Transcript of Hassan Foroosh, Ph.D.

Date: May 1, 2026
Case: ClearCorrect Operating, LLC -v- Align Technology, Inc. (PTAB)

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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CLEARCORRECT OPERATING, LLC,

Petitioner,

v.

ALIGN TECHNOLOGY, INC.,

Patent Owner.

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Case No. IPR2025-00817

U.S. Patent No. 10,791,936

Deposition of HASSAN FOROOSH, Ph.D.

Conducted Virtually

Friday, May 1st, 2026

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Pages 1 - 258

Reported by: Debra A. Whitehead

Deposition of HASSAN FOROOSH, Ph.D., conducted virtually.

Pursuant to notice, before Debra Ann Whitehead, E-Notary Public in and for the Commonwealth of Virginia.

A P P E A R A N C E S

ON BEHALF OF PETITIONER:

XIRUI ZHANG, Ph.D., ESQUIRE
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
Two Seaport Lane
Boston, Massachusetts 02210-2001
(617) 646-1626

- and -

JASON E. STACH, ESQUIRE
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
217 17th Street, NW, Suite 1400
Atlanta, Georgia 30363-6209
(404) 653-6428

A P P E A R A N C E S C O N T I N U E D

ON BEHALF OF PETITIONER:

KATHLEEN A. DALEY, ESQUIRE
ANTHONY J. BERLENBACH, ESQUIRE
FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, LLP
901 New York Avenue, NW
Washington, DC 20001-4098
(202) 408-4273

ON BEHALF OF PATENT OWNER:

MATTHEW A. ARGENTI, ESQUIRE
WILSON SONSINI GOODRICH & ROSATI
650 Page Mill Road
Palo Alto, California 94304-1050
(650) 354-4154

- and -

TASHA M. THOMAS, ESQUIRE
WILSON SONSINI GOODRICH & ROSATI
1700 K Street NW, Fifth Floor
Washington, DC 20006-3814
(202) 973-8883

A P P E A R A N C E S C O N T I N U E D

ALSO PRESENT:

KYLAN BARRY, A/V Technician

C O N T E N T S

EXAMINATION OF HASSAN FOROOSH, Ph.D.	PAGE
By Ms. Zhang	7

EXHIBITS MARKED IN TODAY'S SESSION

(None Marked)

EXHIBITS MARKED IN PRIOR SESSIONS

(Not Attached)

DEPOSITION EXHIBIT	PAGE
Exhibit 1001	58
Exhibit 1004	120
Exhibit 1005	221
Exhibit 2011	13
Exhibit 2012	15

P R O C E E D I N G S

HASSAN FOROOSH, Ph.D.,

having been duly sworn, testified as follows:

EXAMINATION BY COUNSEL FOR PETITIONER

BY MS. ZHANG:

Q Good morning, Dr. Foroosh.

A Good morning.

Q My name is Xirui Zhang. I'm counsel for ClearCorrect.

Would you please state and spell your full name, for the record.

A Hassan Foroosh.

Q Would you please spell your full name.

A Oh. H-A-S-S-A-N, that's first name. And F-O-R-O-O-S-H, last name.

Q Thank you. Have you been deposed before?

A Yes.

Q For how many times?

A Oh, I don't remember. Maybe a dozen.

Q In what kind of proceedings?

A Various different IPRs.

Q Who are the parties you worked with for

those IPRs?

A Some of them were Align versus adversing [sic] parties, so I don't remember everybody. Some of them -- I don't remember all the names.

Q Do you remember the technologies involved in those proceedings?

A To some extent, yes.

Q Can you give some examples?

A Well, Align was dental scanning and imaging and analysis. There was another company also with dentistry, imaging, scanning; I don't remember the name. And I recently also worked with GoPro, so that's a video technology.

Q So you mentioned you have been deposed a dozen times. You probably know this, but I would like to just go over a few of the ground rules. Please bear with me.

You understand that my questions and your answers are being transcribed today. Correct?

A Correct.

Q And you understand that this transcript will be submitted to the patent office, and that

the patent office may rely on this testimony.

Correct?

A Correct.

Q And as our technician mentioned, it is important for the court reporter that we do not talk over each other at the same time. So please let me finish my question before you answer, and I will do my best to wait until your answer is done before asking my next question.

Is that okay?

A Yes.

Q And you also need to give audible answers instead of simply nodding your head to the court reporter, so the court reporter can record your answers. Okay?

A Yes.

Q And if at any time you do not understand a question, please let me know. I will do my best to rephrase or make my question clear. If you answer a question, I will assume you understood the question.

Is that okay?

A Yes.

Q And if you feel like you need to take a break, please let me know. If there is a question pending, please finish answering that question before we take a break. Okay?

A Okay.

Q And I have some preliminary questions as well.

For this IPR, who retained you?

A Align Technologies.

Q And is there anything that would prevent you from testifying truthfully today?

A No.

Q And where are you located for today's deposition?

A I am in Orlando, Florida, in my home, in a room that I often use as my office.

Q And you are using a computer to connect to this deposition. Right?

A That's correct. But my laptop.

Q And apart from this laptop you are using, do you have any devices in your arm's reach?

A No.
Q And on your laptop, apart from the Zoom application we are using right now, do you have any other applications open on your laptop?
A Actually, I have to go to my Gmail in order to get the link. I can close that.
Q Thank you.
A Yes. Now it's only the Zoom application.
Q Do you have any documents in front of you?
A I have clean copies of the exhibits, in addition to my declaration.
Q Do you have any notes on them?
A No; these are clean copies that were sent to me by Attorneys Thomas and Argenti.
Q Do you have any other documents in front of you?
A No other documents.
Q Thank you.
And did you do anything to prepare for today's deposition?
A Yes. We had the preparation session on

Wednesday and another one yesterday on Thursday, with Attorneys Argenti and Thomas.

Q So for each day, how long did you meet?

A I think about eight hours or so. Around eight hours on Wednesday and around four hours on Thursday, yesterday.

Q Did you speak with anyone else to prepare for today's deposition?

A No.

Q Did you review any documents to prepare for today's deposition?

A I reviewed my declaration and the documents that were cited in my declaration.

Q So you said you reviewed documents cited in your declaration?

A That's right.

Q Did you review any other documents?

A No.

Q Did you do anything else to prepare for your deposition today?

A I spent some time without even -- without Attorneys Argenti and Thomas and reviewed myself,

also, outside the session.

Q And how long did you spend on reviewing the materials yourself?

A Might have spent about the same amount of time.

Q And for today's deposition I will introduce some of the exhibits in the chat. And please feel free to use the clean copies you have in front of you as well.

MS. ZHANG: So now I am going to hand you Exhibit 2011.

(Exhibit 2011, previously marked, not attached.)

A That's my declaration.

Is that right?

Q Right. I'm uploading it in the chat.

One moment.

Okay. It uploaded twice, but let me know if you see it.

A As you said, can I use the clean copies? It's more -- I mean, the hard copies here? It's more convenient for me.

Q Sure.

So could you confirm Exhibit 2011 is the declaration you provided in this IPR proceeding?

A Yes, it is.

Q And it's okay if we refer to this document as your declaration?

A Yes.

Q If you turn to Page 61.

A Yes.

Q You provided a list of materials cited.

Correct?

A Yes.

Q Did you consider each of the listed documents in forming your opinions in the declaration?

A Yes.

Q Did you consider anything else in forming your opinions?

A No.

Q Nothing else?

A No.

Q Did you consider any applications related

to the '936 patent?

A I think I just answered that question earlier. I didn't consider anything else in forming my opinion in my declaration, other than the documents that are cited at the -- at that Page 61.

Q Yeah, I just wanted to confirm that you did not review any other documents other than what you provided on this list.

A Yes.

Q Now I'm handing you Exhibit 2012.

(Exhibit 2012, previously marked, not attached.)

Q Let me know if you see it.

A Can I use the hard copy?

Q Yes.

A That's my CV. Is that right?

Q Yes. Correct. This is a copy of your CV.

A I'm more used to by name, kind of, of those exhibits, rather than by number.

Q Yes. Sure.

Is the information in your CV correct?

A To my best knowledge it is correct and up to date.

Q And you are currently employed by University of Central Florida. Correct?

A Correct.

Q And you are a professor of computer science there. Correct?

A Correct.

Q Your research primarily focuses on image and the video processing, image analysis and computer vision. Correct?

A Correct.

Q You do not hold a degree in dentistry. Correct?

A Correct.

Q And you do not hold a degree in orthodontics. Correct?

A Correct.

Q And you have not practiced in dentistry or orthodontics clinically. Correct?

A Correct.

Q And you do not have personal work experience designing or building dental imaging devices. Correct?

A Well, that's not correct, actually. I have been involved in projects where dental imaging systems were developed or designed. I think I have it mentioned in my -- excerpts of my CV in my declaration.

So I have been involved in the past in projects to doing -- with medical imaging, but in particular with dentistry.

Q Did you design the imaging devices themselves or were you working on image processing?

A On that project mostly on image processing.

Q I see. And have you, personally, operated any dental imaging devices?

A Not myself, no.

Q So you have not personally captured dental images yourself. Correct?

A Not personally. But, for instance, in

that project I was collaborating with a company who manufactured dental CT scans, and with the assistance of their technicians we were collecting data. So we were taking images, but I, personally, didn't press a button or did anything myself on those equipment.

Q Understood. Yeah, I see that experience. You mentioned in your declaration and CV that you worked on a project involving modeling and visualization of musculoskeletal structures in dental CT scan. Correct?

A Correct.

Q And that work involved analyzing dentist CT scans. Correct?

A Correct.

Q And as you mentioned, the dental CT scans were captured by CT scanners. Correct?

A That's correct.

Q But you didn't, personally, operate the CT scanners to capture the scan data; someone else did. Right?

A That's correct. I, personally, did not

operate those equipment; but, I was there when we were collecting data. Not every time. But in occasions I could go there, we did that together.

Q Got it. So working on processing and analyzing the CT data. Right? That was your primary role in that project?

A Yes, it could be described that way.

Q And did you use the CT scan data to generate 3D dental models?

A Yes.

Q So how many CT scans do you need to obtain -- do you need to obtain the CT 3D model?

MR. ARGENTI: Objection. Form.

Q Let me rephrase.

How many CT scans are required to obtain a 3D model?

MR. ARGENTI: Objection. Form.

A I don't know what you mean by that. I don't think I opined on that in my declaration, how many CT scans you need. But, you know, one scan produces one, you know -- one scan, full scan creates one 3D, can be used to create one 3D

model, and you can take multiple scans.

I'm not sure if I am -- even if I understand your question.

Q You said you were there when someone was capturing the CT scans. Right?

A Right.

Q How did they capture the CT scans?

A The person's jaw that was being scanned rests on a chin rest, so to keep the patient stationary there is -- there is a part of the equipment referred to, if I remember, as a gantry rotating around the head while the patient is asked to hold as steady as possible. And this gantry goes around and collects data. And that forms a single scan or single 3D model of the -- of the jaw, primarily. But in actual fact that equipment actually collected CT scan of the entire head.

Q I see. So you said the gantry rotates around the patient?

A Yes. Patient's head.

Q Patient's head. Okay. And does the

device take multiple images as the gantry rotates?

MR. ARGENTI: Objection. Scope. Relevance.

A Again, I have not opined on that on my declaration. But essentially, yes, you may think of that way; that it's a device that taking multiple -- you know, these scans perform scans all around the head of the person and convert -- that gets converted to a 3D scan or point cloud.

Q And this is based on your experience and your expertise.

How do you combine those images into a 3D model?

MR. ARGENTI: Objection. Scope. Relevance.

A I did not opine on that in my declaration, and I am not relying on that in my declaration anywhere related to this IPR.

Q For that project -- I'm interested in learning about your work in that project which you offered in your declaration, and it's related to dental scanning. Right?

A It is, yes. It is related to dental scanning.

Q And you say you were there when you were capturing data and you were analyzing the CT imaging data. Right?

A Sometimes I was there, yes.

Q So do you -- you know how you perform those image analysis in those scenarios in obtaining a 3D model. Correct?

MR. ARGENTI: Objection. Form.

A I have said in my CV I believe some -- in my declaration that I have done image analysis of those CT scans, that is correct.

But again, as I told you, I have not used any of those as -- you know, I have not opined, rather, on any of those parts in forming my opinion about the '936 patent or this IPR.

Q In those -- in those projects, you applied your image analysis and processing expertise. Correct?

A Naturally.

Q And in forming your opinions of this

declaration, you also opined based on your expertise and skills in image processing.

Correct?

A Yes, naturally I used my opinions about -- my knowledge in image processing, computer vision, to express my opinion in this IPR.

Q So can you share with us your expertise applied in that project regarding image processing to obtain a 3D dimensional model?

MR. ARGENTI: Objection. Form.

A There is no direct relationship, and I did not opine on that.

As I said, it's the other way around. Rather, I used my knowledge in image processing to work on that project. And I'm using my knowledge in imaging to apply to this IPR.

And I did not opine -- I did not form any one of my opinions about this IPR based on the project I did back then. I don't remember exactly the year, but it was quite a few years back.

I did not form my opinion based on

that -- on that project.

Q Would you say that in this case -- scratch that.

Would you say that the expertise and skills you applied in that project does not apply to the technology involved in this proceeding?

MR. ARGENTI: Objection. Form.

A Again, I did not opine on that. And again, I did not rely on anything from that project in forming my opinion, these proceedings.

As we discussed earlier, at the back of my declaration -- sorry. At the back of my -- back page of my declaration, Page 61, I have a table, and those are the only set of documents on which I relied in order to form my opinion.

Q So why do you list that experience in your declaration?

A Can you repeat that question, please?

Q Yes. Why do you explain -- sorry, why do you identify that experience in your declaration?

A I identified number of other experiences, too; not just that particular one. And I provided

my complete CV up to date to -- maybe to the date where I submitted. All my experiences described there.

So that doesn't mean that, you know, I -- I'm relying my expertise, my -- I'm forming my opinion based on my expertise; but not -- I'm not relying on that particular project to form my opinion.

Q Yeah, I think that -- I'm interested in that project because that shows you have experience with dental imaging. And that shows your expertise in dental imaging.

But you're saying that's not relevant to this proceeding. Correct?

MR. ARGENTI: Objection. Form.

A Again, as I said, it's not that my experience is not relevant to forming my opinion about this IPR. But I am saying that that project wasn't anywhere used or I did not consider it for forming my opinion.

The only things that I used for forming my opinion are the exhibits that are used and

cited in my declaration.

Q Did you apply any of your expertise in image processing in forming your opinions in the declaration?

A Of course. That's my expertise, so I used those expertise to form my opinion.

Q And did you apply your expertise in image processing in this dental CT scanner project?

MR. ARGENTI: Objection. Form.

A Well, again, expertise, applying expertise, I'm trying to separate between two things.

My expertise are my expertise. I applied -- I applied my expertise to that project also. I applied my expertise to this IPR and a number of other IPRs; but not the other way around, that I did not use that project as a basis to form my opinion.

Q Do you have expertise in image registration?

A I do.

Q Did you apply that expertise in the 3D CT

scanner project?

MR. ARGENTI: Objection. Form.

A It's been quite a years -- number of years ago. But off the top of my head, I believe yes.

Q How did you apply image registration in that project?

MR. ARGENTI: Objection. Form. Scope. Relevance.

A Again, I did not use that project as a -- as a basis to form any one of my opinions in my declaration. I keep saying the same thing and same answer.

I did not use any elements of that project that's we are discussing to form any one of my opinions in my declaration.

Q I understand you don't -- you did not form your opinion based on that project. I'm trying to understand how you applied your image-processing expertise in that project.

A In that project or in this IPR?

MR. ARGENTI: Is there a question

pending?

MS. ZHANG: I'm going to.

Q So I'm trying to understand your work in that project. Did you form -- sorry, scratch that.

You said that you focused on image processing in that 3D scanner project, CT scanner project. Correct?

MR. ARGENTI: Objection. Form.

A My answer is the same. I did not use any other references or documents in forming my opinion other than the ones that I have cited on Page 61 of my declaration.

Q I understand that you did not consider anything besides what you listed in the materials cited in your declaration.

Let's go to Paragraph 8 of your declaration. This is Page 4.

A Yes.

Q Starting from the sixth line of Paragraph 8 you stated, "This research project focused on registration and alignment of 2D images and 3D

digitized data obtained by dental CT scans and dental imprints of a patient."

Correct?

A Correct.

Q So you applied your image registration expertise in this project?

MR. ARGENTI: Objection. Form.

A In this project it -- as I said, I applied my expertise in image processing that includes registration, also. But again, this is not used -- this project was not a basis in forming my opinion in this IPR.

Q And could you turn to Page 5. The last sentence in this paragraph you said, "Methods were developed to register CT models to the physical imprints of patients."

Correct?

A Yes.

Q How do you -- in that project, how do you register the 2D images and 3D digitized data?

MR. ARGENTI: Objection. Form.

A Again, my answer remains the same. What

I did in that project has not been any shape or form been considered in my opinions, the opinions formed regarding this IPR.

Q Can you explain how registration was performed in that project?

A It's been a long time ago. I cannot remember off the top of my head.

Q Is a dental CT scanner an intraoral scanner?

A A dental CT scanners form -- perform scans of -- as I explained to you earlier, of the jaw. But typically they acquire also data beyond the jaw. In fact, that's -- at least that CT scanner could gather data almost of the entire head.

Q Is it an intraoral scanner?

MR. ARGENTI: Objection. Form.

A Again, as I said, it is a scanner that creates 3D data of the -- of the jaw, whether internal or external. All the -- it creates 3D model of the head, both internal and external.

Q How does it work to get an internal and

external structures by the CT scanner?

A I did not opine on that in my declaration, and I do not rely on how a CT scanner works in forming my opinion -- my opinions in this declaration.

Q But today are you -- can you explain to us how it works?

A I mean, I can give you a general knowledge, if you want to.

Imagine that you -- you -- it's a projection in many different directions, and there are many algorithms that combine them together to create a 3D model. And CT scan is capable of getting data both from inside an object and, of course, the whole outside structure of the object, too.

Q How do they combine the data together to form the 3D model?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on this in my declaration, and I did not use how a CT scanner, dental CT scanner, combines images in forming my

opinion -- my opinions in this IPR.

And I -- I did not see any relevance in taking that into account. And as I -- as I said in my declaration on Page 61, I cite exactly the documents that I have used, the material that I have used in forming my opinion.

Q So you don't think how a CT scanner combines images is relevant to this proceeding.

Correct?

MR. ARGENTI: Objection. Form.

A I never said that. I never said that whether it's relevant or not relevant to this proceeding.

I said that I did not consider the relevance of that in this proceedings. I did not consider that project as a basis to form my opinion, that's what I said.

Q Do you have any experience with intraoral scanners?

MR. ARGENTI: Objection. Form.

A Again, I did not think my personal experience -- I did not use, rather, my personal

experience in forming my opinion in this IPR. I used -- again, I'm repeating -- I used those documents on Page 61 of my declaration. I did not use my personal experience with any scanner, intraoral scanner, in order to form my opinion.

But I been to dentist's office who have done -- you know, who have scanned my teeth.

Q Did you --

A If that counts -- I'm sorry, if that counts as personal experience.

Q Yeah. Did you see how an intraoral scanner works in your experience?

A Do you mean as a patient when I was in doctor's office?

Q Yeah. Can you explain how intraoral scanner works for me?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not use that, my personal experience, in forming my opinion. But I was there, of course, as a patient. And the doctor used a handheld device to scan the intraoral cavity.

Q So an intraoral scanner is a handheld device?

MR. ARGENTI: Objection. Form. Scope.

A I have not formed any opinion on that, whether it's a handheld device or it's not a handheld device. That does not come into my -- you know, nowhere in my declaration I have opined on that.

Q So do you know how an intraoral scanner works?

MR. ARGENTI: Objection. Form.

A Again, if you're talking about the background technology, that's a separate issue. But, you know, I have a knowledge of -- I'm an imaging processing expert. I have background knowledge on various different methods, general methods, of producing 3D data.

But I have not used the operational characteristics of intraoral scans, handheld or not, or any other issues or solutions with intraoral scans in forming my opinion -- by "issues" I mean how they are operated, whether

they are handheld or not.

I did not opine on that. And I did not form my opinions based on how an intra -- intraoral scanner is operated.

Q Are you providing opinions on how you perform image processing of data captured by an intraoral scanner?

MR. ARGENTI: Objection. Form.

A No, I did not opine on that. But I said I have a knowledge of various different methods that, you know, might be used in different intraoral scanners.

Q What kind of methods can be used in different intraoral scanners?

MR. ARGENTI: Objection. Form.

A Again, I did not opine on that in my declaration, and I did not rely on different methodologies or technologies used in intraoral scanners.

Q So you're not here to provide opinions on how image-processing technologies can be used for data captured by intraoral scanners?

A That's not what I said.

I said that I did not use -- I did not use how different intraoral scanners use different technologies; but I have a knowledge of the methodologies that might have been used, that may be used in different intraoral scanners. I mean, I can provide, you know, general -- I can say general, I can talk about general methods and technologies that are not necessarily used just in intraoral scanners, but in different areas.

Q So here you just said, I have a knowledge of the methodologies that might have been used in different intraoral scanners.

A Yes. There are different technologies --

MR. ARGENTI: Is there a question pending?

Q Correct? Is that correct?

A No. As I said, what I was -- what I'm trying to say is that I'm an image processing computer imaging expert. So there are different methods that you can apply from a set of images to create a 3D point cloud, or 3D scans.

So I'm saying that I have a knowledge of all -- all these -- all those different methods.

Q And those methods are not limited to intraoral scanners. Correct?

A They are used in other areas also. As an example, in autonomous driving, an area scanning, you know, autonomous driving, an area that I have been working on also, and other areas, yes.

Q Can those technologies be used in other medical imaging areas?

MR. ARGENTI: Objection. Form.

A They might be.

Q So you're not bringing any knowledge of how an intraoral scanner works. Right?

MR. ARGENTI: Objection. Form.

A As I said, I have a knowledge of methods that might be used in intraoral scanners, or, in fact, in other application areas. But I did not consider how, you know, particular, for instance, scanner might use this technology or that technology.

Q So you said, I have a knowledge of

methods that might be used in intraoral scanners.

Are those methods image-processing methods?

MR. ARGENTI: Objection. Form.

A They are image-processing methods. Images used to create the 3D data. But some of them may -- may be different methods that are not necessarily require taking images.

Q So you're not using knowledge of how an intraoral scanner works. Right?

MR. ARGENTI: Objection. Form.

A What I said was that in forming my opinion in my declaration, I used -- I based my opinions based on the review and examining the document that I have cited on Page 61.

Q So you're not bringing knowledge of how an intraoral scanner performs a scan of a patient's teeth. Correct?

MR. ARGENTI: Objection. Form.

A No, I'm not in the sense that I did not examine for forming my opinions, my opinions, a set of intraoral scanners and form my opinion

based on that.

What I did -- again, I repeat -- I used the documents cited on Page 61 on my -- of my declaration as a basis to form my opinions.

Q In reviewing those documents, you do not know how an intraoral scanner scans a patient's teeth. Correct?

MR. ARGENTI: Objection. Form.

A I did not need to know how each individual intraoral scanner operates or scans patient's intraoral cavity to form my opinion.

My opinion is based on the documents, again, that I cited on Page 61 of my declaration, and I was responding to Dr. Karam's opinions.

Q So do you have any knowledge with the tooth-preparation process for orthodontics?

A Not beyond what has been done on me as a patient, let's say. No, I'm not an orthodontist, I'm not a dentist. But I've been to a dentist's office and I had treatments like restoration tooth treatments before on me.

Q So you had personal experience having a

tooth restored?

A As a patient.

Q So in that experience, a tooth needs to be prepared for mounting apparatus. Right?

MR. ARGENTI: Objection. Form.

A That's what some of the documents that I considered state, including the prior art, the tooth needs to be prepared in some cases. But I'm not a dentist and orthodontist to have an opinion on that. I just consider this as a POSITA.

Q So based on your understanding of the documents you reviewed, during the preparation process some physical changes may need to be made to the tooth. Correct?

A Can you show me where in my declaration I opined on that?

Q This is a general question based on your reading of the materials cited in your declaration.

A If it's a general question, as I said, it is exactly the same answer as the previous question. That I read that in some of the prior

art that were produced in support of this IPR. Some of those prior arts refer to physical change in the process of tooth preparation.

Q And can you give some examples of the physical changes that you read in the prior art?

A I don't remember off the top of my head. But the prior art they're referring to -- you know, to fit the prosthesis on the -- on the tooth that is being treated, then physical changes may be applied to that tooth.

Q Does shaping the tooth surface count as a physical change?

MR. ARGENTI: Objection. Form.

A I believe that Dr. Karam mapped physical change to -- to that. So I applied that in my declaration also.

Q Does removing some material from the tooth surface count as physical change?

MR. ARGENTI: Objection. Form. Scope.

A I did not opine on that. As I said, I believe that Dr. Karam mapped physical change to tooth surface, changing the tooth surface shape,

and I applied that in my declaration also.

Q In your reading of the prior art, if there's something on the tooth, like a foreign material, and if you remove it from the tooth, is it a physical change?

MR. ARGENTI: Objection. Form. Scope.

A I did not opine on that in my declaration.

Q An intraoral scanner, an intraoral scanner can be used to obtain a 3D model of the teeth during the preparation process. Correct?

MR. ARGENTI: Objection. Form.

A Can you repeat your question again, please?

Q Sure. An intraoral scanner can be used to obtain a 3D model of the teeth during the preparation process. Correct?

MR. ARGENTI: Objection. Form.

A I guess I don't understand what you mean by "during preparation process."

But an intraoral scanner can be used to acquire 3D scan point clouds from intraoral

cavity.

Q So you can use an intraoral scanner to obtain a 3D model of the intraoral cavity.

Correct?

A Correct.

Q How long does it take to scan the intraoral cavity using an intraoral scanner?

MR. ARGENTI: Objection. Form?

A I did not opine on that in my declaration.

Q So you don't know how long it takes to scan the intraoral cavity using an intraoral scanner. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I did not opine on that in my declaration. That's -- that's my answer, is that I did not opine on the time or considered that in forming my opinions in this IPR.

Q So after you obtain a 3D model of the teeth, you can perform some physical changes to the teeth. Correct?

MR. ARGENTI: Objection. Form.

A Can you show me where I opine on that in my declaration?

Q Hold on for a minute, let me find it for you.

Could you look at Paragraph 34 of your declaration?

A Yes.

Q In the first sentence you said, "I understand that during prosecution of the '936 patent the examiner acknowledged the differences between the claims of the '936 patent and the conventional approach described in the prior art."

Correct?

A Correct.

Q What is this "conventional approach" that you're referring to here?

A I'm referring to what the examiner was describing as the conventional approach.

In other words, conventional approach is that if you do additional surface preparation, then you take a new scan and you create a new model.

Which differs from the '936 patent that was describing a completely different approach at the priority date, at the time of that patent, that you don't -- you keep the initial model, and you update the initial model with a region -- with the scan of a region that has been -- scan of surface that has received additional surface preparation, you replace and create a composite model out of those two scans.

Which was different, again, from conventional approach, that you take additional scan to supplement or you take additional scan and discard the old scan.

So that's what I mean by conventional approach as described by the examiner.

Q So in the conventional approach you are describing, there was an initial model. Correct?

A Correct, there was an initial model. And in the language that I adopted from the mapping of Dr. Karam, if additional surface preparation has taken place, then in that case in the conventional method a new model would have been created from a

second scan. And either both model, the initial model and the new model, would supplement each other, or the old model would be discarded and the new model would be kept as a reference.

Whereas the examiner identified that the '936 patent is taking a completely different approach at the priority date. They're saying that here is the initial model. Don't take -- I'm sorry, here is the initial model, and remove a portion that is identified by the -- by the user and replace that region with the portion from a second scan. In other words, create a composite model.

Q So when you just described the conventional approach, you said in the conventional method a new model would have been created from a second scan. And either both models, the initial model and a new model, would supplement each other, or the old model would be discarded and the new model would be kept as a reference. Correct?

A Correct.

Q In your opinion, the conventional approach is taken when there is a physical change performed. Correct?

MR. ARGENTI: Objection. Form.

A It's not just my opinion. I mean, prior art, like Boerjes, discloses that, teaches that. Or Geng is disclosing that and teaching that. Both of those are describing conventional method of rescanning to either supplement or create a whole new model when additional surface preparation is -- is done on a tooth.

Which is very different from what patent '936 was describing, which was updating and creating a composite model.

Q So you just said, "Both of those are describing conventional method of rescanning to either supplement or create a whole new model when additional surface preparation is done on a tooth."

Correct?

A Yes. I said that it -- this -- this what I was saying there is not -- it's included in the

examiner's description of conventional method. It was also in a separate IPR a few years back with 3Shape that came up again, the difference between conventional method and the method proposed by -- by '936 patent, which PTAB at the time recognized that also, the board recognized that.

And I'm saying that in this IPR also the two -- in fact all, the three of the prior arts that are produced are adopting the conventional approach, or describing the conventional approach, teaching the conventional approach. Whereas the '936 patent departs from that approach and is talking about compositing models and updating the initial model.

Q So in your description of conventional method, what's the difference between supplementing and creating a new model after additional surface preparation?

MR. ARGENTI: Objection. Form.

A So I use the plain and ordinary meaning of those terms. When you supplement something, you keep whatever you had and you add -- you keep

both if you want to, the old scan and -- initial scan and the new scan. That's what I call supplementing.

And if you take -- if you -- if you completely replace the old scan, well, it basically means you discard the old scan -- the old model, rather, and replace it with a new model.

Q So when you supplement, you keep -- you said you keep both the new scan and the old scan. How do you keep both scans and generate the model?

A No. I said that you keep the old model and the new model, that's what I meant. You keep the old model and the new model. So both of them are used.

So -- so you're not creating a composite model, so both of those models are kept. That's how you supplement the old model with the new model.

Q What does "supplement" mean where you say "you supplement the old model with the new model"?

A I mean, as I said, I used the plain and

ordinary meaning of that term.

If you are supplementing something, it means that you think it's a good idea to add -- to include this new data with the old data to keep them together, to have them together, to have them both. So they are supplementing the additional data that you have, in this case a 3D model.

You have a 3D model which is your initial 3D model, and then let's say some additional surface preparation has taken place on a tooth. So you take a second scan, create a new model, and you keep both models.

So those two models are what I call supplementing each other.

Q So you're adding the new model into the old model.

Is that what you mean by "supplementing"?

A No, I don't mean that you add the old model into the new -- into the -- no. I am saying that you keep both models. You have two models, and you keep them both.

You're not using any method of

compositing them into -- compositing two scans into a single model. You're not dealing with one single model. We're dealing with multiple models if multiple scans are taken.

Q How do you use both models?

MR. ARGENTI: Objection. Form.

A I didn't opine on that. However it's used, it's not something that I considered in forming my opinion. I just opined on the fact that the prior arts described -- the prior arts are teaching that approach.

And I also recognize that during the prosecution of the '936 patent the examiner recognized that. And as I said earlier in a previous IPR, even the board recognized that.

That's -- and I agree with them. In examining the three prior arts that are used, that are asserted in this IPR, I see that all the three of them are using the conventional approach of supplementing or completely replacing old models. Which, as I said, is completely different from what '936 patent describes.

Q The prior art doesn't say supplementing means keeping old and new models and use two models. Correct?

A I said that I used the plain and ordinary meaning of "supplementing." So I -- I think a POSITA at the priority date would have understood that if you're supplementing something, it means that you are not throwing away whatever you had before, and you have now additional supplemental data.

Q I just heard you say you agree with examiner during prosecution. Correct?

A I said that I -- you know, in examining and reviewing the prior art, that's the opinion that I formed. And by the way, the examiners during the prosecution also recognized that. And I agree with them that there was this conventional approach at the priority date that you supplement to taking totally new scan. Which -- you know, which '936 patent completely departed from that approach and said that when you take a new scan, you combine -- you create a composite model.

And I also said that I even agreed with the -- with the board, who also recognized this in a separate IPR.

Q Earlier you said today in forming your opinions in your declaration you did not consider anything else other than what's listed in the materials cited in Page 61 of your declaration.

Correct?

A That is correct.

Q Did you list the prior art, Kriveshko, for WO 2007/084647 in your materials cited table?

A You have that table in Page 61, I can go through them. These are the ones that I have considered in forming my opinion in my declaration, the ones on Page 61. If it is not cited there, it means that I did not use it in forming my opinion.

Q Is the conventional approach the only way to obtain a new 3D model after a physical change?

MR. ARGENTI: Objection. Form. Scope.

A I don't think I opined on that, is it the only form or not.

What I examined is that that's how the prior arts are describing, that's how the prior arts are teaching to do it. And the conventional approach. In other words, so all the prior arts is describing the conventional approach. And the '936 patent is teaching it completely different approach.

Q And the prior art you have considered are listed in the materials cited on Page 61 of your declaration. Correct?

A Well, the prior arts are the ones that are asserted by the adverse party. I mean, I'm talking about Boerjes, Geng, and Babayoff. Those are the prior arts that I'm referring to.

Q So in forming your opinion about the conventional approach, you did not consider any other prior art other than Boerjes, Geng, and Babayoff. Correct?

MR. ARGENTI: Objection. Form.

A Well, those are the three prior arts that Dr. Karam used for her grounds. And so I considered those in response to Dr. Karam and the

petition in what the conventional approach was and how it differed from the '936 patent approach.

Q As an expert providing your opinion as one of ordinary skill in the art, you're not aware of any other approach for obtaining a new 3D model?

A I did not opine on --

MR. ARGENTI: Is there -- is there a question pending?

MS. ZHANG: Yeah, that was my question.

MR. ARGENTI: All right. I see the question mark on the transcript.

Then objection, form. Scope.

A I did not opine on that. As I said, those three prior arts are asserted by Dr. Karam and used by Dr. Karam to contend obviousness. And so I considered those in forming my opinion in order to respond to the four grounds that Dr. Karam has been discussing in her declaration.

MR. ARGENTI: Counsel, we've been going for a while now. Is it a good point for a break?

MS. ZHANG: Yeah. Maybe just one last --

one or two questions after I will finish this module, if that's okay.

MR. ARGENTI: Sure.

Q So you can -- so you cannot give any other example for -- sorry. Scratch that.

So you're not aware of any other approach for obtaining a new 3D model after a physical change. Correct?

MR. ARGENTI: Objection. Form. Scope.

A That's not what I'm saying. I'm saying that I'm responding to Dr. Karam and the petition and the four grounds that being produced to challenge the '936 patent. And I'm saying that, okay, I'm responding to those -- to those grounds. And I'm using -- I'm relying on the three prior arts that have been used on those grounds. So I'm responding to Dr. Karam.

MS. ZHANG: Okay. Thank you, Dr. Foroosh. We can take a break.

(A recess was taken.)

BY MS. ZHANG:

Q Thank you for coming back, Dr. Foroosh.

Before we took our recess we were talking about the conventional approach, and the approach in the '936 patent. And you mentioned that the '936 patent's approach is obtaining a composite scan. Correct?

A No. I said obtaining a composite model from the initial scan and a new scan taken after surface -- additional surface preparation.

Q What is a composite model?

A That is a general question. You want me to describe to you what Patent '936 is saying? I mean, I didn't opine on what does it mean a composite model, so it could be in different area, in different reference. Some areas describing composite as something else.

I can tell you what '936 patent describes as the composite model.

Q Sure. I'm interested in both. How about you tell me what the '936 patent describes as the composite model first.

A Yeah. So we can -- let me pick up, if I may, the '936 patent. That's Exhibit 1001.

(Exhibit 1001, previously marked, not attached.)

A And I'm going to turn to Page 29, Column 30, where what is claimed.

So down in Claim 1, one of the limitations, one of the claims that was in part of Claim 1 it says that, Receive user input defining a portion of the model to be removed.

So it's instructing, it's teaching that this -- in this initial model, the user defines a portion of that model that has to be -- that needs to be removed. So that's the first step that it describes in creating the composite model.

So it says, Remove from the display model, a removed surface portion of the model to be removed according to the user input.

And then the next line it says, "Receive second scan of the patient's teeth from the handheld intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity."

So it's instructing or teaching that a

second scan taken of -- is taken of -- using Dr. Karam's language, after additional surface preparation of that region.

And it says, "Replace at least a portion of the removed surface portion of the model" using the second received -- "using the received second scan data of the patient's teeth, including surface data of a physically changed portion of the patient's intraoral cavity."

So that's the -- that's the -- those -- this is the one that I also labeled in my declaration as 1.H. So Limitation 1.H is basically -- so summarizing all that, it says that there is some physical change. Which using the mapping again of Dr. Karam, additional surface preparation, for instance, that's physical change.

And an initial scan was taken before that additional surface preparation, that's the initial -- initial scan.

And after surface preparation, the second scan is taken of the regions where additional surface preparation was performed.

And in Limitation 1.E, as I referred to in my declaration, as I read here also, it instructs that remove that identified by the user that area that has been changed, remove that from the initial model, and replace that part of the initial model -- I mean, I'm sorry, initial scan.

So remove that from the initial scan, and replace that portion with the data that you got from the new scan. And then together they form a new model, which is the -- what I call the composite model.

Q So the composite model is the initial model with the portion of it updated using new scan data. Correct?

A Composite model is -- is a combination or amalgamation of two scans. Part of the composite model is coming from the initial scan -- excuse me. And another part that had been physically modified due to additional surface preparation is coming from another scan. And the two together form what I call a composite model.

And those are the ones that are described

in Claim 1, which I labeled in my declaration as 1.E and 1.H, I believe.

Q So the second scan data is used to replace a portion of the first scan.

Is that right?

A Yes, that's basically -- I mean, I can read that to make sure that we use the same language as the '936 patent. It says? Replace at least a portion of the removed surface portion of the model using the received second scan data of the patient's teeth, including surface data of a physically changed portion of the patient's intraoral cavity," and then it says, Output that model, which is what I called the composite model on the display.

Q And the '936 patent describes that the user determinations whether a portion of the initial model is undesired or unacceptable.

Correct?

MR. ARGENTI: Objection.

A I did not see that, no. I don't think the '936 patent talks about undesirability. Or

what was the other words, I'm sorry, you used?

Q Not acceptable.

A Not acceptable. I didn't -- I don't see that.

It says, Remove from the displayed model, a removed surface portion of the model to be removed according to the user input. Prior to that it says, Receive user input defining a portion of the model to be removed.

It doesn't say whether it's desirable, undesirable. Or it doesn't say -- it doesn't -- it doesn't say that. It says the user defines -- here it says, Receive user input defining a portion of the model to be removed.

Q But what is the reason for the user to define a portion to be removed?

MR. ARGENTI: Objection. Form.

A I mean, the claim is not saying what is the reason, other than saying that, yes, so there might have been some physical change. Which again, I mentioned earlier I used a mapping that was done by Dr. Karam in her declaration saying

that she mapped it, she mapped the physical change to additional surface preparation of the tooth.

Q You reviewed the '936 patent in its entirety when forming your opinions. Correct?

A Correct.

Q And you understand the disclosures of this '936 patent. Correct?

A Correct.

Q In reviewing the '936 patent, what does it describe as the reason for a user to identify a portion to be removed?

A Well, I just -- I think I just answered that question. It's already in Claim 1.

It says that -- Claim 1 describes what is called the removed surface. It says, Remove from displayed model the removed surface portion of the model to be removed according to the user input.

Q Claim 1 -- sorry. Go ahead.

A I'm sorry. Let me finish. It says And -- and as I said, '936 patent, it says that that removed surface is a physically changed tooth in the intraoral scan.

And going back again, I said that I adopted the mapping that was provided by Dr. Karam saying that that's when additional surface preparation is taken place on a tooth.

So those are the reasons, basically; some physical change which is, according to Dr. Karam, is additional surface preparation, and in that situation '936 patent is teaching us that the user input defines that portion. That portion is removed from that part of the scan, is replaced by data from the new scan, and then composite model is produced.

Q Yeah. So Claim 1, that doesn't say why a user removed the portion of the initial model.

Correct?

MR. ARGENTI: Objection. Form.

A I'm sorry, I -- can you paraphrase your question? I'm not sure if I understand your question.

Q Claim 1 does not expressly state why the user removed a portion of the initial model.

Correct?

A Well, no. That's incorrect. That says it is removed surface. And it describes removed surface, the '936 patent, as a physical change. And again, as I said, so I use the mapping that Dr. Karam provided to say what is a physical change. And Dr. Karam said that is additional surface preparation on tooth.

Q Sure. Let's focus on the teachings of the '936 patent itself, which you have reviewed in its entirety.

What does the patent teach the -- sorry. Scratch that.

What reasons does the patent teach that a user needs to remove a portion of the model?

MR. ARGENTI: Objection. Form. Scope.

A Can you tell me where I opine on that in my declaration? I mean, I can -- I can go through my declaration and answer your question based on that.

Can you tell me where in my declaration I discuss that?

Q So let's look at the '936 patent itself

that you have reviewed. The patent teaches that a user determines whether a portion of the model needs to be removed. Correct?

A Portion of the model to be removed, yes, that is correct. A user defines a portion of the model that needs to be removed.

Q And the patent teaches that the user determines that an undesired portion of the model needs to be removed. Correct?

MR. ARGENTI: Objection. Form.

A Incorrect. Patent never talks about desirability or undesirability. Patent says that if a surface has been physically changed, then a second scan is taken. Again, referring back to Dr. Karam's mapping. Right? Physical change, I also used the mapping that provided -- was provided by Dr. Karam. In other words, additional surface preparation of the tooth.

'936 patent is saying that, therefore, that if additional surface preparation is taking place on the tooth, then that portion is identified by the user and is removed, and

replaced by scan from a second scan to create a composite model.

So the patent doesn't talk about what is desirable or undesirable or anything along that line.

Q So the user's identification happens before the physical modification. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I don't think I opined on whether it's done before or after. That is not what is part of the teaching of -- of the '936 patent.

So the '936 patent doesn't say do it before change or after change, physical change; it says that user identifies a portion that needs to be replaced.

Q So reading the '936 patent as a whole, do you have an opinion on whether the user performs the identification before the physical change?

MR. ARGENTI: Object to form. Scope.

A I did not opine on that in my declaration. And it would not affect in any way also my opinion whether it's done before or after.

That's not the central to my -- the point I'm making by pointing out the Limitations 1.E and 1.H. I'm saying that this is -- this is how '936 patent is teaching us in case -- in the case of additional surface preparation what to do, which departs substantially from conventional approach that was saying supplement the scan or take a completely new scan.

Q So you have no opinion on whether the claims require the user identification before the physical change?

MR. ARGENTI: Objection. Form.

A Well, I just repeat my answer.

I did not opine on that. And that does not affect in any way what I said -- I can just repeat. What -- that does not affect what the teaching says in the '936 patent, which shows how that teaching is different from conventional approach at the time of the patent.

Q So are you saying you don't have an answer for it, or you have opinion but you don't want to provide opinion today?

MR. ARGENTI: Objection. Form.

A Neither/nor. It's just that I did not opine on that, whether it's done before or after a physical change. But I -- I'm saying that it wouldn't matter, because it's a departure from conventional approach. The time is not an issue here, at what point the user defines a portion that needs to be removed.

But that being said, maybe, you know, it's more logical to assume that based on the sequences that describes that the -- the user after physical change -- because it says, "After additional surface preparation."

So after the additional surface preparation, the user may be saying that, Hey, remove this portion of the first scan and replace it with additional scan that is taken from that region to create a composite model.

Q So you said the '936 patent does not describe why a user would define a portion to be removed. Correct?

A Incorrect. I actually said the '936

patent is saying that if additional surface preparation is done on a tooth, then that portion is identified by the user and scanned again that area, and is -- that's the reason. Additional surface preparation is the reason.

And then a composite model is produced from initial scan, and the additional scan of that area that has been done in the second scan.

Q So in your opinion, the user performs the physical change, and then the user identified a portion where the physical change happened in the initial model.

Is that correct?

MR. ARGENTI: Objection. Form. Scope.

A No. That's incorrect. I never said who the user is. I'm just saying that what the teaching is.

I mean, the physical change may be taking place what -- I mean happening by one person, like the dentist, who is, you know, expert in that area, where, I don't know -- that surface preparation, of course, additional surface

preparation.

But what '936 patent is describing is, you know, that process of additional surface preparation, then go -- then initiates this -- these steps of 1.E and 1.H that I describe that the user identifies or somebody identifies, you identify.

It says -- the teaching says that you identify that -- I can read the exact sentence to make sure is that -- I mean, from Claim 1.E. So it says, receive user -- yeah. It says, user. "Receive user input defining a portion of the model to be removed." So it uses the word "user."

Now, who the -- I never said that user is the person who actually performs that additional surface preparation. And neither does the '936 patent.

Q So in your view, a physical change is performed on the tooth, and then the user identified a portion to be removed in initial model. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I didn't opine on that. As I said in -- in the -- in the timing, you know, I -- if you are talking about timing. But it's -- it seems like a logical order that additional surface, according to the Claim 1, additional surface preparation is taken, and the user input defines an area therefore that needs to be removed and replaced by additional scans to create the composite model.

Q Can you look at Claim 17 in Column 32, Line 30 to Line 40?

A Yes. Do you want me to read that for you?

Q That's okay. I would like to point to Line 32. Sorry, Line 30. It says, "Receive user input defining a portion of the model to be removed."

Do you see it?

A Yes.

Q And the next element says, "After receiving the user input, remove from the displayed model a removed surface portion of the model to be removed according to the user input."

Correct?

A Correct.

Q The next element states, "After removing the portion of the model, receive second scan data of the patient's teeth from the handheld intraoral scanner."

Correct?

A Correct.

Q Does the second scan data here include a portion of the physically changed portion of the tooth?

MR. ARGENTI: Objection. Form. Scope.

A The second scan data is of the regions that have -- where -- areas where additional surface preparation has taken place.

Q And you said a couple moments ago that the patent never talks about the desirability or undesirability. Correct?

A I don't recall patent talking about desirability or undesirability, no.

Q And does the patent talk about a portion of the model not acceptable?

MR. ARGENTI: Objection. Form.

A I just read in Independent Claim 1 what patent says. It says that "Remove from the displayed model, a removed surface portion of the model to be removed according to the user input."

That's -- that's -- and that area is identified in the -- as it was -- it reads in the previous line, by the user.

It does not talk about -- it doesn't characterize, other than saying that some change, physical change, has happened on that tooth. It doesn't talk about desirability, undesirability, or -- I forgotten your next -- previous question -- I mean, your question, how you referred to that area.

It talks about that a change has taken place, and we rescanned that area and we create a composite model with the initial scan.

Q You have Exhibit 1001 in front of you. Right?

A Exhibit 1001? What is -- yeah. That's the patent. Yes. '936 patent.

Q And in every answer you have reviewed entirety of this patent. Correct?
A Correct.
Q And that includes the specification and the claims. Correct?
A Correct.
Q And you said the patent doesn't talk about the user identifying a portion as not desirable. Correct?
A I said I don't recall saying desirable or undesirable, no. I said that patent, based on my best recollection, patent says if physical change has happened there.
Can you show me where it says it's desirable and undesirable?
Q Sure.
Could you go to Column 20, Line 64 to Line 67.
A Yes, I'm there.
Q Here the patent states, "For example, this Part DVM1 of the first virtual model, VM1, may be considered by the user as not acceptable or

desirable and needing to be better defined for a particular dental procedure of interest."

Do you see it?

A Yes. Yeah, I remember that now.

Q So would you like to change your answer whether the patent describes the user identify a portion to be acceptable or not acceptable?

MR. ARGENTI: Objection. Form.

A I mean, based on the portion that you made me read, yes, it says the patent in the specification -- specification says the word acceptable or desirable. However, it still doesn't change my opinion in the sense that the user identifies the portion that is need to be replaced to create a composite model.

The departure from conventional approach is not the question. It's not based on the question of whether user thinks a portion is desirable or undesirable or acceptable or unacceptable. It's based on the fact that the conventional approach is not using this -- is not providing this teaching that you create a

composite model from two scans.

And I think that's nicely depicted on the front page, on Page 1 of the patent, where it shows that you have VM1, VM2 of a scan of a region that the user has identified to be replaced to create VM3, which is the composite model.

And that's actually a copy of Figure 6 of the patent.

Q So the user identifies a portion of the initial model to be removed and replaced. Correct?

A The user identifies a portion of the initial scan that needs to be removed. And that portion, as I said, is then, that area that portion of the intraoral cavities scanned, and the second scan and the first scan are composited as shown in Figure 6 of the patent to create the composite model.

Q The '936 patent teaches the user identifies that portion on initial model by marking that portion on the model. Correct?

A Correct. That's what I referred to as

Limitation 1.E in my declaration.

Q And if you look at the patent at Column 31, Line 44 to Line 46, that is Dependent Claim 10.

It says, "The method of Claim 9, further comprising marking an area on the displayed model associated with the user input."

Correct?

A "Associated with the received user input." Yes, correct.

Q And same column, Column 31, if you're looking at Lines 17 to 22 -- sorry, starting from Line 19, it says, "Mark on the displayed model, the user input defined portion, after receiving the user input and before removing the removed surface portion of the model."

Correct?

A Correct.

Q So the user marks the portion on the displayed model to be removed and replaced.

Correct?

MR. ARGENTI: Objection. Form. Scope.

A It says what it says. The -- it says "Mark on the displayed model, the user input defined portion, after receiving the user input and before removing the removed surface portion of the model."

Q Could you please look at Column 24, at Line 41 to Line 45.

A Yes, I'm there.

Q So the patent states -- "By 'marked' it meant that user may optionally interact with this area of the first image in the display, 33, so that a visual mark is included in the image to show and demarcate this area on the imagine that is on the display."

Correct?

A Correct.

Q So that marking also at the same time indicates the portion of the model to be retained.

Correct?

MR. ARGENTI: Objection. Form. Scope.

A It describes a portion of the model to be -- I mean, portion of the initial scan to be

removed. Which by extension I think you would -- say the remaining of it is the part that we retain.

Q Does the '936 patent talk about reasons why a portion of the model may be undesirable?

MR. ARGENTI: Objection. Form. Scope.

A Well, I did not opine on that in my declaration. I was responding to Dr. Karam. And Dr. Karam is -- was stating that when additional surface preparation is taken place, those are the portions that -- that she contended that the prior arts that were used in her grounds and combinations were making the claims of '936 patent obvious.

I was responding to -- I been responding to Dr. Karam regarding that. Dr. Karam says, is additional surface preparation.

Q Sure. I'm interested in your opinion, your understanding of the teaching of the '936 patent from the perspective of one of ordinary skill in the art.

And my question is, in your reading of

the '936 patent, does it describe reasons why a portion of the 3D model may be undesirable?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not form any opinion on that. I did not opine on that. And as I said, I have been responding -- I was responding to Dr. Karam's four grounds and combinations that she provided, where she maps the portion as for being the due to additional surface change, the portion of the intraoral scan as being the portion that has received additional surface change, or surface preparation, rather. Excuse me.

So I -- I used that mapping. I am responding to those four grounds that are used for challenging the '936 patent. And those grounds, Dr. Karam is talking about additional surface preparation.

Q So are you saying you don't have an answer to my question, that whether the '936 patent teaches reasons for a portion of a model to be undesirable?

MR. ARGENTI: Objection. Form. Scope.

A No, I did not say that. On the contrary. I said I do have an answer. And my answer is that I use Dr. Karam's mapping as, you know, defining that portion being the portion that additional surface preparation is taken.

Q Dr. Karam's mapping is looking at the Boerjes's reference. Correct?

A But she is using that as a grounds to challenge '936 patent. All those combinations and grounds, the four grounds, are to challenge the claims of '936 patent. So I am using that mapping in the '936 patent to describe how -- why '936 patent is different, because it actually departed from conventional approach.

Q So you don't have opinion on whether the '936 patent describes why a portion of a 3D model may be undesirable. Right?

MR. ARGENTI: Objection. Form.

A And as I said, I did not opine on that. And it's not that I don't have or I have an opinion; I did not opine on that. I -- again, I used Dr. Karam's mapping of what that region is as

a place where additional surface preparation is taken place. And I used that to respond to Dr. Karam.

Q If I ask you to opine on that today based on your perspective from an ordinary skill in the art, from -- sorry. If I ask you to opine on that today from the perspective of an ordinary skill in the art, do you have an opinion?

MR. ARGENTI: Objection. Form. Scope. Relevance.

A Well, in order to form an opinion on the fly like this about anything, you know, I cannot do that. I have to put it in context and have a look at it again, and may take days for me to review again to form an opinion. And I said that -- I mean, it doesn't mean that I do not have an opinion. But I reserve the right to have -- to, you know, develop an opinion on that in that sense.

But I'm not going to -- I'm not going to say, Here it is, my opinion on something that I have not considered in my declaration.

My declaration scope was limited to responding to Dr. Karam's declaration.

Q Earlier today you testified in forming your opinions in your declaration you have reviewed the '936 patent. Correct?

A Correct. But for responding to -- to Dr. Karam's opinions.

Q And in preparing for today's deposition, you also have reviewed the patent. Correct?

A Correct. I reviewed the patent. But again, with the scope of responding to Dr. Karam's opinions and the four grounds that she has produced and the combinations that she discusses.

Q So you don't have your independent opinion on what the patent teaches. Correct?

MR. ARGENTI: Objection. Form.

A Teaches on what? I'm mean, I -- I have opined on every combination and grounds that Dr. Karam has produced in order to challenge what the teachings of the '936 patent are. So I am responding to those challenges or grounds or -- or combinations that Dr. Karam is using. I see the

scope of my declaration to that.

Q So if today I ask you to opine on a particular teaching within the '936 patent itself, are you -- are you offering your opinion or not?

MR. ARGENTI: Objection. Form.

A I am not going to form an opinion unrelated to the scope and the -- that would be a new opinion. In the sense that, I mean, I -- my declaration is responding to Dr. Karam. And she produced four grounds, and the combinations that she produces. And I'm responding to that.

Now, if you ask me to talk about, you know, form an opinion on something about the '936 patent that Dr. Karam is not using anywhere in her grounds, I mean, that's -- you are asking me to on the fly to form a new opinion, and I will need context and look at it and details and look at other materials that I have considered in the previous response.

So it's not something that I can offer on the fly like this, to form a new opinion about something that is not part of the grounds or part

of the combinations that Dr. Karam has used.

Q Does the patent describe removing a part of the model -- removing a part of the model of the tooth that was covered with a foreign material?

MR. ARGENTI: Objection. Form. Scope.

A Again, I used Dr. Karam's mapping in forming my opinions, as I was responding to Dr. Karam.

And she said that the -- the portions that we are discussing to -- you know, the portion to do -- has either -- you know, has physical change or some errors due to scanning, she describes it that if there is a physical change, then is term -- she maps that to additional surface preparations that has been done on that tooth or in that region.

So I use that same mapping.

Q Could you look at Column 14, starting from Line -- starting from Line 55 to Line 67.

A I'm sorry. Column 14 of the patent?

Q Uh-huh.

A '936 patent?
Q Yes.
A Can you repeat the line numbers again, please.
Q Yeah. Starting Line 55 to Line 67.
A Yes.
Q Line 55 says, "A part VDMI of the virtual model is deleted or otherwise removed interactively on the screen by the user."
Correct?
A Yes.
Q And if you look at a couple of lines down below it says, "For example, this deleted part DVM1 of the model may not be acceptable and needs to be better defined."
Do you see it?
A Yes.
Q And a few lines down it says, "During the initial scan that resulted in the VM1, the corresponding part DRM1 of the physical dental surface was covered with saliva, blood, debris, or otherwise obscured by another element."

Do you see it?

A Yes.

Q So in your opinion, reading the past paragraph with me here today, does this teach that the user can identify a part of the model that is not acceptable?

MR. ARGENTI: Objection. Form. Scope.

A Yeah, I'm -- I'm not sure -- what I said earlier, I'm not sure what your question is, really. But what I said earlier I believe was that there -- when there is a physical change in the intraoral scan, then Dr. Karam maps that to additional surface preparation. I say that for that, a physical change performed, I -- I mapped that to what Dr. Karam said.

I did not say -- and I think at some point you asked me this question. I did not say that it's user is -- I mean, user is defining the portion that is to be removed and replaced from a second scan. And I did not say that what is that user. I did not describe what is that user-defined region, why that area is defined. I

said that in Dr. Karam's declaration the physical change is interpreted as additional surface preparation.

Q So you did not answer my question. Do you understand my question?

A Please paraphrase your question, then, if you think I did not understand your question. I think I did, and I answered the question. But go ahead, please, paraphrase your question.

Q In Column 14, Lines 55 to Line 67, the portion of the '936 patent we just looked at, does it describe that the user can identify a portion of the model that is not acceptable?

MR. ARGENTI: Objection. Form. Scope.

A The user identifies a portion of the model to be removed. And I am not in any one of those combinations considering whether what the user motivation is, challenge the combinations that Dr. Karam is using. But I'm not sure if I understand your question correctly.

You mean what is the motivation of user to -- to define a portion that needs to be

removed? What is the question? I'm not sure if I understand the question.

Q So you don't understand the question. I can ask it again.

Does this paragraph from Line 55 to Line 67, Column 14 of the '936 patent, does it describe that the user can identify interactively on the screen a portion of the model that is not acceptable?

A Well, let me read --

MR. ARGENTI: Objection. Form. Scope.

A Let me read that paragraph. It says, A part DVM1 of the virtual model is deleted or otherwise removed interactively on the screen by the user, resulting in modified first visual model VM1 prime.

D. For example, this deleted part of DVM1 of the model may not be acceptable and needs to be better defined for some dental procedure. The deleted part DVM1 may correspond, for example, to a part of the dental surface DRM1 that was not clearly defined in the first visual model DVM1 --

VM1, I'm sorry, because, for example, during the initial scan that resulted in VM1, the corresponding part DRM1 of the physical dental surface was covered with saliva, blood, debris or otherwise obscured by another element, such as, for example, part of the gums, cheek, tongue, dental instrument, et cetera.

So the patent is giving examples that why a portion might be unacceptable, and then user identifies. It says, For example this, For example that. These are examples that user may identify that data in that portion is unacceptable, and therefore define it as a portion to be removed.

Q Does the '936 patent describe any other examples?

MR. ARGENTI: Objection. Form. Scope.

A Again, I mean, it really -- I mean, it does not affect my opinion on what I referred to as conventional approach and this other approach the '936 patent describes.

One of the other examples, I gave you one

that Dr. Karam maps a physical change to a tooth as additional surface preparation. So that's one other example that is mapping that done by Dr. Karam, and I used it also.

Q In examples that you just read, that a tooth is obscured by saliva, blood, or debris, for example, the physical change, what would be the physical change?

MR. ARGENTI: Objection. Form. Scope.

A Well, actually, as I said, this is where I think -- this is where I said that I used the mapping done by Dr. Karam.

Dr. Karam says that a physical change is when additional surface preparation has been done on tooth. And this is where I use Dr. Karam's mapping for me when I -- as I said, for -- to respond to Dr. Karam, then I use that mapping. For physical change, that what I considered as the physical change.

Q The '936 patent describes different kinds of physical change. Correct?

MR. ARGENTI: Objection. Form. Scope.

Relevance.

A I mean, again, my responses was to Dr. Karam. And whether patents '936 is describing other physical changes or not, I did not respond to -- I was responding to Dr. Karam.

Dr. Karam says that a physical change is additional surface preparation. And I responded to that. Okay, that's the physical change.

Q So could you look at Column 32, Line 1 to 3 of the '936 patent.

A Can you repeat the line numbers, please?

Q Column 32, Line 1 to 3.

A One to three? Okay.

Q Here it says, "Wherein a portion of the finish line is obscured or distorted, and wherein the physical change results in the finish line not being obscured or distorted."

Correct?

A That's what it says.

Q And this is one example of a physical change described in the '936 patent. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Again, I'm going to repeat what I said earlier. I was responding to Dr. Karam in my declaration. And Dr. Karam says, The physical change is when additional surface preparation is done on a tooth.

And so I used that mapping in my response.

Q In the same column, Column 32, Line 10 to 12 it, says, "Wherein the physical change is a physical modification of the surface of the physical preparation of the patient."

Do you see that it?

A Yes.

Q And this is the physical change that you're saying is the additional surface preparation that Dr. Karam opined on. Correct?

A Yes.

MR. ARGENTI: Objection. Scope.

Q So this physical change in Claim 15 is not a physical change in Claim 14 that we just looked at. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I did not opine on that, whether this physical change is the same as that. I just -- this does not -- you know, I did not opine on this.

My declaration, again I was responding to Dr. Karam, to the four grounds and the combinations she produced. And she maps a physical change to additional surface preparation that is done on a tooth.

Q Claim 1 does not recite that a physical change is a physical modification of the surface of the physical preparation of the patient.

Correct?

A Did you say Claim 1?

Q Uh-huh.

A So do you want me to read through Claim 1? No. I mean, Claim 1, it says -- I'm going to go in the middle, because that's the part. "Receive user input defining a portion of the model to be removed."

It does not talk about physical change or acceptable or unacceptable or desirable. It just

says that -- Claim 1 does not talk about -- it talks about that there is a user input to defining that a portion needs to be removed and replaced to create a composite model.

Q So Claim 1 doesn't state what type of physical change it needs to be. Right?

MR. ARGENTI: Objection. Form. Scope.

A Again, Claim 1 says -- states what it says. But, again, I'll go back to, I'm responding to Dr. Karam. Dr. Karam says that a physical change is when additional surface preparation is taken, or -- or performed on a tooth. And in considering Claim 1, I -- I am not -- you know, in Claim 1 there is no mention that is it physical change or, as I said, acceptable or unacceptable. It says user input defining a portion of the model to be removed.

User defines that. It doesn't talk about physical change or acceptability or desirability or not.

Q So it doesn't specify what type of physical change is performed on a tooth. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Where -- again, I mean, I'm going to revert back to what I said.

I am responding to Dr. Karam. Dr. Karam says, Physical change is when additional surface preparation is taken, in her declaration. So I responded to that.

Q So do you think the claim covers the physical change that results in the finish line not being obscured, as we have right in the claim language?

A Which claim?

MR. ARGENTI: Objection. Scope.

A Claim 1?

Q Does Claim 1's physical change cover the change that results in the finish line not being obscured?

MR. ARGENTI: Objection. Form. Scope.

A Claim 1 does not talk about physical change. Claim 1 says that receive user input define -- defining a portion of the model to be removed.

Q So you say Claim 1 doesn't talk about physical change?

A I can read through Claim 1. It says, A system for scanning the patient's teeth for a dental procedure, the system comprising a handheld intraoral scanner; and a computer readable medium including instructions that when executed by a computer system, cause the computer system to: Receive first scan data of the patient's teeth from the handheld intraoral scanner; display, to a display, a model of the patient's teeth, wherein the model of the patient's teeth is based on the received first scan data of the patient's teeth; receive user input defining a portion of the model to be removed; remove, from the displayed model, a removed surface portion of the model to be removed according to the user input; receive second scan data of the patient's teeth from the handheld intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity; replace at least a portion of the removed surface portion of the

model using the received second scan data of the patient's teeth including surface data of a physically changed portion of the patient's intraoral cavity; and output to the display, the model of the patient's teeth with the portion of the removed surface portion replaced using the received second scan data.

So that's what Claim 1 is saying. It says that a physically changed portion is deleted and replaced by a second scan from a second scanner to create a composite model.

And again, I repeat, I used the mapping done by Dr. Karam said that that physical change is additional surface -- is done -- is due to additional surface preparation. That's -- that's how I opined in my declaration.

Q That's what Dr. Karam said?

A Dr. Karam maps physical change to additional surface preparation. And my -- I used that.

Q Claim 1, which you just have read, doesn't say the physical change is additional

surface preparation. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Yes. But I'm responding to Dr. Karam. And my -- so therefore I used -- I used her mapping.

Q Does the '936 patent describe a portion of the model may also be not acceptable due to a defect in the scanning process?

MR. ARGENTI: Objection. Form. Scope.

A Again, within Claim 1, it's talking about a physical change. And I used the mapping that was done by Dr. Karam that that physical change is due to additional surface preparation.

Q Could you look at Column 21, Lines 11 to 17.

A Yes.

Q The patent says here, For example, during the initial 3D data collection concept, for example via scanning, that resulted -- that resulted in the first virtual model VM1 being generated, the virtual Part DVM1 may be distorted or otherwise defective and does not properly

correspond to real Part DRM1.

Do you see that it?

A Yes.

Q And it continues to say, "For example, due to some defect in the actual scanning process."

Do you see it?

A Yes.

Q So the portion -- a portion of the model may be defective because of a defect in the scanning process. Correct?

MR. ARGENTI: Objection. Form. Scope.

A It says what it says. But reverting back to Claim 1, Claim 1, it says the physical change. And again, Dr. Karam maps that to additional surface preparation.

Q And if you look in the same column, Column 21, starting from Line 30 to Line 34.

A Yes.

Q It says, "Part DVM1 of the first virtual model VM1 is then deleted or otherwise removed or replaced interactively on the display 33 by the

user."

Correct?

A That's what it says.

Q So if a portion of the model is distorted or defective because of a defect in the scanning process, the user can delete or remove that portion on the display. Correct?

MR. ARGENTI: Objection. Form. Scope.

A It says what it says. But again, going back to Claim 1, Claim 1 is saying, physical change. And again, I repeat myself. Dr. Karam says, physical change that Claim 1 is referring to, she maps that to additional surface preparation. And I am responding to Dr. Karam in my opinion in my declaration.

Q Understood. Let's focus on this column, these two paragraphs that we looked at.

In this example of the '936 patent, reading what we have just looked at, does it describe that the user can delete a portion of the model that is defective because there is some defect in the scanning process?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on this in the sense that Claim 1 is saying a physical change. And again, I repeat my answer is the same, that physical change, Dr. Karam says that is additional surface preparation. I did not opine on other, you know, examples where the user may define an area that needs to be deleted and replaced.

Q As of now, today, do you agree that Boerjes -- sorry, the '936 patent describe an example that the user can remove a portion of the model when there is defect in the scanning process?

MR. ARGENTI: Objection. Form. Scope.

A Well, you're asking me to form an opinion on something that I did not consider in my response to Dr. Karam. So I'm -- I'm going to just repeat what I said. That reading Claim 1, it says, Physically changed portion of the patient's intraoral cavity. And Dr. Karam says that that physical change is due to additional surface preparation.

Q So you don't want to provide her understanding of the paragraphs that we just looked at. Correct?

MR. ARGENTI: Objection. Form.

A It's not that I do not want or want -- or I want; it's that I did not form an opinion on -- you know, my opinions were entirely to respond to Dr. Karam. I did not form an opinion beyond the scope of that.

Q If you look at the '936 patent itself, and example we just looked at, that describes that a user can remove a part of the first virtual model when the model is defective. Correct?

MR. ARGENTI: Objection. Form. Scope.

A It says what it says. I can read that part again. But Claim 1 says what it says, too. It says, Physically change portion of the patient's intraoral cavity. And Dr. Karam is challenging that that -- you know, Claim 1, and I am responding to that.

And Dr. Karam said that physically changed is when additional surface preparation is

taken place. So I did not opine on the Column 21, those lines that you mentioned, in my declaration, because I was responding to Dr. Karam.

Q Did you consider what -- did you consider that example in forming your opinion in the declaration?

MR. ARGENTI: Objection. Form.

A I considered the entire '936 patent. I mean, I reviewed, rather, the entire '936 patent. But again, I saw the scope of my declaration as responding to Dr. Karam.

Q So you're -- the scope of your declaration is limited to the particular example in Claim 1.

Is that correct?

MR. ARGENTI: Objection. Form.

A Well, I don't think we can call what is in Claim 1 an example. It doesn't say, "as an example." It says that -- I can read it again. Claim 1 says, Receive user input defining a portion of the model to be removed. Remove, from the displayed model, a removed surface portion of

the model to be removed according to the user input. Receive second scan data of the patient's teeth from the handheld intraoral scanner, the second scan data including surface data of the physically changed portion of the patient's intraoral cavity.

And then it goes on for the -- so, and Dr. Karam maps that physically changed portion again to additional surface preparation. And I'm responding to that.

So Claim 1 doesn't say this is an example. It says it's a physically changed portion.

Q So your opinions are limited to the context as covered by Claim 1, where there is a physical change. Correct?

A I -- again, my opinions are in response to Dr. Karam's opinions.

Q So you have no opinions beyond what you are responding to Dr. Karam's opinions?

A Well, again, I respond to Dr. Karam. Dr. Karam presents four grounds, and also

combinations in those four grounds, and I respond to them.

Q So anything Dr. Karam did not opine on, you don't have an opinion?

MR. ARGENTI: Objection. Form.

A I didn't say I have an opinion or I did not -- I do not have an opinion or -- I just said that I was -- I have been -- I have responded to Dr. Karam's opinions in terms of the four -- four grounds and combinations that she has produced.

Q So you don't want to provide your opinion beyond responses to Dr. Karam's opinion. Correct?

A I think I'm here to respond to Dr. Karam's opinions. I think I'm here to respond to that. So -- and I have done that in my declaration.

MR. ARGENTI: Are we coming up on a good point for a break?

MS. ZHANG: Yeah, that would be a great -- good point. Thank you.

(A recess was taken.)

BY MS. ZHANG:

Q Good afternoon.

Dr. Foroosh, I would like to go back to the '936 patent. And we were looking at Claim 1 of the '936 patent.

For your reference, that is Column 30, Line 24 to 50.

A Yes, I'm there.

Q And I'm interested in your understanding of the meaning of this claim. So --

A What is the question?

Q Yeah. Sorry. One second.

If the user provides input defining the whole model of the initial model to be removed, and then perform the second scan to replace the whole -- the entire first model, does Claim 1 cover that scenario?

MR. ARGENTI: Objection. Form. Scope.

A Well, I mean, you're creating a new scenario. Again, I have not opined on that.

But reading from the claim, it says, Receive user input defining a portion of the model to be removed. It doesn't say the whole model to

be removed.

The whole model to be removed for me means discard the model. Why would it say -- why removed? Once we remove the -- you know, everything in the model, we're just discarding the model then. That's -- I mean, that's plain and ordinary meaning of the words there, it would change. You're now modifying the claim, I think, because it says what it says. It says user -- receive user input defining a portion of the model to be removed.

Q So can the second scan data cover the entire dental subject matter included in initial model?

MR. ARGENTI: Objection. Form. Scope.

A Okay. Let's read. It says, Receive second scan data of the patient's teeth from the handheld intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity.

It doesn't say the second scan is the scan of the entire intraoral cavity. That's

not -- that's not what it says. Again, then you're -- if you put that there as -- as a possibility, then you are changing the claim.

Q So can a second scan data cover the same area as the first scan data?

MR. ARGENTI: Objection. Form. Scope.

A I did not opine on that. But I can say that those two lines, I read them again, receive user input defining a portion of the model to be removed. So that's -- you know, I mean, the POSITA's understanding would be that there's a portion that is removed and a portion -- and that's defined by the user.

And then it says, Receive second scan data of the patient's teeth from the handheld intraoral scanner, the second scan data including surface data of a physically changed portion of the patient's intraoral cavity.

It says what it says. It doesn't say, like I think you are implying in your questions, that remove -- identify and remove could be identify the entire scan and remove it. I mean,

that -- that's equivalent to discarding the scan.

And when it says, Take a second scan, again it says, take a second scan of -- or receive the second scan data of portion that has physically changed.

Q The claims --

A And --

Q Excuse me.

A And to continue on that, that matches, to my opinion, Figure 6, that shows that you have a scan of bigger area, and there you have a scan of a portion that is deleted and replaced, and you create a composite model out of these two.

Q Claim 1 doesn't say where the second scan data's boundaries are. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Although Claim 1 doesn't say that the boundaries -- yes, the answer to that question is yes, the Claim 1 doesn't say what the boundaries are. But Claim 1 says you scan that portion that has physically changed.

Q Right. So the second scan data includes

surface data of a physically changed portion.

Correct?

A Yes, it says -- the second scan data including surface data of a physically changed portion of the patient's intraoral cavity.

Q So it could be the patient's entire intraoral cavity. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I didn't opine on it could be entire intraoral cavity.

And I think it goes also against this nonconventional approach that the -- that the patent '936 is proposing, is that you update your initial scan with the portion that has changed, not -- if you're taking the whole scan, then that's -- I mean, it goes against the spirit of the patent, '936 patent, to my opinion.

But, I mean, whether -- does, you know, Claim 1 say, Here are the boundaries? No, it doesn't. But it does say that take scan of the portion that has physically changed.

Q So can you use a second scan data that

includes the entire intraoral cavity, but just to use a portion of it to replace a portion of the first model?

MR. ARGENTI: Objection. Form. Scope.

A I didn't opine on that. But I also do not see how that affects anything. You know, that does not change my opinion in my responses to any of the grounds.

Q Right. From a perspective of one of ordinary skill in the art, could you use a second scan data that includes the entire intraoral cavity to replace a portion of the first model?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on that. I was responding to Dr. Karam's opinions and grounds. And in the grounds and combinations that she produces, that's not even part of the grounds. None of those prior arts and combinations are discussing this. So I did not opine on this.

Q Right. As an expert, in forming your own independent opinion, do you think, would it be possible to use a second scan data that includes

entire intraoral cavity to replace a portion of the first model?

MR. ARGENTI: Objection. Form. Scope.

A Again, you want me to form an opinion on the fly here on something that is not part of any of the grounds. So I have to spend time, think about it. It doesn't mean that I don't have an opinion or cannot form an opinion; it just -- you know, it's not part of any of the grounds that taken entire whole scan and replace, update the portion that is removed by just a portion that is in -- I mean, I did not opine on this.

Because none of the prior arts is discussing this. None of the prior arts -- and by "prior arts" I mean Boerjes -- I call them by name, sorry -- Boerjes, Geng, and Babayoff are discussing such scenario. So I did not form an opinion on that.

Q Right. You did not form an opinion. But as of today, can you explain your understanding whether the second scan data can include the entire intraoral cavity, including a physically

changed portion?

MR. ARGENTI: Counsel, the rules governing this proceeding limit your cross-examination to the scope of his opinions in his declaration. He's told you repeatedly about the scope of his opinions in his declaration, which were, in turn, responding to Dr. Karam's declaration. So all of your questions are out of line and in violation of the rules here.

MS. ZHANG: Is that an objection?

MR. ARGENTI: Oh, you bet it is, yes.

Q Dr. Foroosh, do you understand my question?

A Can you repeat your question.

Q Sure. Today do you have an opinion on whether the second scan data can include the entire intraoral cavity, including a physically changed portion?

MR. ARGENTI: Objection. Form. Scope.

A So my answer remains the same, is that none of the grounds and combinations that are offered and produced by Dr. Karam is discussing

this, so I did not form an opinion on this.

I did not discuss this in response to Dr. Karam because Dr. Karam's combinations and -- and the grounds she produce do not discuss a scenario like this. And none of those prior arts is considering a scenario like this.

Q Based on the plain and ordinary meaning of the claim language, do you think the second scan data can include the entire intraoral cavity, including a physically changed portion?

MR. ARGENTI: Objection. Form. Scope.

A My answer remains the same. I did not form an opinion based on a POSITA -- POSA's understanding regarding that scenario that you are describing, because that scenario is not part of any of the grounds or combinations, part of the prior arts that are used in those grounds and combinations.

Q We're looking at the meaning of the claim here, the meaning that whether the meaning of the claim limitation reciting the second scan data, including a physically changed portion.

And we're interested in your opinion from the perspective of a person of ordinary skill in the art whether that limitation covers the scenario where the second scan data covers the entire intraoral cavity, including a physically changed portion.

A I think this question is just repeating, and I responded to that.

The scenario that you're describing is not described by any of the three prior arts, in other words, Boerjes, Geng, and Babayoff, and is not part of any of the grounds that Dr. Karam has produced based on these prior arts. So I do not -- I did not have any opinion on that, or I did not opine on that on this scenario, hypothetical scenario, that is not part of the -- any of the grounds.

This is a hypothetical scenario, and you want me to express an opinion on the fly. It's a hypothetical scenario. It's not part of any of the prior arts.

MR. ARGENTI: I'm also going to add

objection to form and scope. I didn't get it in because I didn't think there was a question pending.

Q Dr. Foroosh, can you look at your declaration at Paragraph 42. This is on Page 20.

A Paragraph 42?

Q Yes.

A Yes, I'm there.

Q So here you stated that, "I have been advised that the claim terms in '936 patent are to be given their plain and ordinary meaning; i.e., the meaning that the terms would have to a POSITA at the time of the invention."

Correct?

A Correct.

Q And in the next paragraph you said, "I understand that this analysis focuses on intrinsic evidence, including how the claim term is used in the claims, specification, and prosecution history."

Correct?

A Yes.

Q And you said, "I also understand that dictionaries or other intrinsic sources may assist in determining the plain and ordinary meaning that cannot override a meaning that is ambiguous from the intrinsic evidence."

Correct?

A Correct.

Q So based on these principles, when you look at a claim limitation "second scan data," in your opinion, does it cover the scenario where the second scan data include the entire intraoral cavity, including a physically changed portion?

MR. ARGENTI: Objection. Form. Scope.

A So again, you -- it's the same question. I mean, earlier you asked me what would be a POSITA's point of view on this. But -- and you're reading through my declaration that I say that I -- I basically considered everything from point of a POSITA at the priority date of July 19, 2010, it's still the same question. It's a hypothetical scenario where the second scan is the entire intraoral cavity scan.

And as I said, that is not part of the grounds that Dr. Karam is using.

Q Is that your answer to my question?

MR. ARGENTI: Objection. Form.

A Well, my answer is that I did not opine on that because that hypothetical scenario is not part of any of the grounds that Dr. Karam has produced.

Q I have handed you an exhibit in the chat box. This is Exhibit 1004.

(Exhibit 1004, previously marked, not attached.)

Q Please let me know if you see it.

A So that's Boerjes. Is that right?

Q Correct.

A I have that, a clean copy of that, in front of me.

Q You recognize this document as the Boerjes reference. Correct?

A Correct.

Q And you have reviewed the Boerjes reference in preparing your declaration. Correct?

A Correct.
Q And you have reviewed this Boerjes reference in its entirety. Correct?
A Correct.
Q And you understand what this reference discloses. Correct?
A Correct.
Q Boerjes discloses an intraoral scanner system. Correct?
A Yes, correct.
Q How does Boerjes's intraoral scanner perform scanning?
MR. ARGENTI: Objection. Form.
A What do you mean, "how does it perform scanning"? I'm not sure if I understand your question.
Q Based on your reading of this reference in its entirety, how does Boerjes' intraoral scanner work?
MR. ARGENTI: Objection. Form.
A You mean how it is operated? I mean, I'm not -- I do not understand your question. You

mean how it is operated?

Q How does Boerjes' intraoral scanner obtain scan data?

A Well, it is an intraoral scanner, so the doctor or whoever is doing, performing the scanning, takes scans of intraoral cavity. And that scan Boerjes says is saved on a computer.

Again, I'm -- again, I'm confused. You mean how it is operated? I'm not sure what you mean, how is the scan is done.

Q How does the intraoral scanner obtain scan data of the intraoral cavity?

MR. ARGENTI: Objection. Form.

A Can you repeat your question?

Q How does the intraoral scanner in Boerjes obtain scan data of the intraoral cavity?

MR. ARGENTI: Objection. Form.

A You mean what method it uses, what technology it uses internally, or you mean how it is operated by the doctor in order to take the scans?

Again, I mean, your question is not clear

to me. You are -- you mean how -- what is the technology behind it, or you mean how it is operated in order to get the scans?

Q Yeah, can you explain how it is operated by user in order to take the scan?

A I mean, intraoral scanners do have a handheld scanning unit that the doctor moves in the mouth, and the data is collected and stored on the computer. That's what Boerjes is describing. And that's the scanning process.

Q So the scanning process involves the scanner moving throughout the intraoral cavity.

Correct?

A The person who is scanning moves it. The scanner doesn't move on its own; but the person that is scanning the intraoral cavity moves it around to scan parts of the portions of the cavity that he or she wants to scan.

Q So if the user wants to scan multiple teeth, the scanner is moved across portions of each of the tooth. Correct?

MR. ARGENTI: Objection. Form.

A If the user decide to scan multiple teeth, then he or she would move the handheld unit inside the mouth to point at those teeth to acquire data, the 3D scanning data from those teeth.

Q So as the scanner is moved by the user, the scanner incrementally scans portions of each tooth. Correct?

MR. ARGENTI: Objection. Form.

A It's -- I mean, it is part of the same scan. It produces one scan data. But, yes, I mean, incrementally would update for, shall I say -- incrementally would acquire, rather, more scanning points.

Q And the data obtained at the incrementally scanning points are combined together to form scan. Right?

MR. ARGENTI: Objection. Form.

A One single scan.

Q And that is a 3D scan. Right?

A That would be one scan, yes.

I mean, so the technology, let's say it's

based on images. It would take many images, and collection of all those images would create one scan. Which, for instance, in the language of '936 patent, for instance, it would be the initial scan. Or if it's in another visit, then it would be a second scan.

Q So those images are captured incrementally and used to form a 3D scan.

Correct?

MR. ARGENTI: Objection. Form.

A As the -- as the -- as the operator or user moves the hand, or points to different parts or different portions of the intraoral cavity, additional data is collected in that visit. And at the end of that visit, all of that forms one single scan data.

Q And those images of different portions of the intraoral cavity are combined together to form the 3D scan. Correct?

A I wouldn't call it combined together to form a 3D scan. I would say that those images collectively provide the data to -- to form one

scan of the intraoral cavity, one 3D scan of the intraoral cavity.

In other words, the output of the -- of the scanner is what is typically referred to as a point cloud. It produces a single point cloud, which is one scan.

Q So that one scan does not occur all at once. Correct?

MR. ARGENTI: Objection. Form.

A What do you mean, "all at once"? I'm not sure what you mean by -- what do you mean by, "at once"?

Q The data you used to obtain the single scan is not obtained all at once. Correct?

MR. ARGENTI: Objection. Form.

A I still don't understand your description of "at once." What do you mean, "at once"? It's one -- I call it one visit earlier. Means that the -- the doctor, let's say doctor who is scanning, doctor moves the scanner inside the intraoral cavity and collects the data in that visit, that forms one scan data, one scan. Which,

you know, again, in the language of saying, for instance, the initial scan would be -- for instance, one scan data collected in that way.

Q So if the user wants to scan both the top teeth and the bottom teeth, does the user need to scan them separately?

A I mean, the user could potentially scan in one visit, yes. I mean, no, I mean, doesn't have to be done separately. It could be part of one visit.

Q And during that one visit, if the user wants to scan the top teeth and the bottom teeth, how does the user proceed with moving the scanner in the intraoral cavity?

MR. ARGENTI: Objection. Form.

A Well, I'm not an expert -- I'm not -- I have not performed scanning of intraoral scans. I'm not a doctor. But, you know, as -- a POSITA's understanding would be in that same visit you scan both jaws, the upper jaw and lower jaw. So that would be one scan, then it would end up being one scan.

Q In your opinion, if the user need to scan both the top teeth and the bottom teeth, the user only need to do one scan.

Is that right?

MR. ARGENTI: Objection. Form.

A I didn't provide an opinion on that, no. You asked me, you know, is it possible. I mean, I -- I'm not an expert in that area, but I can imagine it's possible to move around and do -- do it -- do scan both jaws in one scan.

But I did not offer an opinion on that in my declaration.

Q Based on your understanding of how an intraoral scanner works, doesn't a user have to scan the top teeth and then move onto the bottom teeth to get a scan of both the top and the bottom teeth?

A I -- I did not opine on that. I mean, I -- I did not express any opinion in my declaration on that.

And again, it's not part of any of the grounds, so I didn't express any opinion on that.

Q Can you answer this technical question of how the scan can be performed if the user wants to scan both the top teeth and the bottom teeth?

MR. ARGENTI: Objection. Form.

A Well, again, as I said, it could be scanned potentially in one visit or, I don't know, maybe if scanned in multiple visits. But it still doesn't relate to any of the grounds. It really doesn't affect any one of my opinions on any of the grounds, because it's unrelated.

That's not -- I mean, none of the prior arts are discussing this scenario that scan the bottom jaw, scan the upper jaw. And it's -- I did not express any opinion on that.

Q So you said you could do it in one visit. During that one visit, how do you scan the top teeth and the bottom teeth?

MR. ARGENTI: Objection. Form.

A Again, I did not have any opinion on that. So scanning top teeth and bottom teeth in one visit, I did not, you know, describe this hypothetical scenario and offer an opinion on

that.

Q So today, based on your reading of the prior art and the '936 patent, if a user wants to get a scan of the top teeth and the bottom teeth, does the user scan them separately or perform one scan?

MR. ARGENTI: Objection. Form.

A Can you show me where, which prior art is discussing this scenario?

Q This is asking you in general, based on your understanding of how the intraoral scanner works in Boerjes.

A But you said based on my understanding of the prior art, so that's why I said, you know, can you show me where, which one of the prior arts is discussing this scenario.

Q I can point you to that. But can you answer my question, if that is clear to you?

MR. ARGENTI: Objection. Form.

A Again, I did not form an opinion on this in my declaration. But tell me which prior art is discussing this.

Q So can an intraoral scanner obtain a model of the entire intraoral cavity?

A Yes, I mean. The scanner may be able to obtain the 3D scan of the intraoral cavity.

Q The intraoral cavity has top teeth and bottom teeth. Correct?

A Correct.

Q If you wanted to obtain a 3D scan of the intraoral cavity, do you scan the top teeth and the bottom teeth separately?

MR. ARGENTI: Object to form.

A I don't know. You may. I mean, again, I do not see how this affects my opinion on any of the grounds that have been put forward by Dr. Karam.

Q Can you scan the top teeth and then move onto the bottom teeth to obtain a 3D scan of the intraoral cavity?

A As I said, I can imagine, Why not? I mean, it's a handheld device. You scan the top, and then you move on, you scan the bottom teeth. But whether that's how you do it or not -- I mean,

this is not something that I considered and offered an opinion on because it's not part of any of the grounds or combinations that Dr. Karam has produced.

Q Boerjes teaches using the intraoral scanner to obtain a 3D model of one or more teeth.

Correct?

A Yes.

Q So if a user wants to obtain a model of multiple teeth, the user would move the scanner from one teeth to the next one. Correct?

A Again, I did not form an opinion on that. I'm -- I've never performed -- I told you I'm not a dentist, I'm not an orthodontist. I've never operated a scanner, how and -- you know, the doctors move their hand from one teeth to the over, to the next teeth. And I did not offer an opinion on that.

Q So you don't have an understanding of how an intraoral scanner like the one Boerjes performed the scan to obtain its 3D model.

Correct?

MR. ARGENTI: Objection. Form.

A That's not what I said. I didn't say I don't have an understanding; I said I did not offer an opinion on that.

Q So in Boerjes you just said, It teaches obtaining a 3D model of multiple teeth. Correct?

A Yes.

Q And the scanner is moved incrementally from portions one teeth to another to collect data performing the scan. Correct?

MR. ARGENTI: Objection. Form.

A So, yes, I mean, that might be -- I mean, Boerjes is not saying that this is how you should operate this, the scanner. You're talking about operational.

Yes, you incrementally collect in one visit more and more 3D data. And collectively all those 3D point clouds form one 3D scan.

Q Could you turn to Paragraph 144 of Boerjes. This is in Page 37 of Boerjes.

A Yes.

Q In Line 5 Boerjes says, "The

three-dimensional data for each newly acquired two-dimensional image set may be derived and fitted or stitched to existing three-dimensional data using a number of different techniques."

Correct?

A I'm lost. Which line did you start from?

Q Start from Line 5 of Paragraph 144.

A I mean, so -- I mean, which line of -- I mean, they divided as not line of paragraph. It divides it as line in that page. So Paragraph 144, which line on that page? Because it says ten, for instance, is the third line is ten from -- in that paragraph.

Q Okay. Can you start looking at Line 12 of this page?

A Yes.

Q It says, "The three-dimensional data for each newly acquired two-dimensional image set may be derived and fitted or stitched to existing three-dimensional data using a number of different techniques."

Right?

A Yes.

Q So when you obtain the incremental scan data, you would fit them into an existing three-dimensional data, or stitch them to an existing three-dimensional data. Correct?

A This is still part of the same scan, that scanning visit. So this is talking about the actual imaging technology that is used, or the technology that is used in that scanner.

So you get -- incrementally you get more images, and each image adds new data. And collectively at the end of that visit, that becomes one 3D scan.

Q So incrementally that new data, the two-dimensional image set, are fitted or stitched into existing three-dimensional data to obtain the final 3D scan. Correct?

MR. ARGENTI: Objection. Form.

A Again, it's part of the same scan data. It's talking about the technology that is used, the technique that is used. So each image gives additional data, and incrementally you get more

images as the doctor moves, scanning more teeth, and collectively produces one 3D scan data.

Q And Boerjes says here you can use fitting or stitching to produce that one 3D scan.

Correct?

A It's talking about fitting and stitching in the context of one scan how it is obtained.

Q When you say "one scan," that's the 3D model. Correct?

A That's, you know -- what I mean by that is, I'm connecting with the language of the '936 patent. Like, referring to initial scan or a second scan. I'm using that. So all those stitching and fitting leads to one scan. You know, like, for instance, the initial scan.

Q Right. But Boerjes's terminology is "existing three-dimensional data." Correct?

A Yes. It's data is a three-dimensional data, is what we try and refer to as point cloud.

So as -- it's saying that as additional images are collected, additional point cloud data is put within that 3D scan data to form the final

3D scan of the intraoral cavity.

Q And that final 3D scan is a 3D model of that intraoral cavity. Correct?

A I don't know whether you want to call it 3D model is the -- that corresponds to one scan of the -- of the intraoral cavity. That forms the -- collectively they form one scan.

So this is talking about, again, within the same visit, this is incrementally more data is collected. This stitching or fitting has nothing to do with taking two separate scans and -- and creating a model out of those two.

This is talking about the same scanning visit.

Q The stitching or fitting performed on a two-dimensional image data. Correct?

A I think that would be scanner-dependent. I disagree with that. That would be scanner-dependent.

There are scanners that do not depend on imaging.

Q And Boerjes says you can fit or stitch

three-dimensional data derived from the incrementally acquired two-dimensional image set.

Correct?

A It says what it says. For -- let me read that again.

Three-dimensional. Okay. It says that three-dimensional data for each newly acquired two-dimensional image set may be derived and fitted to stitch -- to stitched to existing three-dimensional data using a number of different techniques. I'm sorry, or stitched, not "to stitched"; "or stitched."

Q So you mentioned that during a single visit you obtain a scan. And does that mean you only obtain one model of whatever you scanned in that single visit?

A What I mean by that is that each scanning visit, or each scanning process that the doctor performs, data is collected, and that forms one scan data.

Q So if a patient -- if the patient only needs the top teeth to be scanned, the user would

only need to scan the top teeth. Correct?

A I never opined on that. But if the doctor decides to scan only the top teeth, then the doctor would scan only the top teeth. But I never opined on that.

Q If the doctor only scanned the top teeth, the doctor would get a model of the top teeth.

Correct?

A Yes. You would get the model of the teeth that you have scanned.

Q If the doctor decide after obtaining the first model, the doctor was to obtain a model of the bottom team, the doctor would need to do another scan. Correct?

A Sure. If the doctor decides that needs also for the treatment to scan the bottom teeth, then the doctor would in a -- in a second scanning visit, would scan the bottom teeth.

Q So the doctor can decide to obtain two models during a single visit of a patient.

Correct?

A What do you mean -- by "visit" I meant

the operation of -- of the device, of the scanning device.

So, in other words, asking the patient to open the mouth so that intraoral cavity can be accessible in one scanning visit; in other words, one process of scanning the intraoral cavity. Once you stop that scanning process, that incremental scanning that you were mentioning, once you stop that, all of that data that you have collected becomes one scan, one 3D scan of the patient.

Q And if the doctor repeat the process you just said, the doctor get another 3D scan of the patient. Correct?

A That is correct, yes.

Q And can the two 3D scans be combined to form one 3D scan?

A That's what the patent is teaching us, and that's where the departure is in between prior arts that Dr. Karam introduced and what patent is saying. Patent is saying that take a first scan and remove a portion of that first scan, which is

identified by the user, and replace that with a second scan.

And that second scan just means what visit I use is the second scan performed by the doctor of the portion that had physical change. And it says that create a composite model out of these two. And then Figure 6 of the patent is actually demonstrating that, how it is done.

That's where the distinction is, with all the prior arts, including Boerjes that we are looking at right now, is that that's not what Boerjes is teaching.

In this Paragraph 144 that you were asking me to read, it's talking about one scan. You know, that, you know, like let's say that initial scan or the second scan as -- I mean, the language of the patent, these are -- each of them is a -- that paragraph is describing how the scanner is operated to create one scan of the -- one 3D scan of the intraoral cavity of the patient.

Q Boerjes teaches a quality-control process

for evaluating the 3D model. Correct?

A Boerjes I think discusses three quality-control cases; manual, automated, and remote.

Q The quality-control process allows the user to use a mark-up to evaluate the 3D model. Correct?

A Can you tell me where you're reading this from so we can be on the same page?

Q Yeah. Could you turn to Paragraph 57 of your declaration. This is on Page 26 of your declaration.

A Yes.

Q Here you describe the mark-up tool that Boerjes teaches. Right?

A Can you -- I mean, did you say Paragraph 56 on my declaration?

Q Paragraph 57.

A Fifty-seven. Oh, I see. I'm sorry. Yeah. I can read through to -- it says, "Similarly Dr. Karam cites to Paragraph 192., but this paragraph only describes that the system may

include markup tools that a dentist may use to evaluate suitability for subsequent processing and the creation of the physical dental object, such as a restoration, not to identify a portion of the model to be replaced by the system."

I mean, it continues. I can continue reading it. What is the question?

Q So Boerjes teaches the user can use the markup tools to evaluate a 3D model. Correct?

A Yes.

Q And Boerjes in Paragraph 192 says, "The markup tools may be used to measure, mark, annotate, or otherwise manipulate a digital model."

Correct?

A I need to go to Paragraph 192.

Yes. And he continues saying that, To evaluate the suitability for subsequent processing and the creation of a physical dental object such as restoration, as I was citing in my -- in my declaration in Paragraph 57.

Q So when the user uses the markup tools to

evaluate the 3D model, the user can mark errors on the 3D model. Correct?

A Well, it says what it says. It doesn't say the word -- oh, I think, let me read it again. Paragraph 192. "Although not depicted in Figure 4, it will be appreciated that quality control may be semiautomated. Thus, for example, the user interface may provide a number interactive three-dimensional tool" such as a markup -- "such as markup tools that a dentist or other dental professional may use to measure, mark, annotate, or otherwise manipulate a digital model to evaluate suitability for subsequent processing and the creation of the physical dental object, such as a restoration."

It says it's a markup tool to evaluate suitability for subsequent processing and the creation of physical dental object, such as restoration.

Q So in Boerjes, the user determines -- in the manual quality control of Boerjes, the user determines whether the model is suitable.

Correct?

A It doesn't say "determine." It says to evaluate suitability for subsequent processing.

Q The user evaluates suitability of the model for subsequent processing. Correct?

A It doesn't even say that. It says, The markup tool is used to perform those operations to evaluate suitability for subsequent processing. It doesn't necessarily say the user evaluates.

Q In the manual quality control, what does the user do to evaluate the model?

MR. ARGENTI: Objection. Form.

A Can you point me to the paragraph where you're reading from?

Q Let's look at Paragraph 193. This is on Page 55 of Boerjes.

A Yes.

Q It says, "Quality control may include manual quality control."

Right?

A Yes.

Q And it gives examples. Correct?

Are you still reading this paragraph?

A Oh, I read it, yes. I was waiting for a question.

Q This paragraph gives an example of a dentist inspecting a scan. Correct?

A Yes. It says, As shown in Figure -- I'm sorry, in Step 408, quality control may include manual control. This describes the manual control and -- and how the -- that has been performed.

Q And if you look at the next paragraph, Paragraph 194.

A Yes.

Q Starting from Line 12.

A Yes.

Q Sorry. Line 13. It says, "The dental laboratory may request manual marking of a margin by a dentist where the margin is not visible on a prepared tooth surface."

Correct?

A Correct.

Q And it says, "The dental laboratory may also apply separate standards for data quality

(density, accuracy, surface continuity, feature detail, et cetera), and may request additional or new scan data consistent with its own specifications."

Right?

A Correct.

Q And towards the end of the paragraph 194 it says, "Feedback may be provided to a dentist, such as an identification of regions requiring further reduction."

Correct?

A Correct.

Q And if you look at the next paragraph, Paragraph 195, it says, "Quality control, whether automated or manual, whether local or remote, may include a variety of different dental evaluations."

Correct?

A Yes.

Q And then it gives examples of various evaluations. Correct?

A Yes.

Q And those are quality-control evaluations. Correct?

A I'm sorry, repeat? Can you repeat that question. Those are --

Q Those -- sorry. Yeah. I will repeat.

Those are quality-control evaluations.

Correct?

A Yes. Uh-huh, this is discussing quality control.

Q And if you move on to Paragraph 196, it says, "The feedback from a quality control step, whether automated or manual, and whether remote or local, may include various forms of feedback."

Correct?

A Correct.

Q And it gives examples of that feedback.

Correct?

A "For example, an evaluation may conclude with an identification of regions of a prepared tooth surface requiring additional preparation or reduction, or regions of a digital model requiring additional or supplemental scanning due to

incomplete, erroneous, or potentially erroneous data, which may be identified, for example, by comparison to models of expected shape for dentition, surface preparations, and the like."

So it gives -- it separates this into two possibilities here. So it says, May conclude with an identification of regions or prepared tooth surface requiring additional preparation or reduction -- so, basically additional surface preparation -- or regions of a digital model requiring additional or supplemental scanning due to incomplete. So it's -- it considers these two options.

So in the first case where the feedback may identify regions that need additional surface preparation, or another option is that regions of digital modeling requiring additional or supplemental scanning due to an incomplete, erroneous, or potentially erroneous data.

So, yeah, it considers these two scenarios that may occur.

Q So these scenarios are the reasons why a

model is not suitable for a subsequent purpose.

Correct?

A Yes, in the language of Boerjes, these are the two cases that Boerjes considers.

Q And when Boerjes gives these examples, it says whether automated or manual. Right?

A Yes.

Q So the user can identify these issues on a model manually. Correct?

A I did not get that question.

Q So we looked at different scenarios where the model is not suitable. And that, we looked at those scenarios applied to both manual and automatic quality control.

So in manual quality control, it is the user who decides whether the model have errors.

Correct?

A In manual quality control the user, yes, it -- it's deciding if you want to, yes. It is deciding whether the scan data is suitable or not, depending on one of those two scenarios that I read from Paragraph 196.

Q Right. So in manual quality control, the user identifies the regions of the prepared tooth surface that requires additional preparation.

Correct?

A Yes, in -- in manual quality control, the user identifies regions of digital model requiring additional or supplemental scanning due to incomplete, erroneous, or potentially erroneous data. Or in the first case, if the identification of regions of prepared tooth surface requiring additional preparation or reduction.

Q So what can cause errors in the model, after you read these paragraphs?

A As I said, or rather what Boerjes says, there are two cases. He says the Case Number 1 is that the regions of the prepared tooth surface requiring additional preparation or reduction. So additional surface preparation is needed in this case. The feedback is telling the dentist, We need additional surface preparation.

And the second scenario is that regions of digital model itself requiring additional or

supplemental scanning due to incomplete -- I mean, it spells it out what could be that -- incomplete, erroneous, or potentially erroneous data.

Q And Paragraph 196 at Line 9 of this page says, "Which may be identified, for example, by comparison to models of expected shape for dentition, surface preparations, and the like."

Right?

A Right.

Q So if the model does not reflect the expected shape for the dentition, the user could identify that portion of the model that's not following the expected shape. Correct?

MR. ARGENTI: Objection.

A Well, I mean, it doesn't talk about portion of the model. It says that the -- a number of issues could have caused, that is that in the second scenario, "that regions of the digital model requiring additional or supplemental scanning due to incomplete, erroneous, or potentially erroneous data, which may be identified, for example, by comparison to models

of expected shape for dentition, surface preparation, and the like."

So it described what kind of issues may trigger that; in other words, erroneous -- I mean, erroneous, or potentially erroneous data. So those are the causes. And it says that on this quality control. It says, Okay, by comparison, for example, with models of expected shape or dentition, surface preparation, and the like.

So in the second -- the latter half of -- the latter part of that sentence it is saying that, for example, it can be done in this way, that quality control identification of those two scenarios.

Q So what can cause -- what can cause the erroneous or potentially erroneous data?

A Can be done by a number of things. I don't know. It could be that the patient moved, the scanner moved too fast. I mean, Boerjes doesn't say there in that paragraph what causes that. He says that could be incomplete, erroneous, or potentially erroneous data. So

that's Case Number 2.

Case Number 1, of course, that quality control has identified that additional surface preparation is needed.

Q If the scanning -- during a scan the lighting is insufficient, could that cause erroneous data?

MR. ARGENTI: Objection. Form.

A I mean, I don't think I opined on lighting, how lighting conditions affect the scanning process.

But I believe most scanners have their own lighting also. But again, I don't want to offer an opinion on that. But I -- I don't know. I mean, it's not discussing here what is causing that. And I don't want to speculate on that, definitely not.

So it says what it says. It says "incomplete, erroneous, or potentially erroneous data." It doesn't say what caused that. It says that the -- the quality control step basically would detect those scenarios and provide the

feedback.

Q So from an imaging perspective, based on your expertise, what could cause the erroneous data or potentially erroneous data in this example?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on that. I told you, I didn't consider what could be the causes of erroneous data, because they were not related to the grounds that Dr. Karam is proposing.

So I did not form an opinion on that, what could be the cause of erroneous or potentially erroneous or incomplete data.

Q How would a person of ordinary skill in the art understood Boerjes's disclosure on the potential causes here?

MR. ARGENTI: Objection. Form.

A Again, I did not opine on that, how the person of ordinary skill would -- would understand what Boerjes means by "incomplete, erroneous, or potentially erroneous data" because it's not part of any of the grounds. You know, what -- in the

sense that it does not affect my opinion on those grounds. The only thing I can imagine here related to the -- my discussion of those grounds is that I identified those two separate scenarios. Scenario where additional surface preparation is needed, and scenario where, you know, the scanning is deemed incomplete or erroneous, or potentially erroneous.

Q So do you understand that prior art needs to be understood from the perspective of one of ordinary skill in the art?

A I understand that, yes.

Q And here today you're providing your opinion, as one skilled in the art, what the prior art teaches. Right?

MR. ARGENTI: Objection. Form.

A Here today I am providing opinion with respect to Dr. Karam's opinion on those prior arts.

Q So you don't have any opinion beyond responding to Dr. Karam's reading of the prior art. Correct?

MR. ARGENTI: Objection. Form.

A Can you, I'm sorry, repeat that question? Did I understand correctly that I do not have any opinions responding to Dr. Karam's opinions?

Is that what you said?

Q No. Do you have your own opinion on what the prior art teaches?

MR. ARGENTI: Objection. Form.

A Well, I -- I reviewed the prior arts and considered them from the point of a POSITA's understanding by the priority data. And I responded to the opinions expressed by Dr. Karam regarding those prior arts that were included in her combinations and the grounds that she proposed.

MR. ARGENTI: It's been over an hour and a half since our last break. Are we coming up on a good stopping point?

MS. ZHANG: We can stop here, but I need to come back to these questions about Boerjes, and I am interested in your understanding of Boerjes's disclosure. But if you'd like to take a break

now, we can take a break.

THE WITNESS: That's fine with me either way.

MR. ARGENTI: Should we do ten minutes again?

MS. ZHANG: Uh-huh.

(A recess was taken.)

BY MS. ZHANG:

Q Dr. Foroosh, we were talking about your understanding of Boerjes' erroneous data. And you said you have no opinion on what could cause the erroneous data in Boerjes' intraoral scanner system. Correct?

A No, that's not what I said. I said that I did not offer an opinion on that. I didn't say I don't have an opinion.

I mean, I gave you earlier a couple of examples. I said I don't know that doctor's hand may not be steady, move fast, or patient head might be moving. And, I mean, those are just examples. Could be the scanner, I don't know, maybe were interrupted in the middle of scanning.

I don't know.

But I'm just saying that I said that I did not offer an opinion on that, and could be many cause, many things causing that. It's not that I don't have an opinion, but many things could have caused that.

Q Okay. Thank you for offering that opinion.

What else could cause the erroneous data?

MR. ARGENTI: Objection. Form. Scope.

A It goes back to what I said. I did not offer an opinion, so I just gave them as examples, you know, because I did not form an opinion in my response to Dr. Karam because it's -- it did not involve any of the grounds in terms of my response to any of the grounds and the combinations that Dr. Karam is suggesting.

Q So you're giving us some examples today.

What other examples can you give?

MR. ARGENTI: Objection. Form. Scope.

A I think I just answered that question. This was your previous question, too. I said that

I did not offer an opinion. So I came up with a few examples just like this. But could be anything causing that. I did not offer an opinion, and Boerjes in that paragraph is not expanding on the -- what causes that incomplete, erroneous, or potentially erroneous data.

Q So it could be various reasons that can cause the erroneous data. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Maybe. I did not offer an opinion on that.

Q So you just gave some examples of examples for causing the erroneous data. Right?

A Yeah, I gave a few examples that I thought might have caused erroneous data.

Q And we looked at Paragraph 196, from Line 9 to Line 10 it says, "erroneous data may be identified, for example, by comparison to models of expected shape for dentition, surface preparations, and the like."

Correct?

A Yes. So it says what it says. It says

that, you know, there are two cases, and it says that how those are two cases that may occur. And it says that how potentially, for instance, it states, going back to the Line 9 that you were reading, for example, it says, "by comparison to models of expected shape for dentition, surface preparation, and the like."

So just gives examples how it may be done by the quality control. It says there are two cases may occur, those are quality issues, and the feedback is provided, and potentially these are examples how it may be done.

Q So if the prepared tooth surface is different to the expected surface preparation, the user would provide that identification. Correct?

MR. ARGENTI: Objection. Form.

A I don't know what you mean, the user would provide it. Because again here the -- it says that feedback is provided. And it says there, and Boerjes discloses that the three options -- I don't know who user is here, basically. Boerjes says there are three options;

manual, automatic, and remote. So it's not any mention of user here; it's user feedback is provided.

Q Okay. So in the case of the manual quality control, does the dentist identify the region of the prepared tooth surface that is different from expected tooth surface?

MR. ARGENTI: Objection. Form.

A So, I mean, in the case of manual, then that process is performed manually by someone.

Q So if there is a foreign object on a tooth surface, even if the scan is performed accurately, the model can still have areas that's different from expected surface. Right?

MR. ARGENTI: Object. Objection. Form. Scope.

A I didn't opine on that in my declaration.

Q Did you answer the technical question?

MR. ARGENTI: Objection. Form.

A I thought the answer -- I answered your -- what do you mean by "technical question"? You -- I'm not sure what you mean by technical

question.

Q The question is, if there is foreign object on the tooth surface, the model, after a perfect scan, would still have an area that's different from expected surface preparation.

Correct?

MR. ARGENTI: Objection. Form. Scope.

A And I answered that question. I said I did not opine on that in my declaration. That scenario, I did not opine on that in my declaration.

Q So if you considered that scenario now, if there is a foreign object on a tooth surface, does the model have erroneous data?

MR. ARGENTI: Objection. Form. Scope.

A My answer remains the same, is that I did not opine on that. Now you're asking me to form an opinion and express an opinion.

No. I responded to Dr. Karam's opinions on those four grounds and combinations. And this did -- was not involved, this situation was not involved in my responses.

Q So during an intraoral scanning there can be foreign material on a tooth surface. Correct?

MR. ARGENTI: Objection. Form.

A I don't know. Maybe, maybe not. I mean, I -- it may. But again, I did not opine on that situation.

Q And there could be saliva on the tooth surface that affects a scan. Correct?

MR. ARGENTI: Objection. Form.

A I mean, again, I did not opine on that. But, sure, there is saliva in the mouth, and, you know, anything in front of the scanner can affect the scan data. But as I said, it's not part of the combinations, that particular scenario in the saliva is in front of the scanner, it is not part of any of the combinations that Dr. Karam is -- is proposing.

Q And saliva on a tooth surface would cause erroneous data in a model. Correct?

MR. ARGENTI: Objection. Form. Scope.

A I did not form an opinion. I did not express any opinion in my declaration whether

saliva can cause any problems in the scan data.

Q So you have no opinion that if there is saliva on a tooth surface, whether that would cause problems in the scan data?

MR. ARGENTI: Objection. Form.

A I didn't say I don't have an opinion; I said that in my declaration I did not offer an opinion on that, that saliva could cause scanning issues.

Q So do you have an opinion on this question?

MR. ARGENTI: Objection. Form. Scope.

A As I said, I did not form an opinion on this in my response to Dr. Karam.

Q You did not form an opinion on this in your declaration.

As of today, do you have an opinion on that issue?

MR. ARGENTI: Objection. Form. Scope.

A My understanding here is that I am here to respond to Dr. Karam, and that's what I mean. I did not form an opinion in my response to

Dr. Karam about how saliva or does saliva or how saliva affects the scanning process.

Q I understand you did not form an opinion in your declaration. But here I'm asking today your opinion whether, in your understanding of Boerjes's system, whether saliva on a tooth system would cause erroneous data in a model.

If you have that opinion today, you can answer the question.

MR. ARGENTI: Objection. Form. Scope.

A My answer remains the same. I believe I'm here to respond to Dr. Karam. And my response to Dr. Karam, I'm not offering an opinion on how saliva affects -- affects the scanning process.

Q You said you're not offering an opinion. Do you have an opinion, but you just don't want to offer it today?

A Well --

MR. ARGENTI: Object to form. Scope.

A Same answer. I did not form an opinion in my declaration, and I am not offering an opinion on the fly like this, because I'm here to

respond to Dr. Karam's grounds.

Q So you have no opinion on this issue to respond to Dr. Karam's opinion. Correct?

MR. ARGENTI: Objection. Form.

A I didn't say I don't have opinion on this or I do. I said that I did not form an opinion on this in my response to Dr. Karam's expressed opinions on the grounds that she proposed.

Q And you're not offering an opinion here today on this issue?

MR. ARGENTI: Objection. Form.

A Again, it's -- I'm responding to Dr. Karam's opinions. So you have my opinions entirely in my declaration.

Q You discuss the Paragraph 199, Boerjes, in your declaration. Correct?

A Can you tell me which page of my declaration?

Q Could you turn to Paragraph 67 of your declaration on Page 32.

A Yes, I'm there.

Q And if you look at the next paragraph,

Paragraph 68, you provided Paragraph 199 of Boerjes. Correct?

A Yes.

Q And if you look at the next paragraph, Paragraph 69, you talked about your understanding of this paragraph. Correct?

A Correct.

Q And your discussion continues to Paragraph 70 and 71. Correct?

A Yes.

Q You stated in Paragraph 69 that Boerjes describes that two alternatives may occur for Step 414 after quality control has been performed. Correct?

A Correct.

Q And if you could look at Paragraph 58 of your declaration, Page 27.

A Yes.

Q You also described Paragraph 199's teaching. Correct?

A Correct.

Q In the middle of the paragraph you said,

"Paragraph 199 (which I discuss in more detail below with respect to the Limitation 1.H) only discusses two alternatives that may be performed after the quality control steps."

Correct?

A Correct.

Q Boerjes itself does not use the phrase, "two alternatives." Correct?

A But he discloses them. We just read through, what was it, Paragraph 196. Even over there he discloses them. He says there are those two situations that may occur. Case 1, erroneous or inadequate data, in which case he says you need to supplement your model, your digital model, with additional models. And says the other case where additional surface preparation is needed. In that case he says that you create a whole new scan and create a whole new model.

He discusses them. He may not put Case 1, Case 2; but a POSITA reading it would understand that he is separating those two cases.

Q So that's your understanding of Paragraph

199. Right?

A That's my understanding. And that's what it says. It separates in those two scenarios, Boerjes separates into those two scenarios that I just described.

Q In both of those scenarios, the data in the model is not satisfactory to the user.

Correct?

A For different reasons. Is because quality control has identified either this or that, and Boerjes is teaching what to do in each scenario.

Q So let's look at Paragraph 199 Boerjes.

A Yes.

Q The first sentence of 199 says, "After one or more quality control steps, a determination may be made as to whether a scan and/or surface preparations are satisfactory."

Correct?

A Correct.

Q And following that Boerjes says, "If the data is not satisfactory, the process 400 may

proceed to Step 414, where the digital model may be supplemented or replaced with new scan data."

Correct?

A Correct.

Q And then Boerjes gave two examples of handling the unsatisfactory data. Correct?

A It says, "This may include, for example, the dental subject matter following, e.g., additional surface preparation consistent with errors identified during quality control. The Process 400 may then return to Step 404 where a new digital model is obtained."

Q So the first example in Paragraph 199 is "New scanning to replace apparently erroneous or inadequate scan data."

Correct?

A Correct.

Q Here the new scanning produces new scan data. Correct?

A Can you repeat that question? Here is the new scanning is what?

Q The new scanning produces new scan data.

Correct?

A Well, that's what it means. New scan is a new scan data.

Q And that new scan data is used to replace apparently erroneous or inadequate scan data.

Correct?

A Correct.

Q And that is a targeted replacement of erroneous data in a digital model. Correct?

A I'm sorry, can you paraphrase that question?

Q That is replacing a partial -- sorry, that's replacing a targeted portion of the digital model that has erroneous data. Correct?

A Where does it say that? No. It doesn't. It says, "The Process 400 may then return to Step 404, where a new digital model is obtained."

I mean, we can even refer to Figure 4 where all those steps are depicted on Page 133 of Boerjes.

So all those boxes that he describes, 404 and 414, are shown here, and with the quality

controls in the middle.

So it says, Obtain a digital model, go through quality control. If it is not satisfactory, supplement scan. And then he goes back as he describes in Paragraph 199, he says, Obtain a new digital model. That's why it says in plural, obtain digital models. There is an S in that box there, Box 404, so there are multiple models.

So each time the quality control feedbacks, a new digital model is created. That's what the paragraph says, a new digital model is created.

Now, it could be the case that is caused by insufficient or inaccurate data, in which case they are supplementing. So these models are kept all together. In the case of, as Boerjes described it in that paragraph, in case where there is additional surface preparation, in that case the whole new digital model is produced that -- to -- and the old digital model is discarded.

Q So a new digital model could be obtained by supplementing or replacing erroneous data in the digital model. Correct?

A That's not what it says here. It says that a new digital model is created. But it says that scan data is replaced, erroneous scan data is replaced in that situation. It's -- it does not say that.

Again, you can see that -- you can verify throughout Boerjes that Boerjes always talk about multiple digital models. And to confirm that, as I said, Figure 4 of Boerjes on Page 133, it shows that obtained digital models.

It doesn't say insert or update or produce composite model. It says, obtain digital models. There are multiple models there.

Q Does it say the digital model may be supplemented or replaced with new scan data?

A New scan data, yes.

Q And that's the first example that Boerjes gave, right, here?

MR. ARGENTI: Objection.

Q When the data is not satisfactory, Step 414, where the digital model may be supplemented or replaced with new scan data?

MR. ARGENTI: Objection. Form.

A Yeah, that's for Case 1. And the Case 2, where additional surface preparation consistent with errors identified during the quality control, in Case 2 Boerjes says replace a whole new model of the -- of the dentition, of the intraoral cavity.

Q Where does Boerjes say replace a whole new model of dentition?

A Let me -- let me pull out -- as I said, Boerjes everywhere is talking about this. So let's go to Paragraph 32 of Boerjes, for instance. I mean, I'm talking about the supplementing here. It says here, "In another aspect, a method disclosed herein includes receiving an electronic dental description, including prescription data, the first three-dimensional representation of one or more intraoral structures, including at least one tooth surface prepared for an artificial

dental object, and a second three-dimensional representation of the at least one tooth surface prior to preparation for the artificial dental object."

It spells it out there that there are two -- there are two three-dimensional representations here in the prescription. They're all -- they're both there, the fact that there are multiple 3D presentations simultaneously, here it is again in 32. It spells it out. There are -- the old one, the initial one, and the new one.

Q So Paragraph 32 says you can fabricate artificial dental object using these two models.

Correct?

A Right. But there are two models. It's -- this is -- this is -- what I'm saying is that what the conventional approach was that you would have an initial model, with another model to supplement. You would have multiple models in the case of erroneous data, as Boerjes is teaching. Which is not the same thing as the '936 patent is teaching.

'936 patent is saying that remove a portion of initial scan data, replace it with addition -- with a second scan of that area, to create a composite model.

In Figure 4 of the '936 patent also actually depicts that. I think it's Figure 4. I need to go figures up front.

No. I'm sorry. Figure 6 of the patent, '936 patent, is depicting that idea. This is different, fundamentally different. That's the conventional approach. The one described in Boerjes is the conventional approach. You're producing these multiple models. Even his block diagram is describing that. What -- the patent departed from that. That's what the main difference is from conventional approach.

Q Let's look at Paragraph 32 again, since you take us there.

It talks about first three-dimensional representation and the second three-dimensional representation.

Does either of those three-dimensional

representations have erroneous data?

A The point I was making is that the first three-dimensional representation, if there is a second representation by implication from that, that idea that you produce a second representation because quality control detected erroneous, so you need now a new model, so the second one is in response to quality control. That's by implication from what -- what Boerjes is teaching.

So if the first model, first representation is accurate, good, adequate, no errors, nothing of concern, then why do we need a second three-dimensional representation? Boerjes is teaching us that we're taking a second representation because maybe the first representation either potentially or definitely was identified to have -- to have issues.

Q So both of these representations are imaging the same area of the same tooth?

A Both of these representations are -- are imaging or representing the area that -- the area or areas or regions that have been -- are being

treated by the dentist and evaluated by the -- I'd say by the lab for quality control.

Q And the first representation have erroneous data based on the quality control.

Correct?

A That would have been my interpretation.

Q Okay. Back to Paragraph 199, where you describe it as two alternatives.

The first alternative is performing new scanning to replace apparently erroneous or inadequate scan data. Correct?

A Correct.

Q And in your view, the second alternative is a new scan of the dental subject matter following additional surface preparation consistent with errors identified during quality control. Correct?

A That's what it says. It says that those are -- those are the two options. And that matches also, that paragraph matches 196 that we were reading earlier. Over there also he mentioned these two possibilities.

Q Are these two alternatives exclusive to each other?

A I did not opine on that if they are mutually exclusive or not. But what -- that's what Boerjes is teaching. Boerjes is teaching that two alternatives, and here is how you handle them.

Q From the perspective of one of ordinary skill in the art, reading Boerjes, if the user determines there is erroneous scan data, is replacing the erroneous scan data the only option to address that error?

A Where --

MR. ARGENTI: Objection. Form.

A Let's read what it says. It says to replace the erroneous scan data with new scan data. But it say to supplement -- to supplemental -- to supplement or replace with new scan data.

So there are two -- those two options, supplementing in Case 1 or replace with new scan data -- completely new model, I'm sorry, new model

in the second case.

Q What do you mean, "in the second case"?

A Well, when additional surface preparation is -- is -- quality control says that additional surface preparation is needed. It says, "or a new scan of the dental object matter following, e.g., additional surface preparation consistent with errors identified using quality control."

Q So in your view in the second alternative, if additional surface preparation is needed, an entirely new scan is performed.

Is that correct?

A And the -- a new model is created to replace the old model.

Q And how is the new model is created?

A By taking a new scan of the intraoral cavity.

Q And in your declaration you said it is an entire new scan. Correct?

A Can you tell me which paragraph of my declaration?

Q Right. Could you go to Paragraph 69,

last sentence. This is on Page 33 of your declaration.

A Yes.

Q So here you say, "As Paragraph 199 makes clear, the only option Boerjes provides following additional surface preparation is an entirely new scan of the dental subject matter."

Do you see that?

A Yes.

Q What do you mean by "entirely new scan of the dental subject matter"?

A Well, that's what Boerjes is teaching. Teaching that take an entire -- produce an entire new model if additional surface preparation has -- is required. So there is the pre-surface preparation model. Boerjes says that if additional surface preparation is required, then create a completely new model.

Q Boerjes doesn't use the words "an entire new model," does it?

A It doesn't say "supplemented," so it's -- it says here in Paragraph 199, it says, "or a new

scan of the dental subject matter," in the second case, following those additional surface preparation.

Q So it's your understanding that Boerjes produces an entire new model. Correct?

A In the case where additional surface preparation is required.

Q In that case, Boerjes says "a new scan of the dental subject matter."

Correct?

A Correct.

Q And that new scan produces new scan data.

Correct?

A Correct.

Q And that new scan occurs after the additional surface preparation. Correct?

A Yes.

Q And Boerjes teaches the additional surface preparation is consistent with errors identified during quality control. Correct?

A Correct.

MR. ARGENTI: Objection. Form.

Q So the errors identified during quality control can include inadequate surface preparation. Correct?

A Can you repeat that again?

Q The errors identified during quality control can include inadequate surface preparation. Correct?

A Yes. The errors could say that errors identified due to quality control, they could say Case 1, there is some inadequate or -- or potentially erroneous or erroneous data. In which case Boerjes is teaching us to supplement. And in fact as I showed you in Figure 4, he shows that multiple models are produced, even in Paragraph 32 I showed you that it's -- it talks about the initial model and the second model.

But in the case of additional surface preparation is required, if the quality control, let's say the remote lab identifies that, then Boerjes says just take a new scan.

Q And the new scan is taken after the additional surface preparation to address that

error during quality control. Correct?

MR. ARGENTI: Objection. Form.

MS. ZHANG: I'll rephrase.

Q And a new scan is taken after additional surface preparation to address that error identified during quality control. Correct?

MR. ARGENTI: Objection. Form.

A A new scan is performed to handle either of those two cases. So the Case 1, a new scan is taken to supplement the initial model. And in the case of additional surface preparation, a new scan is taken to -- to create and complete a new model.

Q In Case 1, a new scan is to take -- supplement the initial model, or to replace the erroneous scan data. Correct?

A Yes, it's replaced with the new scan data.

Q And in your view, in the second case, a new scan is taken to create a complete new model.

A That's right.

Q But Boerjes doesn't use the words "complete new model," does it?

A It doesn't say "supplemented." It says, take a new -- new scan. I think a POSITA would have understood it that way. So I -- otherwise -- I'm continuing my answer. Otherwise, why separate these two cases.

Why not say that whatever feedback, do this. Why -- otherwise there is no explanation that it makes a distension between these two cases. In fact, in Paragraph 196 we discussed earlier, you are still making those two distinctions, that there's this case and that case. Where here it says hard to respond to those cases.

So why not just say if the quality control has an error, just do the same thing. Why separate to these two cases.

Q Yeah, why does Boerjes separate these two cases?

A I'm not here to judge why Boerjes proposes that. Boerjes does what it does. I mean, that's his teaching, and it's his teaching. I am not here to judge whether it is the right

thing to do or wrong thing. I'm just saying that it is his teaching.

Q So as a person of ordinary skill in the art, why do you think Boerjes does separate these two cases?

MR. ARGENTI: Objection. Form.

A I did not express any opinion on that. And, I mean, it -- it does what it does. Its teaching is, these are two separate cases, that quality control may return and do this. If these are his teachings, I'm not here to argue why this teaching is the way it is. He's teaching what he's teaching. I mean, I cannot say more than that.

That's what he is disclosing. I -- if it's there.

Q So as one skilled in the art, reading Boerjes, if there is an erroneous data, one of ordinary skill in the art must replace the erroneous data with new scan data?

MR. ARGENTI: Objection. Form.

A Well, again, I'm -- I'm just saying that

Boerjes is teaching that to a POSITA. A POSITA reading that would -- would have understood that here is the teaching, those two cases, and how to handle them. And those two cases are identified by quality control.

A POSITA would have been taught those two cases and understood that -- that's Boerjes's teachings.

Q In the first case, could a POSITA choose to obtain a complete new model instead of replacing their erroneous scan data?

MR. ARGENTI: Objection. Form.

A That's not the teaching of Boerjes. Boerjes teaches supplemental models.

And by the way, I think even the Board identified that; that, you know, Boerjes is teaching taking either supplemental models or -- or creating new scans -- I mean, new model.

Q So you read the Board's decision?

A Parts that I have cited. The Board identified that -- that Boerjes is silent about creating a composite model. Says do -- do either

take either supplemental -- I mean, create either supplemental models or additional -- I'm sorry, or new model.

Q Did you list the Institution Decision in your declaration?

A I have in summary of the '936 patent that I say, prosecution of the '936 patent and prior Board, it's on Page 16. Here I'm talking about the prosecution.

I still here talk about, in this section, Paragraph 34, 35, I describe -- I describe that again here also; that the examiner, basically the allowance of the patent -- I mean claims were based on the fact that there is a distinction between conventional approach where you either create new model, supplemental model, versus what '936 patent is disclosing, which is creating a composite model; in other words, updating your initial model with the portions that need updating.

Q So you have considered a document that's not listed in the materials cited in your

declaration. Correct?

MR. ARGENTI: Objection. Form.

A I'm sorry, can you repeat that question again? I -- I spoke over.

Q So earlier today you said you did not consider any document other than those listed in the materials cited in your declaration in forming your opinions. But just now I heard you said you considered the Board's Institution Decision.

Correct?

A This -- I'm sure somewhere at the beginning of when I got involved in this IPR, I have looked at it, the Board position, that's why I mentioned it here. I didn't say that it's necessarily my declaration. But I remember that I said that even the Board acknowledged that. Boerjes is silent about, if I remember correctly from the words that the Board used, silent about creating a composite model.

But that's off, you know, top of my head. I just in this discussions, I mention it.

Q So did you consider -- I want to ask

again. Did you consider any other document not listed in your materials cited list in your declaration in forming your opinions in your declaration?

MR. ARGENTI: Objection. Form.

A Again, I think I have answered that question at the very beginning of, no. For informing my -- you know, opinions in my declaration, these are the only ones that I have considered in -- in my declaration, in forming my opinions.

Q Okay. Going back to Boerjes. You say that, In the first case, a person of ordinary skill in the art would not do a complete rescan when there is erroneous scan data. Correct?

A I said that that's what Boerjes is teaching; that a person of ordinary skill in the art would have understood that Boerjes is making distinction between those two cases, and is teaching what to do in each case.

Q So can a person of ordinary skill in the art choose to obtain an entire new model of the

tooth when there is erroneous scan data?

MR. ARGENTI: Objection. Form. Scope.

A Again, that's not what Boerjes is teaching. Boerjes is not saying do that. Boerjes is distinguishing between these two cases. And in each case he's teaching what to do in response.

Q So your view, a person of ordinary skill in the art would just follow the first case scenario; that when there is erroneous data you must replace the erroneous scan data in the model.

Correct?

MR. ARGENTI: Objection. Form.

A I'm just saying that that's what a POSITA would have understood from reading Boerjes. Boerjes is teaching each of these cases and says what to do in each case.

Q To replace the erroneous scan data in the model with new scan data, can you use image registration techniques?

A Where does Boerjes say that? There is no disclosure of that in Boerjes.

Q My question is, can you use image

registration technique to replace erroneous scan data in a model with new scan data?

MR. ARGENTI: Objection. Form. Scope.

A Well, now we are -- so are we still with Boerjes, or we are getting into some hypothetical question? I'm lost here.

Q As a person of ordinary skill in the art, when you read Boerjes' teaching of replacing erroneous scan data in a model with new scan data, do you understand whether you can use image registration to perform that replacement?

A But that's not what Boerjes is teaching. Boerjes is not saying -- I mean, now we are extending it into additional stuff. Not only Boerjes in those two cases, but teaching -- is teaching two different approaches. Now you are adding in another layer, saying that here we have this -- these additional tools that Boerjes is not talking about, and so could this happen.

I mean, now we are getting completely out of the teaching of Boerjes. This is not in the combinations of -- that Dr. Karam has discussed.

Dr. Karam is discussing Boerjes, and Boerjes is not teaching that.

Q In your view, based on your expertise in image processing, when you read Boerjes's example of replacing erroneous scan data with new scan data, could you use image registration to perform that replacement, as a person of ordinary skill in the art?

MR. ARGENTI: Objection. Form. Scope.

A Again, as I said, by the priority date that was not the conventional approach. The conventional approach was that you take so either supplemental scans or you replace with an entirely new scan. And Boerjes is following that conventional approach. We just separated them into two parts and say that for this case, produce supplemental -- I mean, obtain supplemental models; and for the second case, just replace it with a new model. That was the conventional approach at that time.

Q And in general, just based on image processing, in the field of image processing, if

you wanted to replace a portion of a model with new scan data, can you use image registration techniques?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on that. You are -- I opined on the combinations that Dr. Karam is providing. Dr. Karam is relying on the prior arts, the three prior arts that she is using. And none of those combinations is discussing using any tools or methods to create composite models.

Q So you have no opinion beyond the particular grounds in the petition. Correct?

A Why should I? I mean, I'm here to respond to Dr. Karam and those grounds. And I am not here to offer new opinions and theories. I'm here to offer my opinion regarding the opinions that Dr. Karam has expressed in her declaration and the grounds that she has produced.

Q And you're not offering any opinion even in general in the field of image processing.

Correct?

MR. ARGENTI: Objection. Form.

A Well, I did offer, if you want a general opinion, I said that conventional wisdom was at the time at the priority date, and this is what you do, that's -- that is not only it's shown with the prior arts, it's proven by the prior art that Dr. Karam is using, Boerjes, Geng, and Babayoff, following the conventional approach.

Q So you cannot answer the question of whether image registration can be used in replacing a portion of a model with new scan data in general?

MR. ARGENTI: Objection. Form. Scope.

A Well, as I said, I just -- the fact that image registration tools, for instance, were available -- first of all, you say "in general." It's not such a thing as a generic image registration tool. But the fact that -- that it -- I mean, the mere existence of image registration tools does not speak to -- to the approach that the '936 patent is teaching. These are two separate things, I mean. And again, though, the prior arts that are produced by

Dr. Karam proves that point, that that was the -- back in -- at the priority date, that was the conventional approach to solve this -- these problems, and that's what these prior arts are also disclosing.

Q So in your personal research experience in image processing, have you ever used image registration techniques in combining two images?

MR. ARGENTI: Objection. Form. Scope. Relevance.

A Yeah, I mean, this is -- again, I'm not sure how this relates to any of the combinations that Dr. Karam proposes. I didn't opine on this issue, using image registration to combine images. I didn't opine on that in my declaration.

And as I said, the mere existence of such tools does not speak to doing -- I mean, following the process that the '936 patent is saying.

Q So do you agree that image registration tools exist to combine 3D images?

MR. ARGENTI: Form. Scope. Relevance. Objection.

A My answer remains the same. So I did not opine on that because it's not part of any of the combinations. None of these prior arts are discussing that. None of these combinations of these prior arts leads to that. So I did not form an opinion on that.

That's not what they are teaching. They are not teaching use image registration to do this.

Q That doesn't answer my question. My question is, do you agree that image registration tools exists to combine 3D images. It's not tied to the grounds in this proceeding.

MR. ARGENTI: Objection. Form. Scope. Relevance.

A I still answered your question. I did not form an opinion on that, because none of the prior arts asserted in the asserted grounds are doing that. They are not combining to -- I mean, they are not -- you are not -- it's very specific that the '936 patent says that a user-identified portion is taken out and replaced by data from a

second scan to create a composite mold.

This does not appear in any of the grounds or any of the prior arts used in those grounds.

Q So as a professor in computer science, with expertise in image registration and stitching, you cannot answer the question of whether image registration have been used in combining 3D images, as of today, here?

MR. ARGENTI: Objection. Form. Scope. Relevance.

A Well, again, I mean, sitting here today, my -- I think my role here is to offer opinion on the grounds and respond to Dr. Karam, not to offer -- you know, I'm not here to offer a general opinion about general image-processing techniques. I'm offering my opinion about what Dr. Karam said and her opinions offered in those grounds and -- and the combinations that she discussed.

Q So I would understand that you have an opinion, but you do not want to provide that opinion, sitting here?

MR. ARGENTI: Objection. Form.

A Well, again, as I said, I believe I'm here to respond to Dr. Karam. And that's what I'm doing. I mean, beyond that, anything outside that, I think I'm not here to -- I'm here to respond, but Dr. Karam's opinions are and why they are wrong. And that's what I'm here for, to response to Dr. Karam's opinions.

Q So back to Boerjes, when we talked about the two scenarios.

You mentioned that the first one is to supplement the model, and the second one is to do entire new model.

What's the difference between supplementing the new model and obtaining an entire new model?

A Well, it's -- when you are supplementing something, you keep that something and you have another thing that is supplementing it. That's -- I mean, I use plain and ordinary meaning of the -- of the word "supplement." And I think that's what the POSITA would have understood. When you are

supplementing something, you keep both things, the one is supplementing the other.

But if you are -- if you are creating a whole new model, you discard the old model, you have now a new model.

Q So in the second scenario, in your view the first initial model is discarded?

A That's what Boerjes is teaching, teaching that a new model is created. If when you are -- if you're in the case of additional surface preparation needed for a tooth or teeth that are being treated, that's what Boerjes is teaching.

Q Does Boerjes teach discarding the old model?

A Well it doesn't say, "supplemented." So the way I read it, I think a POSITA would have understand -- understood that when he says, "or a new scan of the dental subject matter following additional surface preparation," I think that's -- that's how a POSITA would have understood it.

Q So Boerjes doesn't use the word "discarding the old model." It's your

understanding. Correct?

A As I said, if you are not supplementing the old model, then you're not using it anymore. So you have a new model now. You're not supplementing the old model.

So in the case where you are supplementing, you're scanning this region and you're supplementing with additional models the old model.

But if surface preparation has happened and you scan, and you create a new model.

Q So in your view, if surface -- additional surface preparation is performed, the only option is to perform an entirely new scan of the dental subject matter. Correct?

A I'm not talking about the -- I'm saying that that's what Boerjes is teaching.

Q But Boerjes doesn't use the phrase "entire new scan." Correct?

A It says -- it says, A new scan of the dental subject matter following additional surface -- it says a new scan.

Q Does it say "an entirely new scan"?

A Well, my reading is that it's -- it's saying that create a new scan, not for supplementing; create a new scan. I don't -- as I said earlier, I don't see why Boerjes otherwise is separating these two cases. If you are doing -- if you are going to do the same thing, so how do you justify -- how do you explain why Boerjes here in 199 and 196 and maybe other places he says that, Hey, these are two separate cases. Because he is proposing to handle them differently.

Q So you don't understand why Boerjes is separating these two cases?

MR. ARGENTI: Objection to form.

Q Is that what you are saying?

A I don't need to understand. Because, I mean, why do I need to understand? I am just saying Boerjes is teaching that. I mean, I'm not here to judge whether Boerjes is doing the right thing or wrong thing or why is he doing. I'm just saying that Boerjes is teaching it. This is what Boerjes is teaching.

Q So in your view, the second alternative is the replacement supplementation approach.

Correct?

MR. ARGENTI: Objection. Form.

A What do you mean, "second alternative"? Can you be more -- talk about the corresponding?

I mean, as I explained earlier, there are two -- these two cases; the case where erroneous or potentially erroneous data is identified during quality control, in which case Boerjes is teaching us to obtain supplemental model -- models.

And -- and that Figure 4 of Boerjes actually demonstrates that. He says obtain digital models.

And then in the case that where additional surface preparation has taken place, it actually spells that out. It says that a new scan of the dental subject matter. So he's talking about a new scan of the patient, a whole -- you know, dental subject matter to patient's dentition should be taken.

Q So in the second case, when additional

surface preparation is needed, the user would not ever do a supplemental scan. Correct?

MR. ARGENTI: Objection. Form.

A Who -- who is the user? I'm sorry, I don't understand your question.

What do you mean, the user wouldn't do that? Who is the user here? This is what Boerjes is teaching, that's what I'm saying. Boerjes is teaching that do these, follow these. According to his teaching, this is what he -- he is disclosing to do in each of those cases.

Q So in your view, in the second -- in the second case, a person of ordinary skill in the art, reading Boerjes, would never supplement the model with new scan data. Correct?

MR. ARGENTI: Objection. Form.

A I'm not saying what person of ordinary skill. I'm saying that that's what -- that's what Boerjes is teaching.

Boerjes is teaching to do -- in each of those cases, to do what he says, which we discussed many times, which I explained many

times.

I am not discussing what the person of ordinary skill would have done. What I -- I do discuss what person of ordinary skill would have understood what Boerjes is teaching. And Boerjes is teaching that.

Q So in your view, Boerjes teaches -- in the second case Boerjes teaches the entire model is replaced with a new model. Correct?

A And by "second case" you mean when additional surface preparation is performed. Is that -- yes, Boerjes is teaching that a new model is created.

Q And that new model would include portions of the teeth that were not physically changed.

Correct?

MR. ARGENTI: Objection. Form. Scope.

A I'm completely lost. What do you mean? Did I hear correctly, portions of the model that were not visible?

Q So in the second scenario where additional surface preparation is performed, the

additional surface preparation is a physical change. Correct?

A That's basically exactly as we were discussing earlier. Dr. Karam maps basically the physical change through additional surface preparation, yes.

Q And an entire new model in the second case would include that portion that is physically changed. Correct?

A Correct.

Q And the new model in the second case would also include portions that were not physically changed. Correct?

MR. ARGENTI: Objection. Form. Scope.

A Well, I don't know how -- what scan in the second case, what was scanned, what would have been scanned. Maybe -- maybe it would not include, or it would include portions. But that's not something that I considered in forming my opinion. I'm just saying that the teaching of Boerjes is that in the second case, create, obtain a new digital model.

Q So let's consider an example where the first model covers the whole mouth and a physical change is made to a portion of a tooth.

In Boerjes's second case, when you obtain this new model, do you have to scan the entire whole mouth again to obtain the new model?

MR. ARGENTI: Objection. Form. Scope.

A Boerjes is not teaching -- is not discussing that. Boerjes is just saying that in the second case, create a new model. It doesn't say scan the whole mouth if -- if -- Boerjes is not discussing that. I'm just reading what I'm reading. You know, Boerjes is teaching those two cases. And it says what it says in that Paragraph 199 or other places, in fact, 196. And it says what it says.

If it doesn't -- it doesn't talk about you go and rescan in your hypothetical example the entire mouth or not. It just says that create a new model.

Q Earlier today you agreed that Boerjes teaches scanning multiple teeth. Correct?

A Sure, yes.

Q And if after quality control it is determined a portion of one of the tooth need additional surface preparation, does Boerjes teach you need to rescan all the teeth in the first model?

A What do you mean by "all the teeth"?

No. Boerjes is discussing that -- Boerjes is not saying that if you're in the, as you call it, the second case, if you have done additional surface preparation, Boerjes says take a new scan to produce a new model.

It doesn't say, all the teeth, part of the -- part of the dentition. It doesn't talk about that. It just -- it just takes two -- these two different approaches for those -- these two cases; one of them supplementing the model, the other one obtaining a new model.

Q So if the first model includes, for example, five teeth, and it's determined through quality control a portion of one of the teeth needs additional surface preparation, does Boerjes

teach you need to scan the five teeth included in the first model to obtain the new model?

MR. ARGENTI: Objection. Form.

A I -- I think I answered that question. Boerjes doesn't say how many teeth to scan and what part to scan in the second model -- I mean, the second time for this -- in the second case for the new model that you obtain says. Boerjes is teaching what it's teaching.

It says that if surface preparation, additional surface preparation have been taken place, then take a new -- obtain a new model.

Q So you said Boerjes doesn't say how many teeth you need to scan for the new model.

Is that right?

A Well, it is there in Paragraph 199. He doesn't say do one, two, or more teeth. I mean, it says what it says. It says that these two cases; in one of them you're supplementing your model, and in the other one, in the second case you are creating a new -- a whole new model, a new model.

Q So in the second case when you create the whole new model, you don't have to scan everything included in the first model. Correct?

MR. ARGENTI: Objection. Form.

A Well, it doesn't talk about that. It just says it takes -- again, it doesn't talk about how many teeth, one tooth or many teeth. It says that obtain a new model if the additional surface preparation has been performed.

Q So is it up to the user to decide what portion of the tooth to scan for obtaining the second model?

A Who is the user?

Q The user who is operating Boerjes's intraoral scanner.

A I mean, it still doesn't affect anything that -- the teaching is there. I mean, who is the user? What do you mean by the user?

You mean the doctor, doctor uses his opinion to say, Okay, I'm going to scan so many teeth if I'm using this teaching, follow this teaching? I don't understand who the user is.

There is no notion of user here; it's just a notion of Boerjes is teaching in Case 1 do this, in Case 2 do that. So I don't know who user is in your question.

Q Boerjes teaches the manual quality control. Correct?

A It's one of the quality controls that he teaches.

Q And it teaches the dentist can perform the quality control. Correct?

A Can you refer me to the paragraph?

Q Sure. If you go to Paragraph 195.

A Yes.

Q This is Page 56 of Boerjes, starting at Line 31. It says, "As another example, a dentist may visually confirm accuracy of a scan by inspection for gross errors or omissions."

Do you see it?

A Yes.

Q And it continues. In the next sentence it says, "The dentist may also visually inspect margin lines on surface preparations, and may

annotate margins for identification."

Do you see it?

A Yes.

Q Okay. And the next page second line it says, "The dentist identify the margins on a surface preparation where the margin lines are not self-evident."

Correct?

A Yes.

Q So back to our question.

If the dentist decides to do another scan when the dentist decides there is additional surface preparation to be performed, does the dentist decide which area to scan and how many teeth to scan?

MR. ARGENTI: Objection. Form.

A Well, I did not opine on, again, how many teeth the dentist decides to scan in this manual controlled, quality-controlled process.

I mean, I am saying what Boerjes is teaching. So what the -- it doesn't say the doctor must scan N teeth or so many number of

teeth. But it seems obvious to me that -- clear to me that the portion, for instance, that have been physically modified and are for -- in other words, that additional surface preparation has been taken, then -- taken place, then those portions are, to my opinion, included, the POSITA would have understood that included in that new model. That's the purpose of taking a new -- a new, completely new scan, so that those areas that have been physically modified are in the new scan.

But, you know, Boerjes does not teach do at least so many teeth or which teeth, et cetera, or what part of the dentition. It just says that those are the two cases, that in his system those are the two cases that apply.

Q When you say "completely new scan," what does the word "completely" modify? Modify the new scan or modify the scan area?

MR. ARGENTI: Objection. Form.

A What -- I'm not sure -- can you paraphrase? I'm not sure if I understand your question.

Q Sure. I'm trying to understand your opinion.

What does "completely new scan" mean, in your opinion?

A So what I meant was that a new scan is taken, not for supplementing an initial scan. But a new scan is taken to -- to replace the old scan.

Q And the new scan doesn't have to include everything in the old scan.

Is that right?

A I did not express any opinion on that. And Boerjes does not discuss that. Boerjes says that -- again I repeat myself. Boerjes discuss that those are the two options. Option 1 do this, and it's Situation 1 do this; scenario Situation 2, do something else.

So there is no discussion of the number of teeth that need to be scanned or how many of the dentition needs to be scanned. There is no discussion of that in -- in here.

Q And you have no opinion on how much needs to be rescanned in the second scan either.

Correct?

MR. ARGENTI: Objection. Form.

A Well, I don't have an opinion in the sense that my opinion is not trying to invent things that Boerjes is not teaching.

Boerjes is teaching what he's teaching. I'm not going to fill in with things that Boerjes is not disclosing.

Boerjes's teaching was his teaching. He says to do that, do this. He doesn't say how many teeth, what part of the dentition, or all those details. He's left it out. I don't know.

You -- I mean, it is -- it is teaching what it is teaching.

Q So during the manual quality-control process, if the dentist determines there is erroneous data in the portion of the tooth -- sorry. Let me scratch that. Let me ask again.

If the user determines there is erroneous data in the model and a portion of that model include a tooth surface that need additional surface preparation, in your view which scenario

should the dentist proceed?

MR. ARGENTI: Objection. Form. Scope.

A Well, I did not opine on that because Boerjes is not discussing such a scenario. Neither does Dr. Karam, and in any of her combinations. But Boerjes is not discussing a situation like that, so I -- I cannot offer an opinion on something that Boerjes is not teaching.

Boerjes, again -- as I said, Boerjes is teaching what he's teaching, it's there.

Q So a person of ordinary skill in the art, reading Boerjes's teaching, do not know which approach to take when there is both erroneous scan data and inadequate surface preparation. Correct?

MR. ARGENTI: Objection. Form.

A Well, again, this is not something that Boerjes is discussing, is teaching, saying that when both cases occur, Boerjes is not discussing them. So I -- I cannot offer an opinion on something that is not even there in Boerjes.

MR. ARGENTI: Are we coming up to a good point for a break?

MS. ZHANG: I actually just have a couple more questions on Boerjes. I think if we can finish that in this section, that would be great.

MR. ARGENTI: Okay.

BY MS. ZHANG:

Q So a person of ordinary skill in the art, reading Boerjes, even if Boerjes doesn't teach the particular scenario where there is both erroneous data and inadequate surface preparation, a person of ordinary skill in the art, reading Boerjes, wouldn't know what to do in this scenario?

MR. ARGENTI: Objection. Form. Scope.

A Well, again, I -- I can only offer opinion on person of ordinary skill's understanding of what Boerjes is teaching. I cannot offer an opinion on what a POSITA would understand -- would have understood on something that Boerjes is not teaching.

I can -- I mean, if Boerjes is not teaching, how do you want me to say how -- if Boerjes is not teaching a scenario, how do you want me to say what a POSITA would have understood

of something that Boerjes is not teaching?

Boerjes is not teaching that. And Boerjes is one of the prior arts asserted by Dr. Karam in her combinations. Boerjes is not teaching that.

Q So would the person of ordinary skill in the art apply Boerjes's teaching to address this scenario where there's both erroneous data and inadequate surface preparation?

MR. ARGENTI: Objection. Form. Scope.

A Again, I did not opine on that, or in this case even could -- I could not even opine on that. Because, again, it's a scenario that -- a hypothetical scenario that you're describing that Boerjes is not teaching that scenario.

Now, what a POSITA would do in that scenario, Boerjes is not teaching anything about that.

Boerjes is one of the prior arts used by Dr. Karam. Now you're telling me, Hey, Boerjes has a deficiency that, you know, there's a scenario that a POSITA would be lost. Well, I

don't know. I mean, that's -- that's the -- Boerjes is the prior art that is used in the combinations produced by Dr. Karam.

And what POSITA would have understood in such a scenario, POSITA is not teaching anything about that.

Q So you don't know what a POSITA would do if there is a scenario where both erroneous data and inadequate surface preparation. Correct?

MR. ARGENTI: Objection. Form. Scope. Relevance.

A Well, again, you know, I believe that I -- I need to -- I would provide my opinion about -- you know, I'm here to provide my opinion about what POSITA would have understood about a particular prior art, not what he would -- he or she would have done reading that prior art.

Or even worse than that -- I'm sorry, let me correct that -- is that would have done on a -- on something that the prior art is not teaching.

So, I mean, this -- this sounds like really completely -- so now you want me to offer

an opinion on -- on what a POSITA would have done on something that a prior art is not teaching. That -- that sounds like not something that I should be offering an opinion on, I mean.

Q So you adopted a definition of person of ordinary skill in the art offered by Dr. Karam.

Correct?

A Correct.

Q And you applied that definition in forming your opinions in the declaration.

Correct?

A Correct.

MS. ZHANG: Okay. We can take a break now. Thank you.

(A recess was taken.)

BY MS. ZHANG:

Q Dr. Foroosh, I introduced an Exhibit 1005 in the chat.

(Exhibit 1005, previously marked, not attached.)

Q Let me know if you see it.

A That's Geng. Is that right?

Q Yeah. You recognize this document. Correct?
A Right. Let me take it out. Yes, I have it in front of me now.
Q You reviewed the Geng reference in preparing your declaration. Correct?
A Yes.
Q And you reviewed this reference in its entirety. Correct?
A Correct.
Q And you understand what this Geng reference disclosed. Correct?
A Yes.
Q Geng discloses an intraoral scanner system for obtaining a 3D model of the teeth. Correct?
A Well, I can read through the abstract, for instance. But yes, generally speaking, is -- is talking about 3D, three-dimensional dental imaging.
Q And Geng's intraoral scanner also obtains data incrementally. Correct?

MR. ARGENTI: Objection. Form.

A I don't understand. Can you define what "incrementally" means?

Q So earlier when we discussed Boerjes's intraoral scanner, we talked about how intraoral scanners obtain data incrementally across the mouth and use all the data to obtain a 3D scan.

Does Geng work in the same way?

A Yeah. I mean, the use of the words can be confusing here. When you say "data," I mean, image is data also. So -- so it's become confusing. So I need to make clear -- clarification, as I did with Boerjes early on, as you said, that the scanning systems who are based on imaging, they -- in other words, they take multiple images and convert them to a point cloud. So those are the ones that in, you know, one scan, what I call one scan, was one scanning process by the dentist as goes from one position to the next one, multiple images in this manner are acquired, and collection of all those images result in one 3D scan data.

Q And Geng teaches scanning an individual tooth. Correct?

MR. ARGENTI: Objection.

A Can you repeat that? I'm sorry, I'm not sure if I understand your question.

Q Geng teaches scanning an individual tooth. Correct?

MR. ARGENTI: Object to form.

A I mean, where do you -- where do you read -- what part of Geng? Can you refer me to where Geng is saying an individual tooth?

Q If you could turn to Column 11, Line 16 to Line 19, of the Geng reference.

A Yes. You want me to read?

Q So here Geng says, "Preliminary imaging of prepared teeth is utilized for treatment preparation. The type of restoration for any individual tooth or group of teeth should be indicated in the treatment plan."

Correct?

A Yes.

Q So Geng teaches imaging an individual

tooth. Correct?

A Or a group of teeth.

Q Yes, or a group of teeth. Correct?

A Yes.

Q And Geng teaches scanning the entire mouth. Correct?

MR. ARGENTI: Objection. Form.

A Again, can you point me to exact location where he's talking about that?

Q Sure. Let's go to Column 17, Lines 7 to 12. That is Claim 16 of Geng.

A Yes.

Q And starting from Line 9 it says, "Views of said 3D image for analyzing a patient's dentition at different contextual levels, said different levels including an individual tooth level, a single arch level, and a whole mouth level."

Do you see that it?

A Yeah, it is considering, like earlier for tooth and/or teeth, multiple teeth. Here also in Claim 16 he is referring to single arch level and

a whole mouth level.

Q Right. So Geng teaches imaging the whole mouth. Correct?

A Among others, yes.

Q And Geng also teaches editing the 3D model of the teeth. Correct?

A Yes, Geng discloses an editor, a general-purpose editor that can be used for editing 3D data.

Q And the editing can be for deleting, creating, and modifying objects. Correct?

A Are you reading from a particular paragraph?

Q All right. Let me direct you to Column 7, Lines 38 to 51, where Geng teaches the editor tool.

A Right. Yes, I'm there.

Q So Geng teaches, The editor tools allows operators to modify 3D data files interactively and conveniently. Correct?

A Yes.

Q And starting from Line 46, it states,

"Known editing functions can be employed, including typical editing functions that provide for deleting, creating, and modifying objects."

Correct?

A Correct.

Q And it also says, The editor tool can provide various filtering functions, smoothing and noise removal, that can be applied to entire 3D data sets or to selected local areas.

Correct?

A Correct.

Q So Geng's editor tool can be applied to entire 3D model or local areas on a 3D model.

Correct?

A It says that for it is "the editor can also provide various filtering functions (e.g., smoothing and noise removal) that can be applied to entire 3D data sets or to selected local areas."

It's just talking about particular functionality, which is filtering, like smoothing and noise removal, that can be applied either

locally or to the entire data set, the 3D data. It is not -- it is not talking about this distinction.

He is saying that for this specific functionality of the editor, which is filtering functions, e.g. smoothing and noise removal, then that applies, yes. That it can be either local or to the entire scan.

Q And a few lines above that Geng teaches, "The editor allows operators to modify and/or eliminate any undesirable areas on the original 3D image obtained from the camera."

Correct?

A "Obtained from the camera." Yes, I see that.

Q And two below it says, "3D objects can be edited, including triangular regions, vertices, local areas, and an entire data set."

Correct?

A Correct.

Q So Geng teaches the editor tool can be used to modify the 3D model. Correct?

A It's teaching, yes, you can edit and -- you can edit. It is a general-purpose editor that you can edit your 3D model.

Q And you can also use the editor tool to eliminate undesirable areas on a 3D model.

Correct?

A Yes, it says that to eliminate any undesirable areas.

Q And the undesirable areas can be a local area on a 3D model. Correct?

A I don't know. I'm it's not talking about locality here. But it says that it can be used to eliminate any undesirable areas. It doesn't say "local" here, no.

Q Does it limit -- does Geng limit the functions of editor tool to any particular purpose?

A Well, it describes it there. It says that is for the purpose of editing three-dimensional data. It is a general-purpose editor for editing three-dimensional models.

Q An area of the model can be undesirable

if it does not accurately represent the tooth surface. Correct?

MR. ARGENTI: Objection. Form.

A Well, in whose teaching are we talking about? Are you saying that Geng is teaching that?

Q I'm trying to understand your understanding of the prior art's teaching.

A Well, prior art is teaching that -- that editor 312 can include general-purpose 3D model editing software. And it says that it has these functionalities in it. So I'm not sure what your question is really, again. So maybe you will need to paraphrase it.

It says what it says. I can read again.

Q Can you give some examples of undesirable areas in a 3D model of teeth?

MR. ARGENTI: Objection. Form.

A Well, I mean, undesirable areas is what -- it says what if says, I mean. I don't know in Geng's teaching what undesirable area is, if you just -- if I read just this. But, you know, undesirable areas could be many different

things. If -- if we -- within the context here, you know it, says undesirable areas. But, you know, it could be many different things, undesirable areas. And based on the functionalities it says -- it says that, Oh, we could do, for instance, filtering, smoothing, noise removal. So, you know, a POSITA would have understood that it means that in those cases it means that there is an area that is noisy, an area that maybe has inaccuracies and needs smoothing again, some kind of a noise. Based on functionality, a POSITA would have understood that if you are applying those functionalities, then because those kind of problems are there, and that's undesirable.

Q Can you give some other examples of undesirable areas?

MR. ARGENTI: Objection. Form.

A Well, I gave some examples. I mean, how many examples -- I don't know. I mean, as you read through, then it says, Eliminate any undesirable areas on the original 3D image

obtained from the camera. It says, remove abnormal data. It points out, remove abnormal data, data points.

So data point or data points. So you can remove individual points in your data, in your 3D data, in your point cloud. It allows that editor to remove.

So maybe that you, by inspection, when you are doing, for instance, you're inspecting to see if your data is good, you find that one point is off, and it shouldn't be like that. You just want to delete that.

So based on -- based on what I read, my understanding of undesirable means that there are some points that you judge to be abnormal. And -- and then it continues say, Clean up the acquired image data to reduce the size of image data file.

So it says, Well, the size of the image data set may be too big. You clean up to reduce the image size. So that's another functionality of the -- to undesirable maybe it means here in this case too big of a data, reduce your data. So

that's undesirable.

And then it says, 3D objects can be edited, including triangular regions, vertices, local areas, and an entire data set.

So again, this is -- these triangular areas I am interpreting as small patches of triangular areas that form the model. So again, one interpretation could be that you see that that triangular area is abnormal. You want to correct that. You want to edit that so that it looks correct from the dentist point of view, for instance.

Dentist says that doesn't make sense, that part of the data.

And the rest of it I just said also, the other functionalities. Based on the functionalities, I can say what my interpretation of undesirable is. And those are the functionalities that Geng describes.

Q So from the dentist's point of view as you are saying, an area can be undesirable if the dentist determines it does not accurately

represent the tooth surface. Correct?

MR. ARGENTI: Objection. Form.

A It's not talking about that here. Although I said that, you know, that's my interpretation. You said what is undesirable? It didn't describe what undesirable is, so I'm not going to opine on that, what they mean.

But -- but, you know, based on the functionality of the editor, you know, it says that editor does this, that, et cetera. You say, Okay, if it does that, it means that that's an undesirable situation.

Like if it says that, Hey, there is noise, so smooth the data because that's undesirable, so editor has that functionality. Which means that noise is undesirable. Abnormal data point is undesirable. Those are undesirable scenarios that Geng is discussing here.

Otherwise, why it's discussing, you know, those functionalities. Those functionalities been there to basically eliminate, as he says, any undesirable area. And then it goes on giving

examples of un -- those undesirable situations.

Q Right. So the extraneous parts is one example. Correct?

MR. ARGENTI: Objection. Form.

A Which part is one example? I'm sorry, I didn't hear correctly. What did you say is one example?

Q Sorry, let me ask that, rephrase.

Abnormal data points is an example of an undesirable area. Correct?

A Correct. It says that abnormal data point or point(s), in parentheses, points, S in parentheses, that that may be considered undesirable.

So you have this point cloud. And when you do an inspection, you see certain points. The point or certain points are off. They don't look right. So you can go and -- and it says that you can go and eliminate that, eliminate that, that point or those points, remove them, rather. Remove those abnormal points.

Q And Geng doesn't limit the undesirable

areas to just abnormal data points. Correct?

A It -- it says what it says. I can read again. It says that eliminate any undesirable areas on the original 3D image obtained from the camera. And then he goes and says that, try to give, say, what is undesirable. He says remove abnormal data points and clean up the acquired image data to reduce the sides of the image data points.

So that's -- so it seems like too big of a -- too big of a file data, of the data file, is undesirable, so reduce it. 3D objects can be edited, including triangular regions, vertices, local areas, and an entire data set.

So he says that this kind of editing can be applied either to some local place or to even a single point or to an entire data set.

Known editing functions can be employed, including typical editing functions that provide for deleting, creating, and modifying objects. So earlier on he was saying that deleting, even he says here creating. So, you know, so maybe you

move the point to a different location.

And the editor can also provide various filtering functions, e.g., smoothing and noise removal. So again I have to interpret that that's another undesirable scenario, when the data is noisy you want to smooth it and filter it.

So those are the ones he discloses.

Q So Geng's editor tool modifying a 3D model do not necessarily need to reduce the file size. Correct?

A It says that's one of the -- I mean, based on my reading, a POSITA would have understood that if the file size is too big, that's undesirable, so reduce it. So that editor function allows you to reduce the file size.

Q So that's one scenario. Right?

A That's -- that's one of the scenarios that it considers.

So here it's saying that these are the -- these are the ones that Geng is considering, these are the ones I'm considering in my editor.

Q Geng also teaches interactive evaluation

of tooth reduction. Correct?

MR. ARGENTI: Objection. Form.

A Which -- which paragraph are we referring to? Which part? I mean, which column, which line?

Q So if you could turn to Column 11 at Line 53.

A Line 53, you said?

Q Uh-huh. Yes.

A Yes. It says, Interactive 3D imaging provides for evaluation of tooth reduction criteria, including but not limited to axial reduction (e.g., buccal/lingual and -- I'm not sure how to pronounce that word -- meningeal cycle/distal) and/or occlusal/incisal reduction.

So what was your question again? I'm sorry?

Q So Geng teaches interactive 3D imaging evaluation of tooth reduction. Correct?

MR. ARGENTI: Objection. Form.

A Yes, in that sentence it talks about that.

Q And if you could turn to Column 12, Line 2 to Line 7. Geng says, "To help ensure the accuracy of the final 3D image, the system can implement evaluation steps, which can include but are not limited to confirming correction of any problems found in preliminary imaging, identifying and correcting any artifact data and verifying and indicating margins."

Do you see that?

A Yes, I see it.

Q So Geng teaches you can identify or correct artifact data in the model. Correct?

A It says what it says. Yeah, that -- that paragraph, that -- I mean, those lines is saying that identifying and correcting any artifact data.

Q Can Geng's editor -- sorry, can Geng's editor tool be used to remove or correct artifact data in the model?

MR. ARGENTI: Objection. Form. Scope.

A So now we are going beyond. It says, "Identifying and correcting any artifact data." It does not talk about removing a portion of the

data or anything alluding to that. It says just "identifying and correcting any artifact data" there.

Q Okay. Can you turn to Column 14 at Line 30 to 31?

A Yes.

Q Here it says "Individual tooth level, removal of artifacts."

Do you see it?

A Yes.

Q Can Geng's editor tool be used to remove artifacts on the individual tooth model?

MR. ARGENTI: Objection. Form. Scope.

A Well, I did not opine on this. This does not come into any one of the combinations. I did not opine on this in my declaration, in my response to Dr. Karam.

Q Do you think artifact data is desirable?

MR. ARGENTI: Objection. Form. Scope.

A I don't know. I mean, the -- I mean, Boerjes is not connecting them together. Show me where it says -- Boerjes says that artifacts are

undesirable. And also, as I said, this does not appear in any of the combinations, and therefore I did not provide any opinion on that in my declaration.

Q Geng teaches its editor tool can be used to remove undesirable area in the model. Correct?

A It says what it says. We went through that. And I went step by step for each of the functionalities.

So it says -- it says, allows operators to -- I'm back to Column 7, where it describes the editor 312, somewhere in the third line it says the editor allows operators to modify and/or emit any undesirable areas under the original 3D image obtained from the camera. And then he goes on describing.

So that's what I was expanding, remove -- try to -- basically describing what is undesirable. Remove abnormal data points. So he says, in other words, abnormal data points, my interpretation and a POSITA would have understood, I think, that abnormal data points are

undesirable.

Clean up the acquired image data to reduce the size of the image data files. So again, my interpretation, and I think a POSITA's interpretation, would have been that if the file size is too big, then that's undesirable. So the editor takes care of that, reduces the size of the image file data.

3D objects can be edited, including triangular regions, vertices, local areas, and an entire data set. So says that it can be done at different levels, you know, the triangular area or -- or a local area and the entire data set. So it just builds this hierarchy that at different levels in this editor can operate.

And then he talks about known editing functions can be employed, including typical editing functions that provide for deleting, creating for any of these above, you can do any of these. Deleting, creating, and modifying objects. So that object could be a point or set of points, or -- or it could be a triangular area, et cetera.

And then he continues, say that on top of that, the editor has this additional functionality of filtering. Now, I do not see any one of those cases describing the editor talking about artifacts.

Q So in your opinion, is artifact data on a model an undesirable area on the model?

A As I said, I did not opine on that because it's not in any of the combinations that we discussed.

Q Boerjes talks about erroneous scan data in a model. Correct?

A Correct. Erroneous or potentially erroneous. Do you want me to go back to Boerjes?

Q And erroneous data, scan data in a model, or potentially erroneous scan data in a model, would that be undesirable for a dentist?

MR. ARGENTI: Objection. Form. Scope.

A Again, you want me to define what "undesirable" is, and I -- I -- so I'm not offering an opinion on the definition of "undesirable."

Q So in your view as a person of ordinary skill in the art with expertise of image processing, would Geng's editor tool be suitable for Boerjes replacing the erroneous scan data?

MR. ARGENTI: Objection. Form. Scope.

A Well, I mean, so I -- even -- are you -- are you -- I'm not sure if I understand the question correctly.

Are you saying that could this editor be used as what functionality again?

So, I mean, the functionality of the editor we went through and one by one. And it's not saying that these are the examples. It says that those are the functionalities of its editor. So what other functionality you ask me if Geng could be used for?

Q Let me ask this way.

Can you use Geng's editor tool to remove the erroneous data in Boerjes?

A Again, even -- even Dr. Karam is not suggesting the use of Geng's editor outside the -- the way patent '936 is describing the use of

removing and identifying surface. So I'm not -- I'm not making any connection here.

So I did not -- I mean, I did not opine on the function -- first of all, I did not opine on the functionality, that is not described in the editor. I did say the editor is a general-purpose cleanup tool which, if you read through that -- that paragraph in Column 7, starting Line 38 to 51, everything you read is either file size reduction or a cleanup tool, based on the disclosure that Geng is saying.

Now, you asked me could it be used for a functionality in Boerjes? I -- first of all, I don't see any motivation to combine them. Secondly, the functionality as you are describing is not there. I mean, you are talking about removing erroneous data. Where does it say -- I mean, unless you talk about abnormal data points, the -- I mean, Boerjes is talking about a scan data in some region being erroneous.

So here Geng is talking about an editor that has some cleanup functionality or

image-size-reduction functionality.

Q So could Geng's editor tool be used to clean up Boerjes's erroneous data?

MR. ARGENTI: Objection. Form. Scope.

A So again, I did not opine on that because, you know, first of all, as I said, even Dr. Karam is not suggesting that Geng's editor could be used in the functionality of removing an area in the -- in the -- in Boerjes.

But, you know, as I said again, we are talking about two different things. To my opinion, that's a cleanup tool as described by -- by Geng.

And it's not discussing that remove an identified surface by the -- by the user here. In Geng is not -- is not -- that's not what -- that's not what he's disclosing.

Q So are you saying Geng's editor tool can only be used for reducing noise or cleanup?

MR. ARGENTI: Objection. Form.

A I'm saying that Geng's editor can be used for what it describes in Column 7, in that

paragraph. And it -- it says what it does. And its functionality is to do cleanup either for image size reduction -- or I'm sorry, image file reduction or for cleaning up, like, removing a point or some points, or filtering. That's what it says. It says what it says. I can -- I cannot add functionality to it.

Q So does it always result in a file size reduction?

MR. ARGENTI: Objection. Form.

A Again, that's one of the functionalities. So he -- it is used for file size reduction.

Q So it does not always use for file size reduction. Right?

MR. ARGENTI: Objection. Form.

A We went through those other functionalities.

So, for instance, filtering may not result in file size reduction. Smoothing may not result in file size -- file size reduction. But if the file size is too big, Geng is disclosing that when that's undesirable, by implication he is

saying, because he is saying that its goal with the editor is to eliminate any undesirable areas under original 3D image to achieve the following functionalities.

So I have to assume that one of those undesirable cases is image file size, and therefore it can be used to reduce that. But not every functionality, probably.

If the file size is not excessive, then it is not worried about that. Geng is -- but it could be that the file size is fine, but there are a few abnormal points, for instance, that require to be removed by the dentist.

Q So Geng also teaches a merger tool.

Correct?

A Can you point me to the column and paragraph?

Q Sure. Please turn to Column 7, Line 57.

A Yes.

Q So it says, The merger provides tool that enable operators to integrate multiple uncalibrated 3D images into a single 3D digital

impression.

Do you see it?

A Yes, I see that.

Q So you say a manual mode requires operators to specify corresponding points among multiple 3D images.

A Yes, I see that.

Q And two lines below it says, An auto mode provides intelligent capability that searches the common points among multiple images based on their geometric features, such as curvatures.

And then it continues to say, From the identified common points, the acquired set of multiple 3D images can be merged automatically.

Do you see it?

A Yes.

Q So Geng's merger tool allow combining multiple 3D images into a single 3D image.

Correct?

A It says that from the identified common points, the acquired set of multiple 3D images can be merged automatically.

Q And Geng teaches the merger tool can use image registration. Correct?

A Where does it -- where does it say that?

Q If you keep reading this paragraph, at the bottom of Column 7. It says, "Alternatively, image registration" --

A I see.

Q -- "techniques known to those skilled in the art can be used to merge the acquired images together to form the 3D digital impression."

Do you see it?

A Yes.

Q So Geng teaches the merger tool can use image registration. Correct?

A Yes. In that sentence it says -- it says that.

Q So in Boerjes, we talked about the first case here where there is erroneous scan data that needs to be replaced with new scan data. Correct?

A But let me -- let me just make it clear. Boerjes is never teaching that. So I'm not -- I'm not sure what you are talking about.

Boerjes -- we discussed this before the break -- is teaching two scenarios. You have undesirable and erroneous data, in which case you take supplemental scans. Boerjes never talks about using an editor removing undesirable parts. I'm not sure -- I'm completely lost with that assumption. That Boerjes has never taught that. We went through Boerjes at length, and I have it in my declaration.

And in the second case, Boerjes is describing that, you know, additional surface preparation is taken place. In which case it says take new scan. Where does Boerjes say edit, remove? I'm not sure what we are getting at this. Where does it say -- where does it say -- where does Boerjes teaching say, remove undesirable scan data that we could come here, Oh, here, there we go, Geng is offering that to me.

Boerjes is not teaching that in the first place. I don't see any motivation why I should go and use Geng on something that Boerjes is not teaching me.

Q So I'm not talking about removal or Geng's editor tool. I'm talking about Boerjes's example where you have erroneous scan data and Boerjes teaches replacing the erroneous scan data with new scan data.

A Yes. It say replace the scan data with a new scan data. It doesn't say remove a portion of the scan data from old scan and replace it with a corresponding portion from a new scan to generate the composite data. That's what the patent says. Boerjes never says that.

Boerjes never says, create a composite model. Why do I need the merger in Boerjes for something that Boerjes doesn't do? Whether it's the editor or the -- or the merger, Boerjes is not teaching that. So why -- why a POSITA should go and look, say that, Oh, great, Geng is giving me these two functionalities for something that Boerjes is not teaching.

Q So could Geng's merger tool be used for integrating the new scan data into the model when replacing the erroneous scan data?

MR. ARGENTI: Objection. Form.

A Are you telling me -- I'm sorry.

Are you telling me that we use hindsight and use, you know, these two tools in a way that the '936 patent is describing? Because I don't see any alternative.

Boerjes is not teaching compositing two data -- two models. It's not teaching either that if there is erroneous data, that we should composite the two models. It says that you either take supplemental -- you create supplemental models or you create a new model. In none of those cases require neither editor nor a merger. And I have no idea -- and in fact, I believe that even Dr. Karam did not provide any motivation to combine these tools in -- in Boerjes, outside describing it exactly like '936 patent.

I did not see any motivation outside the same way, exact same way that '936 patent says it.

Q So you're saying one of ordinary skill in the art would not have used a merger tool as taught in Geng to integrate a new scan data into

an existing model to replace an undesirable area?

A I'm saying that that's not Boerjes, what Boerjes is teaching. Boerjes is not teaching in your initial scan remove the portion using an editor, and replace it, that portion, with new -- data from new scan. Boerjes is never teaching that.

And if Boerjes is never teaching that, why a POSITA would want to look to Geng, into Geng and say, Oh, great, here is an editor and a merger, exactly what I needed. Boerjes is not teaching that in the first place. There is absolutely no motivation for a POSITA, from my point of view, to look for an editor or -- or a merger in order to achieve what Boerjes is teaching.

Boerjes's teaching does not require any editor or merger.

MS. ZHANG: Okay. I think I'm done here with my questions. I do have one last one for Dr. Foroosh.

Q During any of the breaks that we took

today during this deposition, did you discuss the substance of your testimony with counsel?

A No.

MS. ZHANG: That's all my questions.

Thank you.

MR. ARGENTI: In that case why don't we take a short break, five minutes, and I'll see -- go through my notes and see if I have any redirect.

(A recess was taken.)

MR. ARGENTI: No questions from me.

Thank you, Dr. Foroosh.

(Off the record at 6:16 p.m. EDT.)

ACKNOWLEDGMENT OF DEPONENT

I, HASSAN FOROOSH, Ph.D., do hereby acknowledge that I have read and examined the foregoing testimony, and the same is a true, correct and complete transcription of the testimony given by me, and any corrections appear on the attached Errata sheet signed by me.

_____ _____

(DATE) (SIGNATURE)

C E R T I F I C A T E

I, Debra Ann Whitehead, E-Notary Public in and for the Commonwealth of Virginia, do hereby certify:

That HASSAN FOROOSH, Ph.D., the witness whose deposition is hereinbefore set forth, was duly sworn by me before the commencement of such deposition and that such deposition was taken virtually and is a true record of the testimony given by such witness.

I further certify that the adverse party, ALIGN TECHNOLOGY, INC., was represented by counsel at the deposition.

I further certify that the deposition of HASSAN FOROOSH, Ph.D., occurred virtually, on Friday, May 1st, 2026, from 10:01 a.m. to 6:16 p.m. EDT.

I further certify that I am not related to any of the parties to this action by blood or marriage, I am not employed by or an attorney to any of the parties to this action, and that I am in no way interested, financially or otherwise, in the outcome of this matter.

IN WITNESS WHEREOF, I have hereunto set my hand this 6th day of May, 2026.

My commission expires:
October 31, 2027



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