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UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE PATENT TRIAL AND APPEAL BOARD

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SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,

Petitioner,

v.

STRATASYS, INC.,

Patent Owner.

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Case IPR2025-00438 (US Patent No 10,569,466)  
Ref. 56224-0010IP1

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VIDEOCONFERENCE DEPOSITION OF

DENIS R. CORMIER

MARCH 25, 2026

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9:58 a.m. - 1:31 p.m.

REPORTED BY:

Tamara L. Houston

CA CSR No. 7244, RPR, CCRR No. 140, CRG

Job Number J14530508

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VIDEOCONFERENCE DEPOSITION OF DENIS R. CORMIER,  
taken on behalf of the Petitioner, commencing from 9:58  
a.m. to 1:31 p.m. EST, Wednesday, March 25, 2026, before  
Tamara L. Houston, CSR No. 7244, CCRR, RPR, CRG.

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I N D E X

EXAMINATIONS  
PAGE

MR. BIENIUS 6

E X H I B I T S

\*\*\* REFERENCED ONLY \*\*\*

EXHIBIT NO.	DESCRIPTION	PAGE
Exhibit 2013	Declaration of Denis R. Cormier	9
Exhibit 1001	US 10,569,466	21
Exhibit 2014	Tutorial: The Rapid Prototyping Technologies	41
Exhibit 1009	U.S. Patent Publication 2006/0127153	54
Exhibit 1004	U.S. Patent Publication 2006/0091199	59
Exhibit 1005	U.S. Patent Publication 2008/0192074	72
Exhibit 1018	KISSlicer Quick-Start Guide	81

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WEDNESDAY, MARCH 25, 2026, 9:58 a.m.

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COURT REPORTER: My name is Tamara Houston,  
California Certified Shorthand Reporter Number 7244.

DR. DENIS R. CORMIER,  
having been called as a witness,  
who was thereupon examined and testified as hereinafter  
set forth:

EXAMINATION BY MR. BIENIUS:

Q. Good morning, Dr. Cormier.

Today, we are discussing IPR proceeding IPR  
2025-00438 regarding U.S. Patent Number 10,569,466.

Do you understand that you are under oath?

A. Yes, I do.

Q. Is there any reason that you cannot give  
truthful and accurate testimony today?

A. No, I don't believe so.

Q. For true clarity, I will define several terms  
that we'll use throughout this deposition.

When I use the terms "patent owner" or  
"Stratasys," I'm referring to Stratasys, Inc., the  
patent owner in this proceeding.

Do you understand?

A. Yes, I do.

Q. When I use the term "Petitioner" or "Shenzhen

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1 Tuozhu," I'm referring to Shenzhen Tuozhu Technology  
2 Company Ltd.

3 Do you understand?

4 A. Yes, I do.

5 Q. When I use the term "the '466 patent," I'm  
6 referring to U.S. Patent Number 10,569,466.

7 Do you understand?

8 A. Yes, I do.

9 Q. When I use the phrase "this IPR" or "this  
10 proceeding," I am referring to IPR Proceeding Number  
11 IPR 2025-00438 filed against the '466 patent.

12 Do you understand?

13 A. Yes, I do.

14 Q. And you understand that the '466 patent is  
15 Exhibit 1001 in this proceeding, correct?

16 A. That's -- yes, that's my recollection.

17 Q. When I use the acronym "POSITA," I'm referring  
18 to a person of ordinary skill in the art at the time of  
19 the alleged invention.

20 Do you understand?

21 A. Yes, I do.

22 Q. Your declaration in this proceeding is  
23 Exhibit 2013 signed on January 16th, 2026.

24 When I use the term "your declaration," I'm  
25 referring to Exhibit 2013 in this proceeding.

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1 Do you understand?

2 A. Yes, I do.

3 Q. Can you please describe how you prepared for  
4 today's deposition?

5 A. Sure.

6 So I read materials that were provided to me.

7 I took plenty of notes.

8 We had meetings with -- with McDermott and  
9 myself. We had Zoom meetings and discussed what my  
10 positions were.

11 And then there was essentially a team effort  
12 to prepare the written document, which I then did final  
13 editing of and signed off that it was my opinion.

14 Q. Roughly how much time did you spend preparing  
15 your declaration for this case?

16 A. That was -- that was a couple months ago. So  
17 I'm guessing it was probably somewhere between 20 and  
18 30 hours, if I had to take a guess.

19 Q. In preparing your declaration, did you  
20 communicate with anyone other than counsel for the  
21 patent owner?

22 A. No, I did not.

23 Q. Approximately how much time did you spend  
24 preparing for today's deposition?

25 A. I would guess 10 to 15 -- 15 hours, maybe.

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1 Q. As part of preparing for today's deposition,  
2 did you communicate with anyone other than counsel for  
3 the patent owner?

4 A. No, I did not.

5 Q. What documents did you review in preparation  
6 for your deposition today?

7 A. The -- well, the references that were provided  
8 to me, including -- so there was the list of patents  
9 that were provided as references. There was  
10 Professor Hickner's declaration. The -- the preliminary  
11 board decision.

12 Those are the ones that are coming to mind  
13 right off the top of my head. Obviously all the files  
14 are closed on my computer, so I don't have the list of  
15 documents. I'm going off of memory here.

16 Q. In preparing for today's deposition, did you  
17 review any documents that are not currently of record in  
18 this proceeding?

19 A. I -- so there is -- there is an example of a  
20 figure that -- I inserted one of the figures that are  
21 inserted into my declaration for the binder jetting  
22 process, for instance, that I used as supporting  
23 information for my position.

24 Q. I'm going to drop your declaration,  
25 Exhibit 2013, into the chat.

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1           Hoping you can identify the figure that you  
2 were just referring to.

3           (Exhibit 2013 was referenced.)

4           THE WITNESS: Sure.

5           Hasn't arrived in the chat. Oh, there it is.  
6 Okay. Give me one second to open that.

7           Hang on. It's trying to download it instead  
8 of opening it.

9           Oh, I guess I do have to download it. Okay.  
10 One more second here.

11           Okay. Okay. I have the file open, and give  
12 me one second here to scroll down and locate that.

13           Okay. It looks like it's page 68. There's an  
14 illustration of a binder jetting process there.

15 BY MR. BIENIUS:

16           Q. You're referring to the image from  
17 Exhibit 2014 (sic), correct?

18           A. That appears to be correct, yes.

19           Q. When were you first contacted by someone on  
20 behalf of Stratasys to work on the current set of cases  
21 involving Stratasys and Shenzhen Tuozhu?

22           A. Let's see. We're in 2026. This -- I want  
23 to -- it was -- I'm guessing it was early 2025, in that  
24 approximate timeframe.

25           Q. Do you recall who first contacted you on

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1 behalf of Stratasys?

2 A. I believe it was Aashish Kapadia -- is that  
3 how -- I don't remember how to pronounce or spell his  
4 last name, but it's close to that.

5 Q. As part of your work on this case, have you  
6 communicated with anyone at Stratasys?

7 A. Did you say in preparation for this? I didn't  
8 hear the first part of the question.

9 Q. Yeah. In preparing your --

10 A. Oh.

11 Q. -- declaration and preparing for the  
12 deposition today, have you communicated with anyone at  
13 Stratasys?

14 A. No, I have not.

15 Q. Had you heard of Stratasys prior to being  
16 engaged with these cases?

17 A. Yes.

18 Q. When did you first become familiar with  
19 Stratasys?

20 A. The late '90s, I purchased a machine from  
21 them. So it's been over 20 years now. Almost 30 years.

22 Q. When did you first become aware of the '466  
23 patent?

24 A. It would have been the same time that Aashish,  
25 or Mr. Kapadia, reached out to me. I had not read that

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1 patent prior to him reaching out, to the best of my  
2 recollection, at least.

3 Q. As part of your work on this IPR proceeding,  
4 did you communicate in any way with any of the named  
5 inventors of the '466 patent?

6 A. No.

7 Q. Other than counsel for the patent owner, did  
8 you have anyone, such as an assistant, help you with  
9 your declaration for this IPR?

10 A. No, just me.

11 Q. Has anything happened to change any of your  
12 opinions that you provided in your declaration for this  
13 case?

14 A. None that I can think of.

15 Q. Are you currently aware of any errors that  
16 exist in your declaration?

17 A. None that I'm aware of. I won't -- if I read  
18 it again and again, I won't swear that I haven't missed  
19 anything, but none that I'm aware of.

20 Q. During your career, approximately how many  
21 times have you been retained as an expert either in  
22 litigation or IPR matters?

23 A. Once before, plus this one.

24 Q. During your career, approximately how many  
25 times have you been deposed as an expert in litigation

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1 or IPR matters?

2 A. This is my third time being deposed.

3 Q. Prior to reading the expert declarations  
4 submitted by Dr. Michael Hickner in this case and the  
5 other related IPR proceedings, did you know Dr. Hickner?

6 A. No. I -- it's entirely possible that we just  
7 met in passing at conferences, but I don't have an  
8 explicit recollection of ever meeting him in person or  
9 communicating with him via e-mail or anything.

10 Q. All right. We already have your declaration  
11 open, Exhibit 2013. I want to turn to paragraph 12 of  
12 your declaration.

13 A. Okay. One second.

14 Okay. I see it.

15 Q. In paragraph 12, you state that you've taught  
16 classes in additive manufacturing/3D printing.

17 What different types of additive manufacturing  
18 processes did those courses cover?

19 A. Pretty -- pretty much all of them. The  
20 introductory preprinting course is a survey -- that's  
21 the one that I've been teaching for a very long time,  
22 25 years or more. That course covers all of the basic  
23 processes such as fused filament fabrication, binder  
24 jetting, laser sintering, and so on.

25 Q. Can you briefly describe the binder jetting

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1 process?

2 A. Sure.

3 So binder jetting is a powder-based process  
4 where you have a container or a platform and you spread  
5 a very thin layer of powder over -- over the build  
6 platform, and then an inkjet printhead passes over the  
7 powder layer and selectively jets droplets of ink, or  
8 you can think of them as glue, that bind the particles  
9 together only where you need them held together within  
10 that one layer.

11 And then you spread another layer on top of  
12 the first and repeat the process one layer after another  
13 until the three-dimensional shape has been produced.

14 And then at the end of that, you remove the  
15 bound part or three-dimensional shape from the powder  
16 bed and blow off any remnant powder that's sitting on  
17 the surface.

18 Is that a sufficient description?

19 Q. Yes. Thank you.

20 A. Okay.

21 Q. In binder jetting processes, are there certain  
22 temperature requirements for the process, such as  
23 temperature for the -- temperature for dispensing  
24 material, build platform temperature, build volume  
25 temperature, et cetera?

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1           A.    There -- there can be.  So if you need the --  
2   if the binder that I alluded to is being printed, in  
3   certain instances, you might have to heat up the ink to  
4   a temperature that makes it jettable.  Compatible with  
5   the inkjet printing process.

6           In some cases, you might -- you might apply  
7   heat to the powder bed after you printed to help dry  
8   the -- dry the fluid and so on.

9           Q.    Are there cooling requirements for binder  
10   jetting?

11          A.    I -- in my professional experience, I don't  
12   recall actively cooling, like blowing cold air or  
13   anything or having chillers.  You will -- when you're  
14   done printing, you turn off all the heat, if there is  
15   any heat applied, and it would naturally cool down.  But  
16   I don't recall active cooling with chillers or things  
17   like that.

18          Q.    The temperature requirements that you just  
19   discussed, such as a jetting temperature, would those  
20   temperatures vary based on the material used in the  
21   process?

22          A.    They -- generally speaking, you would --  
23   they're ink specific, so -- so you might have to -- so  
24   you might change the temperature as you're printing.

25                Depending on which ink you're printing, you

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1 might -- if there is closed-loop process control where  
2 you're monitoring whether or not droplets are coming  
3 out, you might dynamically raise or lower temperatures  
4 as the process progresses.

5 Q. Can you briefly describe the laser sintering  
6 process?

7 A. Yes.

8 So in laser sintering, it's, again, a powder  
9 base where it starts out with a powder and a platform.  
10 So you spread -- you know, a doctor blade will spread a  
11 thin layer of powder typically inside of plastic or  
12 metal over the build platform.

13 And then a laser from above points down and  
14 scans over the surface of the powder, and anywhere the  
15 laser scans over the surface of the powder, it melts the  
16 powder. And that's the selective part. You selectively  
17 melt some powder and not other areas.

18 And then repeat the process, and pull your  
19 part out of the powder when you're done.

20 Q. Would laser sintering processes have  
21 temperature requirements, such as a platform or build  
22 volume temperature requirement, for a temperature  
23 achieved by the laser?

24 A. So it's an indirect thing where the laser  
25 power and speed will determine the temperature of the

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1 material that you're melting. And, you know, as a  
2 general rule there, you want to get the temperature up  
3 above a certain value to get proper melting.

4           Again, that -- that value will change as -- as  
5 the build progresses, so you may increase or decrease  
6 laser power or speed. It's not a static number just  
7 because the part is accumulating heat as you're growing  
8 the part.

9           Q. Can you briefly describe the fused filament  
10 fabrication process?

11           A. Yeah.

12           So fused filament fabrication, that's the --  
13 for the general public, when you say "3D printing,"  
14 that's the process that most people are familiar with.

15           So you have a plastic wire -- it's kind of  
16 like Weedwacker wire -- that you feed into a heated  
17 nozzle. I call it a very expensive hot melt glue gun.

18           And so you melt -- melt the plastic, and the  
19 melting -- the plastic gets pushed out of a nozzle, and  
20 the nozzle moves over a print bed.

21           And so that plastic that's continuously coming  
22 out of the nozzle will lay down a bead plastic, and you  
23 do that over and over and over again to build up the  
24 three-dimensional shape.

25           Q. You mentioned melting the plastic. Would

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1 different types of plastic material have different  
2 melting temperatures in the fused filament fabrication  
3 processes?

4 A. Yes. Each -- each plastic has its own melting  
5 temperature.

6 Q. So would using different materials require  
7 different temperatures for the extruder nozzle?

8 A. Yes. You would extrude different materials at  
9 different temperatures, and also the temperature will  
10 change -- excuse me, the temperature will change while  
11 you're printing as well. It's not one static number.  
12 As a general rule, that is.

13 Q. Do fused filament fabrication processes ever  
14 include other temperature requirements, such as build  
15 platform temperature or build volume temperature  
16 requirements?

17 A. Yes, you will -- optional depending on which  
18 machine you're using, but if a machine is equipped with  
19 a print bed heater and/or a chamber heater, then you  
20 could -- you could use those during the printing  
21 process.

22 Q. Would those temperature requirements be  
23 changed based on the type of material used?

24 A. Yes, they would. Well, they could, at least,  
25 I'll say.

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1 Q. Are there cooling requirements for fused  
2 filament fabrication processes?

3 A. Yes. For that process in general, it's not  
4 uncommon to have a fan that blows on the material that  
5 you've squeezed out of the nozzle to help it cool down  
6 and solidify more quickly.

7 Q. Would those cooling requirements change based  
8 on the material used?

9 A. They -- they could. Yeah.

10 Q. Sticking with paragraph 12 of your  
11 declaration, towards the end of the paragraph, you  
12 mention 3D printing of metallic components.

13 At the time of the '466 patent, what processes  
14 were available to a POSITA for 3D printing of metallic  
15 components?

16 A. So the -- the most commonly known one at that  
17 time was laser powder bed fusion. There's electron beam  
18 melting. There is what we call metal binder jetting.  
19 And directed -- I'm sorry, directed energy deposition.

20 Those would be examples of metal 3D printing  
21 processes.

22 Q. How does laser powder bed fusion differ from  
23 the laser sintering process you mentioned earlier?

24 A. So you start getting into trademarks and  
25 things like that. So different names for the same

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1 thing.

2 But also laser sintering, as a high-level,  
3 generic term, could also be used to describe melting  
4 plastic powder instead of metal powder. So laser powder  
5 bed fusion usually -- not globally but -- the typical  
6 meaning of laser powder bed fusion is interpreted to  
7 mean for making metal parts.

8 Q. Did you cover any of the processes that you  
9 just mentioned for 3D printing of metallic components in  
10 the classes that you taught?

11 A. Yes. The intro class as well as -- well,  
12 actually, I'm sorry. As of 2012, I had not taught a  
13 metal additive manufacturing course. But, yes, in the  
14 generic 3D printing or the intro 3D printing course, I  
15 covered those processes.

16 Q. Can you briefly describe the directed energy  
17 deposition process?

18 A. Sure.

19 So there are two variants of it. If -- if you  
20 imagine a laser -- shooting a laser down onto a plate of  
21 metal, it melts a little spot on the metal plate. And  
22 so you have what's normally called a puddle, a melt  
23 puddle. Odd name for molten metal, but that's what  
24 people call it.

25 And then from the side, you would either blow

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1 in metal powder or you could feed in a wire so you're  
2 adding metal to the little puddle there, and then you  
3 start moving. And so you're laying down a bead of  
4 additional metal in whatever path you follow.

5 And then obviously keep doing that to build up  
6 the three-dimensional shape.

7 Q. Would there be temperature requirements for  
8 the directed energy deposition processes, such as  
9 platform temperature or build volume temperature?

10 A. It's -- it's not common to control the build  
11 volume temperature with that process. There are  
12 instances where people will heat or even sometimes cool  
13 the build platform, though, that you're printing onto.

14 Q. Can you briefly describe the electron beam  
15 melting process?

16 A. Sure.

17 So it's identical to the laser powder bed  
18 fusion process that I described with the exception -- or  
19 it's, generally speaking, identical, with the exception  
20 that you're using an electron beam instead of a laser as  
21 the energy source to melt the metal powder.

22 And it only applies to metals. Unlike lasers,  
23 you would not use an electron beam to melt ceramic  
24 materials, for example. Just metallic materials.

25 Q. I want to talk about the '466 patent,

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1 Exhibit 1001. I'm going to drop that into the chat.

2 A. Okay.

3 (Exhibit 1001 was referenced.)

4 THE WITNESS: Downloaded it, but it's --  
5 There it is. Okay.

6 Okay. I have the '466 patent open.

7 BY MR. BIENIUS:

8 Q. I want to start at the very bottom of Column 1  
9 with the sentence that starts at line 66.

10 A. Okay. I see it.

11 Q. Here, the '466 patent states: (As read) "The  
12 following description emphasizes three-dimensional  
13 printers using Fused Deposition Modeling or similar  
14 techniques where a bead of material is extruded in a  
15 layered series of two-dimensional patterns or 'roads,'  
16 'paths,' or the like to form a three-dimensional object  
17 from a digital model."

18 Is this Fused Deposition Modeling technique  
19 described here the same as or different from the fused  
20 filament fabrication process you mentioned earlier?

21 A. It's similar to -- again, Fused Deposition  
22 Modeling was a trademark term for the process, and fused  
23 filament fabrication is the generic term. It's kind of  
24 like tissues and Kleenex. Kleenex is a trademark name.  
25 It's a similar thing here.

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1 Q. So a POSITA would consider Fused Deposition  
2 Modeling to just be a variety of fused filament  
3 fabrication; is that correct?

4 A. Generally speaking, yes.

5 Q. So the temperature requirements you described  
6 earlier, such as material dispensing temperature, build  
7 volume temperature, et cetera, for fused filament  
8 fabrication processes, those would apply equally to  
9 Fused Deposition Modeling; is that correct?

10 A. Yes, that's generally correct.

11 Q. All right. Continuing with the same  
12 paragraph, now on Column 2, the '466 patent states:  
13 "Numerous additive fabrication techniques are known in  
14 the art, including, without limitation, multi-jet  
15 printing, stereolithography, digital light processor  
16 ('DLP'), three-dimensional printing, selective laser  
17 sintering, and so forth."

18 Do you see that?

19 A. I do.

20 Q. Is multi-jet printing the same as or different  
21 than the binder jetting printing that you mentioned  
22 earlier?

23 A. It's a different process.

24 Q. Can you please briefly describe the multi-jet  
25 printing process?

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1           A.    Sure.

2                    So with multi-jet printing, it's -- it's an  
3 inkjet process where the -- and this is as a general  
4 rule, the typical implementation. It's an inkjet  
5 process where the ink being printed is a liquid plastic,  
6 and so you have liquid plastic being jetted out of the  
7 print head nozzles.

8                    When the liquid plastic lands on the  
9 substrate, it's -- it either solidifies -- it solidifies  
10 by one method or another. You might shine an  
11 ultraviolet light on it or other curing methods. And  
12 then you've printed one layer, so then you print the  
13 second layer and the third layer and so on.

14                   So that's in contrast to binder jetting where  
15 there was powder -- powder material. You were jetting  
16 glue to hold the particles together.

17           Q.    Would different liquid plastic materials used  
18 in multi-jet printing have different temperature  
19 requirements, such as dispensing temperature, platform  
20 temperature, or build volume temperature?

21           A.    They -- well, just to be clear, the dispensing  
22 temperature, that term generally refers to a different  
23 process. But if you use the term "jetting temperature,"  
24 for instance, that would be more appropriate for that  
25 process.

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1           And so depending on what kind of liquid  
2 plastic you're -- you're jetting, you might choose to  
3 use a different temperature during printing. And as was  
4 the case before, that -- that's not necessarily a static  
5 temperature. It can change depending on the print  
6 conditions and where you are.

7           Q.    Would that be different temperatures for the  
8 jetting of the material, the platform temperature, and  
9 the build volume temperature?

10          A.    It -- it's -- it can be, yes.

11                And I'm sorry -- you did mention build volume  
12 temperature; is that correct?

13          Q.    Correct.

14          A.    Okay. Yeah. Generally -- generally speaking,  
15 in multi-jet printing, there is not a -- you don't  
16 specify or use a build volume temperature. That's used  
17 for other processes but not -- not that specific  
18 process, generally speaking.

19          Q.    Are there cooling requirements for multi-jet  
20 printing?

21          A.    I cannot think of -- in my professional  
22 experience, I cannot think of any multi-jet printing  
23 system that I've ever used or seen that had active  
24 cooling of any sort. I wouldn't rule it out globally,  
25 but my professional experience, I don't recall active

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1 cooling.

2 Q. Other than the temperature requirements that  
3 we just discussed, are there other operating parameters  
4 for multi-jet printing that would change based on the  
5 type of liquid plastic used?

6 MR. TATUM: Objection. Form.

7 THE WITNESS: I have to think about that for a  
8 second to see if I can come up with examples.

9 You said other -- other printing parameters  
10 that would change based on the material used; is that  
11 correct?

12 BY MR. BISENIUS:

13 Q. Correct.

14 A. Okay. So the -- we're getting into the weeds  
15 here that -- that -- a POSITA wouldn't be familiar with  
16 this, but getting into the weeds, when you operate an  
17 inkjet print head, there's a voltage signal that you  
18 send to each of the nozzles that determines how much  
19 energy you -- you apply to push the plastic out of the  
20 nozzle, the discrete droplets.

21 And so that voltage could vary depending on  
22 which -- which material you're trying to jet. Just some  
23 materials require more energy to get the droplets to  
24 fly.

25 But that -- that could be one example.

1           Q.    Can you please briefly describe  
2 stereolithography?

3           A.    Sure.

4                    So stereolithography is widely credited as  
5 being the first 3D printing process.  And so you -- in  
6 that case, you have a vat or a container filled with the  
7 liquid plastic -- or resin, it's called -- and then you  
8 have a laser from above that shines down onto the top  
9 surface of that liquid plastic, and the laser moves  
10 around a prescribed path.

11                   And anywhere the laser impinges upon that  
12 liquid plastic, it selectively hardens where it converts  
13 the liquid to a solid.  And then you lower the build  
14 platform and another layer of liquid plastic, and you  
15 repeat the process and then clean -- clean all the goop  
16 off of your part when you're done.

17           Q.    Would there be different temperature  
18 requirements for different types of liquid plastic used  
19 in these processes, such as temperatures for the build  
20 volume or temperatures reached by the laser?

21           A.    For the laser, I don't think -- so this  
22 particular process does not use heat to cure the  
23 material -- or to harden the material.  It's a chemical  
24 reaction rather than heat.

25                   And so the -- the only temperature requirement

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1 that might come into play here -- and I'm trying to  
2 think prior to -- well, 2012 or earlier, I -- I'm not  
3 sure if there were -- if there were resin vat heaters  
4 prior to -- well, 2012 or earlier, let's say.

5 Modern versions of this process can have  
6 heaters of the resin vat to -- and that temperature  
7 might vary depending on which material you're -- you're  
8 printing.

9 I -- I couldn't swear to you that that was in  
10 place prior to -- I'm sorry -- 2012 or earlier. It may  
11 or may not have been.

12 Q. Can you briefly describe digital light  
13 processor three-dimensional printing?

14 A. Sure.

15 So it -- if you're standing there, watching  
16 it, it looks kind of similar to the stereolithography  
17 process that we just talked about in that you have a  
18 container of liquid -- liquid plastic. Instead of a  
19 laser that shines down and, you know -- it's just kind  
20 of a point source, like a laser pointer if you were to  
21 draw shapes on the wall that your cat chases. Right?

22 With DLP, it's the same DLP projectors that  
23 are in classrooms that project an image from a computer  
24 onto a -- onto a screen. The light from that DLP  
25 projector will selectively harden the plastic. So if

1 you were to project an image of a white square onto the  
2 liquid plastic, it would harden a square in that area.

3 From that point forward, it's just do another  
4 layer of liquid plastic, project the next image, and so  
5 on.

6 Q. So the area that's cured or hardened is based  
7 on the color of the light projected on it; is that  
8 correct?

9 A. It's based on the wavelength specifically, the  
10 scientific term. So if you're -- 465 nanometers, for  
11 instance. The liquid plastic is chemically tuned to  
12 harden at a very narrow range of wavelengths. And  
13 that's the same case with stereolithography.

14 Q. This paragraph in the '466 patent uses the  
15 term "selective laser sintering."

16 Is that the same as the laser sintering  
17 process you discussed earlier?

18 A. It -- it's -- it's similar. And, again, so --  
19 and, again, these are not universal. Different people  
20 will use terms a little bit differently.

21 But the majority of people, I would say, use  
22 the term "selective laser sintering" when they're  
23 describing melting plastic powder, whereas "laser powder  
24 bed fusion" is more commonly used to describe metal --  
25 melting metal powders.

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1           The process is operating essentially in the  
2 same manner. Spread a layer of powder and scan a laser  
3 beam over the powder.

4           Q. I want to continue with the '466 patent.

5           And going towards the end of Column 4,  
6 starting at line 57, it states: "Figure 2 depicts a  
7 networked three-dimensional printing environment."

8           How does a networked three-dimensional  
9 printing environment differ from a non-networked  
10 three-dimensional printing environment?

11          A. So a non-networked -- well, I can give you an  
12 example of a non-networked three-dimensional printing  
13 environment in which you might have a three-dimensional  
14 printer, you might have a PC or a computer that's  
15 connected to the 3D printer, and that --

16           I'm sorry, I'm just rereading that sentence  
17 just to make sure I'm answering your question here.

18           So, yes, it is not necessary to have a network  
19 with data or information flowing over a network to  
20 operate a 3D printer, I guess is what I'm trying to say.

21           And I just gave an example of that.

22          Q. Okay. So you just gave an example where you  
23 might have a PC or other computer directly connected to  
24 a 3D printer.

25           If you took the same PC or desktop computer

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1 and had it communicate with the 3D printer over the  
2 Internet, would that be a networked three-dimensional  
3 printing environment?

4 A. Over the Internet. So, yes, I would describe  
5 that as a -- if you're considering the Internet to be an  
6 element of a network. It's -- I wouldn't say that it's  
7 common, but normally the term "network" in 3D printing  
8 refers to an Ethernet, for instance.

9 Q. Continuing with this part of the '466 patent,  
10 at the top of Column 5, it describes that the network  
11 could be a public network such as the Internet.

12 Do you see that?

13 A. I do, yeah.

14 Q. So would you consider situations in which a PC  
15 is communicating with a 3D printer over the Internet to  
16 fall within the '466 patent description of a networked  
17 three-dimensional printing environment?

18 A. As -- as it's described in the previous -- at  
19 the bottom of Column 4 that you were just saying, that  
20 would be an example of that, yes. It says the term  
21 "public network such as the Internet."

22 Q. The specific networked three-dimensional  
23 printing environment shown in Figure 2 of the '466  
24 patent includes a number of devices and components in  
25 addition to the three-dimensional printers; is that

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1 correct?

2 A. I -- so I just scrolled to Figure 2. I would  
3 have to -- I'd have to go back and refer to the numbers.  
4 So please repeat the question. It refers to a number of  
5 different -- what was that?

6 Q. A number of different devices and components  
7 in addition to three-dimensional printers.

8 A. Okay. Yes. The -- that particular figure  
9 shows a whole bunch of devices and components in  
10 addition to what -- looks like 204 is the 3D printer  
11 or -- well, two 3D printers.

12 Q. So going back to the bottom of Column 4, in  
13 the paragraph starting at line 57 that I was discussing  
14 earlier, in the third sentence of that paragraph,  
15 starting at line 60, this mentions other devices  
16 involved in the networked three-dimensional printing  
17 environment include "client devices, print servers,  
18 content sources, and mobile devices"; is that correct?

19 A. Yes, that's what the language says there.

20 Q. Moving to Column 5, the paragraph that starts  
21 at line 40, this paragraph is still discussing the  
22 networked three-dimensional printing environment of  
23 Figure 2; is that correct?

24 A. It's referring to numbers in the 200s, so,  
25 yes, that appears to be referring to Figure 2.

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1 Q. This paragraph mentions that the client  
2 devices can be any number of computing devices, such as  
3 "desktop computers, laptop computers, network computers,  
4 tablets, or any other computing device that can  
5 participate in the environment 200"; is that correct?

6 A. It does say that, yes. Lines, roughly, 42.

7 Q. So earlier when you mentioned that, in  
8 non-networked three-dimensional printing environments,  
9 there would usually be a computer in communication with  
10 the printer, if you were to take that same computer and  
11 place it into the networked three-dimensional printing  
12 environment of Figure 2 and have it communicate with the  
13 printer over the network, that same computer could serve  
14 as one of these client devices; is that correct?

15 MR. TATUM: Objection. Form.

16 THE WITNESS: Let me understand your question  
17 one more time. So you said the --

18 So, for instance, the scenario that I was --  
19 the common scenario that I described earlier is you  
20 have, for example, a computer sitting next to the 3D  
21 printer, and it's plugged into the 3D printer, typically  
22 over a USB -- USB cable. So you're -- in that context,  
23 can you repeat the question?

24 BY MR. BISENIUS:

25 Q. Yes.

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1           Would you be able to use that same computer as  
2 one of the client devices in the networked  
3 three-dimensional printing environment of Figure 2?

4           A.    It -- you don't think of it as -- so I guess  
5 I'm having a hard time answering the question.  You --  
6 you --

7           In the context of using a 3D printer, the -- a  
8 PC that's directly connected to the printer is typically  
9 considered part of the 3D printing system, as opposed to  
10 a client -- as opposed to a client that's remote.  My  
11 office, for instance, has a PC, and I would send jobs  
12 over -- over the network.

13           I'm sorry, let me jump back to the -- we  
14 were -- we were in Column 5; is that correct?

15           Q.    Yeah.  The paragraph that starts at line 40.

16           A.    There we go.  Okay.

17           Yeah.  So the function that's described here  
18 is any device "within the environment operated by users  
19 to initiate, manage, monitor, or other" -- I'm sorry --  
20 "otherwise interact with print jobs at the  
21 three-dimensional printer."

22           And so it -- so if it's performing those  
23 functions, then as it -- as described there, it could  
24 serve the function of a client device if it's performing  
25 those functions.

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1 Q. I want to continue to the paragraph starting  
2 at line 3 of Column 6.

3 This paragraph is still discussing the  
4 networked three-dimensional printing environment of  
5 Figure 2; is that correct?

6 A. And I'm sorry, you said paragraph 3? So is  
7 that line 59?

8 Q. I'm sorry, line 3. Line 3.

9 A. Line 3. Okay. Sorry.

10 Q. Okay. I'll repeat my question.

11 This paragraph is still discussing the  
12 networked three-dimensional printing environment of  
13 Figure 2; is that correct?

14 A. It appears to be because the numbers are  
15 labeled in the 200s, yes.

16 Q. This paragraph is discussing the multiple  
17 print servers in the network; is that correct?

18 A. It -- it starts alluding to the print servers,  
19 so that appears to be correct.

20 Q. This paragraph describes that the print  
21 servers can manage a print job received from one or more  
22 client devices and distribute print jobs to the  
23 printers; is that correct?

24 A. I'm just trying to find the part -- the  
25 portion of the sentence where it says "distribute jobs

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1 to the 3D printers."

2 Q. Maybe I can ask this a different way.

3 A. Sure.

4 Q. How would you describe the function of the  
5 print servers 208 in the network?

6 A. Sorry, I just lost my -- lost my place here.  
7 So we're on Column 6, correct?

8 Q. Correct.

9 A. For answering your question. Yeah.  
10 So -- yeah, so it says: "For example, the  
11 print servers may manage print jobs received from one or  
12 more of the client devices and provide related  
13 supporting functions such as content search and  
14 management."

15 So that -- and then it also says: "A Web  
16 server that provides Web-based access by the client  
17 devices to the capabilities of the" -- "of the print  
18 server."

19 And it may communicate periodically with the  
20 3D printers to get the status of the printers.

21 So those are all examples of functions of a  
22 server that it explicitly lists there.

23 Q. The '466 patent also describes that the print  
24 servers select printers to complete the received print  
25 jobs; is that correct?

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1           A.    Can you -- I can search.  Can you tell me  
2 where you're reading from?  What do you want me to  
3 search for?

4           Q.    It's not a direct quote --

5           A.    Oh, okay.

6           Q.    -- but it's around line 22 of Column 6.

7           A.    Okay.  And -- and apologies one more time.  
8 Can you repeat the question?

9           Q.    Would you agree that the '466 patent describes  
10 that the print servers select printers to complete the  
11 received print jobs?

12          A.    So line 24, it appears, it says a print server  
13 may automatically select one of the three-dimensional  
14 printers for a user-submitted print job.

15          Q.    Okay.  The description of the functionality of  
16 the print servers continues into columns 7, 8, and 9; is  
17 that correct?

18          A.    Yes.  That appears to be correct per the top  
19 of Column 9.

20          Q.    In this network environment described with  
21 respect to Figure 2, do the print servers themselves  
22 have any three-dimensional printing capability?  In  
23 other words, are they capable of fabricating  
24 three-dimensional objects themselves?

25          A.    I could -- I could take the time to read all

1 of that. I'm -- I can say that I do not recall ever  
2 seeing a print server having any connection -- or print  
3 server being used to 3D print a part. A print server is  
4 generally a computer, not a 3D printer, if that's what  
5 you're getting to.

6 Q. So generally around this timeframe, 2012 and  
7 earlier, in general, in a networked printing  
8 environment, would you agree the function of a print  
9 server is to receive print jobs from client devices and  
10 send those print jobs to printers?

11 MR. TATUM: Objection. Form.

12 THE WITNESS: So the 2012 timeline -- I'm  
13 trying to think of -- so since 2012, what you just said  
14 for sure is -- it has been done by different software  
15 packages.

16 I'm trying to think -- I'm trying to come  
17 up -- if I can remember any examples of print servers  
18 being used that way 2012 or earlier. Prior to this --  
19 prior to this patent. I --

20 So, again, I can't give you an absolute or a  
21 definitive, "Yes, this happened"; "yes, this did not  
22 happen."

23 I do not have any memory of print server --  
24 I'm sorry -- 3D printer server software doing this 2012  
25 or earlier.

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1           So I couldn't give you a definitive "yes" or  
2 "no" answer to that question.

3 BY MR. BIENIUS:

4           Q.    Sticking with Column 9, looking at the  
5 paragraph that starts at line 25.

6           A.    Okay.

7           Q.    This paragraph is still discussing the  
8 networked three-dimensional printing environment of  
9 Figure 2; is that correct?

10          A.    It appears to be, yes, referring to  
11 200-numbered items, yep.

12          Q.    This paragraph is discussing the content  
13 sources 210, correct?

14          A.    Yes, I see reference to that.

15          Q.    What is the function of the content sources  
16 210?

17          A.    So the examples that it's giving there are  
18 sources of content for fabrication with the 3D  
19 printer -- "databases of objects accessible through a  
20 Web interface."

21                So the -- it's kind of what the name implies.  
22 It's a source of content -- well, it's a circular  
23 description there, but a content source is a place where  
24 you could get things that you want 3D printed, I guess,  
25 is the crude way of describing it.

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1 Q. Moving on to Column 10, the paragraph that  
2 starts at line 4, this paragraph is still discussing the  
3 networked three-dimensional printing environment of  
4 Figure 2; is that correct?

5 A. It appears to be, yes.

6 Q. What function do the mobile devices 212 serve  
7 in the networked printing environment of Figure 2?

8 A. So as described there, the mobile device can  
9 interact with the networked printing environment, which  
10 could be interacting with a laptop computer, tablets,  
11 et cetera; may be operated by users for user-oriented  
12 functions such as to locate printable objects, submit  
13 objects for printing, and to monitor a personally owned  
14 printer.

15 Those would be examples that address your  
16 question.

17 Q. So do the mobile devices 212 function as  
18 client devices?

19 A. So in the sense that it says to submit objects  
20 for 3D printing, that could be an example of -- you  
21 might consider that an example of the functionality of a  
22 client that wants to submit something for printing.

23 Q. Continuing on to columns 11 and 12, these two  
24 columns are still discussing the networked  
25 three-dimensional printing environment of Figure 2; is

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1 that correct?

2 A. That appears to be correct. All the numbers I  
3 see are in the 200s.

4 Q. In Column 13 at line 65, the '466 patent  
5 begins discussing Figure 3; is that correct?

6 A. Yes, that's correct.

7 Q. So would you agree that the portion of the  
8 '466 patent starting at Column 4, line 57, and  
9 continuing until Column 13, line 64, is describing a  
10 networked printing environment?

11 A. Say the start -- the start column again.

12 Q. Column 4, line 57.

13 A. Okay. Do you want me to read it?

14 And then I know you said through the bottom of  
15 Column 13. Right?

16 Q. Correct.

17 A. Okay. Yeah, so --

18 Q. And the question was: Would you consider this  
19 portion of the '466 patent from Column 4, line 57, until  
20 Column 13, line 64, to be describing a networked  
21 printing environment?

22 A. At least portions of it do. I'd have to read  
23 all -- whatever -- these four pages or so, but --  
24 portions of it refer to networked printing, not  
25 necessarily the entire range that you mentioned.

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1 MR. BISENIUS: I'm about to switch to a  
2 different exhibit, and we've been going for about an  
3 hour. So now might be a good time for a break.

4 THE WITNESS: Sure.

5 MR. BISENIUS: Should we reconvene at ten  
6 past?

7 THE WITNESS: Sure. That works.

8 (Recess: 11:03 a.m. to 11:10 a.m. Eastern  
9 Time.)

10 MR. BISENIUS: I've dropped Exhibit 2014 into  
11 the chat.

12 (Exhibit 2014 was referenced.)

13 THE WITNESS: Okay. I've got it.

14 BY MR. BISENIUS:

15 Q. You briefly mentioned Exhibit 2014 earlier  
16 today when discussing the figure on page 68 of your  
17 declaration. So I want to talk about some of the  
18 disclosures in Exhibit 2014.

19 A. Okay.

20 Q. Specifically I want to start on page 3.

21 A. PDF page 3, correct?

22 Q. Correct. PDF page.

23 A. Okay. Got it. Sorry.

24 Q. Under the subheading 4, "Details of RP  
25 Technologies," in the second paragraph, it states: "At

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1 present, the prototyping technologies are based on the  
2 following five main manufacturing processes."

3 Do you see that?

4 A. Yes, I do.

5 Q. What 3D printing technologies would fall under  
6 the curing process?

7 A. Curing process -- so stereolithography --  
8 sorry, I almost gave the wrong acronym there. So  
9 stereolithography is one. The -- Excuse me -- direct  
10 light fabrication.

11 And, again, you have to understand that  
12 people -- this is a rapidly evolving technology, so  
13 people use different acronyms. What we were previously  
14 talking about, digital light processing, DLP, in this  
15 reference, they call it digital light fabrication  
16 instead.

17 So those -- those will be two.

18 I'm trying to find the -- what they call the  
19 photopolymer inkjet printing. They don't call it the  
20 same name here.

21 If it's important, I can look for that  
22 specific process on the list.

23 Do you need me to, or were the first two that  
24 I gave you enough?

25 Q. Those examples are fine.

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1           A.    Okay.

2           Q.    What technologies use the sheet process?

3           A.    So on the right column, about two thirds of  
4 the way down, there's LOM. That refers to laminated  
5 object manufacturing. That's pretty much it. Well, as  
6 of 2012, that's the sheet process.

7           Q.    Can you briefly describe laminated object  
8 manufacturing?

9           A.    Yeah.

10                    So the version that existed in 2012 involved  
11 rolling out a -- if -- you have a roll of paper like  
12 butcher's paper where it's got plastic on one side of  
13 it, so you roll that out. A laser basically cuts a  
14 contour in the paper, and then a hot roller rolls over  
15 that. And the plastic on the underside melts to the  
16 previous layer.

17                    And then you keep doing that layer upon layer.  
18 And then when you're done, you essentially break away  
19 all of the cube material that's surrounding your part,  
20 and then you've got the final part that's done.

21           Q.    What technologies use the dispensing process?

22           A.    So that's -- let me -- when you're asking me,  
23 you're asking me to select from their list; is that  
24 correct?

25           Q.    Or if you can think of something off the top

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1 of your head.

2 A. Oh, okay.

3 So the -- the material jetting process that we  
4 were talking about before, which -- so I'll be  
5 completely honest with you. Some of the names that they  
6 assign to processes in this reference are not the ones  
7 that are commonly used.

8 Like I see reference to "fast inkjet," which I  
9 suspect -- I've never heard anybody use that term  
10 before, but I suspect that's similar to the -- the  
11 inkjet -- photopolymer inkjet process that we were  
12 talking about earlier.

13 And I don't see any others on their list  
14 that -- now -- I'm sorry, let me -- let me be more  
15 specific there.

16 The dispensing process, I actually thought I  
17 read "jetting" there. My apologies. I mis- -- I  
18 misread the name of the process.

19 So, yeah. Okay. I'm sorry, so the dispensing  
20 process where the material is melted -- so it's -- it's  
21 not normally -- so the dispensing is normally an  
22 extrusion process, which will be the fused filament  
23 fabrication, or FDM, the Fused Deposition Modeling  
24 process.

25 And it says "hot droplets" there. I'm trying

1 to think of a -- so if your melt -- I guess if you're  
2 inkjetting molten wax, that would be a different process  
3 that's described there.

4 Q. What technologies use the sintering process?

5 A. So in the context there, they're using the  
6 term "sintering," and they presumably mean melting as  
7 well. Sintering is just done at a lower temperature,  
8 and you're not melting the powder particles.

9 So whether it's sintering or melting, examples  
10 of that process would be the -- the laser powder bed  
11 fusion process that we talked about before, or selective  
12 laser sintering being the name that's more commonly used  
13 for plastic sintering.

14 Q. What technologies use the binding process?

15 A. So that would be the binder jetting process  
16 that we talked about where you spread a layer of powder  
17 and inkjet glue, if you will.

18 Q. I want to continue on to PDF page 6 of this  
19 exhibit.

20 A. Okay.

21 Q. At subheading 4.5, it's discussing Fused  
22 Deposition Modeling.

23 Would this be the same as the Fused Deposition  
24 Modeling discussed in the '466 patent?

25 A. Yes, it would.

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1 Q. And that's a type of fused filament  
2 fabrication; is that correct?

3 A. Yes, they are typically used synonymously.

4 Q. Continuing on to page 7, under  
5 subheading 4.5.1, "Method," it discusses that "a  
6 filament of material is extruded out of a fine nozzle  
7 and deposited onto a platform."

8 Do you see that?

9 A. Yes, I do.

10 Q. So Fused Deposition Modeling involves  
11 dispensing material; is that correct?

12 A. Specifically extruding, yeah, as it's  
13 described. It's an extrusion process, yep.

14 Q. A few more sentences down, it states that "the  
15 extruded filament is hot."

16 How would the filament be heated in Fused  
17 Deposition Modeling?

18 A. Typically you have what's called a heater  
19 cartridge, which is nothing more than a fancy name for a  
20 little cylinder that heats up when you run current  
21 through it.

22 So you would have a -- a heater cartridge  
23 adjacent -- or within the block of, say, aluminum that  
24 the plastic is flowing through. And so the heat flows  
25 from the heater cartridge to the aluminum to the

1 plastic.

2 Q. Where would the heater cartridge be located  
3 with respect to the nozzle?

4 A. Typically it's very -- it's close to the  
5 nozzle, I would say. I'd have to draw it to show you  
6 exactly where. But it's upstream just a little bit from  
7 the nozzle when the plastic exits. About -- I don't  
8 know -- 5 or 10 millimeters above it.

9 Q. This paragraph goes on to state that "a second  
10 nozzle is used to extrude a different material in order  
11 to build up support structures for the part where  
12 needed."

13 And then in the next column, under  
14 subheading 4.5.3, "Disadvantages," it states that one of  
15 the disadvantages of FDM is support structures are  
16 needed.

17 So would you agree that FDM typically involves  
18 building support structures?

19 MR. TATUM: Objection. Form.

20 THE WITNESS: So this is kind of -- this is a  
21 survey paper -- and I will answer your question, just  
22 with a little bit of explanation.

23 It's a survey paper that's giving single  
24 bullets to add super high-level characterization. It is  
25 absolutely possible to print some parts without

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1 supports; some parts require support. So it's --  
2 support structures may be needed would have been a more  
3 accurate way for them to word that.

4 So sometimes support structures are needed.

5 BY MR. BIENIUS:

6 Q. So looking at the bottom of the second column  
7 of page 7, going on to page 8, in Section 4.6, it's  
8 discussing multi-jet modeling.

9 Is the multi-jet modeling mentioned here the  
10 same as or different than the multi-jet printing  
11 discussed in the '466 patent?

12 A. I'm trying to get figures here that are  
13 aligned with the process that's being described, so give  
14 me one second here.

15 So, yes, this appears to be similar to what we  
16 were talking about, what you just said. Yeah.

17 Q. So multi-jet modeling is at least similar to  
18 the multi-jet printing discussed in the '466 patent; is  
19 that correct?

20 A. Yes, that's my -- yes, that's my recollection  
21 without going back to the '466 patent's description,  
22 yep.

23 Q. Continuing on to subsection 4.6.1, "Method,"  
24 in the second sentence, it states: "Where material is  
25 to be deposited, a jet dispenses a droplet of

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1 thermoplastic polymer."

2 So this technique uses a dispensing process;  
3 is that correct?

4 A. I would -- it jets a droplet. I'll be honest.  
5 I've never heard of anyone else use the term  
6 "dispensing," but -- but it says what it says, yes.  
7 That's not a typical description, but it says what it  
8 says.

9 Q. A few sentences later, it states: "The hot  
10 droplets of material bond to the previous slice of the  
11 part that has just been printed."

12 How is the material heated to deposit hot  
13 droplets?

14 A. So -- so one thing -- let me clarify -- or let  
15 me correct something that I said earlier.

16 So the -- when we were talking about the  
17 multi-jet printing in the '466 patent, that was  
18 photopolymer jetting that they were describing where you  
19 use an ultraviolet light. And if you recall, I  
20 explicitly said that it does not use heat to cure the  
21 material but uses light to initiate a chemical reaction.

22 The process that's described here is different  
23 from that process in that this is using what's called a  
24 thermoplastic material that -- that is heated so that it  
25 melts. So I stand corrected when I -- just a moment ago

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1 when I said they were describing the same process. So  
2 they are not.

3 But having said that correction, you asked how  
4 it's -- how the plastic is heated and melted; is that  
5 correct?

6 Q. Yes. How is the plastic heated in these  
7 systems?

8 A. Yeah. So for -- with this process -- which  
9 it, again, is different from what we were talking about  
10 earlier in the '466 patent, but -- but it's similar --  
11 it would typically use something like a heater cartridge  
12 to melt the plastic.

13 Q. In these multi-jet modeling systems, would the  
14 heater cartridge be located adjacent or close to the  
15 nozzles?

16 A. They're typically a little bit farther  
17 upstream, but -- so in terms of absolute distance, they  
18 are not quite as close because, in this case, you have a  
19 large reservoir of molten plastic, not just a teeny -- a  
20 teeny filament.

21 So you're melting a boxful, if you will, a  
22 small boxful of plastic, in this case.

23 Q. Is the multi-jet modeling process described  
24 here similar to the binder jetting process you mentioned  
25 earlier, or are they different?

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1           A.    They are different.

2           Q.    How does the multi-jet modeling differ from  
3 the binder jetting process?

4           A.    So binder jetting, as we discussed earlier, is  
5 a powder-based process where you spread a layer of  
6 powder and then you jet a liquid plastic, which is  
7 not -- it's not a molten plastic like we're describing  
8 here.  It's -- I always think of superglue.  Right?

9                    If you were to jet droplets of superglue  
10 and -- you're not heating those droplets up, generally  
11 speaking.  And so they're -- in that sense, they are  
12 different processes.  There is no powder bed in this  
13 multi-jet process.

14          Q.    So here it's discussing heating of the  
15 material to dispense the hot droplets.

16                    Would different materials require different  
17 heating temperatures in multi-jet modeling?

18          A.    So, yes, if you change from one -- if you  
19 change from one kind of plastic to a different, they  
20 would have different melting temperatures and therefore  
21 different temperatures that you would heat them up for  
22 jetting.

23                    The melting temperature is not the temperature  
24 that you jet at.  But -- but, yes, they would have  
25 different -- different printing temperatures.

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1 Q. This paragraph goes on to state: "Thin  
2 support pillars must also be built up slice by slice in  
3 the same material where they are needed."

4 And two sentences later, it states: "When all  
5 the slices have been completed, the part is removed from  
6 the machine, and support structure is broken off."

7 So would you agree that, in at least some  
8 cases, multi-jet modeling involves printing a support  
9 structure?

10 A. That's a generally correct statement. I think  
11 they made a mistake here saying it's in the same  
12 material. But, yes, "yes" to your question about at  
13 least sometimes requiring a support material. Not all  
14 the time, but sometimes.

15 Q. You're aware of solid freeform fabrication, or  
16 SFF, correct?

17 A. That's correct, yes.

18 Q. Was SFF employed in three-dimensional printers  
19 in 2012 and earlier?

20 A. Yes. It -- as I mentioned earlier, it was  
21 more commonly referred to as "FDM." Again, different  
22 names. FFF and FDM are just generic versus, you know,  
23 trademark names.

24 Q. So would fused filament fabrication and solid  
25 freeform fabrication be the same process?

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1           A.    I'm sorry.  I might have misheard you.  The  
2 question you just asked, I thought you were asking about  
3 FFF versus FDM.

4           Q.    I'm sorry.  I'll use the full names instead of  
5 the acronyms.  We can start over on that.

6           A.    Yeah.

7           Q.    Was solid freeform fabrication used in  
8 three-dimensional printing in 2012 and earlier?

9           A.    Okay.  Yeah.  And I -- my ears heard FFF.  
10                So, yes, the SFF is actually not a name for  
11 one specific process.  It's a generic term, umbrella  
12 term.  It's the term that was used in the 1990s the way  
13 we today call -- use the term "3D printing."

14                And so SFF does not refer to one specific  
15 process.  It's an umbrella term, if that makes sense.

16           Q.    So would the curing processes, sheet  
17 processes, dispensing processes, sintering processes,  
18 and binding processes we were discussing earlier all  
19 fall under the umbrella term of "solid freeform  
20 fabrication"?

21           A.    Yes.  I think that's a fair statement.  At  
22 least generally speaking, yeah.

23                MR. BISENIUS:  I'm going to add another  
24 exhibit to the chat.  This is Exhibit 1009, which is  
25 U.S. Patent Publication 2006/0127153.

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1 (Exhibit 1009 was referenced.)

2 BY MR. BIENIUS:

3 Q. This is referred to in the papers as Menchik.

4 A. Okay. I have it open.

5 Q. When I use the term "Menchik," you understand  
6 that I'm referring to Exhibit 1009, correct?

7 A. Yes, I do.

8 Q. I want to talk about paragraph 4 of Menchik.

9 A. Okay.

10 Q. The first sentence here says: "Some  
11 three-dimensional printers utilize a printing head. For  
12 example, an inkjet-type printing head through which  
13 material" --

14 (Reporter requested clarification).

15 BY MR. BIENIUS:

16 Q. The first sentence in paragraph 4 states:  
17 "Some three-dimensional printers utilize a printing  
18 head. For example, an inkjet-type printing head through  
19 which material for printing three-dimensional objects is  
20 jetted."

21 Is the inkjet-type printing mentioned here the  
22 same as or different from the multi-jet printing we were  
23 discussing earlier?

24 A. It's -- there is actually not enough material  
25 here. This -- this paragraph, there's not enough

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1 material here to definitively say "yes" or "no." It's  
2 actually a little bit vague. So --

3 And, for instance, binder jetting uses an  
4 inkjet head, but the multi-jet process -- you can't tell  
5 from this paragraph which -- which one of the two they  
6 are referring to.

7 Q. I'm going to go back to your declaration,  
8 Exhibit 2013.

9 And I want to talk about paragraph 13.

10 A. Okay.

11 Q. Here, you state: "In addition to teaching  
12 additive manufacturing/3D printing classes, I have  
13 taught computer-aided design (CAD) and computer-aided  
14 manufacturing (CAM) classes over the past 30 years."

15 Would you have a high level of overlap of  
16 enrollment of students between your 3D printing classes  
17 and your CAD and CAM classes?

18 A. I -- maybe about 25 percent overlap. And  
19 obviously it shifts from year to year, semester to  
20 semester. But students that take both classes, maybe  
21 25 percent.

22 Q. What is computer-aided design?

23 A. So the -- the general term is typically used  
24 to describe a process of using a computer software  
25 package to design the shape -- let's say the size and

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1 the shape of components, sometimes, in an assembly.

2 Q. What CAD software did you teach in your  
3 classes around 2012 and earlier?

4 A. During that timeframe, I was using a software  
5 package called SolidWorks.

6 Q. Can you name other CAD software that you had  
7 used prior to 2012?

8 A. S -- SDRC I-DEAS. SDRC was the company.  
9 I-DEAS was the software.

10 AutoCAD would be another one.

11 Those were the primary ones.

12 The overwhelming majority of my CAD teaching  
13 was SolidWorks.

14 Q. What type of device would this type of  
15 software such as AutoCAD or SolidWorks typically be  
16 installed on?

17 A. It would typically be installed on a personal  
18 computer or a laptop computer.

19 Q. Earlier, we discussed that the '466 patent  
20 mentioned that client devices can be personal computers  
21 such as laptop computers.

22 Would a client device such as those mentioned  
23 in the '466 patent be suitable for running CAD software?

24 A. It -- it is possible to run CAD software on a  
25 client device, assuming the client device is a personal

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1 computer, yes.

2 Q. CAD software is used to create CAD files,  
3 correct?

4 A. Among other things. But, yes, CAD files is  
5 the primary intent.

6 Q. What information is in a CAD file?

7 A. As a general rule, it's what I described  
8 earlier. It's the -- the size and shape of the geometry  
9 that defines the parts.

10 Q. How does a personal computer communicate with  
11 a printer?

12 A. It could be connected via the Ethernet. A  
13 laptop could wirelessly communicate. Or you could -- I  
14 mean, those would be some common communication methods.

15 Q. How are CAD files typically transferred from a  
16 personal computer to a printer?

17 A. When you say "printer," you mean 3D printer?

18 Q. Correct.

19 A. Okay. The -- the most common method still --  
20 it's archaic, but -- the most common method is to  
21 transfer the file -- well, you're -- you said the CAD  
22 file, right, not the -- what we call the slice file? I  
23 just want to make sure I'm hearing you correctly.

24 Q. Yes, I said CAD file.

25 A. Okay. Yes. Thank you.

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1           So you -- you could transfer the CAD file. It  
2 could be over an Ethernet. How it's most commonly done  
3 today is still -- you save it to a USB memory stick, for  
4 instance, and then walk to the 3D printer and plug it in  
5 and do the slicing software that -- that generates the  
6 instructions for operating the 3D printer.

7           Q.    Prior to 2012, was it also known to transfer  
8 CAD files from a computer to a three-dimensional printer  
9 over a network?

10          A.    I won't rule it out definitively. I can say  
11 that I personally did not do that, and I can't think of  
12 instances where my students or I did that.

13                But I won't -- I can't rule out that it wasn't  
14 possible that -- that -- you know, again, the 2012, the  
15 sliding timeline as far as when that became a possible  
16 thing. I can just tell you I don't believe that I ever  
17 personally did that prior to 2012.

18          Q.    In 2012 and earlier, would 3D printers have  
19 typically had CAD software installed directly on them?

20          A.    I -- CAD software. I don't -- so, again,  
21 it's -- it's not that you couldn't do it. So it was  
22 possible to do that if -- provided the 3D printer has a  
23 PC or personal computer as part of the 3D printing  
24 system.

25                The fact that I -- normally I would do the

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1 design, let's say, in my office, and then the file would  
2 go to the 3D printer for slicing. So it would just --  
3 it's not that it's not possible. It's just it would be  
4 awkward typically to do the designing sitting next to  
5 the -- next to the 3D printer.

6 Q. So in general, you would design the models on  
7 a computer running CAD software and then transfer the  
8 CAD file to the three-dimensional printer in some  
9 manner; is that correct?

10 A. Yes. So that it could be prepared for 3D  
11 printing.

12 MR. BIENIUS: I'm going to drop another  
13 exhibit in the chat. This is Exhibit 1004.

14 And I'll admit I'm very bad at pronouncing  
15 last names, but I've been pronouncing this as Loughran.

16 (Exhibit 1004 was referenced.)

17 BY MR. BIENIUS:

18 Q. This is U.S. Patent Publication 2006/0091199,  
19 referred to as "Loughran" in the papers.

20 A. So it has -- at least on my computer, Menchik  
21 is the most recent one. Maybe -- maybe resend it. I  
22 can see and hear you just fine, so I don't think we're  
23 having a network problem, but I'm not --

24 Oh, okay. It just arrived. Got it.

25 Okay. I have it open now.

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1 Q. All right. I want to start at paragraph 1.  
2 Okay.

3 Paragraph 1 refers to solid freeform  
4 fabrication and gives the abbreviation SFF.

5 Earlier, you mentioned that this is a generic  
6 term for three-dimensional printing; is that correct?

7 A. Yes, that's correct.

8 Q. Staying on the same page and looking at  
9 paragraph 12.

10 About halfway through the paragraph, it  
11 states: "In some embodiments of the invention, the  
12 first SFF system 102 may be considered a client to the  
13 second SFF system 104, in that the first SFF system 102  
14 provides SFF jobs to the second SFF system 104 and the  
15 second SFF system 104 fabricates these jobs."

16 Do you see that?

17 A. I do.

18 Q. So I'm going to be referring to the SFF system  
19 102 and the SFF system 104 quite a bit in my next line  
20 of questions, so I just want to clarify something that I  
21 believe might be an error in Loughran.

22 A. Yes. Yes. I know where you're headed with  
23 that.

24 Q. Okay. So comparing this paragraph to  
25 Figure 1, this paragraph states that the first SFF

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1 system is the system 102, but in Figure 1, it uses the  
2 numeral 104 to refer to the first SFF system. And so I  
3 want to make sure that we're on the same page about  
4 this.

5 The sentence I just read from paragraph 12  
6 refers to the SFF system 102 as a client.

7 Do you see that?

8 A. Let me just find it here. I'll just search  
9 for the word "client." That will speed things up.

10 Why is it not finding it?

11 Can you point me to -- is it --

12 Q. It's in paragraph 12.

13 A. All right.

14 Q. That sentence I just read was about -- a  
15 little more than halfway through paragraph 12.

16 A. Okay. Okay. Got it. The first SFF system  
17 may be considered a client to the second.

18 Okay. We're at the same place.

19 Q. Okay. So we'd agree that SFF system 102 is  
20 identified as a client here?

21 A. Yes.

22 Q. And then it goes on to say that the SFF system  
23 104 fabricates these jobs.

24 A. Yes, I see where it says that.

25 Q. So would you agree that the SFF system 104 is

1 a printer, a three-dimensional printer?

2 A. It includes a -- the word "system" in this  
3 case would include a 3D printer.

4 Q. So going back to Figure 1, would you agree  
5 that the SFF system 102 in the upper right is the client  
6 and the SFF system 104 in the bottom middle is the  
7 system where the printer is located?

8 A. So it -- yes, as it's illustrated there.

9 Q. Okay. So to correct for the typo or mistake  
10 in Figure 1, I'm not going to use the term "second FSS  
11 system" (sic) or "first SFF system." I'm going to use  
12 the reference numerals 102 and 104 because I believe  
13 those are consistent between this figure and  
14 paragraph 12 of the rest of the specification.

15 A. Okay. I will --

16 Q. Does that make --

17 A. Yes, that makes sense.

18 And I'll try to correct myself if I -- if I  
19 get into a situation where I, myself, use them  
20 backwards.

21 Q. All right. I want to talk about paragraph 20  
22 in Loughran.

23 A. Okay.

24 Q. So this paragraph discusses both the SFF  
25 system 102, which is the client, and the SFF system 104,

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1 which is the location of the printer; is that correct?

2 A. Yes, it mentions both of those.

3 Q. This paragraph states that the SFF fabrication  
4 jobs are generated at the SFF system 102; is that  
5 correct?

6 A. Okay. I'm sorry. I was reading the bottom  
7 there.

8 So, yes, I see that SFF fabrication jobs are  
9 generated at the first SFF system 102.

10 Q. So would you agree that the client system  
11 fabricates -- sorry, would you agree that the client  
12 system generates the fabrication jobs?

13 A. Client -- I've got to slow down now with the  
14 mix-up. So, yes, the client system is -- is able to  
15 generate the job in this scenario that's described right  
16 there.

17 Q. And generation of the fabrication job would  
18 include generation of the model of the object; is that  
19 correct?

20 A. As it's described in here, from the CAD  
21 software, so -- and I -- I pronounce it Loughran, but  
22 however we pronounce this patent -- it mentions in other  
23 paragraphs the CAD software generating the SFF job. So  
24 that's what it's alluding to here.

25 Q. Moving ahead to paragraph 27 on the next page.

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1 A. Okay.

2 Q. This paragraph describes that the fabrication  
3 job is generated at the client SFF system 102 and then  
4 executed at the SFF system 104; is that correct?

5 A. You're paraphrasing, or that's an exact quote?

6 Q. I'm paraphrasing.

7 A. Okay. I'm sorry. Yes. I was looking for  
8 the --

9 Yes. A continuation of what we were talking  
10 about a moment ago, fabrication of physical objects by  
11 the second SFF system. Yes.

12 Q. So the fabrication happens at the SFF system  
13 104; is that correct?

14 A. I'm sorry. Yes.

15 Q. Then in the next paragraph, in the second  
16 sentence -- and this is a quote -- it states, quote:  
17 "The second SFF system 104 may have already sent the  
18 material identifier for the material 112 to the first  
19 SFF system 102, as indicated by the letter C 122, such  
20 that the first SFF system 102 requests this information  
21 only if it does not already have it," end quote.

22 So would you agree that this portion is  
23 describing that the SFF system 104, where the printer is  
24 located, sends the material identifier to the client,  
25 SFF system 102?

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1           A.    It says it may have, yes, sent the material  
2 identifier. It qualifies it. It says if the --

3                    Hang on. Sorry. I've got meeting invites  
4 popping up here that -- of meetings I'm not attending,  
5 so let me dismiss those.

6                    Yes, the first system 102 may have the  
7 information regarding the material.

8           Q.    Okay.

9           A.    I'm with you now.

10          Q.    Good.

11                   It's describing that, in at least some  
12 scenarios, the system where the printer is located sends  
13 material identifiers to the client system; is that  
14 correct?

15          A.    Yes, that appears to be correct in this -- in  
16 this paragraph.

17          Q.    I'll use your pronunciation because you're  
18 probably right.

19                   I want to move to paragraph 41 of Loughran.

20          A.    Okay.

21          Q.    The first sentence here states: "The first  
22 SFF system 102 receives a first list of material  
23 identifiers known to the second SFF system 104 over the  
24 network 106, as well as optionally other information  
25 (402)."

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1           So, again, this paragraph is describing that  
2 the client system receives material identifiers from the  
3 system where the printer is located; is that correct?

4           A.    Yes, that appears to be correct.

5           Q.    Continuing on to the next paragraph, in the  
6 second sentence, which is at the top of the second  
7 column, it states: "For each material identifier that  
8 is in the first list but not in the second list, the  
9 first SFF system 102 retrieves information regarding the  
10 material associated therewith."

11           So this paragraph is describing that the  
12 client system retrieves information about the materials;  
13 is that correct?

14           A.    "Retrieves information regarding the  
15 material." Yes, it says that there.

16           Q.    And it says that the material information is  
17 provided by the material information server 108; is that  
18 correct?

19           A.    Yes. It's describing that scenario there.

20           Q.    Continuing on to paragraph 43, several  
21 sentences in, about halfway down, after step 414, it  
22 states: "The first SFF system 102 then parses the  
23 information regarding the materials for using it in SFF  
24 fabrication job generation."

25           Do you see that?

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1           A.    Yes, I do.

2           Q.    So would you agree that this is describing  
3 that the client system uses information about the  
4 material to generate the CAD file?

5           A.    Well, that paragraph does not refer to the CAD  
6 file.  If you --

7                    Paragraph 27 of Loughran describes how the CAD  
8 software -- so it describes the -- the CAD -- I'm about  
9 six lines down -- that the CAD software may have to have  
10 information regarding the material so that the job "can  
11 be accurately generate" -- I think they meant  
12 generated -- "for ultimate fabrication of physical  
13 objects for (sic) the material."

14                   So it uses, for instance, build time  
15 estimation, part scaling for shrinkage, and so on.  So  
16 that's how it's -- that's what the CAD system is doing.  
17 So if --

18                   Are you able to repeat the question, and I'll  
19 tie it into what I just showed?

20           Q.    Yeah.  And I can reframe it a little bit.

21           A.    Sure.

22           Q.    Would you agree that at least some of the  
23 information included in the fabrication job generated by  
24 the client device is based on the material information?

25           A.    So in the sense -- I'll actually answer that

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1 using paragraph 27.

2 So when -- so if you say the shrinkage of the  
3 materials, the example that they give there, you would  
4 design the shape of the part. If you know how much it's  
5 going to shrink, in the CAD software, you might enlarge  
6 it a little bit so that, after you print it and it  
7 shrinks, it's the correct size.

8 So in that case, it's using a property of the  
9 material shrinkage to generate the size and shape of the  
10 part before it's sent off for slicing on the 3D printer.

11 Q. Moving ahead to paragraph 50 --

12 A. Did you say 50 or 58?

13 Q. 50, 5-0.

14 A. Got it. Thank you.

15 Q. This states: "Figure 6 shows a block diagram  
16 of the first SFF system 102."

17 So would you agree that this paragraph is  
18 discussing the client system?

19 A. Yes. 102 is the client; 104 is where the  
20 3D printing takes place. So, yes, I believe that's  
21 correct.

22 Q. Later on in paragraph 50, it states that the  
23 client system includes CAD software 610; is that  
24 correct?

25 A. Yes, I see that. Yep.

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1 Q. In the next paragraph, 51, in the second  
2 sentence, about halfway through the second sentence, it  
3 states that "the CAD software 610 has information by  
4 which to generate SFF fabrication jobs for transmission  
5 to the second SFF system 104 over the network 106."

6 Do you see that?

7 A. Yes, I do.

8 Q. So once again, this is describing that the  
9 client device generates the fabrication job and then  
10 sends it to the system where the printer is located; is  
11 that correct?

12 A. From the CAD soft- -- so the SFF fabrication  
13 job, as defined by the CAD geometry, is being sent to  
14 the system 104, where the job is 3D printed.

15 Q. I want to move ahead to paragraph 55 on the  
16 next page.

17 A. Okay.

18 Q. A few sentences in, a little more than halfway  
19 through this paragraph, it states, quote: "The CAD  
20 software 610 generates a SFF fabrication job for  
21 fabrication from a specific material based on the  
22 information regarding that material which has been  
23 received," end quote.

24 Do you see that?

25 A. I do see that, yes.

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1 Q. So this is, once again, describing that the  
2 client device uses information about the material to  
3 generate the fabrication job; is that correct?

4 A. And referring back to paragraph 37, just to be  
5 specific about what it's doing, it is defining the size  
6 and shape of the part in the CAD software. And that can  
7 be done using information regarding the material to do  
8 that process.

9 Q. So would you agree that the fabrication job is  
10 providing instructions to the SFF system 104 to instruct  
11 the printer on how to print the object?

12 MR. TATUM: Objection --

13 THE WITNESS: No --

14 No, I would not agree with that.

15 The -- again, using paragraph 37 as an  
16 example, there's -- there's nothing -- nothing that says  
17 anything about instructions about how to print -- print  
18 the part.

19 It talks about CAD software, and a POSITA  
20 knows that CAD software is used to design the size and  
21 the shape of a part. A --

22 And did you just -- you used the term -- you  
23 said how to print the part? Was that the phrase that  
24 you used?

25 BY MR. BISENIUS:

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1 Q. I think so.

2 A. Okay. So the -- I mean, putting it in the  
3 context of the '466 patent, the operational parameters  
4 that tell the printer how to print the part that's -- so  
5 I think we have a difference of opinion here that the  
6 CAD model -- the size and the shape of the part is not  
7 instructions on how to print the -- print the part.

8 Q. Maybe I can reframe it a different way.

9 Would you agree that the SFF system 104 where  
10 the printer is located relies on information in the CAD  
11 file to define how the part is printed?

12 A. So it will -- so it -- it needs the  
13 information, the size and shape of the part, to  
14 generate --

15 It's conventionally called slicer software.

16 But the slicer software is what would generate the  
17 instructions or operational parameters, if you want to  
18 call them, or instructions on how to print the part.

19 MR. BIENIUS: I'm going to switch to another  
20 exhibit, and it's been close to an hour again. Now  
21 would be a good time for a break. I know you're on the  
22 East Coast. Would you like to do lunch now or a shorter  
23 break and wait until later?

24 THE WITNESS: Honestly, I had breakfast at  
25 4:00 o'clock this morning. I'm a morning person, so

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1 that was eight hours ago. So I wouldn't mind having  
2 lunch now.

3 MR. BIENIUS: Okay. Should we reconvene at  
4 maybe 50 past the hour, 10:02?

5 THE WITNESS: That works for me. Thanks.

6 (Lunch recess: 12:08 p.m. to 12:51 p.m.  
7 Eastern Time.)

8 MR. BIENIUS: Back on the record.

9 I've added Exhibit 1005 to the chat.

10 (Exhibit 1005 was referenced.)

11 THE WITNESS: Yes, I've got it.

12 BY MR. BIENIUS:

13 Q. This is U.S. Patent Publication 2008/0192074,  
14 referred to as "Dubois" in the papers.

15 I want to go to paragraph 55 of Dubois.

16 A. Okay.

17 Q. This paragraph states, quote: "To determine  
18 the print layers, the embodiment of the method according  
19 to the invention produces 'layers of object,' which are  
20 obtained by slicing the 3D representation of the  
21 component into slices of equal thickness and  
22 consequently slicing the characteristic objects and  
23 which are used here to determine print layers."

24 Do you see that?

25 A. Yes, I do.

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1 Q. You mentioned slicing software earlier today.  
2 The software that generates the slices from a 3D model  
3 is often referred to as "slicing software" or a  
4 "slicer"; is that correct?

5 A. Yes, that's correct.

6 Q. Does 3D printing in general usually require  
7 slicing a 3D model into multiple slices?

8 A. Generally -- yes, generally, that's correct.

9 Q. We talked about quite a few different  
10 three-dimensional fabrication processes earlier today.

11 Can you identify any of those processes that  
12 wouldn't involve slicing a 3D model into multiple  
13 slices?

14 A. Not in the ones that we've talked about today.

15 Q. So in other words, all of the  
16 three-dimensional printing processes that we've  
17 discussed today would include slicing a 3D model into  
18 multiple slices; is that correct?

19 A. That's generally correct, yes.

20 Q. I'm going to skip ahead a few pages to  
21 paragraph 150, 1-5-0.

22 A. Okay.

23 Q. This paragraph is, again, discussing slicing  
24 of a 3D model; is that correct?

25 A. Yes. The unit 198 is adapted to slice the 3D

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1 representation.

2 Q. And it's the computation unit 198 that  
3 performs the slicing function here; is that correct?

4 A. Yes, that's what it says.

5 Q. Skipping ahead two more pages, I want to talk  
6 about paragraph 170.

7 A. Okay.

8 Q. This paragraph states that the computation  
9 unit 198, along with computation units 201, 202, 203,  
10 the analysis unit 205, and the unit 206, can be  
11 implemented as software running on a personal computer  
12 such as a PC; is that correct?

13 A. It says -- yes, it says words to those effect.

14 Q. So looking at these paragraphs together, this  
15 is describing that the slicer software is executing on a  
16 personal computer; is that correct?

17 A. It can be, yes.

18 Q. In this scenario, would the personal computer  
19 be part of the 3D printer, or it would be a separate  
20 device from the 3D printer?

21 A. I'm not seeing where it specifies one or the  
22 other. So do you want me to look at the figures and  
23 tease that out?

24 Q. Yes, that would be helpful.

25 A. Okay. And just fair warning, this will take

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1 me a few minutes here.

2 All right. I'm jumping back and forth from  
3 Figure 5. Can you remind me what -- what paragraph that  
4 text was in that we were just at?

5 Q. 170.

6 A. 1-7-0. All right.

7 (Pause on the record.)

8 THE WITNESS: I do apologize. This is going  
9 to take me a little while because of how much I'm  
10 jumping back and forth. So thank you for your patience  
11 here.

12 Other thing, it's not a searchable document.  
13 So that's slowing me down as well.

14 Okay. Can you repeat the question, please?

15 BY MR. BIENIUS:

16 Q. Would the PC that's running the computation  
17 units 198, 201, 202, and 203 be separate from the  
18 three-dimensional printer?

19 A. Can you clarify if you mean physically or  
20 functionally?

21 Q. Would it be a distinct device from the  
22 three-dimensional printer?

23 A. It's -- I don't believe it says one way or the  
24 other here. So you're asking a hypothetical, could it  
25 be. Sorry, just --

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1           So there are 3D printers that have PCs  
2 attached to them that are, you know -- we'll call it  
3 adjacent to it as opposed to physically inside the box,  
4 running software that performs many of the functions  
5 that are described there in the control units.

6           Q.    Could the personal computer described in  
7 paragraph 170 be separate from the three-dimensional  
8 printer?

9           A.    So "separate" meaning it doesn't -- correct,  
10 "separate" meaning it doesn't have to be physically  
11 inside the box of the 3D printer?

12          Q.    Correct. That's what it means.

13          A.    Yes, that is correct.

14          Q.    I want to go back to your declaration,  
15 Exhibit 2013.

16                And I want to start at paragraph 135, which is  
17 on page 66.

18          A.    Okay.

19          Q.    Starting at the second sentence of  
20 paragraph 135, you state, quote: "In my professional  
21 opinion, Devos's 'supports' parenthetical is unrelated  
22 to 3D printed supports. It is, at most, an aside  
23 related to potential use of a settling coefficient to  
24 inform decisions about thermal postprocessing support  
25 requirements that could take place after the component

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1 has been three-dimensionally printed," end quote.

2 Do you see that?

3 A. I do.

4 Q. Does Devos itself discuss thermal  
5 postprocessing?

6 A. Just to be clear, you have not loaded -- you  
7 have not loaded Devos yet, correct?

8 Q. Correct.

9 A. Okay. We don't have Devos.

10 Q. Yeah. I can bring it in.

11 A. So I can -- I can tell my answer from memory.

12 Q. I've uploaded Devos.

13 A. Okay. It just arrived.

14 Q. And I'll repeat the question just to make the  
15 transcript a bit clearer.

16 A. Yes. Thank you.

17 Q. Is there any discussion in Devos of thermal  
18 postprocessing?

19 A. Okay. So -- so the documents that we have are  
20 not searchable, so I can -- I can read through the whole  
21 thing and confirm my recollection, or I can give you my  
22 recollection with the asterisk that I might have to go  
23 back and reread it if I stand -- and correct it.

24 So do you have a preference if I read through  
25 the whole thing since it's not searchable or go from

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1 memory and reserve the right to change --

2 Q. I'm fine. Answer from memory works for me.

3 A. Okay. So I do not have -- I do not recall  
4 Devos mentioning thermal postprocessing.

5 Q. Can you describe the thermal postprocessing  
6 that you discuss in paragraph 135?

7 A. Yes, let me jump to that paragraph again.

8 So with -- with this process, you will -- and  
9 to be honest with you, this typically doesn't apply, but  
10 if you're --

11 If, for instance, you are making metal parts,  
12 with binder jetting, there is a second step that happens  
13 after 3D printing in which the part coming out of the 3D  
14 printer is not in its final form. It has the shape that  
15 you want, but it's very weak because it's just the glue  
16 holding the metal particles together.

17 So you would then transfer that part from the  
18 3D printer, and you would put it in a furnace and heat  
19 it up very slowly. And, you know, over a period of many  
20 hours, the -- the glue that's holding the particles  
21 together will burn off, and the metal particles will  
22 then sinter or fuse together. And then you have your  
23 final metal part.

24 Q. So in paragraph 135, are you describing that,  
25 in some scenarios, that thermal treatment would require

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1 support structures?

2 A. I think I -- I describe it a little more  
3 farther down, but there --

4 So, yes, there can be. It's not always, but  
5 there could be scenarios where, in the furnace -- not in  
6 the 3D printer and not during the 3D printing process,  
7 but -- in the furnace afterwards, the part might, let's  
8 say, sag. Right?

9 And so it's -- at that time, it was customary,  
10 if you had that kind of a situation, where you might put  
11 a ceramic pillar or something underneath the part to  
12 hold it up for support.

13 Q. When would those supports be added? Would  
14 they be generated during the 3D printing process?

15 A. So as of 2012, and prior to 2012, it was  
16 customary -- as I was describing, it was customary to  
17 use ceramic pillars or, you know, blocks, cubes,  
18 whatever. And you would put them underneath the  
19 surfaces where the part would have a possibility of  
20 sagging.

21 Q. Are you saying that a person would physically  
22 put the ceramic supports under the parts that would have  
23 a possibility of sagging?

24 A. That was the typical scenario as of 2012. But  
25 there have been developments since then, since -- newer

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1 than 2012, that changed that. But from 2012 to  
2 previous, that was -- what I just described was the --  
3 was the typical approach.

4 Q. How would a powder settling coefficient inform  
5 decisions about thermal postprocessing support  
6 requirements?

7 A. So if you -- this does not apply to a POSITA.  
8 If you were a -- let's say a Ph.D. with expertise in  
9 computational multi-physic simulations, that is, the --  
10 give me one sec to work out -- these are not searchable,  
11 so give me one sec.

12 Okay. Okay. So I found it. I'm on  
13 paragraph 139 of my declaration.

14 So as it's explained there, the powder  
15 settling coefficient determines how much powder  
16 particles will compact, if you will, during that  
17 printing process.

18 During the subsequent sintering process, the  
19 density of those particles can affect how strong the  
20 material is and whether or not it's therefore liable to  
21 sag or collapse.

22 And so you have to look at the shape of the  
23 part, and then you're looking at the powder settling  
24 coefficient and doing very complex simulations to --  
25 simulations of how the material will behave during the

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1 sintering process after the 3D printing process to  
2 predict whether or not it will sag.

3 That is -- that's getting towards the need to  
4 have support during that sintering process.

5 Q. So from what you just described, is it fair to  
6 say that the powder settling coefficient is a factor  
7 that's used in determining what those support  
8 requirements would be?

9 A. It is a piece of information that can be  
10 used -- that can be used to determine, yes, whether or  
11 not supports are needed not during 3D printing but  
12 during the sintering process.

13 MR. BIENIUS: I'll drop another exhibit in  
14 the chat. This is Exhibit 1018.

15 (Exhibit 1018 was referenced.)

16 BY MR. BIENIUS:

17 Q. This is the KISSlicer Quick-Start Guide,  
18 referred to as "KISSlicer" in the papers.

19 A. Okay. I have it open.

20 Q. KISSlicer describes slicing software for  
21 slicing a 3D model into layers; is that correct?

22 A. That's -- that's one of its functions. That's  
23 correct.

24 Q. Would KISSlicer software perform a similar  
25 function to the slicer we were discussing with respect

1 to Dubois?

2 A. The -- let me -- give me one second here to  
3 open Dubois as well.

4 Q. And just to refresh your memory on Dubois,  
5 earlier, we had talked about paragraphs 55, 150, and  
6 170.

7 A. Yeah. So the -- the answer is it will -- it  
8 is -- it will generate the slice geometry. Just the one  
9 asterisk or clarification is that the -- the shape of  
10 how the -- I'm sorry -- how the material is deposited is  
11 different between the process that KISSlicer uses and  
12 the process that you would have to use for Dubois.

13 And so the specific example with KISSlicer  
14 refers to the fused filament fabrication, FFF, process.  
15 And so sometimes the inside of a part with that process  
16 can be hollow, or you can envision it would have a  
17 honeycomb structure on the inside; whereas with the  
18 inkjet process used in Dubois, the inside of the part is  
19 always completely solid. So the output of the slicing  
20 process is not generally going to be the same.

21 But what they do have in common is the  
22 upfront -- the math part of it up front of slicing into  
23 layers. The output is different, though.

24 Q. Can you identify where in KISSlicer it  
25 discusses being used for fused filament fabrication?

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1           A.    I just accidentally closed KISSlicer, so give  
2 me one second.

3           Q.    No worries.

4           A.    I've got enough windows open now that the  
5 KISSlicer is on the right side, and it's a tiny little  
6 button, and I clicked the X instead of -- yeah.

7                    So the -- my recollection on this also is  
8 KISSlicer at one point in time was used with  
9 Stratasys -- with the Stratasys printers that are  
10 filament extrusion.

11                   So, for instance, it's -- I'm on -- it doesn't  
12 matter -- page 3, let's say, the images that are on  
13 page 3, one of the tabs says "extruders." So  
14 "extruders" refers to fused filament fabrication.

15                   And then the text in those windows, the window  
16 on the top there says "Extrusion Width" -- "Infill  
17 Extrusion Width" -- and so those are -- as the name  
18 implies, those are extrusion-based processes.

19                   So fused filament fabrication, a POSITA would  
20 refer to that as the extrusion process of it. You know,  
21 how it works.

22           Q.    The KISSlicer software is distinct from  
23 software used for controlling the operations of a  
24 3D printer; is that correct?

25           A.    That -- that would generally be correct, yes.

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1 It's a preparation. You can think of it -- the function  
2 is that it serves as preparation rather than operating  
3 the 3D printer.

4 Q. Would KISSlicer software generally be  
5 installed on a personal computer or directly onto the  
6 3D printer itself?

7 A. I've seen it both ways.

8 Q. Had you used -- had you personally used  
9 KISSlicer software prior to 2012?

10 A. No. Softwares functionally similar to it, but  
11 not KISSlicer directly.

12 Q. Has a Court ever precluded you from offering  
13 an opinion?

14 A. Not to my knowledge, no.

15 Q. To the best of your knowledge, has a Court  
16 ever criticized one of your opinions?

17 A. I -- not that I'm aware of, no.

18 Q. Have you spoken with Mr. Tatum or Mr. Oaks  
19 regarding the substance of your testimony today at any  
20 time after you were sworn in by the court reporter?

21 A. No, I have not.

22 MR. BISENIUS: No further questions.

23 MR. TATUM: Can we just take a quick break,  
24 maybe ten minutes? I can go over my notes, and then we  
25 can come back.

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1 MR. BISENIUS: Sounds good.

2 THE WITNESS: 1:30?

3 MR. BISENIUS: Yeah.

4 (Recess: 1:21 p.m. to 1:29 p.m. Eastern Time)

5 MR. TATUM: No further questions for me.

6 MR. BISENIUS: All right. Thanks.

7 MR. TATUM: Thank you, Dr. Cormier.

8 THE WITNESS: Okay. Thank you.

9 COURT REPORTER: Mr. Tatum, would you like a  
10 copy, sir?

11 MR. TATUM: Yes, a copy, but not in a rush. I  
12 think we have a standard, whatever the ten-day is, I  
13 believe.

14 COURT REPORTER: All right. Would you like a  
15 rough that's requested?

16 MR. TATUM: Oh. No, don't need the rough.

17 MR. BISENIUS: Yeah. I think we wanted the  
18 rough, and then we want the formal by April 6th.

19 (Whereupon the proceedings concluded at  
20 1:31 p.m. EST)

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ERRATA SHEET

NAME OF CASE: SHENZHEN TUOZHU TECHNOLOGY CO., LTD. V. STRATASYS, INC.

DATE OF DEPOSITION: MARCH 25, 2026

NAME OF WITNESS: DENIS R. CORMIER

Reason Codes:

- 1: To clarify the record.
- 2: To conform to the facts.
- 3: To correct transcription error.

Page \_\_\_\_\_ Line \_\_\_\_\_ Reason \_\_\_\_\_

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DECLARATION UNDER PENALTY OF PERJURY

I, DENIS R. CORMIER, do hereby certify under penalty of perjury that I have read the foregoing transcript of my deposition taken on March 25, 2026; that I have made such corrections as appear noted on the Deposition Errata Page(s), attached hereto, signed by me; that my testimony as contained herein, as corrected, is true and correct.

This Declaration is executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, at \_\_\_\_\_, California.

\_\_\_\_\_  
DENIS R. CORMIER

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STATE OF CALIFORNIA ) ss.  
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I, Tamara Houston, RPR, CCRR, CSR No. 7244, a  
Certified Shorthand Reporter in the State of California,  
duly empowered to administer oaths, do hereby certify:

That, prior to being examined, the witness  
named in the foregoing deposition was by me duly sworn  
to testify to the truth, the whole truth, and nothing  
but the truth;

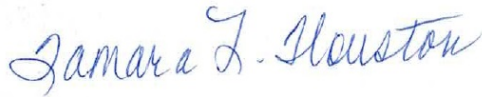
That said deposition was taken down by me in  
shorthand at the time and place therein named, and  
thereafter reduced to typewriting by computer-aided  
transcription under my direction;

That the dismantling, unsealing, or unbinding of  
the original transcript will render the reporter's  
certification null and void.

I further certify that I am not interested in the  
event of the action.

In witness whereof, I have hereunto subscribed my  
name.

Dated: 1st of April, 2026.



---

TAMARA L. HOUSTON  
CSR 7244, RPR, CCRR 140, CRG

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<b>Exhibits</b>	<b>1-5-0</b> 73:21	<b>122</b> 64:19	<b>2006/0091199</b> 59:18
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<b>EXHIBIT1001</b> 4:13 6:15 21:1,3	<b>10</b> 7:25 39:1 47:8	<b>12:51</b> 72:6	<b>2008/0192074</b> 72:13
<b>14530508 Denis.R. Cormier.</b>	<b>10,569,466</b> 5:12 6:6	<b>13</b> 40:4,9,15,20 55:9	<b>200s</b> 31:24 34:15 40:3
<b>EXHIBIT1004</b> 4:17 59:13,16	<b>1001</b> 6:15 21:1,3	<b>135</b> 76:16,20 78:6,24	<b>201</b> 74:9 75:17
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<b>EXHIBIT1005</b> 4:18 72:9,10	<b>1005</b> 72:9,10	<b>15</b> 7:25	<b>2013</b> 6:23,25 8:25 9:3 12:11 55:8 76:15
<b>14530508 Denis.R. Cormier.</b>	<b>1009</b> 53:24 54:1,6	<b>150</b> 73:21 82:5	<b>2014</b> 9:17 41:10,12,15,18
<b>EXHIBIT1009</b> 4:15 53:24 54:1,6	<b>1018</b> 81:14,15	<b>16th</b> 6:23	<b>202</b> 74:9 75:17
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<b>14530508 Denis.R. Cormier.</b>	<b>10:02</b> 72:4	<b>1:29</b> 85:4	<b>204</b> 31:10
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--o0o--		<b>200-numbered</b> 38:11	<b>22</b> 36:6
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