

In the Matter Of:

Apple, Inc. vs

Smith Interface Technologies, LLC

LOREN TERVEEN, PH.D.

April 11, 2025



UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD
IPR2024-01088 - PATENT 10,757,758

APPLE, INC.

Plaintiff,

-VS-

SMITH INTERFACE TECHNOLOGIES, LLC,

Defendant.

REMOTE TESTIMONY OF LOREN TERVEEN, PhD

APRIL 11, 2025 - 9:00 A.M. CT

JOB NO. 2025-981088

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7 DEPOSITION of LOREN TERVEEN, PhD, before	7 EXHIBITS REFERENCED - PREVIOUSLY MARKED
8 S. Arielle Santos, Certified Court Reporter,	8 Exhibit APPLE 1003 7
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1 REMOTE APPEARANCES:	1 LOREN TERVEEN, PhD, Affirmed, Testifies as
2	2 Follows:
3 COUNSEL FOR PLAINTIFF:	3 THE WITNESS: I do.
4 BY - DAVID HOLT	4
5 FISH & RICHARDSON	5 EXAMINATION
6 1000 Maine Avenue SW, Suite 1000	6 BY EAGLE ROBINSON:
7 Washington, DC 20024	7 Q Good morning, Dr. Terveen.
8	8 A Good morning.
9 COUNSEL FOR DEFENDANT:	9 Q Have you been deposed before,
10 BY - EAGLE ROBINSON	10 sir?
11 BY - CHAD WALLIS	11 A Yes, I have.
12 NORTON ROSE FULBRIGHT US LLP	12 Q Approximately how many times?
13 98 San Jacinto Boulevard, Suite 1100	13 A Maybe ten or a little more
14 Austin, TX 78701-4255	14 something like that.
15	15 Q Were those all in patent cases?
16	16 A Yes.
17	17 Q Okay.
18	18 I won't spend a lot of time on
19	19 the preliminaries since you're at least
20	20 familiar with the process generally.
21	21 Two requests. First, let's try
22	22 not to talk over each other so the court

6 1 reporter can get a clean record; is that 2 fair? 3 A Sounds good. 4 Q Okay. If you need a break at 5 any time feel free to say so. The only 6 thing I will ask, if there is a question 7 pending that we get through the answer to 8 that question first before we pause. 9 A That's fair. 10 Q All right. I am going to share 11 exhibits in the chat. I am going to 12 start with -- actually, before I do that 13 just to confirm, do you have anything 14 open on your computer, sir, other than 15 the Zoom interface that we are using? 16 A I do not have anything else 17 open. I have access to clean PDFs of all 18 my declaration and all its exhibits but I 19 do not have any of those open. 20 Q Okay. 21 I will -- I will share clean 22 versions in the chat as well so I know we	8 1 patent today, will you understand I am 2 referring to the US Patent 10,642,413? 3 A Yes. 4 Q What did you do to prepare for 5 your deposition today, sir? 6 A I reviewed -- I reviewed the 7 materials in this case, my declaration 8 and I guess the exhibits from the 9 declaration. 10 Let's see, I reviewed -- and 11 then I met with Apple attorneys. 12 Q And without -- I'm not asking 13 for the content of any discussions but 14 approximately how long did you meet with 15 counsel for Apple? 16 A About five -- five to 17 seven hours, I think. 18 Q Let me find the specific place. 19 Your declaration at paragraph 18 20 lists a number of exhibits. 21 Are those the exhibits to your 22 declaration that you referenced a moment
7 1 are looking at the same version. 2 Is there anyone in the room with 3 you? 4 A No. 5 Q Okay. 6 If that changes, will you let us 7 know so we can pause? 8 A Sure thing. 9 Q All right. Thanks. 10 So to start, I will share your 11 declaration. It's uploading, if you will 12 let me know when that comes through. 13 A I am downloading it right now. 14 Let's see. Okay. I downloaded it and 15 just opened it. 16 (APPLE 1003 Referenced.) 17 Q Right. 18 Is that document your 19 declaration in this proceeding involving 20 US patent 10,642,413? 21 A (Reviewing.) Yes. 22 Q And if I refer to the '413	9 1 ago? 2 A I'm sorry, I went too far. 3 (Reviewing.) 4 Let's see. Those certainly are 5 the exhibits that I referred to. 6 I know I have access to a number 7 of other documents but when I did my 8 preparation and reviewing, I believe 9 these are the exhibits from my 10 declaration that I -- that I reviewed. 11 Q When you say you have access to 12 a number of other documents, what are you 13 referring to, sir? 14 A Oh, I -- I see -- I just had 15 downloaded a set of things so I have 16 things like claim construction charts 17 which I didn't actually look at. 18 I have case management order 19 which I didn't look at. 20 And then I have -- I have the 21 petition in this case, the patent owner's 22 preliminary response and the institution

10 1 decision from the PTAB, so those weren't 2 exhibits to my declaration but those are 3 things that I have access to and at least 4 the petition, the patent owner 5 preliminary response and the institution 6 decision, I did review. 7 Q Okay. 8 Your declaration, Exhibit 1003, 9 is that a complete listing of your 10 opinions in this proceeding? 11 A Yes, I think it outlines all of 12 the opinions that I formed at least up to 13 this point. 14 Q And are there any changes you 15 wish to make to any of those opinions as 16 we sit here today? 17 A No. As I reviewed my 18 declaration, I didn't see any -- I might 19 have seen a typo or two but nothing that 20 changes the substance of my opinions. 21 Q Okay. 22 I am going to ask you to refer	12 1 work with computers to understand 2 problems and opportunities and then 3 create new technologies for people. 4 So generally speaking, that 5 characterizes the field. 6 Q Thank you. 7 Is that field looking strictly 8 at how users interact with hardware or is 9 it more broadly how they interact with 10 the system including web pages and 11 software, for example? 12 A It's certainly a broad field 13 looking at how people interact with 14 computer systems. Considered broadly, 15 yes. 16 Q You are currently employed with 17 the University of Minnesota; is that 18 correct? 19 A Yes. 20 Q What does that role involve, 21 sir? 22 A Well, I am a professor in the
11 1 to your CV at the end of your 2 declaration. I believe it is page 116. 3 A Okay. I am there. 4 Q This says you received your PhD 5 in computer sciences from the University 6 of Texas. 7 Did you have a specific focus 8 for that PhD, sir? 9 A Yes, it was in artificial 10 intelligence and human computer 11 interaction, really the intersection of 12 those two fields. 13 Q Can you briefly describe what 14 human computer interaction refers to? 15 A Sure. It's a general field that 16 looks at issues involving the design of 17 technology, the design of computer 18 technology for use by humans. 19 It includes aspects of specific 20 user interfaces and interactions between 21 people and computers. 22 It includes studying how people	13 1 department of computer science and 2 engineering and it involves research and 3 teaching. 4 Q Are there certain classes that 5 you teach on a regular basis or how do 6 you determine what you teach? 7 A Well, that's -- the way we 8 determine what we teach is a 9 collaborative process between the needs 10 of the department and the capabilities of 11 the faculty. And so what that typically 12 amounts to is we have a set of classes 13 that are important and draw, you know, 14 significant demand from the students, and 15 so we teach those on a regular basis. So 16 that's how we determine the classes that 17 we teach. 18 And then within that, there's 19 typically a number of faculty within an 20 area who had the capability to teach 21 certain classes and we sort of, based on 22 various factors within that group of

14 1 faculty, determine who is going to teach 2 a course at any given time. 3 Q How large is that group of 4 faculty? 5 A I'm sorry -- when you refer to 6 that group of faculty, what do you mean 7 exactly? 8 Q I am not trying to be clever. I 9 tried to use the same phrase that you 10 did. 11 You said that group of faculty 12 that decides who is going to teach which 13 class. 14 A Okay. Yeah. We have about 65 15 faculty in our department but for any 16 given area, there's typically two to six 17 faculty. And in the area where I teach, 18 there's five faculty who would talk about 19 when we look ahead to the next year or 20 two who should teach what courses. 21 Q When you say 65 faculty in your 22 department, which department is that?	16 1 You also said your group handles 2 most of human computer interaction. 3 Help me understand what -- what 4 parts of human computer interaction would 5 be covered by your group and not covered 6 by your group? 7 A Yeah, within our group we teach 8 a large and popular class on User 9 Interface - Design, Implementation and 10 Evaluation. And that's a course that I 11 have taught frequently over the years 12 including this semester. 13 We handle a course that sort of 14 looks at the design of -- or the 15 different technologies for doing sort of 16 web-based user interfaces. 17 We handle a course on social 18 computing that I teach a lot. And we 19 also handle, I guess, a course on sort of 20 a physical embodied device or design for 21 physical and embodied devices as well. 22 Q I'm sorry, this may be a silly
15 1 A The department of computer 2 science and engineering. 3 Q Okay. 4 And then you say there's five 5 faculty in the area where you teach. 6 What is that area, sir? 7 A It would be -- there's various 8 names for it but basically we cover most 9 of human computer interaction and social 10 computing. 11 Q What is social computing? 12 A Yeah, this is -- this is an area 13 close to human computer interaction. I 14 guess I would say highly overlapping. 15 It really focuses on human 16 computer interaction as it involves 17 systems that support groups of people 18 working together. 19 Q Okay. We will get to it in a 20 second but I think I saw a number of 21 papers and research projects that maybe 22 would align with that.	17 1 question. 2 Can you briefly explain what you 3 mean by physical and embodied devices? 4 A Doing things with like Arduinos 5 or Internet of Things, you know, rather 6 than traditional computer, sort of on a 7 laptop or even on a smartphone, you know, 8 how people interact with embedded 9 devices. And it could be anything from, 10 you know, special purpose things you 11 create with hardware like the Arduino or 12 it could be -- it could be smart speakers 13 or other IOT devices. That's one I don't 14 teach, but it is within the scope of my 15 colleagues within my group who do teach 16 that so I am less familiar with the 17 details of that. 18 Q Gotcha. Okay. I just want to 19 make sure I understood what you -- what 20 that area was. 21 You mentioned a large class on 22 user interface design that you have

18 1 taught for a number of years. 2 A Yes. 3 Q When did you first teach that 4 class, sir? 5 A Probably 2003, I think. 6 Q How has that class evolved over 7 the last 22 years? 8 A Well, it's evolved a lot. It's 9 evolved -- it's involved -- it's evolved 10 in the concepts we cover. 11 It's evolved somewhat in the 12 methods that we cover for designing and 13 evaluating user interfaces. And it's 14 evolved in the -- in the technologies 15 that we have taught and supported in this 16 class for people to prototype interfaces. 17 Q When you say technologies that 18 you have taught, is that referring to 19 physical hardware? 20 A Well, the physical hardware that 21 we targeted or focused on certainly has 22 changed.	20 1 by -- now, the timeline is quite fuzzy, 2 but over ten years ago certainly we had 3 started to emphasize design for mobile 4 devices. 5 So for years we made our target 6 platform for people implementing would 7 have been Android Studio so implementing 8 their interfaces on Android devices. 9 So yeah, we taught Android 10 Studio and that was the implementation 11 platform and. 12 As I said, it was over ten years 13 ago and I am not quite sure when we made 14 that shift. 15 Q Fair enough. 16 I think you also mentioned 17 another class specific to internet user 18 interfaces or web-based user interfaces. 19 Is that a separate class? 20 A It is. And this is -- I guess I 21 would say a replacement for a class that 22 I taught when I first got here.
19 1 When I started, the expectation 2 is that people would be designing 3 applications that would run on basically 4 desktops or laptops and then gradually 5 that shifted to more of an expectation 6 they would be designing user interfaces 7 to run on the web, however people access 8 the web. 9 And then gradually, while it's 10 been quite a while now, we had an 11 increasing expectation and emphasis that 12 people would be designing and 13 implementing on mobile platforms. 14 Q What did the timeline of that 15 evolution look like? 16 A Well, I would say by the -- what 17 do you call it, the late 2000s probably, 18 we had pretty much assumed that people 19 would be designing web-based user 20 interfaces. Again, I am fuzzy on this 21 timeline. 22 And then I would say probably	21 1 There was a class we had 2 called -- I don't even know if it's 3 listed if my CV and I don't remember the 4 exact name. It was probably called User 5 Interface Software and Technology or 6 something like that. So I taught that 7 class a number of times too the first 8 years I was here like 2003, '4, '5 in 9 there. And we taught various -- or I 10 taught various software frameworks for 11 implementing user interfaces so that 12 course didn't focus on design or 13 evaluation. It focused just on 14 implementation of user interfaces. 15 So I would teach platforms like 16 Java Swing and typically I taught two or 17 three other platforms each year and that 18 was literally just focused on how to 19 implement user interfaces and software. 20 And then we sort of stopped 21 teaching that for a while and then my 22 colleagues and I decided that it made

22 1 sense to sort of have a -- I think of it 2 as a replacement -- that focused on -- I 3 mean, it was a different class but it was 4 sort of getting at the same thing, user 5 interface implementation, but it was now 6 in the context of the World Wide Web 7 because, you know, there's lots of 8 technologies that let you design the user 9 interface, the frontend for web-based 10 systems. 11 And so again within our group, 12 we sort of identified the need for that 13 and talked about how to -- how that class 14 should work. And that class, even though 15 I was sort of involved in the planning on 16 the design of it, I have not taught that 17 but it's my colleagues within our group 18 who teach that. 19 Q Okay. 20 So if I understand correctly, 21 web-based design was a part of -- sort of 22 a broader user interface class that you	24 1 classes. 2 Is that the class that sort of 3 began with more traditional, kind of 4 desktop and laptop computers, and then 5 evolved to a web-based focus and then 6 evolved to a mobile platform focus or is 7 that a different class? 8 A Yeah, I think my description is 9 probably we lose the anecdence and I 10 might be confusing you. 11 We have this course -- first 12 course that I think I mentioned when you 13 started asking about my teaching is a 14 course called User Interface - Design, 15 Implementation and Evaluation, or Design, 16 Evaluation and Implementation. That's a 17 course I have taught many times since I 18 have been here. 19 That course focuses on design 20 and evaluation but there's always some 21 prototyping and implementation component 22 that let's people test out their designs.
23 1 taught? 2 A Yes, where the course that I 3 teach with the title User Interface - 4 Design, Implementation and Evaluation, as 5 I said, we -- we shifted to having an 6 assumption that people would mostly be 7 doing design for the World Wide Web -- 8 World Wide Web-based interfaces. 9 The focus of that course was on 10 design and prototyping rather than 11 necessarily coming up with a robust 12 implementation of user interfaces but the 13 two courses that I mentioned, the one 14 that I taught, you know, 2003 and so on, 15 that timeframe and then the replacement 16 course, they focused on how to really 17 implement user interfaces -- 18 (Simultaneous Crosstalk.) 19 -- World Wide Web or -- in fact, 20 now it really is focusing on implementing 21 on the World Wide Web. 22 Q Okay. I don't want to mix up	25 1 So that's one course. 2 And then -- and that is the 3 course where when I first taught, we 4 assumed people would be designing sort of 5 a standalone application that would run 6 on a desktop or laptop computer because 7 that's kind of what was common then. And 8 that is the course that after a number of 9 years we thought -- well, it became 10 apparent that people were really doing 11 things more for the web -- for the World 12 Wide Web. 13 And then a number of years after 14 that, we made the decision that it would 15 be -- a whole lot of mobile stuff was 16 going on so it would be really good to 17 have people focusing on design of mobile 18 user interfaces. 19 So that was the one class that I 20 think I spent the most time on. 21 Q Okay. Thanks for clarifying. 22 And then the other classes that

26 1 you mentioned were more specific to World 2 Wide Web user interface design? 3 A No, I'm sorry. I think I 4 confused you a little bit. 5 I mentioned two other courses. 6 One which we taught in the early 2000s 7 into the mid-2000s. That focused on user 8 interface implementation, how you would 9 go about, you know, understanding the -- 10 literally the implementation concepts and 11 software frameworks for implementing sort 12 of a more robust fully functional user 13 interface. And I think we -- we -- so it 14 was lower level, you could say. 15 And when we taught that in those 16 years, we taught frameworks that both 17 worked on desktops, but also I think we 18 taught something for the World Wide Web 19 as well. In fact, I know we did, 20 software framework. 21 And then we stopped teaching 22 that class, and then later -- I want to	28 1 A If by the implementation 2 class -- if we are referring to this more 3 recent class -- 4 Q Yes. 5 A -- it does not sense that -- how 6 should I put it -- a lot of the 7 frameworks that you teach for frontend 8 programming of user interfaces on the 9 World Wide Web, there's the responsive 10 web technology so you design it such that 11 people can access it either on mobile 12 devices or on desktops or laptops and 13 they work -- they work for both. 14 Q So I don't want to get too far 15 into the weeds, but when you say can work 16 for both, is that kind of writing the 17 HTML, whatever code that sort of web page 18 is served in to adapt to device format? 19 A I mean, yes, roughly with these 20 frameworks they are, you know, 21 responsive, aware of the device that they 22 run on. And so they work -- you know,
27 1 say again, probably at least ten years 2 ago, maybe like 11 or 12, we realized we 3 should have a class that focused on 4 literally how to implement user 5 interfaces on the World Wide Web. 6 And so the difference -- so 7 that -- that course -- both of those 8 courses focused on implementation and 9 didn't worry about teaching people good 10 design principles or how to evaluate what 11 they were doing. It was more just nitty 12 gritty of how do you implement things. 13 Q Okay. 14 More sort of the mechanics of 15 how do you take the design and sort of 16 implement it as an actual functioning 17 interface; am I saying it right? 18 A Yes, that was the focus. 19 Q Okay. 20 Did that implementation class 21 involve user interfaces for mobile 22 platforms?	29 1 they work well whether you're accessing 2 from a mobile phone or from a desktop. 3 Q Okay. I want to circle back to 4 the User Interface - Design, Evaluation 5 and Implementation class. 6 That is the broader class, I 7 think; is that correct? 8 A Yes. 9 Q Okay. I want -- I am going to 10 move on. I just want to make sure I sort 11 of got this straight in my head. 12 In that class you mentioned 13 Android Studio as being the platform that 14 you used for mobile design; is that 15 correct? 16 A Yes, we used Android Studio, 17 yes. 18 Q Okay. 19 Were -- were there other sort of 20 mobile design platforms that you used for 21 that class or was it just Android Studio? 22 A The way it worked, we -- we

30 1 supported Android Studio and gave 2 instruction how to use Android Studio and 3 so -- almost all students would use 4 Android Studio on Android devices for 5 their project work. 6 There always would be some 7 students who wanted to do it on iPhones 8 and so they did it with IOS. We didn't 9 directly teach that so I guess that's a 10 little bit of a complicated answer to 11 your question. 12 Q Okay. 13 So where I am headed with that 14 and I will just go there. 15 Can you describe what Android 16 Studio is? 17 A Android Studio is a development 18 environment for creating apps that run on 19 the Android platform. 20 Q And is it an environment that 21 you can use on say a desktop or laptop to 22 make it more easy -- I don't know, more	32 1 taught in that class? 2 A No, we didn't teach it. I think 3 we -- we might mention it to people if 4 they wanted to know how to do things but 5 no, we did not explicitly teach that. 6 Q Maybe I can ask that in a 7 clearer way. 8 That wasn't -- the Apple IOS 9 equivalent of Android Studio was not a 10 platform that was supported or offered as 11 a tool for students to use? 12 A I think it is fair to say we did 13 not -- we did not support it. 14 If students wanted to use that, 15 our TAs would try to help them but it was 16 not explicitly something that we 17 proactively offered or taught about. 18 Q Okay. Thank you. 19 I would like to just walk 20 through your CV a bit. 21 You have a number of -- listed 22 under the external funding.
31 1 convenient to work with than on a mobile 2 device but sort of simulates behavior on 3 a mobile device? 4 A Yes. The way you would use 5 Android Studio is you would run it on 6 your computer, your laptop or desktop. 7 You would do your development there and 8 there's a -- I guess they call it an 9 emulator within the environment so that 10 you can emulate or simulate how the app 11 that you are implementing would work on a 12 phone. And then when you're satisfied, 13 you can -- you can download it and 14 install it on an Android phone and run it 15 on the phone as well. 16 Q Okay. 17 Is there an Apple counterpart to 18 that? 19 A Yes, and I don't remember the 20 details. 21 Q Okay. 22 But it wasn't something you	33 1 Is it fair to characterize those 2 as grants, generally research grants? 3 A Yes. Let me -- (Reviewing.) 4 I mean, in academia, there's a 5 difference between grants and gifts. And 6 I think there might be a couple things in 7 here that are technically gifts but I 8 think -- I think it works to call them 9 all grants. 10 Q Okay. 11 Funding for you to conduct 12 research? 13 A That's correct. 14 Q Okay. Let's see. I would like 15 to refer to page 117. I think the third 16 from the bottom. 17 A Yes. 18 Q HCC: Tools and Mechanisms to 19 Support Social Participation Efforts. 20 What did that work involve, sir? 21 A (Reviewing.) You know, I am 22 going to have to do -- do the best job I

34 1 can of remembering. 2 And the reason why is, 3 especially at that time I had quite a few 4 grants and perhaps not surprisingly, the 5 areas of my work they supported were kind 6 of overlapping so I have a hard time 7 remembering exactly what was what. 8 But my recollection is -- well, 9 let me go back and think a bit. 10 Q I'll tell you what might be 11 easier. Sorry, I don't mean to 12 interrupt. I want to see if I can make 13 this easier. 14 I am more concerned with -- 15 concerned -- more interested in, rather 16 than sort of the individual grants, kind 17 of the focus of your research in that 18 timeframe, you know, 2008 to 2015. 19 A Okay. So I'm sorry, do you have 20 a different question then about that? 21 Q So let me see if I can -- let's 22 take just the last three on page 117.	36 1 Oh, I see. Those are 2012 to 2 2015. Okay. Yeah, I am sort of going to 3 scroll down and look at some of my 4 publications in that timeframe. And if 5 I -- you know, I have a mix of journal 6 and conference papers. I would think I 7 had mostly conference papers in this 8 time, but yes, so I am going to go to the 9 conference paper section. I will tell 10 you where I am looking at then. 11 (Reviewing.) 12 I think I will start on page 124 13 and then I will have to sort of skim 14 through to remind myself because, yeah. 15 So I am going to look at some of 16 these, review these papers that I 17 published in this timeframe, and then I 18 will be in a good situation to -- good 19 state to answer your questions, I think. 20 (Reviewing.) 21 Q Makes sense. Thank you. 22 A (Reviewing.)
35 1 All three NSF grants. 2 All in sort of that 2011, 2012 3 through 2015 timeframe, can you describe 4 sort of what the focus of your research 5 was in that timeframe? 6 A You're talking like 2012 to 7 2015; is that right? 8 Q I guess, maybe 2011 to 2015, 9 sort of those three NSF grants to the 10 extent that they overlapped or you can 11 maybe address them together if that's 12 easier. 13 A Yeah. I mean, the best way for 14 me to do that is I guess to scroll down a 15 little and see -- review my publications 16 in that timeframe. 17 In part, you know, if you are 18 interested in what I was -- what I was -- 19 what my research was like in 2011 to 20 2015. You know, the issue is, if I get a 21 grant in 2015, well, that's not -- I am 22 not spending on that until 2016, 2017.	37 1 EAGLE ROBINSON: Tell you 2 what, I'm sorry to do this. 3 Somebody is ringing my 4 doorbell. Could we pause for 5 five minutes while you take a look 6 at this and let me deal with that 7 and I will be right back. 8 THE WITNESS: Sure. 9 THE REPORTER: Off the 10 record. 11 (Whereupon a Recess Commenced 12 at 9:44 and Testimony Recommenced 13 at 9:46.) 14 BY EAGLE ROBINSON: 15 Q Dr. Terveen, did you have a 16 chance to look at your publication list? 17 A I did and I was very productive 18 in those years so it's kind of hard to 19 try to summarize for you. 20 I mean, there was various 21 strands of work or themes that I was 22 focusing on in my work.

38 1 One thing, we -- this was during 2 a period where we had created a map-based 3 system -- map-based user interface for 4 bicycle routing. And we were doing a lot 5 of research with this at the time. 6 Some of the research was very 7 technical and I am not sure if it was a 8 little earlier than 2011. I see it was a 9 little earlier but we did some technical 10 work on how people could easily select 11 items on a map where, you know, the map 12 is very dense and so it can be kind of 13 hard to get -- zero in on the thing you 14 are really interested in. So we did some 15 technical work like that. 16 We did technical work with how 17 to display information to visualize 18 information on maps in such a way that it 19 wouldn't be too busy that people could 20 understand things. 21 We did interfaces -- interface 22 techniques that we -- that were designed	40 1 both sort of the providers and consumers. 2 Let's see, and I was also doing 3 work with recommender system user 4 interfaces. In our lab, we have a long 5 running movie recommender system and so 6 we did some things with user interfaces 7 for that. 8 I think I have seen one -- let's 9 see -- (Reviewing) -- interfaces to make 10 it easy for a new user to the system to 11 quickly tell the system what kinds of 12 things they were interested in so they 13 could get good recommendations so it 14 didn't take a long time for the system to 15 give them good recommendations. 16 I have also done a lot of work 17 having to do with the Wikipedia system. 18 And I see we did at least one during this 19 time period that was focused on a user 20 interface for Wikipedia editors -- yeah, 21 so those are some of the things that I 22 did during that timeframe.
39 1 to highlight to people, I guess, places 2 on a map where we hope they would 3 contribute information. And that was 4 part of this more general approach to 5 user interfaces that could motivate 6 people to, you know, enter useful 7 information. 8 We did some work -- so our 9 bicycle routing system was a desktop 10 system and we did some work transiting -- 11 transitioning that to mobile. And I 12 think we have one or two publications. 13 As I was looking through, I am not sure 14 which they were, but -- where we had 15 implemented a version of that on mobile. 16 (Reviewing.) 17 Let's see, we also were doing 18 interfaces -- let's see, over -- over 19 this period of time, I was also -- I was 20 doing studies -- started to doing studies 21 of crowdsourcing systems like TaskRabbit 22 or Uber and how people were using those	41 1 Q Which of those -- was there a 2 paper that referred to the user interface 3 for Wikipedia? 4 A Yeah, it's -- this is probably 5 really hard to tell. My collaborators 6 gave it a name that probably obscures 7 that but it's Reference 60. 8 And then I think it was a few 9 years later before I did more user 10 interface work at Wikipedia. But in this 11 timeframe, that was at least one paper 12 that was focused on that. 13 Q Is it fair to characterize the 14 Wikipedia user interface as a web-based 15 user interface? 16 A The frontend for interacting 17 with it is web-based, yes. 18 Q Was it the frontend that you 19 were looking at in that work? 20 A Yeah, that's -- I was trying to 21 be careful when I said the frontend. 22 Well, we built -- we built the

42 1 entire system, including the backend, 2 that analyzed data from Wikipedia and 3 sort of came up with what needed to be 4 presented, but then the user interface to 5 it was accessed through the web. 6 Q Okay. 7 So this was -- I am trying to 8 understand how this works with the 9 Wikipedia system. 10 Wikipedia has its own sort of 11 web page and interface. 12 Was this a separate system that 13 then pulled data from Wikipedia? 14 A There's essentially ways in 15 Wikipedia -- I mean, there's different 16 things you can do when you want to add on 17 functionality. So think of it as more a 18 plug-in that Wikipedia editors could add 19 and then access it and that's how this 20 works. That's how that system worked. 21 Q Okay. 22 Is like Wikipedia API --	44 1 papers on that and I have to try to see 2 what the names of those were but we did 3 work on that, so reference 66 may have 4 done that. 5 This actually was about -- one 6 of my students did a Chinese version of 7 our bicycle routing system and he may 8 have done that on mobile. I can't recall 9 that. 10 I think then if you look at 11 reference 68, it says, Matching GPS 12 Traces to Possibly Incomplete Map Data, 13 so there we were looking at getting 14 bicycle routing -- bicycle -- we were 15 getting GPS route data from mobile 16 devices as people were cycling so that 17 was focused on it. 18 And I think there was one other 19 paper in that line of work that was 20 focused on the design of the mobile 21 bicycling system. I don't know if I 22 found it. I am not -- I am not sure I am
43 1 interact with their backend without going 2 through their web page? 3 A Yes, Wikipedia has an API 4 exactly. Yeah. Yeah. 5 Q Sorry, I didn't mean to 6 interrupt you. 7 A No. No, there's a fair amount 8 of complexity ultimately but that is the 9 basic idea, yes. 10 Q Okay. 11 Were there any of these papers 12 in the papers or presentations in that -- 13 in the -- let's say, 2011 timeframe plus 14 or minus two years. 15 So 2009 to 2013, were there any 16 of your papers or presentations or 17 research work that focused specifically 18 on mobile device user interfaces? 19 A Well -- as I said, there were a 20 couple of -- so we did work implementing 21 our bicycle routing system on mobile 22 devices and I think we published two	45 1 finding that. 2 And then -- I mean, you were 3 focusing on that timeframe, but like 2004 4 to 2006 or '7 we were doing, you know, a 5 number of projects with mobile user 6 interfaces as well. 7 Q Okay. Great. 8 Are there papers related to that 9 work? 10 A Yeah. Let me see. (Reviewing.) 11 Well, there's -- I guess, 12 reference -- I am reminded of how the 13 titles don't always make it clear what's 14 actually going on. 15 Reference 103 was about -- it 16 was about a technical approach to taking 17 data, GPS data, gathered from people's 18 mobile devices and doing inference on it, 19 so that was done with data that we 20 located from people's mobile device 21 usage. 22 And then a little later, I

46 1 reference 97, this was a reference about 2 a system we created to let people -- 3 create reminders that are associated with 4 geographic places. They could create 5 those, I think, using a web-based 6 interface or an interface on their mobile 7 device. 8 And then when they were out 9 carrying their mobile device, they could 10 be -- they would get the reminders when 11 they were near the place for which a 12 reminder was associated. So they -- that 13 was a mobile -- mobile device based 14 interface. 15 And then we had, I think, a 16 couple of other related studies or papers 17 on that same system so I think maybe 18 reference 93, Capturing, Sharing and 19 Using Local Place Information, I think. 20 Again, it was done in the 21 context of that same system, I believe. 22 Again, that's -- I am having to sort of	48 1 Well, I guess -- I will use the 2 last three digits to describe them. I 3 guess the '192 and '648 would be about 4 web-based user interfaces. 5 And then I think the '393, it 6 says, Personal Telephone Agent. Again, 7 this is a few years ago, but the way I 8 remember that is we were working on a -- 9 well, we developed an interface design 10 environment with the goal of letting 11 people sort of specify user interface 12 that then could run on multiple different 13 platforms. And the World Wide Web might 14 have been one of them and I know another 15 one that we were -- in fact, it probably 16 was, but I can't be sure at this point. 17 And then another implementation 18 platform, we were doing this at AT&T, or 19 I was doing this at AT&T. And so you 20 also could generate interactive voice 21 response interfaces from the same 22 specification, if you will.
47 1 to remind myself from looking at the 2 titles. Yeah. 3 Q Great. Thank you. 4 I am going to ask you to jump 5 ahead just a couple of pages to page 131 6 if you would, please, under your listing 7 of Patents. 8 A (Reviewing.) Okay. Yeah. 9 Q Are any of these patents focused 10 on user interfaces? 11 A Let's see, I mean, I think the 12 answer is they all are, yeah. 13 Q What types of user interfaces? 14 A Can you maybe be more specific? 15 What do you mean by type of user 16 interface? 17 Q Fair. Let me try to be a little 18 clear. 19 Do any of these involve 20 web-based user interfaces? 21 A Yes. Let's see. I guess -- let 22 me look at these things (Reviewing.)	49 1 Q AT&T interactive voice response, 2 I am envisioning that sort of being on 3 same sort of -- being on the phone and 4 being able to speak a command and then a 5 computer on the other end taking that 6 command and taking some action? 7 A Yes, and I think if I remember 8 correctly, you could implement it in a 9 voice response system where the system 10 would prompt you and you would -- at this 11 point, you would speak very simple 12 phrases or you could press keys, you 13 know, press 1 for this, press 2 for that. 14 So if I remember correctly, it was -- it 15 was -- it supported both of those things. 16 Q The last patent on that list, 17 the '043 -- (Audio Disruption.) -- 18 Bioacoustic Control System involve -- 19 (Reporter Clarification.) 20 THE WITNESS: Yeah, I didn't 21 quite hear your question. It got 22 chopped off or something.

50 1 BY EAGLE ROBINSON: 2 Q Sorry. I had a call coming in 3 and it interrupted the audio. 4 The '043 patent at the end of 5 that list, what did that Bioacoustic 6 Control System involve? 7 A Yeah, I -- my recollection is 8 both that and the '873 were about similar 9 things. It may have been the same 10 technology that we were trying out, but 11 basically we were looking at how you 12 could attach simple sensors to someone's 13 wrist or fingers. I forget if it was 14 both. And then people -- the sensors 15 could pick up finger motions, whether 16 like in the air or just tapping on a 17 table, whatever the motions were, and the 18 idea was that you could use that as input 19 to a device. 20 And I think we were particularly 21 interested as, you know, input to a 22 mobile device like a personal digital	52 1 So without -- I guess, 2 without -- sorry, let me see if I can ask 3 this cleanly. 4 Are you describing a way of 5 making inputs to mobile devices without 6 physically interacting with the mobile 7 device? 8 A Yes. In this case, that's what 9 that invention was about, that you would 10 have some sensors attached to your wrist 11 or fingers and they would detect motions 12 of fingers so we could -- say something 13 like, you know, tapping the thumb and 14 forefinger together might be the 15 equivalent of a tap, and tapping the 16 thumb or -- and maybe tapping the thumb 17 and middle finger could be a double tap 18 or something like that but, yeah, that's 19 what that entailed. 20 EAGLE ROBINSON: Okay. 21 We have been going a little 22 over an hour, exception with the
51 1 assistant which was the main type of 2 mobile device then. 3 We may have said it could have 4 been used for phones as well. And it 5 was -- it was a way to, you know, 6 exploring a new way for people to give 7 input for devices where, you know, at the 8 time, perhaps even today, simply, you 9 know -- I don't know if you had to use 10 like keys or even touch on a mobile 11 device. This was a different way and 12 maybe a more intuitive way that would let 13 people do it. Maybe would free them up, 14 you know -- and I think -- I think Apple 15 has done and other companies, much more 16 recently, done sort of air gestures and 17 stuff like that, and this was sort of an 18 early version of like, can we -- can we 19 let people just make natural gestures 20 with their fingers and use that for input 21 to mobile devices, you know. 22 Q Gotcha.	53 1 very short break in there. 2 Why don't we take 10 minutes? 3 THE REPORTER: Off the 4 record. 5 (Whereupon a Recess Commenced 6 at 10:08 and Testimony Recommenced 7 at 10:21.) 8 BY EAGLE ROBINSON: 9 Q Dr. Terveen, did you speak with 10 anyone during the break? 11 A No. 12 Q Thanks. I am going to ask you 13 to refer to paragraph 30 of your 14 declaration, please. If you would just 15 let me know when you get there. 16 A Sure. (Reviewing.) Okay. I am 17 there. 18 Q Good. 19 This paragraph 30 of your 20 declaration, you opine on the level of 21 ordinary skill in the field of the '413 22 patent, correct?

54 1 A Yes. 2 Q Okay. 3 In the last sentence, the last 4 clause, it says, Additional years of 5 experience could substitute for the 6 advanced-level degree. 7 Just want to be clear, you don't 8 opine that a POSITA would necessarily 9 have an advanced-level degree; do you? 10 A Let me just read this and make 11 sure it's consistent with what I wrote 12 here (Reviewing.) 13 It is correct that I did not 14 state that a POSITA would have to have an 15 advanced degree. 16 Q I am going to ask you to move a 17 little farther ahead in your declaration 18 to paragraph 48, if you would, please, 19 and I am going to ask you about your 20 opinions about Chaudhri. 21 Let me put Chaudhri itself in 22 the chat in case you want to refer to it	56 1 invisible, correct? 2 A Well, in this particular 3 sentence, it is -- it is describing one 4 example where a user interface object may 5 be in a state of fully transparent, so 6 therefore, not perceptible. 7 And then in another stated may 8 be completely -- as it says, completely 9 materialized visually and then 10 perceptible to the user, so that is what 11 this particular example is talking about. 12 Q So in this example, it's 13 transitioning -- sorry, the object 14 transitions from being completely 15 invisible to then being visible, correct? 16 A That's my understanding. And I 17 cited to paragraph 85 of Chaudhri so why 18 don't I take a look and make sure that I 19 am not -- I mean, I assume that I 20 described it correctly but why not check, 21 right. (Reviewing.) 22 So I am taking a quick look at
55 1 as well. 2 A I will download it and let you 3 know when I got it. 4 Q Should be uploading now. 5 A There it comes. Okay. I have 6 got it. 7 (Exhibit APPLE 1005 Referenced.) 8 Q Okay. I will ask you 9 specifically about paragraph 48 of your 10 declaration. 11 You say, In one example, 12 Chaudhri '842 describes that the, "the 13 optical intensity may be perceived by 14 users as a transparency effect (or lack 15 thereof) applied to the user interface 16 object," such that the object transitions 17 from "not perceptible to the user" to 18 being "completely materialized visually 19 and perceptible to the user." 20 In the context of that sentence, 21 not perceptible to the user, refers to 22 the object being transparent or	57 1 paragraph 85. (Reviewing.) 2 Yeah, so paragraph 85 does give 3 this example where a user interface 4 object may go from fully transparent to, 5 I guess, fully visible. 6 It gives another example in 7 paragraph 85 saying that the optical 8 intensity might be a way to visually 9 differentiate a user interface object 10 against a background based on properties, 11 like transparency and other properties. 12 So I think the paragraph as a 13 whole is talking how you can use factors 14 such as transparency to communicate 15 information to a user. And I should say, 16 changes in transparency. 17 (Exhibit APPLE 1004 Referenced.) 18 Q I will ask you to -- I am going 19 to put in the chat as well, Exhibit 1004. 20 And while that's uploading or 21 downloading, whichever end it's on, I am 22 going to ask you to refer to paragraph 37

58 1 of your declaration. 2 A Okay. Let me get on, load it 3 into my viewer. Okay. I am at paragraph 4 37. 5 Q Okay. 6 Just above paragraph 37 are 7 Figures 13a and 13b annotated from Ahn, 8 correct? 9 A Yes, these are two figures from 10 Ahn. 11 Q Okay. 12 In the right-hand figure, Menu 13 13 is deployed on the right edge of that 14 display, correct? 15 A (Reviewing.) This is -- this is 16 showing when Menu 1300 is at the right 17 edge of the display, yes. 18 Q Okay. 19 Does that menu -- is that menu 20 an example of a transparency effect like 21 what we just looked at in Chaudhri '842? 22 A Well, let me remind myself of	60 1 transparency effect because Chaudhri's 2 notion of that is very general. 3 Q So your understanding of Menu 13 4 is that it's translucent? 5 A (Reviewing.) I would have to 6 look at Ahn to see if it describes it -- 7 how Ahn describes it specifically. 8 I can see that the Menu 1300 -- 9 I can see to the background but I also 10 see that parts of the background at least 11 are blurred. Of course, the quality of 12 these screenshots is not the greatest but 13 you can see that there's some blurring 14 going on in the background so let's 15 see -- and I guess I should look at and 16 see how Ahn describes it in order to 17 give -- give as good an answer as 18 possible. So that's Figure 13. 19 (Reviewing.) 20 Yeah, I mean, I guess if I go 21 down a little bit in paragraph 38, the 22 second sentence it says, First, Ahn
59 1 what we mean by transparency effect. 2 (Reviewing.) 3 I mean -- I think what -- 4 what -- what Chaudhri means by 5 transparency effect is as a POSITA would 6 understand it is, that an object can -- 7 can -- its transparency can vary from 8 completely transparent, which means it 9 would be invisible to completely opaque, 10 meaning not transparent at all. And 11 anywhere along that range I think is 12 covered by the notion of a transparency 13 effect so it might be -- and when it's in 14 the middle of that -- or in that range, 15 we would describe that as translucent, 16 that is, you could sort of see through it 17 but things are kind of not so clear or 18 they are a little blurry through it. 19 And given that understanding of 20 a transparency effect then, then yes, I 21 think what we are seeing in this figure 22 from Ahn with Menu 1300, it is -- it is a	61 1 teaches instead of a transparent form, 2 its menus can be embodied in a 3 translucent form or an opaque form. 4 And then I go on to say that, 5 you know, when you're differentiating 6 between transparent and opaque, it means 7 translucent means allowing the light but 8 not detailed images to pass through or 9 semi-transparent. 10 So I think, you know, again, 11 coming back to Figure 13b which is at the 12 top of my page 22, I have excerpted at 13 the top of my page 22, I think that's 14 translucent. 15 Q And the clock in 13b is showed 16 with less intensity or faded in 13b? 17 A Yes, in 13b the clock icon is 18 shown as being less intensity, faded, 19 blurred. Any of those descriptors, I 20 think, would be accurate. 21 Q That helps to distinguish 22 between the Menu 1300 and the clock?

62 1 A I think you are referring to the 2 fact that the clock is faded or blurred. 3 Yeah, that -- I think what 4 you're seeing here is that this is a way 5 to communicate that -- to show that 6 essentially the menu item has -- the menu 7 list or the menu has -- is foregrounded, 8 is in focus. 9 And that the clock and 10 presumably -- presumably the rest of the 11 background screen is now in less focus so 12 it's communicating a foreground versus 13 background -- that's part of what it is 14 doing, communicating foreground versus 15 background information. 16 Q All right. And so Figure 13a on 17 the left illustrates a finger swiping to 18 the left, correct? 19 A Yes. Yes, that's illustrating 20 that you could swipe your finger from the 21 right edge to -- towards the center the 22 screen in a leftward motion.	64 1 certainly one way to do it is that as you 2 moved your finger from the right edge -- 3 right edge to the center, that as you 4 moved your finger, the menu would sort of 5 follow your finger. And when you 6 moved -- again, one way to do it, as you 7 moved your finger out far enough that -- 8 so that the entire menu was displayed, 9 that would be a sufficient distance -- 10 well, for the motion to be completed, for 11 the menu to be fully exposed. 12 Q In that instance, if the menu 13 slides out with the finger then user 14 could see sort of progress for the length 15 of that gesture as the menu itself slid 16 in, right? 17 A Well, certainly if -- if it -- 18 if the specifics or details of the design 19 are such that the menu is stuck to the 20 finger, as you're moving the finger from 21 right to left, from the right edge 22 leftward toward the center of the screen,
63 1 Q That is the input that causes 2 Menu 1300 to be deployed from that edge 3 and become visible, correct? 4 A Yes, in this example, it's -- 5 Ahn is showing that with this touch 6 motion, that's how you have brought in 7 the menu. 8 Q Okay. 9 How -- how long does that touch 10 and drag need to be to deploy the Menu 11 1300? 12 A What do you mean by how long? 13 Q What distance does the touch 14 need to drag before the menu is deployed? 15 You know, let me back up and ask 16 sort of a first step in that. 17 Does the -- is the distance of 18 the drag that determines whether the menu 19 is deployed or not? 20 A I would think that there might 21 be different ways a designer could choose 22 to implement it, but I would think	65 1 more and more of the menu will be exposed 2 as you move your finger. 3 Q And so a user could perceive the 4 progress of that movement in the menu 5 deployment by the menu sliding in, 6 correct? 7 A Well, they would perceive that 8 the menu is coming onto the screen as it 9 comes onto the screen, yes. 10 Q So they would be able to see 11 sort of in realtime when it was halfway 12 out and when it was fully out? 13 A Yes. Yes. They would be able 14 to see how far out the menu was at any 15 given time. And then as I guess as -- as 16 Ahn shows here, there's this other effect 17 of, I guess, blurring the background, I 18 guess, so it isn't just showing that it's 19 coming out. It's also this -- this thing 20 of making sure that -- that the menu is 21 the foreground or focus thing and what 22 was on the screen before becomes

66 1 background. So I think this figure is 2 illustrating a couple of things. 3 Q So the figure on the left, 13a, 4 shows both the starting point of the 5 finger and the ending point of the 6 finger, correct? 7 A I think it shows -- Figure 13a 8 sort of shows -- well, I am not sure that 9 it necessarily shows an ending point. 10 Again, I don't know how precisely the Ahn 11 patent describes this, but I think what 12 you understand when -- when a person of 13 ordinary skill in the art would 14 understand is that it is showing a 15 leftward motion and there could be -- 16 this could be a stopping point. It could 17 be illustrating that that's how far this 18 particular motion went or it could just 19 be showing, look, you move your finger to 20 the left -- from the right to the left 21 until you don't need to move it anymore 22 but it's just illustrating a leftward	68 1 drag gesture to open the menu. 2 So yeah, I think -- I think it 3 is showing essentially at or near the 4 right edge of the screen and then moving 5 leftward. 6 (Exhibit APPLE 1006 Referenced.) 7 Q Okay. All right. I am going to 8 put the Hinckley reference in the chat 9 now. 10 That's Exhibit 1006 if you would 11 just let me know when it downloads. 12 A Okay. I have got Hinckley. 13 Q So in your declaration, 14 paragraph 49, you note in the second 15 sentence that Hinckley describes "bezel 16 gestures for touch displays." 17 A Yes. 18 Q Can you briefly describe what a 19 bezel gesture is in the context of 20 Hinckley? 21 A Well, sure, I mean, I have got 22 some quotes, but to give you a good
67 1 motion. So just as I look at the figure, 2 I am not quite sure about that aspect. 3 Q Okay. I think I understand your 4 point. 5 So Figure 13a shows -- shows a 6 starting point of the finger on the right 7 and it shows the finger moving to the 8 left but may not show the final point? 9 A It may not. That's correct. 10 Q Okay. Sorry, I want to make 11 sure we are not talking past each other. 12 The Figure 13a shows the 13 starting point of the finger on the 14 right, correct? 15 A Well, that's my understanding 16 and I should probably just verify 17 (Reviewing.) 18 So what I wrote in paragraph 36, 19 I guess it is in the second sentence, As 20 can be seen in Figure 13a, a user 21 initially touches near the right side or 22 edge of the touchscreen and initiates the	69 1 explanation, I am going to take a quick 2 look at those paragraphs that I cited to 3 (Reviewing.) 4 Let's see, Hinckley '03 and '39 5 (Reviewing.) 6 So -- okay. Yeah, so bezel 7 gesture, I think to explain it, I am 8 going to look at a couple of sections of 9 my declaration. 10 So that second sentence in 11 paragraph 49 of my declaration says, More 12 specifically, Hinckley describes bezel 13 gestures for touch displays. And then 14 the next sentence goes on to say, The 15 bezel is made up of the frame structure 16 adjacent the device's display and forms 17 part of the device's housing. 18 And then if I go down to 19 paragraph 50, it's the -- well, it's on 20 page 32. 21 It's the second full sentence on 22 page 32. It says, The computing device

70 1 102 also includes, quote, a bezel gesture 2 module 105 that can be configured to 3 recognize a touch input such as a finger 4 of a user's hand, 106b, that initiates a 5 gesture on or adjacent bezel 103 and 6 proceeds onto the display device 108. 7 And then the final thing is -- 8 that I want to point out, while Hinckley 9 describes these bezel gestures as 10 starting on the frame or bezel and 11 proceeding onto the screen, Hinckley also 12 describes an alternative embodiment which 13 I describe in paragraph 51 of my 14 declaration where the touchscreen 15 actually is flush with the bezel. And in 16 that way, the bezel gesture actually 17 begin at the edge of the touchscreen and 18 move on to it as opposed to necessarily 19 beginning on a frame or bezel. 20 So basically, the bezel gesture 21 begins at the edge, maybe just off of the 22 edge of the screen, and proceeds onto the	72 1 Q Okay. 2 And is the -- well, the bottom 3 part of Figure 17 illustrates a radial 4 menu, correct? 5 A That's correct. 6 Q Okay. 7 The radial menu is not deployed 8 by bezel gesture; is it? 9 A That's -- that's correct. The 10 radial menu is deployed or activated 11 through a different type of touch 12 contact. 13 Q How is that -- what is that 14 contact? 15 How is the radial menu deployed? 16 A The Radial -- let's see, the 17 radial menu is -- I guess the phrase -- 18 the verb that Hinckley has accessed -- 19 the radial menu is accessed through a 20 tap-and-hold -- tap-and-hold gesture. 21 Q The tap-and-hold is at radial 22 menu icon 1714?
71 1 screen. 2 Q Thank you. 3 On page 34 of your declaration, 4 you include an annotated version of 5 Hinckley's Figure 6? 6 A Yes. 7 Q Does this illustrate an example 8 of a bezel gesture? 9 A Yes. Yes, it does. And I say 10 so in paragraph 53 which is referring to 11 Figure 6 of Hinckley. The quote is 12 specifically, quote, The bezel menu can 13 be accessed through a bezel gesture in 14 which a finger of a user's hand 606 15 touches the bezel and then moves across 16 the bezel onto the display 608 in the 17 illustrated arrow. 18 Q And then paragraph 54, spanning 19 pages 35 and 36, you include -- top of 20 page 36, you include Figure 17 annotated 21 from Hinckley, correct? 22 A Yes. Yes.	73 1 A Well, it says -- yeah, I think 2 we are probably looking at the same quote 3 from Hinckley that I included in my 4 paragraph 55 so I should probably just 5 read it. It's the second sentence, it 6 says -- well, you know what, let me read 7 the first two sentences because I think 8 it is useful. 9 So this is paragraph 55, Icon or 10 slot 1712 includes a radial menu icon 11 714 -- 1714 that gives a clue to the user 12 that one or more radial menus, for 13 example, radial menu 1715, is associated 14 with this particular icon or slot. In 15 some implementations, quote, the radial 16 menu 1715 can be accessed through a 17 tap-and-hold of the pen or finger on or 18 near the radial menu icon 1714. 19 Q So when the radial menu 1715 is 20 deployed as in the bottom of Figure 17, 21 the radial menu covers a number of the 22 icon or slot 1712, correct?

74 1 A I think your -- I think -- I 2 think the number 1710 refers to all of 3 the icons or slots that go across on that 4 bar, and 1712 was a particular one. And 5 so I think you said -- I think your 6 question confused the two. 7 Q Let me try to rephrase it so 8 it's clearer. I think I understand your 9 point. 10 When the radial menu 1715 is 11 deployed, it covers a number of the icons 12 in 1710, correct? 13 A That's how it looks. It looks 14 like the radial menu is displayed on top 15 of some of those icons or slots that are 16 labeled by 1710. 17 Q Okay. 18 When that radial menu is 19 deployed, inputs are going to interact 20 with the radial menu as opposed to the 21 underlying slots or icons, correct? 22 A (Reviewing.) I should take a	76 1 And so the question -- then 2 there's this semi-circle around the whole 3 radial menu and so I can imagine that 4 anything that is wholly covered by the 5 semi-circle, those icons or slots would 6 not be accessible. 7 I could imagine that if you cap 8 next to one of those slots, even though 9 it's covered by the radial menu, it would 10 go back to the underlying icon or slot. 11 I don't think that is the best way to do 12 it but it seems it's logically possible. 13 And then I guess the final sort 14 of ambiguity is in the bezel menu there's 15 from left to right there's five, what 16 they are called icons or slots, and the 17 fourth one is slightly covered or is 18 partly covered, partly not covered, by 19 the radial menu. So I would think in 20 that case he wouldn't, you know, if you 21 would tap on least part of that icon or 22 slot, you probably want that to be
75 1 look at what it says about the radial 2 menu icon. I will take a quick look at 3 Hinckley. I think it describes -- I 4 guess I am citing to paragraph 107 there, 5 so I am going to take a quick look then 6 (Reviewing.) 7 Let me just make sure I am now 8 answering the actual question you asked. 9 Could you just ask it again? 10 Q Sure. 11 When the radial menu is 12 deployed, user inputs on the radial menu 13 are going to interact with the radial 14 menu as opposed to the underlying slots 15 or icons, correct? 16 A I would -- I would think that 17 would be how it would be implemented. 18 It's a little ambiguous in principle so 19 like when I look at -- when I look at 20 this figure in this radial menu 1715, 21 there's five options shown by these 22 squares.	77 1 accessible. 2 So I think there's some subtlety 3 here but certainly the radial menu, at 4 least in part, covers icons or slots. It 5 would make it either, at least as the 6 design decision, make it so it was not 7 possible to access the underlying icons 8 or slots. 9 Q So there's a lot there. I want 10 to make sure I understand a couple of 11 points. 12 The first is, it sounds like -- 13 as far as practical implementation for a 14 POSITA, it sounds like a POSITA would 15 likely make it even when the radial menu 16 is deployed, if you tap on an icon in 17 1710, that is not covered by that 18 semi-circle or a part of an icon that's 19 not covered by the semi-circle, that you 20 could still interact with that icon; is 21 that fair? 22 A You know, I do want -- excuse

78 1 me, I want to review what Hinckley said. 2 And then I also want to think a little 3 bit more because I think there's an 4 ambiguity here -- not -- an open-design 5 factor that I wasn't really thinking 6 about first or wasn't explicitly 7 mentioning so -- (Reviewing.) 8 Yeah, the reason I was -- I'm 9 sorry, could you ask that question again 10 because I have probably forgotten the 11 details while I was reviewing things. 12 Q Sure. 13 So it sounds like your opinion 14 is that a POSITA implementing Hinckley's 15 design would allow a user to interact 16 with the parts of icons in 1710 that are 17 not covered by the semi-circle of the 18 radial menu? 19 A I would think -- so here is what 20 I needed to think about. And Hinckley, I 21 think as far as I can tell by my brief 22 review, is silent on this. So I can	80 1 say, Well, look, the radial menu is the 2 thing that's active and I don't want the 3 bezel menu to be active. 4 I think that's a design decision 5 and they could -- they could decide to go 6 either way. 7 Q Okay. 8 But at the very least, if the 9 radial menu is persistent, then you would 10 expect a POSITA to implement it so that 11 inputs onto that semi-circular radial 12 menu would not activate at least the 13 parts of the icons in 1710 that are 14 covered by that semi-circular radial 15 menu? 16 A I think if the radial menu is 17 up, is deployed -- up as it's illustrated 18 here in Figure 17, the bottom part of 19 Figure 17, then touches on the radial 20 menu -- yeah, the radial menu icons would 21 be handled by the radial menu, not by the 22 underlying, whatever, bezel menu or
79 1 think of two ways these radial menus 2 would work. 3 When you tapped and held, the 4 radial menu came up and then you can move 5 your finger and select an item. And if 6 you -- if you moved your finger off the 7 radial menu, it would just go away. 8 Okay. 9 Or the radial menu could stay 10 there until you dismissed it somehow. 11 And if it would go away, if you moved 12 your finger away without, you know, 13 selecting one of the items, then -- of 14 course, you would be able to select 15 anything in the bezel menu. But if the 16 radial menu was persistent until you 17 dismissed it, in that case, I think, a 18 POSITA would -- could well decide that it 19 would make sense to be able to tap on the 20 non-obscured items from the bezel menu. 21 But perhaps the designer would 22 decide not to do that. Maybe they would	81 1 anything else. 2 Q I want to refer you to paragraph 3 108 of Hinckley, the first sentence there 4 says, Once the radial menu 1715 is 5 exposed, the user can access various 6 functionalities or commands by touching 7 down on or near radial menu icon 1714 and 8 stroking in a particular direction. 9 That seems to contemplate that 10 the menu would be persistent so then 11 there's a subsequent touching down on or 12 near the radial menu icon, correct? 13 A I think in this particular -- 14 this particular sentence would be 15 describing an implementation where -- or 16 an example at least where the radial menu 17 is persistent because it has been 18 accessed and then the touch has 19 terminated because it describes now 20 touching back down again. So I do think 21 that's what is going on in this 22 particular description.

82 1 Q Okay. 2 The last two sentences of 3 paragraph 108 says that, In at least some 4 embodiments, each icon or slot 1712 has a 5 default functionality or command. By 6 selecting a particular radial menu 7 functionality or command, the default 8 functionality or command may be replaced 9 by the selected functionality or command. 10 That seems to suggest that by 11 selecting one of the radial menu options, 12 that it will replace the default function 13 of slot or icon 1712 with the function 14 that's been selected in the radial menu; 15 is that correct? 16 A Let me see here. (Reviewing.) 17 Well, let's take -- let's take 18 the first of those two sentences. So in 19 at least some embodiments, each icon or 20 slot 1712 has a default functionality or 21 command. 22 And in the previous paragraph,	84 1 So that -- that seems to be one 2 way that you could change or at least 3 that's one way you could change what the 4 default action is. 5 Q Okay. I will ask you to shift 6 back to the Ahn reference for just a 7 moment, please, Exhibit 1004 -- 8 A Okay. 9 Q -- specifically at paragraph 98. 10 A Okay. 11 Q So it says, The controller 50 12 detects a touch-and-drag operation of a 13 specific direction on the touchscreen 10. 14 Do you see that, sir? 15 A Yes. 16 Q So the next sentence says, The 17 touch-and-drag operation indicates 18 movement of an external object on the 19 touchscreen 10. 20 Do you see that? 21 A Yes. 22 Q Okay. So if the touch-and-drag
83 1 the last sentence says, In some 2 embodiments, tapping on the radial menu 3 icon triggers a default action which may 4 or may not be different from the action 5 associated with tapping on the bezel menu 6 slot. 7 So we know from those two 8 sentences that a bezel menu slot, like 9 1712, can have a default functionality or 10 command that is triggered by tapping on 11 it. 12 And then the final sentence in 13 108, By selecting a particular radial 14 menu functionality or command, the 15 default functionality or command may be 16 replaced by the selected functionality or 17 command. This is -- it seems to be 18 contemplating a way that you can reset 19 what the default action is or -- for an 20 icon or slot through an interaction 21 with -- with the radial menu accessible 22 from the icon or slot.	85 1 operation is an external object on the 2 touchscreen and it is being detected, 3 that's a finger interacting with the 4 touchscreen or perhaps a stylus 5 interacting with a touchscreen and moving 6 across it, correct? 7 A Yes. I think what it is saying 8 here is -- what it is referring to is -- 9 I think an external object would be 10 understood to be a user's finger or 11 stylus. 12 And it says, The controller 50 13 detects a touch-and-drag operation of the 14 specific direction on the touchscreen. 15 And I think then it is 16 describing detecting a touch-and-drag 17 of a -- of a finger or a stylus. That's 18 what one would typically understand. 19 Q I will refer you to paragraphs 8 20 and 9 -- 21 (Simultaneous Crosstalk.) 22 Ahn, yes. Sorry.

86 1 Paragraph 8 says, Figure 1 is a 2 block diagram illustrating a 3 configuration of a mobile communication 4 terminal in an implementation. 5 Figure 2 is a diagram 6 illustrating a key input device and 7 display of Figure 1. 8 Sorry, that second sentence is 9 paragraph 9. 10 A Okay. 11 Q Mobile communication terminal is 12 a mouthful. 13 That's a cell phone, right? 14 A Well, I think it would encompass 15 a cell phone. 16 Communication terminal -- yeah, 17 I suppose it could be, you know, like a 18 personal digital assistant with Wi-Fi 19 capabilities as well, but I would say it 20 doesn't encompass a cell phone, no. 21 Q Okay. 22 If you flip to Figure 2 as well,	88 1 item list comprises, for example, a menu 2 list or a file list. 3 And then it cites paragraph 102 4 of Ahn for that quote. 5 Do you see that? 6 A Yes, I see that. 7 Q Okay. 8 I am going to ask you to flip 9 back to Ahn because I think that 10 paragraph might be a typo. I want to be 11 sure. 12 A Okay. Should I look at 102 13 then, I suppose. 14 Q Well, in Ahn, I am going to ask 15 you to start at paragraph 99, 16 specifically the part of paragraph 99 17 that's on page 5. 18 A Okay. 19 Q The first full sentence there, I 20 think is the quoted sentence which is, 21 The item list comprises a menu list or a 22 file list.
87 1 please, in this example is a cell phone, 2 right? 3 A Flip to Figure 2, yeah, I think 4 Figure 2 would be a cell phone. 5 EAGLE ROBINSON: Okay. 6 I think we have been going 7 another hour. 8 Do you want to take another 9 quick break? 10 THE WITNESS: Sure. 11 EAGLE ROBINSON: And then -- 12 we can go off the record. 13 (Whereupon a Recess Commenced 14 at 11:17 and Testimony Recommenced 15 at 11:31.) 16 BY EAGLE ROBINSON: 17 Q Dr. Terveen, I would like to ask 18 you to refer to paragraph 122 of your 19 declaration. 20 A Yes. 21 Q The second sentence of that 22 paragraph quotes Ahn. And it says, The	89 1 A (Reviewing.) Yes, I think -- 2 yeah, I think that's correct. 3 I almost wonder if that second 4 sentence should have just -- or if the 5 reference after the first sentence should 6 have just been after the second sentence 7 or something like that, yeah, but I agree 8 that, quote, The item list comprises, for 9 example, a menu list or a file list, that 10 comes from paragraph 99. 11 Q Okay. 12 Is it fair then to say that 102 13 is a typo and should have been 99? 14 A Yes. For that quote from Ahn, 15 The menu list comprises, for example, a 16 menu list or a file list, the reference 17 for that or the source of that is 99, not 18 102. That was a typo. 19 Q Thanks. Sorry, I want to go 20 back to Hinckley, Exhibit 1006. 21 In Figure 17, the radial menu 22 1715 has five options, correct?

90 1 A Should we be looking at Figure 2 17; is that what we should be doing here? 3 Q Yes, please. Sorry, I didn't 4 make that too clear. 5 A Yeah. (Reviewing.) 6 Yeah, the radial menu 1715 shown 7 in Figure 17, it's got five items in that 8 menu -- in that radial menu. 9 Q All right. In paragraph 109 of 10 Hinckley, it says that It includes five 11 options. 12 But then the second-to-last 13 sentence says, Radial menus associated 14 with slots or icons that appear at the 15 ends of the bezel menu 1710 may have 16 fewer options due to spacing constraints. 17 A Yes, the second-to-last 18 sentence, that's correct. 19 Q In the context of Figure 17, I 20 think what that is saying is, sort of the 21 icons at the ends of the row 1710 22 wouldn't necessarily have room for an	92 1 possible to display. And so therefore, 2 you might display fewer items. 3 And presumably also -- excuse 4 me -- the fact that in radial menu 1715, 5 five items are shown. I mean, that's a 6 design decision to it. Might be in some 7 examples you would show more. And then 8 at least in this case, Hinckley is 9 pointing out you might show less if 10 you're at the edge of the -- at the edge 11 of the bezel menu so, you know. 12 Q So you said you might do more 13 options. 14 Is that a -- are radial menus 15 sort of constrained by their nature? 16 Meaning is there a limit to the density 17 of options in a radial menu? 18 A Well, radial menus, you know, 19 they use this metaphor of things coming 20 up, I guess, around the radius of the 21 circle. That's probably why they are 22 called radial menus.
91 1 entire semi-circle with all five options; 2 is that fair? 3 A Yeah. Well, let me -- let me 4 take a look at Figure 17 and I think I 5 can maybe respond to that. 6 I mean, I think Hinckley is 7 making a really sort of obvious point 8 about how you are going to display items 9 in -- well, in any case, but like in a 10 menu, and you can see this with sort of 11 normal menus as well or normal displays 12 if you're at the edge of the screen, 13 there's just less room for things. 14 So I think what Hinckley is 15 saying is like well, for example, if 16 you -- if you are displaying a menu at 17 the right edge of the screen, let's say a 18 radial menu at the far right edge of the 19 screen, and you're -- the way you display 20 a menu -- a radial menu, you always want 21 to do the semi-circular layout, well, 22 half of the semi-circle wouldn't be	93 1 And so there is -- there is a 2 definite amount of space that you can 3 devote to the radial menu. 4 In principle with what we think 5 of as normal menus, you could even have 6 scrolling within a normal menu so you -- 7 might not be a good design, but in 8 principle you could make it much -- many 9 more items. 10 In a radial menu, you do have 11 this -- literally geographic constraint 12 by how they are defined. But the actual 13 exact number of items you have within a 14 radial menu, you know, this is a design 15 decision like how big did those items 16 need to be such that users can recognize 17 them and easily select the one they have 18 in mind. 19 Q Just to make sure we are on the 20 same page, when you say normal menu, do 21 you mean sort of a conventional sort of 22 listing of options?

94 1 A Yes, I should have been more 2 precise. 3 When I said normal menu, I meant 4 a conventional, let's say, linear 5 top-down menu where you're just listing 6 items in a column. 7 Q Great. Thank you. 8 I would like to refer to -- 9 well, actually let me stick with Hinckley 10 for just a second. 11 Hinckley talks about novice and 12 expert modes of operation. 13 Can you briefly describe how 14 those work; what the difference is? 15 A Yes, I think I touched on that 16 in my declaration and I wanted to verify 17 that I did and hopefully I have a good 18 characterization on it there. 19 (Reviewing.) 20 Q If it helps, I will refer you to 21 paragraph 53 and 64, I think, in your 22 declaration. I think 53 mentions the	96 1 And then I guess in paragraph 2 64, I sort of revise -- revisit novice 3 mode. And I said, In a novice mode, the 4 gestures are, quote, visually guided 5 based on direct manipulation of a widget. 6 And that's a shorthand for describing 7 that the bezel menu became visible, the 8 user could see the icons or slots and 9 then tap on the one they wanted. 10 And then I go on to say, In 11 expert mode, as user becomes more 12 familiar with the interface, the same or 13 similar gesture can be performed, quote, 14 based on ballistic motion driven by 15 procedural menu -- memory to allow the 16 user to, end quote, to allow the user to 17 more quickly perform actions on the user 18 interface without waiting for the visual 19 guides to appear. 20 Q So the visual guides are the 21 menus themselves, correct? 22 A Yes, let me just be very clear
95 1 novice mode. 2 A Yeah. (Reviewing.) 3 So -- right. So I will read the 4 selected quotes from Hinckley that I 5 included in my declaration. 6 So obviously the difference 7 between novice and expert mode is novice 8 users are not particularly familiar with 9 the user interface while experts are 10 familiar with it. 11 So in paragraph 53, I included a 12 quote from Hinckley, In the novice mode 13 after the user gestures to reveal the 14 bezel menu 610, the user can lift their 15 finger whereupon the bezel menu can 16 remain open for a configurable interval 17 or indefinitely. And the user then may 18 tap on a desired item associated with one 19 of the icons or slots, 612 through 620, 20 which causes the functionality associated 21 with the particular icon or slot to be 22 accessed.	97 1 about that. 2 I think it said, The gestures 3 are, quote, visually guided based on 4 direct manipulation of a widget. 5 So they are guided because the 6 user, specifically or preferentially a 7 novice user, could actually visually see 8 what the options are and then select an 9 option by -- by tapping on it. 10 Q And the options are in the 11 menus, correct? 12 A Yeah, I think the options are 13 the menu items that a user could select. 14 Q So in Hinckley, in the novice 15 mode, the menus are visible and then a 16 user can select the desired options from 17 those menus, right? 18 A Let's see, I mean -- I think -- 19 I like to be, you know, precise in what I 20 say. And so I think the quotes I had in 21 paragraph 53 were pretty good. 22 Q Okay. I will tell you what, I

98 1 will read that quote. I am not trying to 2 be tricky. Quote, In the novice mode 3 after the user gestures to reveal the 4 bezel menu 610, the user can lift their 5 finger whereupon the bezel menu can 6 remain open for configurable interval or 7 indefinitely. 8 A That's correct. And then the 9 next sentence I quoted, The user then may 10 tap on a desired item associated with one 11 of the icons or slots to access the 12 functionality. 13 Q Okay. 14 So in the expert mode -- get to 15 the right place here -- in the expert 16 mode, the menu doesn't need to be 17 displayed because the user knows where 18 those options are, could just 19 instinctively select them. 20 Is that fair? 21 A Yeah, I think Hinckley doesn't 22 give a lot of details. You know,	100 1 the first menu -- a first menu, first was 2 used in Element -- I'm sorry, sort of 3 lost track of my place. 4 Yeah, you were pointing me to 5 100, paragraph 100. And then I had to go 6 back because the first mention of a first 7 menu was in Element [1.d.i] which I start 8 to address on page 56 with paragraph 83. 9 I think there I gave example of 10 Figure 13a and b as satisfying the first 11 menu. 12 And I think more generally 13 speaking -- how should I put it -- 14 differed -- Ahn discloses a number of 15 different menus. And as long as a menu 16 sort of satisfies the requirements of a 17 first menu, it could serve that purpose. 18 But here for [1.d.i], the first 19 mention of a first menu, I pointed to 20 Figures 13a and b. 21 Then if I come back to paragraph 22 100, which you asked me to look at, I am
99 1 Hinckley had this phrase, The gesture can 2 be performed "based on ballistic motion 3 driven by procedural memory." 4 And I think that Hinckley is 5 describing an idea where literally a 6 particular gesture is made without -- 7 without needing visual cues or visual 8 feedback for a user because they are 9 experts. They know what that gesture 10 would be. 11 Q Okay. 12 I am going to ask you to refer 13 to paragraph 100 of your declaration, 14 please. I think it is on page 68. 15 A Okay. I am there. 16 Q If I understand this correctly, 17 you point to menu 420 as the first menu 18 in Element [1.e.i]; is that correct? 19 A Let me -- let me verify that. I 20 am going to look through things here. 21 (Reviewing.) 22 I think, you know, the phrase,	101 1 now in Element [1.e.i]. 2 I think what I am showing here 3 with Menu 4B in paragraph 100, not 4 necessarily that that is the first menu, 5 but rather that this is illustrating -- I 6 am literally using that to illustrate the 7 idea that a menu list of Ahn can be 8 displayed as a result of a touch-and-drag 9 operation, and that menu list may include 10 various sub menus, so that's what I was 11 using Figure 4B here to refer to -- to 12 explain. 13 Q Okay. 14 So -- and just to, I guess, 15 connect the dots on those two, the Menu 16 4B, appears to be the same as the Menu 17 1300, correct? 18 A Let me just be sure because 19 as -- as you just pointed out, Ahn has 20 different menus, different figures which 21 seem to be showing the same menu, so it's 22 a little bit of a challenge to keep them

102 1 straight. 2 So 4B -- and then let me look at 3 13. (Reviewing.) 4 Yes, I think those are -- those 5 two figures, 13b and 4B seem to be 6 illustrating the same menu. 7 Q Paragraph 102 of your 8 declaration -- sorry, let me start with 9 paragraph 101. 10 Sorry, I lost my place. All 11 right. 12 Paragraph 102 of your 13 declaration, you reference -- it says, 14 Ahn also discloses that in some 15 embodiments, selection of one or more of 16 the sub menus may result in the display 17 of further list of functions from which 18 to select. 19 Then it references Figures 9B, 20 16, 17. 21 I just want to make sure that I 22 am clear -- you reference Figure 9B which	104 1 saying, Figures 9B, 16 and 17, show, and 2 then I actually just briefly discussed 3 Figure 9B as a specific example of that. 4 Q Gotcha. Okay. Let me ask you 5 to refer back to paragraph 94 on page 64 6 of your declaration. 7 Nope -- sorry, 84 on page 57 of 8 your declaration. 9 A Okay. 10 Q We talked about these Figures 11 13a and 13b earlier and specifically with 12 the finger kind of at the edge of the 13 screen -- starting at the edge of the 14 screen. 15 Is this consistent with what 16 Hinckley describes as a bezel gesture? 17 A Well, I want to just give you 18 the best answer and I think I can 19 probably do that by looking at where I 20 talked about the combination, how -- why 21 one would combine on Hinckley -- 22 (Simultaneous Crosstalk.)
103 1 then points to a left-hand menu. 2 If I understand your declaration 3 correctly, you're pointing it out as an 4 example of a sub menu. 5 You're not saying that the 6 left-hand menu now becomes the first 7 menu; are you? 8 A I want to look at 9B -- 9 Q Sure. 10 A -- quickly, but -- (Reviewing.) 11 Well, my reference to 9B -- 12 actually Figures 9B, 16 and 17, was 13 simply to give examples of what I said in 14 the first sentence of the paragraph which 15 I believe you already read. 16 The first sentence of paragraph 17 102 I wrote, Ahn also discloses that in 18 some embodiments, selection of one or 19 more of the sub menus may result in the 20 display of a further list of functions 21 from which to select. 22 So that's -- that's what I was	105 1 Q Well, my question is even a 2 little more basic than that. 3 If it helps to look at 4 paragraphs 49 through 50, I think where 5 you talk about Hinckley, what bezel 6 gestures are, I am just wondering if what 7 Ahn describes as its -- Figure 13a, if 8 it's finger moving from the edge inward 9 is a bezel gesture? 10 A Well, I think Hinckley's bezel 11 gestures began, you know, just outside or 12 of the screen or at the edge of the 13 screen and then move inward, and that is 14 also what -- what Ahn is describing here 15 as well -- or what Ahn is illustrating as 16 well in -- among other places, Figure 13a 17 and b and that's what I referred to in 18 paragraph 84, so it is analogous. These 19 are analogous things -- gestures. 20 Q And is the Menu 1300, a bezel 21 menu then? In Ahn, sorry. 22 A Well, I think it's -- I think it

106 1 is analogous to the bezel menu of 2 Hinckley because Hinckley's bezel menus 3 come into the display with the motion 4 from the edge of the display inward and 5 then the menu is displayed. 6 And here in Ahn, there's a 7 gesture from the edge of the screen 8 inward and the menu is displayed and so 9 it is -- what Ahn is showing here is 10 analogous to the bezel menu of Hinckley. 11 Q That Menu 1300 sort of 12 extends -- it sits at the edge of the 13 screen where bezel would be, correct? 14 A The Menu 1300 is shown at the -- 15 with its right edge, looks like at the 16 right edge of the screen, and a bezel. 17 It literally is the part of the frame of 18 the phone that goes around the screen. 19 Q Okay. 20 Paragraph 109 of your 21 declaration, you describe that Hinckley's 22 teachings about bezel menus and radial	108 1 sentence, Moreover Hinckley's teachings 2 about bezel menus and radial sub menus 3 are largely consistent with the menus and 4 sub menus described by Ahn. 5 And I talk about the parallels, 6 and both menus include visual affordances 7 that identify the user's presence of a 8 sub menu. 9 And then you started to read 10 that or you read that, that last sentence 11 which is very long, and it starts to the 12 extent that the techniques for accessing 13 these sub menus diverge between the 14 teachings of Ahn and Hinckley. And at 15 that point, you can see that there are 16 differences. 17 So Hinckley, for example, its 18 sub menus come up as radial menus while 19 that's not how Ahn sub menus come up. 20 And so one could have decided, 21 for example, that, Oh, I like Hinckley's 22 technique of using sub menus as a bezel
107 1 sub menus are largely consistent with the 2 menus and sub menus described by Ahn. 3 And then I think it is the last 4 sentence, it spans seven or eight lines. 5 You say, To the extent that the 6 techniques for accessing these sub menus 7 diverge between the teachings of Ahn and 8 Hinckley, a POSITA would recognize that 9 either Hinckley's techniques could be 10 utilized as a known alternative to Ahn's 11 techniques or both techniques could be 12 implemented together through the use of 13 multiple modes, like the novice and 14 expert modes described by Hinckley. 15 Does that mean, you know, Ahn's 16 techniques would have been in novice mode 17 and Hinckley's techniques would have been 18 implemented in expert mode? 19 A Well, I think -- so you know 20 what I am saying in this paragraph is 21 certainly more general than that. 22 I think you read the first	109 1 menu, so I could try that as a known 2 alternative to Ahn's technique. Or maybe 3 I implement both of them together and 4 through multiple modes, like the novice 5 and expert mode described by Hinckley. 6 And so what that might mean is 7 that for the novice mode, you do it like 8 Hinckley where things are visible -- 9 excuse me, for the novice mode, you do 10 Ahn's technique where things are visible, 11 and the expert mode you would use the 12 expert mode idea of Hinckley, where a 13 particular gesture is recognized as a way 14 to make selections without having to show 15 any visual cues. 16 So there's -- again, there's 17 different ways that you could utilize 18 Hinckley's techniques with Ahn and those 19 are a couple of examples. 20 Q Gotcha. Okay. Thank you. 21 I should move ahead to paragraph 22 121, spanning pages 82 and 83 of your

110 1 declaration. 2 A Okay. 3 Q You're pointing to Menu 1500 in 4 Figures 15a and 15b as the second menu, 5 correct? 6 A So as you said is about Element 7 [1.g] which is in response to the 8 detection of a second gesture that begins 9 in connection with the second edge and 10 moves inward displaying a second menu. 11 And so what I was doing here is 12 showing that Ahn shows a menu coming in 13 from a second edge of its screen. 14 For the first menu, I showed Ahn 15 gave an example of a menu coming in from 16 the right edge. 17 And now for the second menu, I 18 am showing an example of a menu coming in 19 from a different edge, namely the left 20 edge. 21 And yes, I am using Figure 15a 22 and b as illustration of a menu coming in	112 1 EAGLE ROBINSON: All right. 2 Let's come back 25 after the hour. 3 (Whereupon a Recess Commenced 4 at 12:13 and Testimony Recommenced 5 at 12:25.) 6 BY EAGLE ROBINSON: 7 Q Dr. Terveen, have you 8 communicated with anybody during any of 9 the breaks in your deposition today? 10 A No. 11 Q Great. Thanks. 12 EAGLE ROBINSON: I am through 13 with my outline. 14 I pass the witness. 15 If you have any redirect -- 16 DAVID HOLT: No redirect. 17 EAGLE ROBINSON: Great. 18 (Whereupon Testimony 19 Concluded at 12:25.) 20 21 22
111 1 from a second edge, namely the left edge. 2 Q Okay. 3 In Figure 15b, the visual 4 intensity of the clock is not reduced. 5 It doesn't fade out between 15a 6 and 15b; does it? 7 A No, it does not. And yeah, I 8 think as we went over before, Ahn talked 9 about menus being able to be transparent 10 or opaque or somewhere in between 11 translucent. And it looks like whatever 12 happened here, the clock was not -- was 13 not made -- was not blurred or made -- 14 not faded, yeah. 15 EAGLE ROBINSON: So I will 16 tell you what. I may be able to 17 wrap up a little early. 18 Can we break a little early 19 and come back in about 10 minutes 20 and maybe we can wrap this up 21 before lunch? 22 DAVID HOLT: Sure.	113 1 ACKNOWLEDGEMENT 2 STATE OF _____ 3 COUNTY OF _____ 4 5 I, the undersigned, hereby 6 certify that I have read the transcript 7 of my testimony taken under oath in my 8 deposition; that the transcript is a true 9 and complete and correct record of my 10 testimony, and that the answers on the 11 record as given by me are true and 12 correct. 13 14 _____ 15 LOREN TERVEEN, PhD 16 17 Signed and subscribed to before 18 me this _____ day of _____, 19 20__. 20 21 _____ 22 Notary Public

114 1 I, S. Arielle Santos, CSR, CLR, do hereby 2 certify: 3 That prior to being examined, the witness named in 4 the forgoing deposition, was by me duly affirmed 5 remotely under order SC of FL No. AOSC20-23 6 Amendment 4 (II)(C)(2) to testify the truth, the 7 whole truth, and nothing but the truth. 8 That said deposition was taken before me at the 9 time and place set forth and was taken down by me 10 in shorthand and thereafter reduced to 11 computerized transcription under my direction and 12 supervision, and I hereby certify the foregoing 13 deposition is a full, true and correct transcript 14 of my shorthand notes so taken. 15 I further certify that I am neither counsel for 16 nor related to any party to said action nor in 17 anywise interested in the outcome thereof. 18  19 _____ 20 S. Arielle Santos, CSR 21 Notary No. HH 192604 Exp 10/31/2025 22	

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