
23 claims require that active applications, including
24 objects and application specific data, are first opened
25 and displayed in 2D space. Do you see that sentence?

1 A. Yes, I do.

2 Q. What makes an application active?

3 A. Well, in general, you can interact with the
4 application. Applications often are responding to some
5 form of input, whether it be buttons, or whatever, and
6 that makes an application active.

7 Q. So if a user cannot interact with an application, then
8 does that mean that that application is no longer
9 active?

10 A. I'm not sure. You might have to give me a more specific
11 scenario than that.

12 Q. Well, I'm trying to understand what makes an
13 application active, and you gave me an example of
14 interacting with an application. I am asking you
15 whether that is the limits of what an active
16 application is, or if an active application can be --
17 sorry. Or whether an application can be active even
18 when there's no interaction?

19 MR. CORDREY: Object to form.

20 A. Well, in general, the patent makes a distinction
21 between applications, objects having application
22 specific data, and images thereof. Images are images.
23 Applications, well, you can interact with them by press
24 a button, and it has some action associated with it.
25 The application responds to it. It's different on an

1 image in that case, because it's just an image. And so
2 there is a distinction made in the claims between those
3 two things, and I'm drawing that distinction.

4 BY MR. KHAN:

5 Q. You mentioned that applications you can interact with
6 them by pressing a button. Does that make the
7 application an active application?

8 MR. CORDREY: Objection. Form.

9 A. Can you explain what you mean by that?

10 BY MR. KHAN:

11 Q. I should rephrase. Sorry about that.

12 Is an application an active application if
13 you can interact with the application by pressing a
14 button?

15 MR. CORDREY: Objection. Form.

16 A. Well, that was an example, right? Again, drawing a
17 distinction between images versus applications, or
18 these objects, Windows in this case. An image is just
19 that, an image. Whereas, an application different
20 components will behave differently depending on how you
21 interact with it. An example was pressing the button.

22 BY MR. KHAN:

23 Q. So my question was not regarding images. My question
24 was regarding active applications, which is a phrase
25 that you use in your declaration. And I'd request that

1 you can answer the question specifically, and I'll
2 repeat that again. It's is an application an active
3 application if you can interact with the application by
4 pressing a button?

5 MR. CORDREY: Objection. Form.

6 A. Well, again, I'm drawing a distinction with images.
7 Because the patent is drawing the distinction here, or
8 patents, I should say, are drawing the distinction.
9 When you press a button, it has an action, for example,
10 that's specified by that button. If it does what the
11 application would do, I would say you're interacting
12 with an application and not an image in that case.

13 BY MR. KHAN:

14 Q. What's your understanding of the word interacting?

15 MR. CORDREY: Objection. Form.

16 A. I'm not ascribing any particular special meaning to the
17 word interacting. It just means interact.

18 BY MR. KHAN:

19 Q. What does interact mean?

20 A. Well, as I said, I'm not ascribing a special meaning to
21 it. As an example, interacting could be pressing a
22 button.

23 Q. If an application is storing data in memory, is that
24 application an active application?

25 MR. CORDREY: Objection. Form.

1 A. I don't know if that's the distinguishing feature that
2 I would necessarily use. I mean, possibly I might need
3 a specific example to give a better answer.

4 BY MR. KHAN:

5 Q. And maybe I'll give an example that if Microsoft Word
6 is storing data on the memory, is Microsoft Word an
7 active application?

8 MR. CORDREY: Objection. Form.

9 A. I mean, you may be splitting hairs a little bit here.
10 When the application first starts up, the question is
11 is there anything being stored in memory or not. But,
12 you know, I'm going to go with probably here. But,
13 again, whether or not things are stored in memory is --
14 I don't know if it's particularly relevant or not.

15 BY MR. KHAN:

16 Q. If an application sends data to another device, is that
17 application an active application?

18 MR. CORDREY: Objection. Form.

19 A. I'm sorry. Sends data to another device? You're
20 talking about like network communication, for example?

21 BY MR. KHAN:

22 Q. That could be one example.

23 A. Usually that would mean that it's an executing
24 application, meaning it's doing something.

25 Q. And does that make that application active?

1 MR. CORDREY: Objection.

2 A. Again, I don't know that that's necessarily a
3 distinguishing feature but, you know, you could say
4 probably.

5 BY MR. KHAN:

6 Q. If an application such as Microsoft Word receives input
7 from a user, does that make the application active?

8 MR. CORDREY: Objection. Form.

9 A. I mean, I think that's part of it.

10 BY MR. KHAN:

11 Q. If the application receives input from a user and
12 displays the input, is the application active?

13 MR. CORDREY: Same objection.

14 A. I mean, again, it'd be nice to talk about this in
15 specifics in general, but I don't know that it's
16 necessarily required.

17 BY MR. KHAN:

18 Q. So perhaps maybe a more specific example using a web
19 browser, if a web browser receives user input, and
20 displays the user input, is the web browser
21 application, sorry, is the web browser active?

22 MR. CORDREY: Objection. Form.

23 A. I would say yes.

24 BY MR. KHAN:

25 Q. In paragraph 44 of the '868 declaration, you discuss

1 figure 13A, and you also mention 13B of the '868; is
2 that correct?

3 A. Yes.

4 Q. Can you describe in your words what you see in figure
5 13A?

6 MR. CORDREY: Objection. Form.

7 A. Sure. It says, as I state in figure 13A, the Microsoft
8 Word application 490 is presented in the foreground
9 with a Yahoo search application 492 being present in
10 the background.

11 BY MR. KHAN:

12 Q. Earlier you had talked about how you can display
13 Windows in skew in the '868 patent, and if I could ask
14 you to turn to column 22 of the '868 patent.

15 A. You haven't introduced the '868 patent as evidence, but
16 I do have a printout of it here.

17 Q. Okay. Sure, the '868 patent is Apple 1001, and the
18 '868 proceedings. And if you could please turn to
19 column 22 of Apple 1001, that'd be great, and if you
20 could let me know when you get there.

21 A. I'm there.

22 Q. Great. In column 22 beginning paragraph starting from
23 line seven says, When the viewpoint of the end user
24 within a virtual space. Do you see that line?

25 A. Yes.

1 Q. Great. So that paragraph beginning with that line
2 starting from line seven of column 22 briefly mentions,
3 and I'll read the sentence. It says, In such a case,
4 the 3D GUI system utilizes the bind to the HUD feature
5 whereby clicking an icon or bottom analogous to the
6 minimize in windows operating system environment
7 triggers a change to the viewpoint of the end user
8 within the virtual space so that the web page is
9 directly in an end user's visual field, thereby making
10 easier to interact with. Do you see that sentence? Did
11 I read that correctly?

12 A. Yes. I think so.

13 Q. What's your understanding of the bind to HUD feature?

14 A. Just what's presented here in the patent. There's
15 multiple embodiments.

16 Q. What is the bind to HUD feature?

17 A. Well, it states the 3D GUI system utilizes the bind to
18 HUD feature whereby clicking an icon or bottom
19 analogous to the minimized windows operating system
20 triggers a change to the viewpoint of the end user
21 within the virtual space so that the web page is
22 directly in an end user's visual field, thereby making
23 it easier to interact with. In one embodiment, this
24 was accomplished by revealing the 2D version of the web
25 page that was initially hidden or drawn off screen and

1 positioning it in a layer that is in front of the 3D
2 virtual space such that the end user can interact with
3 this layer in 2D. It goes on to discuss the unbind.

4 Q. So I understand you just read back the paragraph from
5 in columns 22, line seven, to approximately line 20 or
6 so. But my question didn't ask you to read the patent
7 back to me. My question was what is the bind to the HUD
8 feature in this paragraph?

9 A. Well, exactly what it says. It talks about clicking an
10 icon, triggering a change to the viewpoint so the web
11 page is directly in front of an end user's visual
12 field. It also talks about in an embodiment this is
13 accomplished by revealing the 2D version of the web
14 page that was hidden off screen.

15 Q. So is that embodiment describing the bind to HUD
16 feature?

17 A. I think it is.

18 Q. How does clicking an icon trigger a change to the
19 viewpoint of the end user within the virtual space?

20 MR. CORDREY: Objection. Form.

21 A. Well, in general, the viewer's in a virtual space.
22 They're going to have a position and orientation. I
23 suppose it could be accomplished a number of different
24 ways, but one way would be with the viewer in its
25 orientation.

1 BY MR. KHAN:

2 Q. Maybe I should be more specific. How does the computer
3 trigger a change to the viewpoint when a user clicks an
4 icon?

5 MR. CORDREY: Objection. Form.

6 A. Again, it could be accomplished a number of different
7 ways. You could, for example, move the user. How would
8 you do that? Well, again, there's a lot of different
9 ways you could do that. You could define a spline, for
10 example, that would orient the user or change its
11 location. But this is just one example of how you might
12 do this. There could be many different ways.

13 BY MR. KHAN:

14 Q. Can you expound on what you mean by orienting the user
15 as accomplishing the change in viewpoint?

16 A. Well, the viewpoint is where this sort of virtual user
17 view would be drawn from. So to change that would be to
18 modify it. Again, it's just an example.

19 Q. And how does a computer modify it?

20 MR. CORDREY: Objection. Form.

21 A. I mean, I've already given you examples of how it could
22 be done. There's lots of different ways after, in
23 general, by changing it. But how do you do that,
24 there's many different ways you could do so.

25 BY MR. KHAN:

1 Q. Can you provide an example of a few ways one computer
2 would do that?

3 A. I gave an example of a spline already.

4 Q. Okay. And can you explain what spline -- sorry. Can
5 you explain how a spline works?

6 A. Well, in general, splines are thought of as polynomial
7 functions. Usually they are represented in a particular
8 geometric form, for example, Bezier curves, which we
9 already talked about in the context of fonts. Bezier
10 curves can be used for all sorts of different things.
11 But these are typically thought of as splines.

12 The original motivation for these things was
13 to -- for these curves was to try to reproduce some of
14 the physical process that happens when you bend a piece
15 of wood. Usually you use these pegs on a board, for
16 example, and you put a piece of wood in between them,
17 and it would cause -- and this is called a spline. You
18 would cause a path to be generated if you wanted to
19 model these things mathematically, and so typically we
20 use polynomial functions, because polynomials are
21 things that people are comfortable with, and you
22 manipulate control points to generate paths, for
23 example.

24 Q. Dr. Schaefer, can you turn to paragraph 65 of your
25 declaration in the '868 proceedings, please.

1 A. Yes.

2 Q. About five lines down from the top of paragraph 65
3 you've included quote "a focal group." Do you see
4 that?

5 A. Yes.

6 Q. And just for context, in this section you are
7 describing Anthony, which is Apple 1007, which is one
8 of the prior art references applied by the petitioners;
9 is that correct?

10 A. I believe so, yes.

11 Q. And so what is your understanding of what Anthony's
12 focal group is?

13 A. Well, it's described right here actually. So a focal
14 group is displayed at a primary point of focus in the
15 GUI. The focal group 509 may be placed in the front and
16 center of the GUI view. Remainder of the groups are
17 displayed on either side of the focal group based on
18 their ordering such that they appear to be less
19 prominent to the user in the focal group. On the
20 following page, I include figure four of Anthony
21 showing the picture of that.

22 Q. Following figure four, what is the focal group?

23 A. So the -- so in figure four, focal group should be the
24 group in the center, which is the pictures in April.

25 Q. So I just want to be -- just want to better understand

1 what you're pointing to. So in figure four, which is
2 included on page 29 of your '868 declaration, which
3 immediately follows paragraph 65 in your declaration,
4 in that figure you noted that the focal group should be
5 the group in the center which is the pictures in April;
6 is that correct?

7 A. Right. As the patent says on paragraph 69, the focal
8 group 1209 is the month of April.

9 Q. And what's included in 1209? Is it just the pictures,
10 or is it also the title April?

11 MR. CORDREY: Objection. Form.

12 A. I need to look through Anthony to see if it defines
13 exactly what a focal group is. You're asking, in
14 particular, about different aspects, and how Anthony
15 has defined a focal group.

16 BY MR. KHAN:

17 Q. Okay. Please go ahead and take your time.

18 A. Do you have a copy of Anthony that you can introduce as
19 an exhibit?

20 MR. KHAN: Yes, I do. Can we provide a link
21 to Exhibit 1007, please.

22 DEPOSITION EXHIBIT 1007

23 Anthony Patent Application Publication

24 1:57 p.m.

25 CONCIERGE: Should be in the public folder

1 if you refresh the page now.

2 A. Well, a focal group appears 310 times inside of
3 Anthony, and I've not looked through all of them. But
4 Anthony does say in paragraph 44 that items that are
5 within the time range covered by the focal point are
6 collectively called the focal group. Also, identifies
7 figure four as a focal group as well, and figure four
8 does have a date on the top of the displayed grouping
9 that's there similar to the April that from above in
10 figure four. So in that sense, it would appear that it
11 could potentially be part of the focal group. Although,
12 again, I haven't looked through all of the 310
13 instances of focal group inside of Anthony to determine
14 if there's anything that would contradict that.

15 MR. KHAN: Okay. We just hit kind of the one
16 hour mark. If you'd like, we can take a 10 minute
17 break, and we can come back. Okay. Great. Off the
18 record.

19 (Break at 2:01 p.m.)

20 (Back on the record at 2:13 p.m.)

21 BY MR. KHAN:

22 Q. I want to briefly touch upon a few topics that we
23 previously covered, just a few more of them. So one of
24 the items we had discussed earlier was regarding the
25 running and opening of applications. I want to just

1 get some clarification there. So my question is the
2 following. To open an application, does one have to
3 execute a file that is associated with that
4 application?

5 MR. CORDREY: Objection. Form.

6 A. In general, that would be the way that it works, but
7 there may be cases where it doesn't require that. I
8 need to think about it.

9 BY MR. KHAN:

10 Q. So maybe if I could be a little more specific it might
11 help. If one -- if a computer were to open an Excel
12 Microsoft application, does the computer have to open
13 an Excel file?

14 MR. CORDREY: Objection. Form.

15 A. No, it doesn't have to open an Excel file.

16 BY MR. KHAN:

17 Q. So how would it open the Excel application then?

18 A. Well, the standard way you might do that is by
19 selecting the icon for Excel from maybe a start menu,
20 or double clicking on a shortcut, or something to that
21 effect.

22 Q. And what does the computer do in response to the
23 selection of say Microsoft Excel icon?

24 A. Well --

25 MR. CORDREY: Objection to form.

1 A. Well, there will probably be a number of different
2 actions that happen. I don't know I can enumerate all
3 of them. In general, it'll cause the application to be
4 loaded in the memory and being executed. There's
5 probably a number of steps in between.

6 Q. How is the application loaded in the memory?

7 MR. CORDREY: Objection.

8 A. I mean, again, it's going to depend, I think, but in
9 general you'll take the executable file, or at least
10 pieces of the executable file, and store them in
11 memory, and set a program counter, set register values,
12 potentially allocate memory depending on what the
13 program's asking it to do, and execute things.

14 BY MR. KHAN:

15 Q. And this executable file that the computer takes, this
16 is an executable file that is associated with the Excel
17 application that the user just selected; is that
18 correct?

19 A. Typically there's usually some executable file, but
20 there may be other executable code.

21 Q. Going back to column 22 of the '868 patent, can you let
22 me know when you have that in front of you?

23 A. Just a minute. Yes.

24 Q. The '868 patent says clicking an icon or bottom
25 (analogous to the minimize in Windows operating system

1 environment) triggers a change to the viewpoint of the
2 end user within the virtual space so that the web page
3 is directly in an end user's visual field; is that
4 correct?

5 A. That's the text, yes.

6 Q. Why is the clicking of an icon analogous to the
7 minimize in Windows operating system environment?

8 MR. CORDREY: Objection. Form.

9 A. I'm not sure that it necessarily is.

10 BY MR. KHAN:

11 Q. So are you saying that the '868 patent is wrong?

12 A. No, I'm not.

13 Q. So in this case, the '868 patent says that it's
14 analogous to the minimize in Windows operating system
15 environment. I'm asking you as an expert hired by the
16 patent owner why the clicking of an icon is analogous
17 to the minimize in Windows operating system environment
18 as stated in the '868 patent?

19 MR. CORDREY: Objection. Form.

20 A. So I disagree with your premise.

21 BY MR. KHAN:

22 Q. Which part of the premise?

23 A. The part where you state that the icon is now
24 analogous. I don't know that that's necessarily what it
25 says.

1 Q. Well, I'm quoting the language there. It says, Whereby
2 clicking an icon or bottom (analogous to the minimize
3 in Windows operating system environment), so I'm just
4 quoting the language there.

5 A. Well, I don't want to split hairs, but you previously
6 did not quote that language. You changed the language.

7 Q. Okay. Well, I hope my clarification helps with respect
8 to the specific quoted language that I just said. Can
9 you explain why the clicking an icon is analogous to
10 the minimize in Windows operating system environment?

11 MR. CORDREY: Objection. Form.

12 A. So I think what it's saying is clicking an icon or
13 bottom indicating that the bottom may be analogous to
14 the minimize in the Windows operating system
15 environment in that case can trigger a change in
16 viewpoint to the end user in that situation. Why would
17 it be analogous, you know, it depends on the system
18 that's being described in terms of this particular
19 embodiment, but I think it's causing the change to the
20 viewpoint, so that something else is directly in front
21 of the user.

22 Q. So you have read the '868 patent, correct?

23 A. Yes.

24 Q. You have reviewed the embodiments that are disclosed in
25 the '868 patent, correct?

1 A. There are many embodiments.

2 Q. And so can you tell me with respect to the disclosure
3 here in the '868 patent that you have reviewed, how the
4 clicking an icon or bottom is analogous to the minimize
5 in Windows operating system environment?

6 A. Well, again, it says it triggers a change to the
7 viewpoint of the end user within the virtual space, so
8 that the web page is directly in the end user's visual
9 field. Something similar may happen when you click a
10 minimize button in the Windows environment, and that's
11 something different that's in the end user's visual
12 field.

13 Q. Okay. Returning to the example of Microsoft Excel.
14 When you click -- when a user clicks an Excel icon to
15 open the Microsoft Excel application, does an
16 application window open up to allow a user to interact
17 with the application?

18 MR. CORDREY: Objection. Form.

19 A. When you say an Excel icon, what are you referring to?
20 That potentially could refer to multiple things.

21 BY MR. KHAN:

22 Q. I guess we don't even have to have the icon. But if a
23 user wants to interact with an application, then they
24 open an application, does it typically open in an
25 application window?

1 MR. CORDREY: Objection to form.

2 A. I would say that's typical, but it doesn't have to
3 necessarily. It can depend on the application.

4 MR. KHAN: Okay. I have no further questions.
5 The witness is yours.

6 MR. CORDREY: Why don't we take a five
7 minute break. Let me just look over my notes and see if
8 I have any follow-up questions. Why don't we'll say in
9 about -- so it's 2:32 your time right now.

10 MR. KHAN: Yes.

11 MR. CORDREY: So let's say 2:40 reconvene.

12 MR. KHAN: Okay. Sounds good.

13 (Break at 2:32 p.m.)

14 (Back on the record at 2:41 p.m.)

15 MR. CORDREY: We don't have any follow-up
16 questions, so we can conclude the deposition.

17 MR. KHAN: Great. Thank you, Dr. Schaefer.
18 Thank you very much. Thanks a lot for helping us get
19 this together. And everyone else thank you for jumping
20 on today.

21 (The Deposition was concluded at 2:41 p.m.

22 Signature of the witness was not requested by
23 counsel for the respective parties hereto.)

24

25

CERTIFICATE OF NOTARY

STATE OF MICHIGAN)
) SS
COUNTY OF WAYNE)

I, JOANNE MARIE BUGG, certify that this remote deposition was taken before me on the date hereinbefore set forth; that the foregoing questions and answers were reported by me stenographically and reduced to computer transcription; that this is a true, full and correct transcript of my stenographic notes so taken; and that I am not related to, nor of counsel to, either party nor interested in the event of this cause.



JOANNE MARIE BUGG, CSR-2592

Notary Public

Wayne County, Michigan

My Commission expires: 2-26-2025

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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.

DISCLAIMER: THE FOREGOING FEDERAL PROCEDURE RULES ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

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.

VERITEXT LEGAL SOLUTIONS

COMPANY CERTIFICATE AND DISCLOSURE STATEMENT

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