



Planet Depos®
We Make It *Happen™*

Transcript of Darrin Young, Ph.D.

Date: December 13, 2024

Case: Nintendo -v- American GNC (PTAB)

Planet Depos

Phone: 888.433.3767 | **Email:** transcripts@planetdepos.com

www.planetdepos.com

Michigan #8598 | Nevada #089F | New Mexico #566

WORLDWIDE COURT REPORTING & LITIGATION TECHNOLOGY

IPR2024-00667, -00668
AGNC EX2020

Transcript of Darrin Young, Ph.D.
Conducted on December 13, 2024

1 (1 to 4)

1 UNITED STATES PATENT AND TRADEMARK OFFICE 2 BEFORE THE PATENT TRIAL AND APPEAL BOARD 3 ----- 4 NINTENDO CO., LTD., and 5 NINTENDO OF AMERICA INC., 6 Petitioners, 7 v. 8 AMERICAN GNC CORPORATION, 9 Patent Owner. 10 ----- 11 IPR2024-0067 12 (Patent 6,508,122 B1) 13 IPR2024-00668 14 (Patent 6,671,648 B2) 15 ----- 16 Deposition of 17 DARRIN YOUNG, Ph.D. 18 Conducted Electronically 19 FRIDAY, DECEMBER 13, 2024 20 11:46 A.M. CST 21 22 23 Job No.: 562601 24 Pages: 1 - 85 25 Reported by: Sean W. Gumm, CSR No. 13168, CRR, RMR	3 1 A P P E A R A N C E S 2 FOR THE PETITIONER, NINTENDO CO., LTD. AND NINTENDO 3 OF AMERICA, INC.: 4 COOLEY LLP 5 By: PATRICK W. LAUPPE, ESQ. 6 3175 Hanover St. 7 Palo Alto, CA 94304-1130 8 (650) 843-5226 9 10 FOR THE PATENT OWNER, AMERICAN GNC CORPORATION: 11 BUNSOW DE MORY LLP 12 By: COREY A. JOHANNINGMEIER, ESQ. 13 701 El Camino Real 14 Redwood City, California 94063 15 (650) 351-7428 16 17 ALSO PRESENT: 18 MILES TAG, PLANET DEPOS TECHNICIAN 19 NACHE BUIE, PLANET DEPOS VIDEOGRAPHER 20 21 22 23 24 25
2 1 Deposition of DARRIN YOUNG, Ph.D., conducted 2 electronically via Zoom video conference 3 4 5 Pursuant to notice, before Sean Gumm, 6 Certified Shorthand Reporter No. 13168, and No. 7 11450, Registered Merit Reporter and Certified 8 Realtime Reporter, in and for the States of 9 California and Texas. 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	4 1 PROCEEDINGS 2 3 DECEMBER 13, 2024 4 REMOTE DEPOSITION 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Transcript of Darrin Young, Ph.D.
Conducted on December 13, 2024

2 (5 to 8)

5				7			
WITNESSES IN CHRONOLOGICAL ORDER				DECEMBER 13, 2024 -- REMOTE DEPOSITION			
PAGE				(Whereupon the following proceedings were held			
FOR THE PATENT OWNER:				electronically via Zoom conferencing in the presence			
DARRIN YOUNG, Ph.D.				of the Court Reporter, Counsel and the Parties.)			
DIRECT EXAMINATION BY MR. JOHANNINGMEIER: 9				--oOo--			
				PLANET DEPOS TECHNICIAN MILES TAG: Thank			
				you to everyone for attending this proceeding			
				remotely, which we anticipate will run smoothly.			
				Please remember to speak slowly, and do your best			
				not to talk over one another. Please be aware that			
				we are recording this proceeding for backup			
				purposes. Any off-the-record discussions should be			
				had away from the computer.			
				Please remember to mute your microphones			
				for these conversations. Please keep your video			
				enabled to help the reporter identify who is			
				speaking. If you are unable to connect with video			
				and connecting via phone, please identify yourself			
				each time before speaking.			
				I apologize in advance for any			
				technical-related interruptions.			
				Thank you.			
				PLANET DEPOS VIDEOGRAPHER NACHE BUIE:			
				Here begins Media Number 1 in the			
				videotaped deposition of Darrin Young, Ph.D., in the			
6				8			
EXHIBITS				matter of Nintendo versus American GNC (PTAB), in			
				the United States Patent and Trademark Office,			
FOR THE PATENT OWNER:				before the Patent Trial and Appeal Board. Case			
NO. DESCRIPTION ID. EVD.				numbers: IPR 2024-00667, and IPR 2024-00668.			
EXHIBIT 1 EX1001 - US Patent 6,508,122 15				Today's date is December 13, 2024, and the			
EXHIBIT 2 EX1002 - Young Declaration - 15				time on the video monitor is 11:46 a.m., Central			
'122 Patent				Standard Time. The Videographer today is Nache			
EXHIBIT 3 EX1001 - US Patent 6,671,648 15				Buie, representing Planet Depos. This video			
EXHIBIT 4 EX1002 - Young Declaration - 15				deposition is taking place remotely.			
'648 Patent				Would Counsel please voice identify			
EXHIBIT 5 EX1003 - Fujiyoshi - 48				themselves, and state whom they represent?			
5,945,599				MR. JOHANNINGMEIER: Yes, this is Corey			
EXHIBIT 6 US8634924 58				Johanningmeier of the firm Bunsow De Mory, LLLP, and			
EXHIBIT 7 Image 2024.12.13.134238 71				I represent American GNC Corporation.			
				MR. LAUPPE: And this is Patrick Lauppe.			
				That's spelled L-A-U-P-P-E, but the actual			
				pronunciation that works is the spelling L-O-O-P-Y.			
				And I -- I'm here on behalf of Petitioner's,			
				Nintendo Co., LTD., and Nintendo America, Inc.			
				PLANET DEPOS VIDEOGRAPHER NACHE BUIE:			
				Thank you. The Court Reporter today is Sean Gumm,			
				also representing Planet Depos. And the witness			
				will now be sworn.			
				DARRIN YOUNG, Ph.D.,			
				(For the Patent Owner)			

9 1 called as a Witness, having been duly and 2 regularly sworn, testified as follows: 3 DIRECT EXAMINATION 4 BY MR. JOHANNINGMEIER: 5 Q. For the video record, can you state your 6 full name? 7 A. Darrin, D-A-R-R-I-N. Last name Young, 8 Y-O-U-N-G. 9 Q. So now, you are currently a professor at 10 the University of Utah; is that right? 11 A. That's correct. 12 Q. Okay. Now, just to get some 13 preliminaries, have you been deposed before? 14 A. Yes, I have. 15 Q. Okay. About how many times? 16 A. About 20 times. 17 Q. Okay. So I'll assume you are an expert 18 then, and just remind you the one thing I don't want 19 to ask about is conversations with counsel. So if 20 you think I am asking you for anything that might be 21 privileged, I assure you I'm trying not to. And if 22 you have any questions about that, we can stop and 23 you can talk to your counsel there. 24 Now, those prior depositions, were they 25 also in the context of IPRs?	11 1 been in trying to -- basically testify that patents 2 are invalid; is that right? 3 MR. LAUPPE: Object to form. Scope. 4 THE WITNESS: I been retained by the 5 counsel to offer my opinion in terms of the -- the 6 validity of the asserted claims of the '648 Patent 7 and '122 Patent. 8 (Whereupon, the reporter asks for 9 clarification.) 10 THE WITNESS: Sorry, I'm here. 11 MR. JOHANNINGMEIER: 12 Q. I understand in this case that you have 13 entered expert declarations where you suggest that 14 these patents are invalid. I'm just trying to ask 15 the more general question have you ever been on the 16 side of a patent owner, instead of a petitioner, in 17 an IPR for instance. 18 And I think you said you have not; right? 19 MR. LAUPPE: Object to form and scope. 20 THE WITNESS: Uh I worked on cases by 21 patent owners in IPRs, but not related to this case. 22 MR. JOHANNINGMEIER: 23 Q. Oh, okay. So have you ever delivered a 24 declaration where you opined that a patent was 25 valid?
10 1 A. Uh, I been deposed, uh, on different 2 cases. Some of them are related to IPRs. Some of 3 them related to District Court cases. Some of them 4 -- one of them is related to ITC. 5 Q. Okay. So you've done some work as an 6 expert in District Court. I take it those are 7 patent cases; right? 8 A. That's correct. 9 Q. And how many -- about how many cases have 10 you been -- have you -- including IPRs -- how many 11 cases have you served as an expert witness? 12 A. Maybe about ten or so. 13 Q. Okay. Have you ever served as an expert 14 witness for the patent owner that was asserting the 15 patent in a case? 16 MR. LAUPPE: Object to form. 17 THE WITNESS: Can you say that question 18 again? I'm sorry. Can you repeat the question 19 again? 20 MR. JOHANNINGMEIER: Have you ever served 21 as an expert hired by the patent owner in an IPR, or 22 the person asserting a -- a patent against a company 23 in a District Court case? 24 A. No, I have not. 25 Q. Okay. So all of your expert testimony has	12 1 MR. LAUPPE: Object to form. Scope. 2 THE WITNESS: Yes, I have. 3 MR. JOHANNINGMEIER: 4 Q. Okay. All right. All right. I was just 5 trying to find out if -- that. So, um, now going 6 back to this case, did you meet with anyone to 7 prepare for this deposition? 8 MR. LAUPPE: And I'd just like to caution 9 the witness not to divulge the content of any 10 attorney-client communications, privileged 11 information. 12 THE WITNESS: Yes, I have met with counsel 13 to prepare for today's deposition. 14 MR. JOHANNINGMEIER: 15 Q. Okay. Did you meet with anyone who wasn't 16 a lawyer, like a -- an engineer for -- well, like an 17 engineer? 18 MR. LAUPPE: Object to form. 19 THE WITNESS: I have not. 20 MR. JOHANNINGMEIER: 21 Q. Okay. I have, I guess, the same question 22 then for your declarations in this case. When you 23 were preparing those, did you talk to anyone other 24 than lawyers -- like, for instance, did you talk to 25 any other engineers?

13 1 MR. LAUPPE: Object to form. 2 THE WITNESS: I have not talked to anyone, 3 except for attorneys. 4 MR. JOHANNINGMEIER: 5 Q. Okay. How long did you spend -- I don't 6 want to know the contents of the discussions. I 7 just want to know how long did you spend meeting 8 with counsel to prepare for today? 9 A. About ten hours. 10 Q. Okay. And so then, I also have a similar 11 question. How long -- well, I'll get to that later. 12 So when you were preparing for this deposition, did 13 you look at documents? 14 A. Yes, I reviewed the documents to prepare 15 for the declaration -- to prepare for the 16 deposition. 17 Q. Okay. And so this is just a very -- you 18 know, I don't want to know necessarily every 19 document you looked at. Did you -- in preparing for 20 this deposition -- look at any documents that you 21 didn't consider when you were drafting your 22 declaration, anything new? 23 MR. LAUPPE: Object to form. 24 THE WITNESS: Nothing new. 25 MR. JOHANNINGMEIER:	15 1 right? 2 MR. LAUPPE: Object to form. 3 THE WITNESS: That's correct. 4 MR. JOHANNINGMEIER: 5 Q. What's your hourly rate here? 6 A. \$750 per hour. 7 Q. Okay. Now, I have put in the Zoom chat 8 here four, sort of, pre-marked exhibits. Exhibit 1 9 being the '122 Patent. 10 (Patent Owner Exhibit 1 marked for 11 identification.) 12 Exhibit 2 being your declaration and CV, 13 Exhibit 1002 to the proceeding involving the '122 14 Patent. 15 (Patent Owner Exhibit 2 marked for 16 identification.) 17 Exhibit 3 being the '648 Patent. 18 (Patent Owner Exhibit 3 marked for 19 identification.) 20 And Exhibit 4 being your declaration and 21 CV, filed as Exhibit 1002 in the '648 Patent 22 proceeding. 23 (Patent Owner Exhibit 4 marked for 24 identification.) 25
14 1 Q. Okay. Have you read the declaration of 2 Professor Larson (phonetic) that was filed with 3 Patent Owner's preliminary response? 4 A. Yes, I reviewed that report. 5 Q. Okay. Did it change your opinions? 6 A. It does not change my opinion. 7 Q. Okay. Now, taking these two -- well, let 8 me ask you just a general question. Have you also 9 been doing any work for Nintendo on their -- the 10 District Court case in the Western District of 11 Washington? 12 A. No, I'm not involved in that case. 13 Q. Okay. So just on these two IPRs, about 14 how many hours have you spent in total working on 15 these cases? 16 A. You mean the time that I spend to prepare 17 my declaration for the -- for these two cases? 18 Q. Yeah, that, and I guess including your 19 preparation for the deposition today -- just total 20 time spent on these cases. 21 A. To prepare the two declarations I spent 22 about -- I don't remember the exact number. Maybe 23 around 110/120 hours. 24 Q. Okay. And now, you are getting paid by 25 the hour for your expert testimony in this case;	16 1 So -- and I understand that you may have 2 paper copies of those things as well; rather? 3 A. That's correct. 4 Q. Okay. So you can -- as I ask you 5 questions about these, you can look at your paper 6 copies. Or if you need to search, you can download 7 them from the chat and do that. I just want to make 8 sure that whichever is most efficient you are able 9 to do. 10 Now, let's call up Exhibit 2. 11 PLANET DEPOS TECHNICIAN MILES TAG: Sir, 12 did you want me to bring that up? 13 MR. JOHANNINGMEIER: No, sorry. 14 PLANET DEPOS TECHNICIAN MILES TAG: No 15 worries. 16 MR. JOHANNINGMEIER: 17 Q. Can you look with me at Exhibit 2, which 18 is your declaration in the proceeding, IPR 19 2024-00667; do you have that? 20 A. I have the Exhibit to my declaration in 21 front of me. 22 Q. Okay. And so, on Page 164 there's a 23 signature. Is that your signature there? 24 A. That is my signature. 25 Q. Okay. So you signed this on March 7th of

17 1 2024? 2 A. That's correct. 3 Q. Now, does this declaration accurately 4 state your opinions in this case? 5 MR. LAUPPE: Object to form. 6 THE WITNESS: My opinions are set forth in 7 the report. 8 MR. JOHANNINGMEIER: 9 Q. So does this declaration identify all of 10 the bases for those opinions as well? 11 MR. LAUPPE: Object to form. 12 THE WITNESS: My opinions are set forth in 13 this report. 14 MR. JOHANNINGMEIER: 15 Q. Well, and the basis for those opinions is 16 in here as well; right? 17 MR. LAUPPE: Object to form. 18 THE WITNESS: I think it's correct to say, 19 you know, the report covers the basis -- covers my 20 opinion. 21 MR. JOHANNINGMEIER: 22 Q. Mm-hmm. Now, is there -- since this was 23 filed in -- in March, have you identified any errors 24 or corrections that you want to make as we're 25 sitting here today?	19 1 that you are referring to. 2 MR. JOHANNINGMEIER: 3 Q. Okay. Do you remember whether you helped 4 draft the petition? 5 MR. LAUPPE: Object to form. Also, just 6 want to caution the witness not to go into -- not to 7 divulge any attorney-client privileged information. 8 THE WITNESS: Yeah, I don't think I write 9 anything related to the petition. I wrote -- I 10 wrote this report with the attorneys. 11 MR. JOHANNINGMEIER: 12 Q. Mm-hmm. Okay. So that was my next 13 question. Did you write every word of this report 14 yourself? 15 MR. LAUPPE: Object to form. 16 THE WITNESS: This is my report. It is a 17 collaborative work that I put time and effort with 18 the attorney. I did not type word by word, but I 19 worked with the attorney closely to make sure that 20 it reflects my opinion. 21 MR. JOHANNINGMEIER: 22 Q. Okay. Understood. So there are at least 23 some exceptions of this that might have been drafted 24 initially by counsel; right? 25 MR. LAUPPE: Object to form, and also
18 1 MR. LAUPPE: Object to form. 2 THE WITNESS: Not that I can think of at 3 this point. 4 MR. JOHANNINGMEIER: 5 Q. Okay. Now, when you were preparing this 6 declaration, did you also review the petitions that 7 were being filed, to which this is an exhibit? 8 MR. LAUPPE: Object to form. 9 THE WITNESS: When you say when I reviewed 10 this declaration, did I also review another 11 document? What was the document that you were 12 referring to? 13 MR. JOHANNINGMEIER: 14 Q. The IPR petition that -- that counsel 15 prepares and files. You understand that this -- 16 your declaration was attached as an exhibit to an 17 IPR petition; right? 18 A. That's correct. 19 Q. Okay. Did you review that petition before 20 signing your declaration? 21 MR. LAUPPE: Object to form. 22 THE WITNESS: It's been awhile. I 23 reviewed a lot of documents, especially related to 24 prior references. But I do not recall exactly 25 whether or not I reviewed this particular document	20 1 again caution the witness as not to divulge any 2 attorney-client privileged information. 3 THE WITNESS: I think certain legal 4 standard language provided to me or -- 5 (Whereupon, the reporter asks for 6 clarification.) 7 THE WITNESS: I said certain legal 8 standards provided to me, or written by the 9 attorneys. 10 (Whereupon, the reporter asks for 11 clarification.) 12 THE WITNESS: I tried. See, this -- 13 this -- this chair somehow automatically somehow 14 tilts backwards. 15 Do you have a harder chair that I can -- 16 MR. LAUPPE: Yeah. Just take a break, and 17 I can get him a firmer chair. 18 THE WITNESS: Automatically goes backward. 19 MR. JOHANNINGMEIER: Yeah, that's fine. 20 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 21 Want to go off the record quickly? 22 MR. JOHANNINGMEIER: Yeah. 23 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 24 Okay. Please stand by. We're going off the record. 25 The time is 12:03 p.m.

21 1 (Off the record.) 2 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 3 Going back on the record. The time is 12:04 p.m. 4 MR. JOHANNINGMEIER: 5 Q. Okay. So before that minor interruption 6 there, we were talking about just the drafting 7 process. And I think you had said that counsel 8 might have done some drafting on the legal standard 9 section. And, you know, I understand that's 10 commonly done. 11 But you said you didn't type every word of 12 this yourself. I take it there are some sections of 13 this -- the substance that were, you know, drafted, 14 you know, by counsel, and then given to you for 15 review and editing; is that fair? 16 MR. LAUPPE: Object to form. Asked and 17 answered. 18 THE WITNESS: I think I answered that 19 question. This is something I worked very closely 20 with the counsel, and I reviewed the documents and 21 the -- provide my feedback just make sure this is my 22 report. I signed off that report. 23 MR. JOHANNINGMEIER: 24 Q. Sure. Sure. And I'm not -- I'm not 25 questioning that fact. I'm just -- to the extent	23 1 MR. LAUPPE: Object to form. 2 THE WITNESS: Uh, that's correct. I 3 finished my Ph.D. in May 1999, and I start my 4 teaching position as Assistant Professor at the Case 5 Western Reserve University in July 1999. 6 MR. JOHANNINGMEIER. 7 Q. Mm-hmm. So in the time frame of 1999, had 8 you worked with MEMS devices? 9 THE WITNESS: Yes -- 10 MR. LAUPPE: Sorry. Object to form. 11 THE WITNESS: Yes. Yeah, my -- my 12 experience working with MEMS devices in terms of 13 design, fabrication, and also electronic circuitry 14 that goes around MEMS devices. Um, you know, all 15 the way goes back to, uh -- uh, time frame around 16 1993/1994-ish. 17 MR. JOHANNINGMEIER: 18 Q. Mm-hmm. And I -- from looking at your CV, 19 I understand that some of that work early on was in 20 RF MEMS; is that right? 21 MR. LAUPPE: Object to form. 22 THE WITNESS: The very first part of my 23 research was looking at design and the simulation of 24 a sigma-delta modulator to interface MEMS inertia 25 sensor, for example, accelerometer. And, you know,
22 1 that there is -- there are paragraphs or sections of 2 your declaration that appear word for word in the 3 petitions, I take it that -- well, do you know how 4 that could have happened? 5 MR. LAUPPE: Object to form. Scope. 6 THE WITNESS: I have not reviewed the 7 petition, if I remember correctly. So I do not know 8 what's -- what -- what's written in the petition. 9 But I stand by my, you know, opinions set forth in 10 my report. 11 MR. JOHANNINGMEIER: 12 Q. Okay. So I won't -- I won't belabor this 13 point. Now, let's turn to the section of of this 14 that is your CV. It looks like it starts at about 15 Page 166. I just want to ask you some general 16 questions about your background. 17 So -- now, the '122 Patent was first filed 18 in September of 1999; right? 19 A. I guess that's correct. I don't remember 20 the exact month of the year, but I remember 21 somewhere -- sometimes in 1999. 22 Q. Mm-hmm. So at that time, you were a -- 23 newly-graduated with a Ph.D., and you were working 24 as an Assistant Professor at Case Western; is that 25 right?	24 1 design simulator sigma-built modulator -- 2 (Whereupon, the reporter asks for 3 clarification.) 4 THE WITNESS: Of a -- of a sigma-delta 5 modulator that was used to interface MEMS sensors -- 6 for example, MEMS accelerometer -- to detect the 7 moveable plates we called the "proof mass," and also 8 move -- the moveable fingers when the structure is 9 under -- under force. 10 For example, in an incoming acceleration. 11 And the sigma-delta modulator outputs a one-bit 12 digital feedback to provide force-balancing 13 mechanism to -- to restore the displacement of the 14 moveable structure of the MEMS device. 15 MR. JOHANNINGMEIER: 16 Q. And is that research -- when did that 17 research occur? 18 A. That occurred between 1993/1994 time 19 frame. 20 Q. Okay. And so that was when you were at 21 Berkeley? 22 A. Yes. 23 Q. Part of your Ph.D. work; is that right? 24 A. Yeah -- 25 MR. LAUPPE: Object to form.

25 1 THE WITNESS: -- that was a part of my 2 research work. 3 MR. JOHANNINGMEIER: 4 Q. Now, was that general investigation of 5 MEMS devices, or was that targeted at a particular 6 application? 7 MR. LAUPPE: Object to form. 8 THE WITNESS: That was general, uh, 9 research work looking at -- looking at the MEMS 10 sensors -- for example, accelerometers -- and how to 11 interface the accelerometers using, you know, that 12 system I called the sigma-delta modulator, and the 13 -- to provide digital outputs. And also using the 14 digital output signal as a feedback signal to 15 control the position of the moveable structure. 16 MR. JOHANNINGMEIER: 17 Q. Mm-hmm. Okay. In your -- in your answer 18 there you mentioned acceleration as one of the 19 things that can be measured by a MEMS sensor, but I 20 take it that you weren't exclusively focusing on 21 accelerometer applications, for instance; right? 22 MR. LAUPPE: Object to form. 23 THE WITNESS: I was looking at the general 24 electronic circuit architecture to see how that type 25 of architecture can be used to interface with MEMS	27 1 control the position of the plate. And, for 2 example, you can use that as a frequency tuning 3 elements for building, for example, oscillators. 4 But if you move the plates, right, the 5 plates can also output a voltage that indicates the 6 moveable of the plate [SIC]. 7 MR. JOHANNINGMEIER: 8 Q. Well, okay. So I didn't ask you whether 9 or not you worked on anything that could be used in 10 an accelerometer. My question is more specific than 11 that. Did you ever try to build a product using a 12 MEMS sensor that would be commercially acceptable as 13 a motion sensor product? 14 MR. LAUPPE: Object to form, and scope. 15 THE WITNESS: I did not build the 16 products. You know, when I was a graduate student 17 at Berkeley, it's a research-driven project to look 18 at how to -- how to develop technologies in terms of 19 design fabrication, and also how to develop system 20 architectures, electronic circuitry. All of that is 21 to enable -- enable MEMS, you know, application. 22 Enable MEMS usage. 23 MR. JOHANNINGMEIER: 24 Q. All right. At the time you weren't 25 working on trying to evaluate whether or not your
26 1 device, especially deals with moveable structures. 2 It may have a plate -- a proof mass that can move up 3 or down. You may have fingers that can move back 4 and forth. Those moving structures are caused by 5 certain force. 6 But once you having the moving structures, 7 you need something that can detect the moving 8 structures, and process the signature output. 9 Something in this case like a digital signals that 10 can be used as a feedback signal to restore the 11 position of those moveable structures. 12 MR. JOHANNINGMEIER: 13 Q. Have you ever -- well, I don't want to say 14 "Have you ever?" 15 Prior to, say, 2001, had you ever tried to 16 build a motion sensor using a MEMS device? 17 MR. LAUPPE: Object to form and scope. 18 THE WITNESS: Yes. Uh, starting from 19 1995-ish, I spent a lot of time designing and 20 fabricating MEMS devices, MEMS structures. And some 21 of the structures that I fabricated -- for example 22 capacitive parallel plates that can be used to sense 23 motions, that can be also used as a -- as a 24 actuator. 25 If you apply voltage on it, you can	28 1 MEMS sensors that you were fabricating were good 2 enough to meet commercial demands in a product; 3 right? 4 MR. LAUPPE: Object to form, and scope. 5 THE WITNESS: That's correct to say. I 6 was -- you know, I was looking at the work that I 7 described as a part of my Ph.D. thesis research 8 work. 9 MR. JOHANNINGMEIER: 10 Q. All right. So have you ever, in your 11 career, actually done this work I'm talking about of 12 trying to build a commercially-viable sensor with a 13 MEMS device? 14 MR. LAUPPE: Object to form, and scope. 15 THE WITNESS: Yeah. I have not built a 16 product per say, but I look at MEMS sensors, 17 electronic circuitries from -- from the research 18 perspective. 19 MR. JOHANNINGMEIER: 20 Q. Sure. And -- and one of the goals of that 21 research, I assume, is to improve the performance of 22 those MEMS sensors in order to make them more useful 23 for people that want to put them in products; right? 24 MR. LAUPPE: Object to form, and scope. 25 THE WITNESS: I think that's correct;

29 1 right. A lot of things we do within the university 2 research space is to investigate a technology to 3 improve so that, you know, ultimately it can benefit 4 in industry usage. 5 MR. JOHANNINGMEIER: 6 Q. Mm-hmm. So if someone said that MEMS 7 sensors that existed at -- in 1999 weren't stable 8 enough or good enough to be incorporated into a 9 commercially-viable product, would you have any 10 basis from your own experience to dispute that? 11 MR. LAUPPE: Object to form. 12 THE WITNESS: I think if you look at 13 around that time frame in the 1990's, right, there 14 are a lot of publications, you know, as a prior art 15 that teach MEMS devices products are widely 16 available. And some of the reference that I cite in 17 my report clearly showed that; right? MEMS products 18 can be used for different type of applications, you 19 know, including navigations, including different 20 type of sensors. 21 So, uh, it is well-known that MEMS 22 products -- for example, inertia sensors -- were 23 widely available. 24 MR. JOHANNINGMEIER: 25 Q. You would agree with me, though, there is	31 1 MR. JOHANNINGMEIER: 2 Q. Well -- okay. So an airbag accelerometer 3 is basically just a device that, you know, if the 4 acceleration exceeds a certain threshold it 5 triggers; right? 6 MR. LAUPPE: Object to form. 7 THE WITNESS: Yeah, that's -- that's my 8 understanding. If the collision -- the force is 9 large enough that will trigger the airbag release. 10 MR. JOHANNINGMEIER: 11 Q. Right. So -- so that is a much simpler 12 application for an accelerometer than trying to do, 13 you know, a navigation system where you need to 14 track precise levels of acceleration; right? You 15 agree with me on that; right? 16 MR. LAUPPE: Object to form. Scope. 17 THE WITNESS: That is not correct. 18 Because if you look at a prior references, like 19 prior reference that I cite in my report clearly 20 indicate that, you know, MEMS accelerometers, MEMS 21 gyroscopes, you know, were used for navigation 22 applications. 23 MR. JOHANNINGMEIER: 24 Q. Well, maybe we can talk about some of 25 those later. But let me -- let me just ask again
30 1 a difference between being available and being 2 high-performance enough to be useful; right? Would 3 you agree with that? 4 MR. LAUPPE: Object to form. Scope. 5 THE WITNESS: I think a lot of MEMS 6 devices work good enough to be used. 7 MR. JOHANNINGMEIER: 8 Q. Well, but -- I mean, I guess as we just 9 sort of talked, you don't have any direct experience 10 at the time actually trying to use those MEMS 11 devices in real products. You had research 12 experience only; is that right? 13 MR. LAUPPE: Object to form. 14 THE WITNESS: But I did came across many 15 products. Like, for example, accelerometers, 16 gyroscopes were used in vehicle applications; right? 17 You know, you probably notice that in the 90's -- 18 perhaps even before that -- you know, MEMS devices 19 were used, for example, as a -- as a detection 20 device to detect, like, collisions to trigger 21 airbags; right? 22 And, uh, you know, MEMS devices also used 23 for other vibration sensors or, uh -- uh, stability 24 sensor -- sensing, uh -- uh, in various type of, uh, 25 industry applications.	32 1 while we have your CV in front of you, have you ever 2 in your own personal experience designed a MEMS 3 sensor into a navigation product? 4 MR. LAUPPE: Object to form. Scope. 5 THE WITNESS: I designed MEMS devices that 6 can be used in navigation product. But to answer 7 your question, I didn't put them into a navigation 8 product. 9 MR. JOHANNINGMEIER: 10 Q. So the integration into a product side, 11 you have not done that for navigation devices at any 12 point in your career; right? 13 MR. LAUPPE: Object to form, and scope. 14 THE WITNESS: Later on, like around 15 1997/'98-ish [SIC], when I was a professor at Case 16 Western Reserve University, you know, I worked on 17 personal navigation projects that used MEMS inertia 18 sensors as a part of the overall system to monitor 19 personal navigation without relying on, for example, 20 GPS signals. 21 MR. JOHANNINGMEIER: 22 Q. Was -- was that a research project? 23 MR. LAUPPE: Object to form. 24 THE WITNESS: That was a research, you 25 know, development project.

33 1 MR. JOHANNINGMEIER: 2 Q. Uh-huh. How long did you work on that? 3 MR. LAUPPE: Object to form. 4 THE WITNESS: If I remember correctly, I 5 worked on it for about ten years. 6 MR. JOHANNINGMEIER: 7 Q. Ten years? 8 A. Yes. 9 Q. Okay. Did it -- did that culminate in a 10 -- in an actual product? 11 MR. LAUPPE: Object to form. 12 THE WITNESS: It didn't go into the 13 product form. You know, it was -- it was a project 14 supported or funded by the U.S. Defense Department. 15 And looking at -- to put MEMS into, for example, 16 inside the shoes as a, you know, wearable component 17 so that, you know, soldiers can move around. You 18 know, in environments where there is no GPS signal, 19 they still be able to know their location, track 20 their position accurately. 21 MR. JOHANNINGMEIER: 22 Q. Mm-hmm. And you said you started that 23 work in about '97; is that right? 24 A. No, 2007 [SIC]. 25 Q. Oh, I'm sorry.	35 1 people worked on this for as much as ten years; is 2 that right? 3 MR. LAUPPE: Object to form. Scope. 4 THE WITNESS: It start off with five/six 5 people. Then, uh -- you know, the funding loss -- 6 the funding was lost about maybe four/five years. 7 Because I was very interested in that type of work, 8 so even after the funding expire I continued work on 9 it. So the overall time frame for me to work on 10 that project was something on the order of ten 11 years. 12 MR. JOHANNINGMEIER: 13 Q. Okay. What kind of MEMS sensors were you 14 using? Were these capacitive, uh, plate type? 15 A. Yeah, I believe -- 16 MR. LAUPPE: Object to form, and scope. 17 THE WITNESS: Yeah, those were 18 commercially-available MEMS sensors, accelerometers, 19 gyroscopes. 20 MR. JOHANNINGMEIER: 21 Q. And you were trying to integrate them into 22 something that would be useful for -- for navigation 23 in a -- uh, in a sort of defense/battlefield 24 context; is that right? 25 MR. LAUPPE: Object to form, and scope.
34 1 A. Yeah, when I started as a professor at the 2 Case Western Reserve University. 3 Q. Okay. So that was as much as eight or 4 ten years after the patents that we're talking about 5 here; right? 6 MR. LAUPPE: Object to form. 7 THE WITNESS: Yeah. I started that 8 project around 2007/2008. But you are asking me if 9 there's anything related to my career where I used 10 those MEMS devices for navigation, so I let you know 11 I did that around that time frame. 12 MR. JOHANNINGMEIER: 13 Q. Right. Right. And so, was it just you 14 working on this, or were there other researchers 15 working on this project? 16 A. Oh, there was a team of people working on 17 it. 18 MR. LAUPPE: Sorry. Object to form. I 19 didn't get a chance. 20 MR. JOHANNINGMEIER: 21 Q. How big was the team? 22 MR. LAUPPE: Object to form. Scope. 23 THE WITNESS: About five/six people. 24 MR. JOHANNINGMEIER: 25 Q. Okay. So is it fair to say five or six	36 1 THE WITNESS: That's what we were funded, 2 you know, for that project to work on. 3 MR. JOHANNINGMEIER: 4 Q. Because it sounds somewhat similar to what 5 American GNC was doing in the late 90's for 6 Aerospace; right? 7 MR. LAUPPE: Object to form, and scope. 8 Are you testifying today, Corey? 9 MR. JOHANNINGMEIER: 10 Q. Are you aware of the work that American 11 GNC was doing in the late 90's in MEMS? 12 MR. LAUPPE: Object to form. 13 THE WITNESS: I came across the name of 14 the company. I don't remember exactly when, but I 15 do not know exactly what they were building inside 16 the company. 17 MR. JOHANNINGMEIER: 18 Q. Okay. All right. But they were -- they 19 were at least known enough in the industry that you 20 heard of them in that time frame; is that right? 21 MR. LAUPPE: Object to form. Vague. 22 THE WITNESS: I was -- you know, I say I 23 may have come across the name, because there are a 24 lot of players, right, building MEMS devices around 25 that time frame. The name, you know, may have come

37 1 across me, or I may have come across the name around 2 that time frame. 3 MR. JOHANNINGMEIER: 4 Q. In the late 90's, MEMS was a -- sort of a 5 big deal; right? Lots of companies were trying to 6 do lots of different things with them; is that fair? 7 MR. LAUPPE: Object to form. 8 THE WITNESS: You know, I don't know how 9 to characterize your statement, "was a big deal." 10 But certainly there are quite a number of, 11 let's say, U.S. companies, right, was -- was working 12 on MEMS, selling MEMS products. 13 MR. JOHANNINGMEIER: 14 Q. Mm-hmm. Yeah, I was an engineer at the 15 time, and I remember there being a lot of start-ups 16 in this field. Does that match your understanding 17 as well? 18 MR. LAUPPE: Object to form. 19 THE WITNESS: I came across many 20 companies -- many U.S. based -- you know, working on 21 MEMS products, selling MEMS products around that 22 time frame. 23 MR. JOHANNINGMEIER: 24 Q. Okay. So I want to turn then to the 25 actual -- have some questions about a couple of the	39 1 A. Yeah, I have done looking at these 2 passages. 3 Q. Okay. So this section beginning on 4 Paragraph 176 is where you are discussing the 5 digital signal processing element of the claim, and 6 saying that in your opinion this would have been 7 obvious to a person of ordinary skill based on 8 Fujiyoshi in light of Townsend; right? 9 A. Yeah, that's my opinion in the readable. 10 Q. Okay. And so, you are not saying that 11 Fujiyoshi has a digital signal processing system; 12 right? 13 MR. LAUPPE: Object to form. 14 THE WITNESS: I do not recall. I offer 15 this opinion just as you cited -- or as you stated 16 in my report. 17 MR. JOHANNINGMEIER: 18 Q. Right. So looking at -- then going 19 forward into this discussion to Paragraph 179 that's 20 where you say it would have been obvious to 21 incorporate a digital signal processing system from 22 Townsend into Fujiyoshi's system; right? 23 MR. LAUPPE: Object to form. 24 THE WITNESS: I mean, that's the position 25 that I set forth in that paragraph, 179.
38 1 substantive issues in -- in your declaration. So 2 let's look at Exhibit 2. 3 MR. LAUPPE: Corey, before we switch 4 gears, can we take maybe five-, ten-minute break? 5 MR. JOHANNINGMEIER: Oh, yeah. That's 6 fine. 7 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 8 Everyone please stand by. We're going off the 9 record. The time is 12:29 p.m. 10 (Off the record.) 11 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 12 Going back on the record. The time is 12:38 p.m. 13 MR. JOHANNINGMEIER: 14 Q. Okay. Welcome back. So before we took 15 the break, I was going to ask you about a couple 16 issues in your declaration. Will you turn with me 17 to your declaration, starting at Paragraph 179? 18 A. Which declaration are you referring -- 19 Q. Oh, sorry, the '122 Patent one. 20 Exhibit 2. 21 A. What was the paragraph number? 22 Q. 179. Actually, maybe for context, go 23 ahead and look at 176. 24 A. Let me just take a look at it. 25 Q. Yeah.	40 1 MR. JOHANNINGMEIER: 2 Q. Right. Now, just to understand -- so in 3 Paragraph 179, you are not citing to anything other 4 than your own professional opinion; right? 5 MR. LAUPPE: Object to form -- sorry, 6 Corey. 7 THE WITNESS: You are saying, "Except in 8 your professional opinion..." 9 Can you please repeat the first part of 10 your statement? I didn't hear the very first part. 11 I only heard you said that, "Except your personal 12 professional opinion." 13 MR. JOHANNINGMEIER: 14 Q. Oh, yeah. Sorry. In Paragraph 179, you 15 don't provide any citations or reference to anything 16 other than your opinion in this case; right? I mean 17 that -- it is just a matter of fact. There aren't 18 citations to anything else in that paragraph; right? 19 MR. LAUPPE: Object to form. 20 THE WITNESS: I see that, you know, 21 provide that opinion in Paragraph 179 by looking at 22 Fujiyoshi system; right? 23 MR. JOHANNINGMEIER: 24 Q. Mm-hmm. 25 A. It has -- it has a figure. For example,

41 1 Figure 9 in my report talks about Fujiyoshi's, uh, 2 MEMS gyroscope in the middle; right? They called it 3 the angular rate sensor unit, and it also have, you 4 know, electronic circuitry that goes around it to 5 provide the data motion sensing control. And also 6 provide, you know, the Coriolis force induced 7 displacement signal, sensing in the feedback 8 control. 9 (Whereupon, the reporter asks for 10 clarification.) 11 THE WITNESS: The angular rate, "R-A-T-E," 12 sorry. Angular rate sensor unit. 13 MR. JOHANNINGMEIER: 14 Q. Right. Well, specifically, if it helps 15 you can look at Paragraph 181. You are suggesting 16 that the person of ordinary skill would have been 17 motivated to connect the node at "c" in the diagram 18 at the top of Figure 9 to some circuitry that was 19 disclosed in Townsend; right? 20 MR. LAUPPE: Object to form. 21 THE WITNESS: Let me look at that 22 paragraph. You said was 181; am I right? 23 MR. JOHANNINGMEIER: 24 Q. Yeah. Right. It refers to the Figure 9, 25 which is right above it on the page there.	43 1 Q. So what you are proposing in 2 Paragraph 181 -- as I understand it -- is that a 3 person of ordinary skill would have been motivated 4 to replace that connection of Node c with something 5 that includes some additional circuitry that they 6 would have seen described in Townsend? That's 7 basically what you are saying; right? 8 MR. LAUPPE: Object to form. 9 THE WITNESS: Yeah, I think -- you know, 10 earlier passage talk about person of ordinary skill 11 in the art would have been motivated by -- to 12 combine Fujiyoshi with Townsend, in terms of 13 providing the -- providing the digital signal 14 processing circuitry for analyzing those signals. 15 And here I just talk about -- for example, 16 if you -- if you use the teaching from Townsend, and 17 the Townsend talks about using buffers, using 18 analog-to-digital converters, digital-to-analog 19 converters, those building blocks would be -- would 20 be needed, right, to implement -- uh, to implement, 21 uh, the circuitry that I was talking about, right, 22 to be able to detect the information, and to process 23 -- process the information in the digital domain. 24 MR. JOHANNINGMEIER: 25 Q. Mm-hmm. Because in Fujiyoshi the signal
42 1 A. Yeah, let me take a look at that passage. 2 Yeah, so that -- I do refer to that Figure 9 in 3 Paragraph 181. 4 Q. Right. So in Figure 9, there is at the 5 top a node labeled "c," and that connects in 6 Figure 9 to a node labeled "c" at the bottom; right? 7 And that's one of the loops in Figure 9? 8 MR. LAUPPE: Object to form. 9 THE WITNESS: Yeah, I think that's what 10 that schematic shows; right? You can have a top 11 "Node c," and a -- some switching scheme that c can 12 be -- will connect to the -- to the c node at the 13 bottom; right? 14 MR. JOHANNINGMEIER: 15 Q. Sure. 16 A. And through that switch, "SW2," it can go 17 into the self-oscillating circuitry, the amplitude 18 control circuitry at the bottom of that figure. 19 Q. Right. So -- and that creates a -- a sort 20 of feedback loop; right? 21 MR. LAUPPE: Object to form. 22 THE WITNESS: It creates a loop for 23 monitoring -- for monitoring the amplitude, and 24 control the amplitude of the delta motion. 25 MR. JOHANNINGMEIER:	44 1 at Node c is analog; right? 2 MR. LAUPPE: Object to form. 3 THE WITNESS: If I remember correctly, 4 Fujiyoshi didn't really say whether analog or 5 digital. But I have to go back to the specific 6 location more carefully. If you look at Fujiyoshi, 7 on the top it just says, "Capacity Detecting 8 Circuit," outputting a value -- outputting a line; 9 right? The line is labeled as "Node c." 10 And that Node c carries information 11 related to, or indicative of the delta motion 12 signal. 13 MR. JOHANNINGMEIER: 14 Q. That signal's analog; right? 15 MR. LAUPPE: Object to form. Asked and 16 answered. 17 A. When I look at the Figure 9, it's a 18 high-level schematic of the system. As I said 19 earlier, I don't remember -- I don't remember 20 whether or not Fujiyoshi explicitly described the 21 signal at that -- at that Node is analog or digital. 22 I'm just looking at -- the schematic says, "Hey, on 23 the top you have a capacitive detecting circuit." 24 And that capacitive detecting circuit -- 25 and again, a person of ordinary skill in the art

45 1 will understand that that capacitive detecting 2 circuit is there to detect the delta motion signal. 3 And that delta motion signal, as -- you know, as we 4 talk about earlier -- is used as some type of 5 feedback loop to control going through the amplitude 6 control circuit to form that loop. 7 MR. JOHANNINGMEIER: 8 Q. As we sit here today, you are not willing 9 to confirm that the signal at Node c in "Fujiyoshi 10 Figure 9" is an analog signal; is that right? 11 MR. LAUPPE: Object to form. 12 THE WITNESS: I don't think that's -- that 13 -- you know, that's the right characterization, you 14 know, of my position. All I'm saying here is I 15 don't remember exactly what was disclosed, uh -- um, 16 or taught in Fujiyoshi, uh, for that signal. You 17 know, if needed I can -- I can look through 18 Fujiyoshi's specifications just to confirm that. 19 MR. JOHANNINGMEIER: 20 Q. Well, no. I don't want to spend our time 21 here today doing that. Let's try it a different 22 way. So you are suggesting in Paragraph 181 that 23 the person of ordinary skill would add a 24 sample-and-hold device, an analog-to-digital 25 converter, and then a buffer, and then a digital	47 1 the -- your opinion of the rationale and motivation 2 to combine these two references, right, starting at 3 182? 4 A. Yes. Yeah, the subtitle, I guess, for 182 5 is, "Rationale and Motivation to Combine Fujiyoshi 6 with Townsend [AS READ]." 7 Q. Okay. So in Paragraph 183, the last 8 sentence you say that, "Fujiyoshi also indicates 9 that some of its functionality involves calculating 10 [AS READ]." 11 So you are basing this on the concept that 12 Fujiyoshi involves calculating; is that right? 13 MR. LAUPPE: Object to form. 14 THE WITNESS: Yeah, Fujiyoshi does teach 15 some of its functionality; right? It involves 16 calculating numbers. You know, a person of ordinary 17 skill in the art will understand that, you know, if 18 you need to calculating certain numbers, or a number 19 of values in that type of system, you know -- you 20 know, a person of ordinary skill in the art would 21 have been motivated to perform those 22 functionalities. For example, calculating numbers 23 using a digital signal processor. 24 MR. JOHANNINGMEIER: 25 Q. Okay. So one of the things you cite in
46 1 signal processing unit, and then they would have to 2 go from that to another buffer, and through another 3 digital-to-analog converter; right? So you are 4 suggesting that chain of -- of circuits to get from 5 an analog signal to a digital signal processing 6 circuit, and then back to an analog signal; right? 7 MR. LAUPPE: Object to form. 8 THE WITNESS: I think that's what this 9 building block will be used for. 10 MR. JOHANNINGMEIER: 11 Q. Okay. So you are suggesting here that 12 from the node c on the top that they would add a 13 sample-and-hold, add an A-to-D converter, add a 14 buffer, and then add the digital signal processing 15 unit, and then add another buffer, and then add a 16 digital-to-analog converter to get back to the Node 17 c at the bottom; right? 18 MR. LAUPPE: Object to form. 19 THE WITNESS: I think in my report I 20 mentioned something like that; right? In order to 21 form that -- that feedback path and using digital 22 signal processing. 23 MR. JOHANNINGMEIER: 24 Q. Mm-hmm. So now then, to go on you have in 25 your report in the next paragraphs a discussion of	48 1 Fujiyoshi for this is Column 6, Lines 4 to 11; 2 right? 3 MR. LAUPPE: Object to form. 4 THE WITNESS: If I may inject a point, I 5 think this may be 16, 4 to 11. 6 MR. JOHANNINGMEIER: 7 Q. Well -- so, yeah, that's what I was, uh, 8 going to ask you. Because 6, 4 to 11 has absolutely 9 nothing to do with calculating. So you think that's 10 16, 4 to 11? 11 I've put Fujiyoshi in the chat as 12 Exhibit 5, if you don't have it there in paper. 13 Will you look with me at 6, 4 to 11 in that? 14 (Patent Owner Exhibit 5 marked for 15 identification.) 16 A. Absolutely. 17 (Whereupon, the reporter asks for 18 clarification.) 19 MR. JOHANNINGMEIER: The way it's written 20 is "6, colon," and then the lines would be 4-11. 21 THE WITNESS: What is the exhibit number? 22 Maybe I can look at the hard copy in front of me. 23 MR. JOHANNINGMEIER: 24 Q. Well, it's the Fujiyoshi '599 Patent. 25 It's 5 in the chat.

49 1 Do you have it there? 2 A. I think I should be there any second. I 3 download it. I just don't want to close the wrong 4 window, sorry. I'll be able to find. I'll be able 5 to find. 6 Q. Okay. 7 A. I'm pretty sure I downloaded, but -- oh, 8 yeah. Oh, sorry. Did I click -- I clicked the 9 video off. Apologize. 10 Q. We still see you. 11 A. I just -- that's good. Yes, I have 12 Fujiyoshi open in front of me. 13 Q. Okay. So looking at -- go with me to 14 Column 6, and then just if you will confirm this is 15 discussing some mechanical aspects of the system and 16 not a calculation? 17 A. I agree. This is talking about training, 18 right, materials, you know, related to supporting 19 beams. But I think this might -- I apologize if 20 it's a typo. If you go to Column 16, I think has -- 21 this is lot more relevant to what we're discussing. 22 Q. Okay. So in Column 16, that is one of the 23 places you go -- if you search the word "Calculated" 24 in this, there is a discussion of -- 25 A. Yeah.	51 1 detecting circuit on the right side of the diagram; 2 right? 3 MR. LAUPPE: Object to form. 4 THE WITNESS: Those connections are shown, 5 right, in Figure 9. 6 MR. JOHANNINGMEIER: 7 Q. Mm-hmm. Okay. So that's basically a -- a 8 loop. And here it's labeled "B," the connection 9 from the capacity detecting circuit, back through 10 the displacement control circuit, the alternating 11 power source and amplifier, and then the electrodes; 12 right? 13 MR. LAUPPE: Object to form. 14 THE WITNESS: Yeah. As I said, you know, 15 all of the specific connections, right, for the -- 16 for the signal path is -- is in Figure 9. 17 MR. JOHANNINGMEIER: 18 Q. But this is a different loop than we were 19 just talking about when we were talking about adding 20 the -- the DSP; right? 21 MR. LAUPPE: Object to form. 22 THE WITNESS: But this talk about you need 23 to calculating those values, right, there are -- you 24 know, there are -- they are calculation needed in 25 order to determine values. If you -- if you -- if
50 1 (Interrupting.) 2 Q. -- calculating the control amount applied 3 -- 4 A. That's right. 5 (Interrupting.) 6 Q. -- to the control electrodes 40 to 42? 7 A. Yes. 8 Q. Okay. And now, this -- so this section is 9 referring to, I believe, Figure 3. In the 10 Exhibit -- I don't know. It's page -- Column 16 is 11 at 42. Then I believe there's a reference here to 12 the control to Figure 3, and to the control 13 electrodes 40 to 42. 14 So is the calculation of the control 15 amount applied to the control electrodes what you 16 were referring to in your -- 17 A. That's correct. 18 Q. -- declaration. 19 A. That's correct. Sorry for the typo. 20 Q. No, I wanted to clarify to make sure we 21 addressed the right thing. Now, looking again at 22 Figure 9, the control electrodes, 41 and 42 -- 23 sorry, 40 and 42, those are fed by an alternating 24 amplifier, a displacement control circuit, and then 25 ultimately some feedback from the capacity	52 1 you -- if you look at the other side, right -- let 2 me make sure that -- 3 MR. JOHANNINGMEIER: 4 Q. Sorry, were you still -- 5 A. Yeah, I'm just looking -- you know, sorry. 6 I'm not very familiar using -- uh, yeah. This is 7 talking about, you know, processing the signal from 8 the "B"; right? 9 Going through, you know, the placement 10 control circuitry. Going through the alternating 11 power source. Going through the alternating 12 amplifier, and then it gets back onto electrode 40 13 and the 42. 14 But gives you that teaching; right? You 15 need to processing those informations, and then you 16 need to go through -- you know, use the processed 17 information. Go through the amplitude control 18 circuitry; right? Drive the alternating amplifier 19 in order -- in order to provide position control. 20 MR. JOHANNINGMEIER: 21 Q. Well, the actual calculation that's -- 22 that's taught in this -- for this circuit is a -- 23 basically just a determination of the displacement 24 necessary to zero the displacement of the mass 25 portion; right?

53 1 MR. LAUPPE: Object to form. 2 MR. JOHANNINGMEIER: 3 Q. So I'm looking -- if you don't believe me, 4 I'm looking at Column 20, Line 20 through 27. And 5 that says, "The detected output from the capacity 6 detecting circuit, 173, is supplied to the 7 displacement control circuit, 182, and the 8 displacement control circuit controls the 9 alternating power source, 181, in such a manner as 10 to make the displacement of the mass portion, 1, 11 zero on the basis of the detected output, so that 12 the corresponding control voltage is applied to the 13 control electrodes, 40 and 42, through the 14 alternating amplifier [AS READ]." 15 So this is describing using the detected 16 signal to zero the displacement, and provide an 17 analog control voltage to the control electrodes, 40 18 and 42; right? 19 MR. LAUPPE: Object to form. 20 THE WITNESS: That's what the passage 21 says. 22 MR. JOHANNINGMEIER: 23 Q. So to the extent this is a calculation, 24 it's an analog one; right? It's a zeroing of an 25 analog-measured output; right?	55 1 skill in the art would have been motivated based on 2 Fujiyoshi's disclosures to incorporate circuitry for 3 rejecting noise. 4 "For example, Fujiyoshi discloses 5 mechanisms for lowering noise" -- right -- 6 "(cross-talks), such that sensor resolution can be 7 improved [AS READ]." 8 And I gave some cites, you know, from 9 Fujiyoshi to support that statement. And I further 10 state that, "A POSITA would look for further means 11 for reducing noise in Fujiyoshi's second and 12 third" -- "second and seventh embodiment, like the 13 sample hold circuit devices disclosed by 14 Townsend" -- right -- "so as to further improve 15 sensor performance [AS READ]." 16 MR. JOHANNINGMEIER: 17 Q. Now, as a general matter, there are a lot 18 of different possible sources of noise in MEMS 19 circuits; right? 20 MR. LAUPPE: Object to form. Scope. 21 THE WITNESS: I mean, if you look at the 22 electrical system, they are noisy, okay. And it's 23 correct to -- to say that, you know, person of 24 ordinary skill in the art would be motivated to 25 apply filters; right? To filter out noise to
54 1 MR. LAUPPE: Object to form. 2 THE WITNESS: Yeah, that is for that -- 3 that is for that feedback loop, you know, as you 4 said. Trying to zero out -- nail out the 5 displacement signal into the -- due to the Coriolis 6 force. 7 MR. JOHANNINGMEIER: 8 Q. Moving on, there's another paragraph in 9 this same section, 186. This is back to your 10 declaration for the '122 Patent, Exhibit 2. In 11 Paragraph 186, you have some further discussion of 12 motivation in your opinion. And at the end of this 13 paragraph -- the last two sentences -- you have a 14 discussion of Fujiyoshi's disclosure of mechanisms 15 for lowering noise. Do you see that? 16 A. Yes. 17 Q. So you are saying that one of the 18 motivations would be the fact that Fujiyoshi 19 mentions noise, and that Townsend also has some 20 discussion of noise. Is that, at a high level, what 21 you are suggesting? 22 MR. LAUPPE: Object to form. 23 THE WITNESS: Let me take a look at the 24 passage. Yeah, that is my opinion set forth in the 25 opinion; right? I said that, "A person of ordinary	56 1 improve the system performance, in terms of 2 improving the sensor's resolution. 3 If you have lower noise, it is always 4 better. 5 MR. JOHANNINGMEIER: 6 Q. Right. And I guess what I'm saying is 7 that, you know, MEMS sensors, in general, are 8 measuring very, very small signals. And so, as a 9 result, noise sources are a perennial, engineering 10 problem that has to be overcome. 11 Is that fair? 12 MR. LAUPPE: Object to form. Scope. 13 THE WITNESS: It's a tradeoff; right? You 14 know, if you work with small signals, it is 15 important that you lower down the noise so you can 16 improve the system performance. But engineers, 17 right -- they are trained with technical skill sets 18 to work with systems that exhibit noise, and lower 19 the noise to include the performance. 20 That's what they are -- that's -- that's 21 what they are hired for; right? 22 MR. JOHANNINGMEIER: 23 Q. Well, I guess what I'm getting at is 24 noise, in some form, is going to be a problem in 25 every MEMS application. It's always an issue;

57 1 right? 2 MR. LAUPPE: Object to form. Scope. 3 THE WITNESS: I think in all electrical 4 systems -- I mean, all electrical systems, just to 5 be fair, right, you always have noise like you said. 6 But engineers are -- are trained to work with the 7 noise to reduce the noise using various filtering 8 techniques to improve the system performance. 9 MR. JOHANNINGMEIER: 10 Q. Right. But I guess what I'm saying is 11 that -- like, if you wanted to create a motivation 12 to combine based on just the fact that two 13 references mentioned two different kinds of noise, 14 you could combine any two patents in the field of 15 MEMS; right? Because they all -- to some degree -- 16 talk about, or are concerned about noise; right? 17 MR. LAUPPE: Object to form, and scope. 18 THE WITNESS: Well, my position for 19 motivation to combine the reference -- for example, 20 Fujiyoshi and the Townsend in my report, right -- it 21 is not just about the noise that we talking about 22 here. I mean, they are in a similar field; right? 23 All talk about -- they all talk about MEMS, you 24 know, gyroscope; right? 25 They all talk about electronic circuitry	59 1 patent. 2 Q. Right. And so, this looks like some work 3 that you did while you were at Case Western; is that 4 right? 5 MR. LAUPPE: Object to form. Scope. And 6 also, we object to this exhibit as outside the 7 scope. 8 THE WITNESS: Okay. To answer your 9 question, this is a part of work that I have done as 10 a professor at the Case Western Reserve University. 11 MR. JOHANNINGMEIER: 12 Q. Right. And so, just based on the 13 abstract, it looks like this is using a MEMS 14 acoustic sensor in an implantable hearing aid; is 15 that right? 16 MR. LAUPPE: Object to form. Scope. 17 THE WITNESS: I think that's what the 18 abstract says. 19 MR. JOHANNINGMEIER: 20 Q. Yeah. And so, this was -- this was a MEMS 21 sensor. This was a capacitive MEMS sensor, too; 22 right? 23 MR. LAUPPE: Object to form. Scope. 24 THE WITNESS: That's -- let me look at it. 25 Yeah, that's correct.
58 1 to interface with MEMS gyroscope in the form of 2 detection, in the form of, you know, feedback 3 control. So a person of ordinary skill in the art 4 looking at these two references -- in addition to, 5 you know, their internal discussion of the noise, 6 right, would be motivated to look at the two 7 reference and combine the teaching. 8 MR. JOHANNINGMEIER: 9 Q. Now, you have a couple of patents 10 yourself; right? 11 A. Uh, that's correct. 12 Q. Okay. I'm going to -- and those are 13 available for anybody to download, right, on the -- 14 they're public; correct? 15 A. I think they probably correct. You should 16 be able to find them. 17 Q. Okay. I did find one. I just put it in 18 the chat as Exhibit 6. 19 (Patent Owner Exhibit 6 marked for 20 identification.) 21 You won't have a paper copy of this, I'm 22 sure. So can you go ahead and download Exhibit 6? 23 A. I think I just did. 24 Q. I take it you recognize this; right? 25 A. Yes, I'm one of the inventors on the	60 1 MR. JOHANNINGMEIER: 2 Q. This was basically the result of some work 3 you did to integrate a capacitive MEMS sensor into 4 an implantable hearing device; right? 5 MR. LAUPPE: Object to form, and scope. 6 THE WITNESS: Yeah, that's sort of the 7 theme of the technical work, right, describing the 8 patent. 9 MR. JOHANNINGMEIER: 10 Q. Now, if we research the word "noise" in 11 this patent, we get -- it looks like -- dozens of 12 hits; right? 13 A. Mm-hmm. 14 MR. LAUPPE: Object to form. Scope. 15 MR. JOHANNINGMEIER: 16 Q. Including in the abstract where it talks 17 about, "a low noise interface electronic circuit 18 chip [AS READ]"; right? 19 MR. LAUPPE: Object to form, and scope. 20 THE WITNESS: That's what the abstract 21 says. 22 MR. JOHANNINGMEIER: 23 Q. Now at Column 8, this patent also has a 24 discussion of digital signal processing; right? 25 MR. LAUPPE: Object to form, and scope.

61 1 THE WITNESS: I have not looked at this 2 patent for quite a number of years since it was 3 filed. But if there is specific things, you know, 4 maybe you can guide me there. I don't want sitting 5 here to tell you something I have not reviewed for 6 long time. 7 MR. JOHANNINGMEIER: 8 Q. I understand. I'm not here today trying 9 to challenge your patent in any way, or anything 10 like that. It's just that, you know, to the extent 11 you are suggesting that -- did we lose video? 12 A. Sorry. I clicked the wrong thing. Sorry 13 about it. How come -- can you see me? Now, you can 14 see me; right? 15 Q. We're okay now. 16 A. I was trying to click that one. 17 MR. LAUPPE: Yeah. 18 THE WITNESS: That's the right window; 19 right? Okay. Sorry about that. 20 MR. JOHANNINGMEIER: 21 Q. No, it's fine. So this goes to the point 22 that we were making earlier about noise. And I had 23 asked you whether or not noise is a perennial 24 concern. I take it, you know, in your work on this 25 patent in the mid-2000's you were also concerned	63 1 in terms of how to feedback certain signals to -- to 2 stabilize, or to uh -- uh -- uh, you can call it 3 control the position of the MEMS gyroscope; right? 4 In addition, it also talks about noise. 5 So we -- I think you -- you -- you somehow focus on 6 the noise as a singular focus by saying, "Hey, if 7 somebody look at noise, would they combine" -- 8 right? 9 You pull off, I guess, my patent -- I'm 10 just co-mentor on it -- which does talk about 11 low-noise, interface basic design, which is one of 12 my expertise designing that type of system, right, 13 circuitry to interface with MEMS. 14 It does talk about low noise, but I just 15 want to, you know, be clear on this. My motivation 16 to combine the two references through the lens of an 17 ordinary skill in the art is not just based on 18 noise. There are a lot of similarities between 19 these two references that would enable a person of 20 ordinary skill in the art reading the two 21 references, and come to a conclusion it is 22 motivating to combine them. 23 MR. JOHANNINGMEIER: 24 Q. And I'm just going based on, you know, 25 what's in your declaration you sort of cited as your
62 1 about various kinds of noise; right? 2 MR. LAUPPE: Object to form, and scope. 3 THE WITNESS: I think as an engineer, 4 right -- electrical engineer, you know, working on 5 electronic circuitry, I have to look at the noise; 6 right? I cannot ignore the noise. 7 MR. JOHANNINGMEIER: 8 Q. Understood. So I guess would you agree 9 with me if I said that if the rationale to combine 10 two references was that they both mentioned noise, 11 that we could potentially combine almost any two 12 MEMS references in -- in the entire body of work, 13 because they're all going to mention noise? 14 MR. LAUPPE: Object to form, scope, and 15 asked and answered. 16 THE WITNESS: I think, you know, I did 17 answer your question; right? The motivation to 18 combine Fujiyoshi and the Townsend -- I offer my 19 position for that motivation at various places in my 20 report; right? One thing that I can, you know, tell 21 you is that they -- they all talk about MEMS 22 gyroscopes; right? 23 That's in the same field. They all talk 24 about electronic circuitry design to interface MEMS 25 gyroscopes in terms of detection of certain signals,	64 1 reasons, and just trying to probe that a little bit. 2 A. You kind of just focus on maybe few 3 sentences, right, out of a paragraph. But there are 4 a lot of places in the report that I go beyond just 5 the noise aspect, right, to lay down my position why 6 a person of ordinary skill in the art would have 7 been motivated to combine Fujiyoshi with Townsend. 8 There are many things that we just talk 9 about within maybe last five/ten minutes, right, 10 describing those motivations. 11 MR. JOHANNINGMEIER: 12 Q. Right. Well, I mean, among those 13 motivations, though, would you agree with me that 14 the -- the sort of mention of noise is a little bit 15 overbroad? 16 MR. LAUPPE: Object to form, and scope. 17 THE WITNESS: If I only focus on noise, 18 maybe it's overbroad; right? But I don't want to -- 19 you know, I don't want to limit myself to only noise 20 on that passage; right? Because if you look at my 21 report, there are a lot of places talk about various 22 reasons why a person of ordinary skill in the art 23 would have been motivated to proceed a combination. 24 MR. JOHANNINGMEIER: 25 Q. I understand. And I'm not -- and we have

65 1 your -- your -- your report, and all of those, uh, 2 reasons have been given. I'm just trying to ask 3 about some of them. And, you know -- you know, the 4 -- the reason is because, you know, if -- if -- you 5 know -- noise if -- if that's sufficient to provide 6 a motivation to combine, then I'm not sure anybody 7 can have a patent in this field. But that's, I 8 guess, more commentary than a question. 9 So let's move on to -- well, I think you 10 also mentioned -- well, the idea of feedback loops. 11 I mean, that's a very, very common, um -- uh, 12 element of MEMS circuit designs; right? Including 13 in your patent we have up here, Exhibit 6, there's 14 discussion of feedback circuits in Column 8; right? 15 MR. LAUPPE: Object to form, and scope. 16 THE WITNESS: You know, I -- as I 17 mentioned to you earlier, you know, I have not -- I 18 have not looked at the patent for quite a number of 19 years. 20 MR. JOHANNINGMEIER: 21 Q. Sure. 22 A. So if you say something related to the 23 specification of the patent, I just don't want to be 24 here without reviewing -- 25 Q. Understood.	67 1 background. This project that you were working on 2 to, um, use a MEMS, uh, sensor in a -- um -- uh, 3 hearing device, was that a long-running project? 4 MR. LAUPPE: Object to form, and scope. 5 THE WITNESS: If I remember, that was an 6 NIH-supported project. A R21 project that last 7 about -- last about two years or so. 8 MR. JOHANNINGMEIER: 9 Q. Mm-hmm. And did it result in an actual 10 prototype or -- or -- or product? 11 MR. LAUPPE: Object to form, and scope. 12 THE WITNESS: As I guess I mentioned to 13 you earlier, you know, this is a research project; 14 right? We conduct research project to explore, you 15 know, new ways or different ways of building better 16 systems or different systems. And we also use the 17 research project to -- to provide as a training 18 platform for graduate students. 19 MR. JOHANNINGMEIER: 20 Q. Mm-hmm. Okay. Well, so was there an 21 actual, physical prototype? 22 MR. LAUPPE: Object to form, and scope. 23 THE WITNESS: There -- there was a 24 physical prototype. And -- and I do not remember 25 exactly what's, you know, described in the specific
66 1 A. -- say something that's incorrect, you 2 know what I mean? 3 Q. Yeah, understood. That's -- you know, I 4 don't need you to confirm what's in the patent. So 5 we can move on actually. Let's call up Exhibit 4. 6 MR. LAUPPE: If we're switching gears, 7 maybe make sense to take a break since we've been 8 going about an hour? 9 MR. JOHANNINGMEIER: Let's take a short 10 break. I mean, I don't have that much left to do. 11 So I can get you out of here quickly if we take a 12 short break. 13 MR. LAUPPE: Okay. So how about just a 14 five-minute break. Thank you. 15 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 16 Everyone stand by. We're going offer the record. 17 The time is 1:26 p.m. 18 (Off the record.) 19 Going back on the record. The time is 20 1:34 p.m. 21 MR. JOHANNINGMEIER: 22 Q. Okay. Welcome back. Since we have 23 Exhibit 6, which is your patent here, I wanted to 24 ask you just a couple more questions about it in the 25 context of, you know, your experience and	68 1 specifications. But we did build prototypes, and we 2 did implant it into middle ear, and we did test it. 3 We make sure it can -- serves as an 4 implantable microphone for building a 5 fully-implantable cochlear prosthetic device. 6 MR. JOHANNINGMEIER: 7 Q. Mm-hmm. Okay. And just generally, about 8 how many people worked on this project over those 9 years? 10 MR. LAUPPE: Object to form, and scope. 11 THE WITNESS: I'm a professor, and I 12 supervise one to two students, you know, working on 13 the project. But as I said to you earlier, sort of 14 these type of project is really used as a training 15 platform, right, to train students to work harder. 16 We like to, you know, include as many 17 students as possible just to provide that training 18 opportunity. 19 MR. JOHANNINGMEIER: 20 Q. Right. Right. For instance, some of 21 these -- I take it, then, that some of these seven 22 inventors on this patent would have been students 23 that worked on this for that purpose; is that right? 24 MR. LAUPPE: Object to form. Scope. 25 THE WITNESS: Could -- could -- could you

69 1 show me that -- where's the patent? Maybe I can 2 open up, you know. Think -- 3 MR. JOHANNINGMEIER: 4 Q. Exhibit 6 in the chat. You can see it. 5 On the very first page, there's a listing -- 6 A. Sorry. Somehow that document disappeared. 7 Q. Oh, well I can put it in again. 8 A. Yeah, I have it. I have it. You know, I 9 can tell the fist one, right, Wen Ko is a professor. 10 I'm a professor. And the other four people there 11 are, you know, graduate students. 12 And the last one, I remember, is a medical 13 doctor. Kind of a -- provide some medical guidance 14 in terms of, you know, when you go inside the middle 15 ear, what is the geometry? What is the spacing? 16 You know, some advice in terms of about 17 medical -- medical implant constraints. 18 Q. Okay. All right. All right. And so, I 19 take it just based on the date of the patent 20 application that this work was done sometime in the 21 mid- to late-2000's; is that right? 22 MR. LAUPPE: Object to form. Scope. 23 THE WITNESS: Around 2003/2004-ish, but I 24 don't remember the exact dates because I have a lot 25 of projects. But if you look at the patent, can	71 1 A. Yeah. I think if you look at the first 2 line, it says, "Rationale and Motivation to Combine 3 (Smith with Chan and Bernstein)." 4 And, you know, I guess I state that, you 5 know, "The proposed combination does" -- "would thus 6 have render obvious a 'micro'" -- quote in a 7 quote -- "inertial measurement unit" -- right -- 8 "with the Smith inertial sensor assembly constructed 9 using micromechanical accelerometers and the 10 gyroscopes, for example, mounted on the printed 11 circuit board using conventional techniques [AS 12 READ]." 13 MR. JOHANNINGMEIER: 14 Q. So the Smith reference disclosed 15 laser-ring gyros; right? 16 A. That's correct. 17 Q. So -- one second here. So I'm just 18 putting in the chat what I'll call Exhibit 7. Do 19 you see that Exhibit 7? 20 A. I see something there. Let me. I do see 21 it. Somehow lost it, but just give me a second. 22 Sorry. Let me download that. 23 (Patent Owner Exhibit 7 marked for 24 identification.) 25
70 1 probably give you an idea around the rough time 2 frame, you know, I conducted that particular 3 research project. 4 MR. JOHANNINGMEIER: 5 Q. Okay. So now I do want to turn to your 6 declaration, but this time I want to look at the 7 declaration Exhibit 4 that's for the '648 Patent. 8 So can you grab that, or call it up on your screen? 9 A. Yes, thank you. I have a hard copy 10 somewhere on this table. 11 Q. So the part I want to ask you about starts 12 on Page 58, beginning with Paragraph 98. So let me 13 know when you are there. 14 A. Yes, I am -- you said Paragraph 98; right? 15 Q. Yeah. 16 A. Okay. Yeah, I'm at Paragraph 98. 17 Q. Okay. So this is a section where you give 18 your opinion about the rationale and motivation to 19 combine the Smith reference with the two MEMS 20 references, Chan and Bernstein; right? 21 MR. LAUPPE: Object to form. 22 THE WITNESS: Let me take a look at the 23 passage. 24 MR. JOHANNINGMEIER: 25 Q. Sure.	72 1 It's an image, right, not a file? Yes, I 2 have that open. 3 Q. Okay. So do you recognize that? 4 MR. LAUPPE: Object to form. 5 MR. JOHANNINGMEIER: 6 Q. You don't have to recognize it. I'll just 7 tell you. This is an image of a laser-ring gyro 8 that I got off Wikipedia. I just find sometimes 9 it's helpful to have pictures of things in the 10 record. Does that look like a laser-ring gyro to 11 you? 12 MR. LAUPPE: Object to form. Scope. 13 THE WITNESS: I mean, based upon its look, 14 and what you just told me, you know, I believe 15 that's the case. 16 MR. JOHANNINGMEIER: 17 Q. So Smith disclosed laser-ring gyros. And 18 basically, to summarize your opinion is -- your 19 opinion is a person of ordinary skill would 20 substitute the MEMS gyros for the laser-ring gyros 21 of Smith; right? 22 MR. LAUPPE: Object to form. 23 THE WITNESS: My opinions are set forth in 24 various parts of my report; right? But as I kind of 25 remember some of the opinions, right, you said a

73 1 person of ordinary skill in the art would have been 2 motivated combined teaching of Smith with the 3 teaching of Chan and Bernstein, right, to use MEMS 4 accelerometers and gyroscopes to -- to replace the 5 laser-ring gyroscope to form an IMU. 6 MR. JOHANNINGMEIER: 7 Q. Right. So, for instance, at Paragraph 99, 8 you say, "The three accelerometers and gyroscopes in 9 Smith would have been replaced with corresponding 10 micromachined accelerometers and gyroscopes"; right? 11 A. That's what the document says. 12 Q. And then, you go on in that paragraph on 13 the next page, 59, and say that, "The use of 14 micromechanical components would have required a 15 change in the manufacturing process"; right? 16 A. That's what that -- that's what the 17 statement says there. 18 Q. And you said that, "That would have 19 required a change to the signal conditioning 20 electronics as well"; right? 21 A. That's correct. 22 MR. LAUPPE: Object to form. 23 MR. JOHANNINGMEIER: 24 Q. Okay. And then, basically at the end of 25 this paragraph you say, "This would have been	75 1 applications. 2 And, you know, there are other 3 motivations, you know, that I laid out in my -- in 4 my declaration; right? If you look at Smith, right, 5 Smith talks about the need of miniaturized size, the 6 need to use inexpensive components to reduce the 7 costs of those IMUs. 8 So if you look at the MEMS, you know, 9 people know in 1990's MEMS are, you know, available; 10 right? You know, uh, if you look at some of the 11 prior art talks about, you know, MEMS angular rate 12 gyroscopes, you know, have been developed, right, 13 for developing IMUs. And those components are 14 small, lightweight, low power, lower cost. 15 So if you look at all of these teachings, 16 a person of ordinary skill in the art would have 17 been motivated, right, to replace or to use MEMS 18 accelerometer gyroscopes as IMUs, and to replace the 19 laser ring gyroscope. 20 MR. JOHANNINGMEIER: 21 Q. Now, in Paragraph 104 of your declaration, 22 you give an opinion stating that, "A person of 23 ordinary skill could have implemented this 24 combination replacing the laser-ring gyros with the 25 MEMS gyros. For instance, using conventional
74 1 regarded as routine [AS READ]"; right? 2 A. Which paragraph? 3 Q. Same one, near the bottom of Page 59 you 4 say, "This would have been regarded as a routine 5 implementation well within the skill of person of 6 ordinary skill [AS READ]"; right? 7 A. That's correct. 8 Q. Then you say, "This is confirmed because" 9 -- "confirmed by Chan and Bernstein. These 10 micromechanical accelerometers and gyroscopes exist, 11 and are commercially available [AS READ]"; right? 12 MR. LAUPPE: Object to form. 13 THE WITNESS: MEMS, you know, 14 accelerometer, gyroscopes exist, right, before 1999? 15 It's just well known. And, you know, I use Chan and 16 Bernstein as just two references to show that, 17 right. MEMS accelerometer, gyroscopes, but also you 18 look at, you know, other -- other prior reference 19 that I cited. 20 I believe one of them is Herrsching 21 (phonetic); right? The other one is Doltz 22 (phonetic); right? Those are prior reports that 23 clearly describe MEMS accelerometers, gyroscopes. 24 You know, can be used, right, to implement, you 25 know, inertial measurement units for navigation	76 1 techniques, without undue experimentation [AS 2 READ]." 3 Do you see that? 4 A. I see that. 5 Q. That's your opinion that it can be done by 6 a person of ordinary skill without undue 7 experimentation; right? 8 A. Yeah, that's what -- what the document 9 says. 10 Q. Right. And then, this paragraph -- the 11 support for that, you cite to the fact, as you've 12 been saying, that these were commercially available; 13 right? 14 MR. LAUPPE: Object to form. 15 THE WITNESS: I think I cite one sentence 16 coming from the '648 Patents, but there are multiple 17 places; right? Throughout my report I talk about 18 motivation to combine; right? If you look to -- I'm 19 just kind of flipping through the pages around the 20 passage you are looking at. 21 Because I remember there are a lot of 22 places offer opinions why, you know, would have been 23 motivated to combine. 24 MR. JOHANNINGMEIER: 25 Q. Right. And I'm not asking about the --

77 1 the -- the motivation to combine. I'm specifically 2 now focusing on this -- this separate opinion where 3 you say, "Assuming they were motivated to do so, 4 that it would have been a routine or using 5 conventional techniques without undue 6 experimentation [AS READ]." 7 Okay. So let's assume for purposes of 8 argument that a person of ordinary skill is 9 motivated to do this work. Uh, and then, you are 10 saying in this paragraph that that person would have 11 an easy time of it. That they could do it without 12 undue experimentation; right? 13 MR. LAUPPE: Object to form. 14 THE WITNESS: I don't think I said that 15 person could have easy time with it; right? You 16 know, these are engineering work. I mean, no 17 engineering work is just replace one component by 18 the other like, you know, swapping the wires; right? 19 There would be technical designs that would need to 20 be done by a person of ordinary skill in the art, as 21 I described in my report. 22 If you are using MEMS, it require 23 different fabrication process. The interface 24 electronics; right? The control electronics may not 25 be the same as the laser-ring gyroscope, but these	79 1 A. Those students need to take classes. It's 2 a training process, you know. 3 Q. Well, so graduate students, then, with 4 presumably electrical engineering degrees, were 5 working on this project adapting 6 commercially-available capacitive MEMS sensors to an 7 application for years basically; right? 8 MR. LAUPPE: Object to form, and scope. 9 THE WITNESS: I must be clear. It's not 10 just adapting. We also build our own sensors. And 11 again, I just want to let you know that these are -- 12 these are projects that we use as a platform to 13 provide research and training experience, to provide 14 engineering design experience for graduate students. 15 And they take classes. They do exams. 16 You know, they may not be working on those projects, 17 like, on the full-time basis. That just how -- that 18 just how things work within the university 19 environment. 20 MR. JOHANNINGMEIER: 21 Q. Mm-hmm. Well, and just to clarify, again, 22 that work that we're talking about, that was done in 23 the mid- to late-2000's; right? 24 MR. LAUPPE: Object to form, and scope. 25 THE WITNESS: We started around
78 1 are all within the skill sets of a person of 2 ordinary skill in the art; right? 3 Electrical engineers, you know, with -- 4 with the right training -- for example, I said that 5 maybe with a bachelor degree, two to three years 6 working experience in that space of technology, you 7 know, they would have the adequate skill set, 8 background, training to implement the design. 9 MR. JOHANNINGMEIER: 10 Q. Okay. So today, as we discussed earlier, 11 you with a Ph.D. in basically MEMS sensor design 12 took as much as ten years to adapt some capacitive 13 MEMS sensors to an application, uh, involving 14 navigation in soldiers' -- I think you said boots, 15 or whatever -- in the field; right? 16 MR. LAUPPE: Object to form, and scope. 17 THE WITNESS: No, that's -- that's not 18 correct. I said that I worked on the project for 19 about ten years, because you asking me in my career; 20 right? I have to work on something using MEMS 21 sensors for navigation. But I also want to let you 22 know because I'm a professor, my job is to train 23 graduate students to do these things; right? 24 MR. JOHANNINGMEIER: 25 Q. Okay.	80 1 2007/2008-ish, if I remember correctly. 2 MR. JOHANNINGMEIER: 3 Q. Right. Okay. And then, we also talked 4 about your patent and -- and related work where you 5 and some students adapted commercially-available 6 capacitive MEMS sensors to this inner ear implant 7 environment. And that took multiple years of 8 experimentation, starting in the mid-2000's; right? 9 MR. LAUPPE: Object to form, and scope. 10 THE WITNESS: I think that's -- what you 11 said is not exactly correct, with respect to what I 12 told you. I said that we start the project maybe 13 around 2003 to 2000 time frame. Last about two 14 years. 15 And if you look at -- if you look at the 16 work we publish, or the work described in the 17 patent, right, it is not just we use a 18 commercially-available MEMS device. The students, 19 you know, design and fabricate it our own MEMS 20 device. Because this is a necessary training step 21 we use to train students how to do these things. 22 MR. JOHANNINGMEIER: 23 Q. Also design the control electronics; 24 right? 25 MR. LAUPPE: Object to form, and scope.

Transcript of Darrin Young, Ph.D.
Conducted on December 13, 2024

21 (81 to 84)

81 1 THE WITNESS: I mean, we have low-power 2 interface ASICs that was designed to -- to interface 3 with the MEMS sensor. All of that is for building a 4 system, but with a scope of provide research 5 experience, research training for graduate students. 6 MR. JOHANNINGMEIER: 7 Q. Mm-hmm. Just to be clear, that ASIC that 8 you described that you designed and built, that 9 included some digital signal processing; right? 10 MR. LAUPPE: Object to form, and scope. 11 THE WITNESS: They had some digital 12 components in there, but been number of years. I 13 don't remember exactly what's inside that chip. 14 MR. JOHANNINGMEIER: Sure. Okay. Well, 15 so I don't have any additional questions, unless 16 your counsel's going to do something, which I assume 17 not. But thank you for your time today, and for 18 preparing. Hopefully the fact that this depo was 19 shorter than your prep time is a good thing, and not 20 -- but very much for being here. 21 THE WITNESS: Well thank you. 22 MR. LAUPPE: And can we just take a 23 five-minute break? I think it's unlikely I'll have 24 any further questions, but I'll -- can we just take 25 a five-minute break.	83 1 WITNESS SIGNATURE 2 3 4 I, DARRIN YOUNG, Ph.D., do hereby declare 5 under penalty of perjury that I have read the 6 foregoing transcript; that I have made any 7 corrections as appear noted, in ink, initialed by 8 me, or attached hereto; that my testimony as 9 contained herein, as corrected, is true and correct. 10 11 12 EXECUTED this ____ day of _____, 2024 13 in _____, 14 (City) (State) 15 16 17 18 DARRIN YOUNG, Ph.D. 19 20 21 22 23 24 25
82 1 MR. JOHANNINGMEIER: That's fine. Yeah. 2 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 3 Okay. Everyone stand by. We're going off the 4 record. The time is 1:57 p.m. 5 (Off the record.) 6 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 7 Sorry. We're going back on the record. The time is 8 2:03 p.m. 9 MR. LAUPPE: And no further questions from 10 Petitioner at this time. 11 MR. JOHANNINGMEIER: Thanks again. 12 PLANET DEPOS VIDEOGRAPHER NACHE BUIE: 13 I'll read us off the video record. Here ends 14 today's deposition. We're going off the record. 15 The time is 2:04 p.m. 16 (WHEREUPON, THE PROCEEDINGS WERE CONCLUDED AT 2:04 17 P.M.) 18 ---oOo--- 19 20 21 22 23 24 25	84 1 CERTIFICATE OF STENOGRAPHIC REPORTER 2 I, Sean W. Gumm, a Certified Shorthand 3 Reporter, Registered Merit Reporter, and Certified 4 Realtime Reporter with the NCRA, hereby certify that 5 the witness in the foregoing deposition: 6 7 That DARRIN YOUNG, Ph.D., the witness whose 8 deposition is hereinbefore set forth, was duly sworn 9 by me before the commencement of such deposition and 10 that such deposition was taken before me and is a 11 true record of the testimony given by such witness. 12 13 I further certified that the deposition of 14 DARRIN YOUNG, Ph.D., occurred electronically, on 15 FRIDAY, DECEMBER 13, 2024, commencing at 11:45 A.M. 16 CST to 2:04 P.M. CST. 17 18 I further certify that I am not related to any 19 of the parties to this action by blood or marriage, 20 I am not employed by or an attorney to any of the 21 parties to this action, and that I am in no way 22 interested, financially or otherwise, in the outcome 23 of this matter. 24 25

85	
1 IN WITNESS WHEREOF, I have hereunto set my hand	
2 December 14, 2024.	
3	
4	
5 	
6 Sean Gumm, CSR 13168, RPR, CRR, RMR	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	