

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

DATASPEED INC.,  
Petitioner,  
v.  
SUCXESS LLC,  
Patent Owner.

Case IPR2020-00147  
Patent 10,027,505  
-and-  
Case IPR2020-00116  
Patent 9,871,671

DEPONENT: ROBERT LEALE  
DATE: Wednesday, August 12, 2020  
TIME: 9:41 a.m. EST  
LOCATION: VIA ZOOM VIDEOCONFERENCE  
REPORTER: Elizabeth G. LaBarge, CSR-4467  
JOB NO: 12193

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Success LLC Exhibit 2024  
Dataspeed Inc. v. Success LLC IPR 2020-00116  
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I N D E X

W I T N E S S

ROBERT LEALE

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1 Wednesday, August 12, 2020

2 Via Zoom videoconference

3 9:41 a.m. EST

4 \* \* \*

5 (All participants appearing via Zoom videoconference.)

6 MR. GOSS: Good morning, everyone. My name is  
7 Maxwell Goss. As you know, I represent the patent  
8 owner, Success LLC. I'm here with Axel Nix, who also  
9 represents the patent owner. I wanted to make a couple  
10 of preliminary -- brief preliminary comments and then  
11 I'll hand the floor over to Mr. Nix, who will be taking  
12 the lead and conducting today's examination.

13 We're conducting this deposition via Zoom. I'm  
14 looking at my screen, it looks like there's several of  
15 you in the same room. Is that -- is it Mr. Leale, the  
16 expert witness, he's to the left on my screen, sitting  
17 on the one side across from the other three of you?  
18 Raising your hand, that's you with the beard?

19 THE WITNESS: That's correct.

20 MR. GOSS: Okay. You're a speck on my screen. You  
21 guys insisted on a remote deposition; I'm surprised to  
22 see you all sitting in the room together without giving  
23 us the opportunity to sit in the room with you.

24 Mr. Leale, I can hardly see you. Is there a way  
25 that you can situate yourself a little closer to the

1 camera?

2 THE WITNESS: I mean, yeah, I mean, I'm  
3 still -- this is the edge of the table, so I'm at the  
4 edge of this conference table. Does that help?

5 MR. GOSS: No. So this is just, from the viewer's  
6 perspective, a little better than a telephonic  
7 deposition because we're just looking at a conference  
8 room full of people, we're not looking at you eye to eye  
9 like you can see us, so I just want to make a record of  
10 that, that that's how you chose to situate in this room.

11 Are you in front of a -- as you know, we're going  
12 to be sharing exhibits. Mr. Nix will be screen-sharing  
13 exhibits to draw your attention to certain portions of  
14 them. I will also be sending links to the exhibits.  
15 Are you -- I can't see -- are you in front of a computer  
16 such that you're able to read along?

17 THE WITNESS: I'm in front of a binder with my  
18 exhibits and my report in it.

19 MR. HELGE: And just to put this on the record, as  
20 well, we had confirmed with you by email before this and  
21 confirmed that he could have paper copies, clean paper  
22 copies of exhibits that are already in the record, which  
23 is what have been printed out, so he can have copies of  
24 these. If you share documents, we can see the screen --

25 MR. GOSS: Okay.

1 MR. HELGE: -- we can see the screen. It may be  
2 easier, once we figure out where it is you're pointing  
3 to in the exhibit, and he can then look at it on the  
4 paper.

5 MR. GOSS: Sure. And as I said in my email to you,  
6 I have no objection and in fact it's helpful that he has  
7 paper documents in front of him. Just to make sure that  
8 we have a clean record and are looking at the same  
9 thing, I'll also be sharing them via Dropbox, but  
10 fortunately, because it's -- everything -- we do have a  
11 common exhibit numbering system as reflected on the  
12 documents, so hopefully everything will be nice and  
13 clear.

14 Like I said, I'm here to just kind of try to smooth  
15 things along. Occasionally I might make comments in  
16 that regard, but otherwise, I don't intend to be  
17 interjecting. Mr. Nix will be conducting the  
18 examination and I would ask that -- and I don't expect  
19 this, but I see there's three attorneys in the room  
20 across from Mr. Leale, I would expect that we're not  
21 going to have three different attorneys objecting all at  
22 once. Will it be Mr. Helge -- I hope I'm saying your  
23 name correctly -- taking the lead in terms of making  
24 objections and then conducting any direct examination?

25 MR. HELGE: Yes. I think, as you're suggesting,

1           there's only going to be one person on your side asking  
2           questions and there will only be one person on our side  
3           making objections.

4           MR. GOSS: Thank you, thank you. And then you guys  
5           said off the record earlier that you wanted to correct  
6           one aspect of Mr. Leale's deposition. Why don't you go  
7           ahead and do that on the record and then we'll jump in.

8           MR. HELGE: Yeah. Just for clarification, it  
9           wasn't in a deposition, but in his Declaration, so --

10          MR. GOSS: Sorry, the Declaration, the Declaration,  
11          pardon me.

12          MR. HELGE: There are two patents at issue today,  
13          the '671 patent and the '505 patent, and there was a  
14          separate Declaration submitted in each of those cases.  
15          Paragraph 19 of the '671 Declaration describes the scope  
16          of the engagement that Mr. Leale undertook on behalf of  
17          Dataspeed, and in the '671 patent there is a  
18          typographical error in terms of that scope of  
19          engagement, and the sentence is more accurately set  
20          forth in Paragraph 19 of the '505 case Declaration,  
21          1103. So just so you all know, he was not retained to  
22          provide analysis regarding what a person of ordinary  
23          skill in the art related to packaging for  
24          semiconductor-based light-emitting devices would have  
25          understood at the time of the '671 patent, it would have



1           been the technology identified in Paragraph 19 of  
2           Exhibit 1103, so to the extent that there was any  
3           question about that, we wanted to clarify that up front.

4           MR. GOSS: Okay, thank you. Okay. Well, I'll hand  
5           the floor over to Mr. Nix.

6                           R O B E R T   L E A L E  
7           having been first duly sworn, was examined and  
8           testified as follows:

9                           E X A M I N A T I O N

10          BY MR. NIX:

11          Q     Good morning. Just for the record, could you state your  
12                name?

13          A     My name is Robert Leale.

14          Q     Leale. And do you understand that I will be asking you  
15                questions about the Declarations in these inter partes  
16                proceedings IPR2020-00116 and IPR2020-00147, do you  
17                understand that you must answer all questions  
18                truthfully?

19          A     I do.

20                MR. HELGE: Allow me to interject a moment. If I  
21                instruct him not to answer a question due to proper  
22                bases for not answering, he won't be answering, so  
23                just -- he's not required to answer everything.

24                MR. NIX: Okay.

25          BY MR. NIX:

1 Q Is there any reason you might not be able to provide  
2 complete and truthful testimony today?

3 A None that I'm aware of.

4 Q If you do not understand a question, please let me know  
5 and I will try to rephrase it; is that okay?

6 A That's perfect.

7 Q Now, Mr. Helge said he may instruct you not to answer  
8 questions. If he objects to something I said, you still  
9 do have to answer the question; do you understand that?

10 MR. HELGE: That's not correct, actually. If you  
11 ask a question that calls for a privilege objection, I  
12 will tell him not to answer.

13 MR. GOSS: Mr. Helge, I think there's no reason to  
14 split hairs. As a general matter, Mr. Leale is required  
15 to answer questions. Obviously, we're not going to get  
16 in the middle of it if you instruct him not to answer,  
17 if we disagree with your instruction, we can take  
18 appropriate measures, but the hairsplitting and how he  
19 phrased a rule that is laid out at the beginning of  
20 every deposition is just not helpful.

21 MR. HELGE: Well, let me -- you're welcome to ask  
22 him whatever, but he understands if I tell him not to  
23 answer a question because you're asking something  
24 privileged, he's not going to answer it. So I'm not  
25 sure about splitting hairs, but if you make a general

1 question and it's not correct on a legal basis, I'm  
2 going to say so.

3 MR. NIX: And if you make an objection, but you do  
4 not instruct him not to answer --

5 BY MR. NIX:

6 Q Mr. Leale, do you understand that those, you do have to  
7 answer?

8 A I do.

9 Q Okay. You can have a break any time you need one, just  
10 let me know, and please answer any questions that may be  
11 pending, so ask for the break after you have answered  
12 the question; is that okay?

13 A That is, yes.

14 (Exhibit 1003 introduced.)

15 BY MR. NIX:

16 Q Now, I'm sharing your Declaration, Exhibit 1003. Are  
17 you -- do you recognize that as your Declaration?

18 A Just one second.

19 That appears to be it, yes.

20 MR. GOSS: I have also shared a Dropbox link to the  
21 same Declaration. Again, we all understand that you  
22 have paper exhibits printed in front of you, but for the  
23 sake of the record and having a common reference point,  
24 there is a link in the Zoom group chat to that same  
25 exhibit.

1 BY MR. NIX:

2 Q This Exhibit 1003, your Declaration, relates to  
3 Patent 9,871,671, also referred to as the '671 patent;  
4 is that correct?

5 A That's correct.

6 Q Did you write this Declaration?

7 A I did.

8 Q Other than what Mr. Helge said regarding Paragraph 19,  
9 do you have to make any corrections to your Declaration?

10 A I do not.

11 (Exhibit 1103 introduced.)

12 BY MR. NIX:

13 Q Exhibit 1103, do you recognize that as your Declaration?

14 A I do.

15 Q That Declaration relates to U.S. Patent 10,027,505,  
16 which we also call the '505 patent; is that correct?

17 A That is correct.

18 Q Did you write this Declaration?

19 A I did.

20 Q Did you have to make any corrections?

21 A I did not.

22 Q So everything you said in these Declarations, with the  
23 noted exception, is still true and correct?

24 A That's correct.

25 Q Have you been deposed before?

1 A I have.

2 Q What case was that?

3 A I don't have the recollection off the top of my head,  
4 sorry.

5 Q You don't remember in what case you have been deposed?

6 A I've been deposed four times.

7 Q Do you remember any of the four times you've been  
8 deposed?

9 A I recall the parties involved, if that would help.

10 Q So what were the parties?

11 A One of them was a company called Amp versus -- I'm  
12 trying to recall the other party -- Amp America  
13 versus -- I don't recall the other -- the other party.  
14 Off the top of my head, I don't recall their exact  
15 names, I'd have to look them up.

16 Q Was that a patent case?

17 A Say that again?

18 Q Was that a patent-related case?

19 A It was, yes.

20 Q And for which side did you testify?

21 A In one side, the defendant; in the other side, the  
22 person -- the company actually doing the -- I'm sorry,  
23 the non-defendant, I don't recall their -- the  
24 petitioner.

25 Q So were those inter partes review proceedings?

1 A They were not.

2 Q Were they patent litigation?

3 A That's correct.

4 Q Okay. And you testified as an expert witness in those  
5 cases?

6 A That's correct.

7 Q What were the cases about?

8 A They were regarding programmable electronic modules for  
9 automotive aftermarket systems.

10 Q Okay. And you're here as an expert today in vehicle  
11 networks; is that correct?

12 A That's correct.

13 Q How did you become an expert in vehicle networks?

14 A I started when I was young. In high school I started  
15 connecting vehicles and computers together in my -- one  
16 of my first vehicles. From there, I became an expert in  
17 computer networks. I worked with a school district  
18 local to me helping them set up computers on networks,  
19 computers, and then configuring the networks for years,  
20 approximately six years of that. Later, after  
21 graduating from college, I went to IBM and worked in  
22 computer networks and server management.

23 After that, I worked at a small company in Chicago  
24 setting up computers in -- not in vehicles, but just  
25 computer networks. Later, I -- I got a job at a company

1 in Detroit called Intrepid Control Systems that  
2 specializes in CAN bus, LIN, FlexRay, JT50, UART, and  
3 other vehicle style networks. From there I took my  
4 knowledge that I had been working on mainly as a hobby  
5 and became a professional trainer and engineer working  
6 with them, connecting and teaching vehicle systems to  
7 OEMs and suppliers. And I've been doing that since I  
8 started working with them in early 2005.

9 Then after -- in 2009 I started my own company that  
10 focused on vehicle networks where we help and assist  
11 companies to integrate aftermarket electronic systems  
12 into vehicles and I've been doing that since 2009. I  
13 formed the -- I worked there and then now I continue to  
14 do that job and have a small company that supports the  
15 aftermarket and OEM companies in integrating  
16 electronic -- electronic systems into vehicles.

17 Q Okay. I think you just said you became an engineer.  
18 How did you become an engineer?

19 A I worked -- well, again, I've been a computer engineer,  
20 a network engineer since -- I started in -- at the end  
21 of high school working and developing network systems at  
22 the end of high school with -- with the district, the  
23 school district that I had worked with, not the district  
24 that I was in, but the district that I worked with, and  
25 then I worked with -- after I worked with the Cisco

1 systems, I engineered their networks on the school -- in  
2 the school district, I also worked with IBM and  
3 engineered their networks, as well. So I became an  
4 engineer well before that, but I worked in automotive  
5 and became an engineer there with on-the-job experience.

6 Q Do you have formal training as an engineer?

7 A I guess I don't understand what you mean by "formal."

8 Q Do you hold any university or college degree in  
9 engineering?

10 A I do not.

11 Q Why didn't you study engineering?

12 MR. HELGE: Objection, form.

13 A So just back in high school, I looked at working on  
14 getting my degree in engineering, and I realized at that  
15 point, after looking at the curriculum, that I had  
16 already completed a lot of the prerequisites required to  
17 get into that field, and I felt at the time that I  
18 wouldn't have gained anything extra from a college  
19 education in something that I had been already doing for  
20 a number of years.

21 BY MR. NIX:

22 Q Okay. Have you worked on vehicles with controller area  
23 networks?

24 A I have.

25 Q Were any of those vehicles convertibles?



1 A Yes, they were.

2 Q Which convertibles did you work on?

3 A I worked with the Pontiac G6. The Saab 9-3. I think  
4 that's it.

5 Q And are you familiar with the operation of the  
6 convertible roof in those vehicles?

7 A Yes.

8 Q Did you review the electrical wiring of the convertible  
9 roof in those vehicles?

10 A Yes.

11 Q Did you try to hack the roof of any of those vehicles?

12 A What do you mean by "hack"? I'm sorry.

13 Q If I understand correctly, you are the president of a  
14 company called CanBusHack?

15 A That's correct.

16 Q What do you do when you hack -- do you hack vehicles?

17 A I do, yes.

18 Q And when you hacked vehicles, did you hack a convertible  
19 vehicle?

20 A I did not.

21 Q Okay. In your Declaration in Paragraph 59, you refer to  
22 a contiguous network. What does that mean?

23 A A contiguous network in Paragraph 59 is a network,  
24 typically a single wire or two wires, connecting two or  
25 more nodes.

1 Q What does the term "contiguous" in that mean?  
2 A Continuing, without break.  
3 Q Wouldn't that be continuous? You called it contiguous.  
4 A Correct. Contiguous, contiguous without break.  
5 Q Contiguous means without break?  
6 A It means -- contiguous means connected -- the two -- in  
7 this situation, it's referring to two nodes connected  
8 together using one or two wires, so a single channel  
9 without any break in those -- in the channel.  
10 Q What would a --  
11 A (Inaudible).  
12 Q What would a break be?  
13 A A break would be an interruption with -- between the  
14 signaling of those two nodes, so the voltages between  
15 the two nodes; if voltage was put on one side of the  
16 network, it wouldn't arrive on the other end of the  
17 network.  
18 Q Okay. Have you ever seen someone refer to CAN as a  
19 contiguous network?  
20 A I'm sure I have before, yes.  
21 Q Do you recall where?  
22 A Probably in my training.  
23 Q Do any of the references you list in Appendix A of the  
24 Declaration refer to a contiguous network?  
25 A I could check, if you'd like.

1 Q So off the top of your head, you don't remember any one  
2 of them referring to a contiguous network?

3 A Off the top of my head. I haven't memorized every word  
4 inside of these references.

5 Q Would it surprise you if we found out that none of them  
6 used the word "contiguous"?

7 A I -- it wouldn't surprise me if it had the word or not.

8 Q Okay. But really, in essence, you're saying the CAN bus  
9 is continuous in that every module on that one bus sees  
10 the same voltage potential, if I understand you  
11 correctly?

12 A The -- if one node sends a CAN frame, the other nodes  
13 simultaneously receive it.

14 Q And that is because they are electrically hard-wired  
15 together, correct?

16 A That's because there is a single wire that connects all  
17 of them together without any breaks, contiguous.

18 Q And that wire could go through one of the modules,  
19 correct?

20 A That wire could -- if -- that wire needs to connect all  
21 of them together so that electrically they are seeing  
22 the same voltage variations and potentials at the same  
23 time, however that happens, whether it's on one wire  
24 or -- or two wires, if it's the case of a two-wire CAN  
25 bus.

1 Q Okay. So they do see the same voltage?

2 A They would monitor the voltages and see them both at the  
3 same time that -- if the voltage changed on one end, it  
4 would change across all the nodes simultaneously.

5 (Exhibit 1001 introduced.)

6 BY MR. NIX:

7 Q Let me share Exhibit 1001. That is the '671 patent,  
8 correct?

9 A Just one second. So I have -- okay. Yeah.

10 MR. HELGE: That's 1101. Yeah.

11 BY MR. NIX:

12 Q Can you take a look at Figure 6 of the '671 patent?

13 A Yes.

14 Q As it is illustrated, there is a BUS1 input that is  
15 connected to a BUS2 input with a direct connection.

16 A Understood. That's correct.

17 Q And are BUS1 and BUS2 in this case part of one CAN bus?

18 MR. HELGE: Objection.

19 A These two buses would -- would both likely -- if this  
20 is -- if this wire is direct and there's no break in it,  
21 I would call this a contiguous network, they are -- BUS1  
22 and BUS2, both of the voltages would be -- whatever  
23 voltage comes on BUS1 would also come on that second  
24 wire labeled as BUS2.

25 BY MR. NIX:

1 Q So you do not see any break as it is illustrated in  
2 Figure 6 between BUS1 and BUS2?

3 A If those -- if that particular wire is shorted, it's  
4 correctly placed, it likely would have the same voltage  
5 potential on both BUS1 and BUS2.

6 Q Do you see any break that would indicate that it is not  
7 the same voltage?

8 A I see a potential there for a break. I'm not sure if  
9 that -- if the switch 606 is open or closed; it appears  
10 to be closed, and in that situation, I would assume that  
11 there would be voltage on both, the same voltage on  
12 both.

13 Q And when adding the second bus, that one must not have  
14 the same voltage; is that correct?

15 MR. HELGE: Object to form.

16 A Just what do you mean by adding a second bus? Sorry.

17 BY MR. NIX:

18 Q The '671 patent refers to adding a second data bus, does  
19 it?

20 A The '671 patent does refer to that, yes.

21 Q And when adding a second data bus, does that have to be  
22 isolated from a first data bus to be a second data bus?

23 MR. HELGE: Object to form.

24 A A second data bus would -- in that situation, a second  
25 data bus may -- I mean, I'm just looking. Can you

1 refer -- can you point me to the -- is that Claim 1,  
2 correct, that you're speaking of?

3 BY MR. NIX:

4 Q Yes.

5 A I'm trying to figure out what you mean by a second data  
6 bus.

7 Q I'm highlighting in the '671 patent, Claim 1, the  
8 limitation "adding a second data bus to the vehicle."

9 A And can you repeat the question, please?

10 Q The question was, is that second data bus electrically  
11 isolated from the first data bus?

12 A In Claim 1, the second data bus would not have the same  
13 electrical potentials simultaneously at -- as the first  
14 data bus.

15 Q If they do not have the same potential, does that mean  
16 they are isolated from one another?

17 MR. HELGE: Object to form.

18 A The second data bus would -- would not be connected to  
19 the first one; thus, not sharing any of the same  
20 properties as the first one, as the -- the first data  
21 bus would not share the same electrical properties, so  
22 if a message was sent on the first data bus, you would  
23 not see that same message at the same time on --

24 BY MR. NIX:

25 Q Are they isolated from one another?

1 MR. HELGE: Object to form.

2 A I mean, define "isolated" in that context. They're not  
3 connected, they're not contiguous, what do you mean?

4 BY MR. NIX:

5 Q In your Declaration, Paragraph 104, you say that  
6 something can be achieved by adding new conductors that  
7 are electrically isolated from the existing data bus; is  
8 that correct? And I'm referring to Exhibit 1003.

9 A Understood. That is correct. Electrically isolated, I  
10 understand now. When you said "isolated," you meant  
11 electrically isolated, understood.

12 Q Okay. So are they electrically isolated from one  
13 another?

14 MR. HELGE: Object to form.

15 A Their electrical potential is not the same at -- at the  
16 same time, that's what I'm trying to say.

17 BY MR. NIX:

18 Q Going back to Claim 1, the second data bus, is it  
19 isolated from the first data -- electrically isolated  
20 from the first data bus?

21 MR. HELGE: Object to form.

22 A The two networks do not have the same electrical  
23 potential, they are electrically different from each  
24 other, so if voltage happens on one network, it doesn't  
25 exist on the other at the same time.

1 BY MR. NIX:

2 Q Do you --

3 A They are -- they are different wires, they don't connect  
4 together, they're not contiguous, they're different.

5 Q Do you know what "electrically isolated" means?

6 A I do. Electrically, the electronics, the electrical  
7 potential is different, it's just what I'm trying to say  
8 several times, the same thing over and over, the --

9 Q I asked a yes or no question and you refused to answer  
10 yes or no.

11 Is the second data bus electrically isolated from  
12 the first data bus?

13 MR. HELGE: I'm going to object to form. He's been  
14 asked this question and he's answered it multiple times.  
15 Just because you want a yes or no answer doesn't mean  
16 that's the answer he's going to give.

17 BY MR. NIX:

18 Q You still have to answer the question.

19 MR. HELGE: You can answer.

20 THE WITNESS: Okay.

21 A So the question is are they electrically isolated; is  
22 that correct?

23 BY MR. NIX:

24 Q That is the question.

25 A And the answer is electrically, they are not connected,



1           they are isolated in that they're in a different  
2           physical space, they don't have the same potential,  
3           electrical potential, going across each other, so if a  
4           message occurs on one, it doesn't occur on the other.

5       Q     So yes, they are isolated from one another?

6           MR. HELGE: Object to form.

7       A     Was that a question? I'm sorry. It sounded like a  
8           statement.

9       BY MR. NIX:

10      Q     Yes, I'm trying to understand if you just said that yes,  
11           they are isolated?

12           MR. HELGE: Same objection.

13      A     I guess to clarify, again, the two networks are  
14           electrically separate.

15      BY MR. NIX:

16      Q     And do you see a difference between being electrically  
17           separate and being electrically isolated?

18      A     Yes, I do.

19      Q     Okay, let's move on. And I'm going to refer to  
20           Exhibit 1006.

21           (Exhibit 1006 introduced.)

22      BY MR. NIX:

23      Q     Do you recognize this exhibit?

24      A     I do, yes.

25      Q     Figure 8 of this exhibit, what does this figure show?

1 A The figure shows a CAN bus connected to a bus  
2 transceiver, connected to receive assembly registers, so  
3 a CAN controller likely, identifier bits, data bits,  
4 connected to a CAN protocol engine, likely connected to  
5 a CAN controller, some message filters/masks inside of  
6 the CAN controller, and some registers inside of the  
7 microcontroller.

8 Q When is a CAN message received?

9 MR. HELGE: Object to form.

10 A A CAN message is received by a CAN controller after the  
11 end-of-frame sequence is completed.

12 BY MR. NIX:

13 Q And referring to Figure 8, where is the CAN message once  
14 it has been received?

15 A It is -- the CAN message is written into the receive  
16 assembly register.

17 Q So receiving a CAN message means the message arrives in  
18 the receive assembly registers, correct?

19 MR. HELGE: Object to form.

20 A The message is received by the CAN controller, not yet  
21 by the microcontroller at that point, that's correct.

22 BY MR. NIX:

23 Q Okay. Could someone refer to receiving a CAN message  
24 when it arrives in the receive register?

25 A Someone could say they received a message -- an

1 application could have received a message in the receive  
2 register, yeah.

3 Q So in that case, not every node on the CAN bus receives  
4 every message, correct?

5 A That is correct.

6 Q Okay. I'm referring back to your Declaration,  
7 Exhibit 1003. In explaining the '671 patent, you used  
8 the term "spoof"; is that correct?

9 A I did, yes.

10 Q And just to clarify, I'm referring to Exhibit 1003,  
11 which is the one relating to the '671 patent.

12 What does it mean to spoof a CAN message?

13 A Spoofing a CAN message is to send a message with the  
14 same identifier as another message that controls a  
15 particular function that you're interested in  
16 controlling.

17 BY MR. NIX:

18 Q Okay. Does that, in effect, mean that message pretends  
19 to originate from a different module?

20 A I don't -- I don't believe that is -- it does not  
21 pretend to originate from it; it simply is sending an  
22 identifier used to control a particular system.

23 Q Did you say it uses the identifier from another module?

24 A It uses an identifier that originates from another  
25 module. Or may originate, may originate from another

1 module.

2 Q So by using the identifier from another module, does it  
3 pretend to be that other module?

4 MR. HELGE: Object to form.

5 A I think the message identifier is -- is useful to the  
6 receiving modules. I don't know how much or if at all,  
7 I don't believe at all, the receiving modules use that  
8 identifier to identify where the message is coming from.

9 BY MR. NIX:

10 Q Okay. But if you explain to someone how to spoof a  
11 message, you would explain it as send a message and use  
12 the identifier from another module, correct?

13 A In my classes that I have been teaching for the past  
14 eight years, when I'm talking about spoofing a module,  
15 I'm talking about sending a message that exists  
16 currently on the bus; I typically don't worry about  
17 where that message is originating from, what node or  
18 what module, rather, that I'm more interested in the  
19 functions that that particular message is capable of  
20 performing.

21 Q Okay. And going back to the Appendix A and the  
22 materials you considered, which one of these discusses  
23 spoofing?

24 A I believe Munoz.

25 Q Okay. Any other document on that list?

1 A I believe Dietz.

2 Q Dietz. Any other document?

3 A I believe SAE maybe, I'd have to look at it again, but I  
4 believe that one has some context that would relate to  
5 spoofing.

6 Q Okay. Any other document?

7 A It's possible that some of the others do, but I  
8 don't -- I don't know off the top of my head.

9 Q If someone comes to you and says -- asks you about  
10 spoofing, which of these documents would you recommend  
11 to read to understand spoofing?

12 MR. HELGE: Object to form.

13 A I think that those documents aren't -- aren't used to be  
14 a -- be for me to teach like somebody who's young and  
15 just learning, there's a lot that they need to  
16 understand before I could get to that. I would probably  
17 recommend taking one of my courses instead.

18 BY MR. NIX:

19 Q So you teach spoofing in your classes?

20 A That's correct.

21 Q And if a young engineer came fresh out of college and  
22 needs to learn about spoofing, you would say they should  
23 attend one of your classes rather than read any of the  
24 documents on Appendix A?

25 A Well, some of those documents are patents, of which I'd

1 have to -- as a learning material to a new student, I  
2 don't see their use. The SAE paper maybe I would  
3 recommend because I think technical papers are good, but  
4 I'm trying to give them as much context as I could in a  
5 class before they delve deep into an SAE technical  
6 paper.

7 Dietz is great for an installation of a module if  
8 they wanted to understand -- and I've referenced Dietz  
9 in a class to show them how this controller can take  
10 messages, you know, take a measured input message, send  
11 an output message, you know, we're cutting the -- we're  
12 cutting the wire so they can see how data comes in and  
13 how data flows out, they can understand really well how  
14 the -- the park system works and why -- how systems like  
15 can stop, like you have this navigation --

16 Q Okay, let's -- we'll get to them --

17 A -- (inaudible) I'm still answering --

18 Q -- in detail in a little bit --

19 A -- the question, do you mind?

20 MR. HELGE: Hang on a second. Axel, when he's  
21 answering a question, it's not your right to interrupt  
22 him, you've got to let the witness -- he's not going to  
23 interrupt you when you ask a question and it's not your  
24 right to interrupt him when he's answering.

25 A So we have the module that can take data from a vehicle

1 system, we open up the network, and then spoof, really  
2 spoof the parking system so that it makes -- I can show  
3 them exactly what spoofing is, they can see that the  
4 screen was blocked out because the vehicle wasn't in  
5 park and how all of a sudden you're driving down the  
6 road and now when you flip a switch and you can see the  
7 vehicle system, so Dietz really gives us a real good  
8 understanding of how spoofing might work and its  
9 practical effect from just simply installing a module.  
10 And then we might connect to both CAN buses, the CAN A  
11 and CAN B, and see how they're electrically different in  
12 that system because one on one side, we have the  
13 messages showing that the car isn't in park, and on the  
14 other side we have a message showing it is in park, and  
15 you can kind of see how the navigation system allows us  
16 to still watch video as you're driving down the road,  
17 and I think Dietz would actually be a really good  
18 example of how we do spoofing.

19 BY MR. NIX:

20 Q Let's go to Munoz. You did say Munoz also discloses  
21 spoofing, correct?

22 A That's correct.

23 Q Where does he mention this?

24 A Munoz describes spoofing in Figure -- I believe  
25 it's Figure 1, and I believe in other parts of the -- of

1 the -- of the patent itself, but in Figure 1 Munoz  
2 describes in 110 original electronics and actuators to  
3 operate a factory-installed sunroof or folding roof, so  
4 that's their receiving module that's being -- been cut.  
5 In 115, the original data connection will be terminated  
6 so all communication has to go through the roof control  
7 module, and in 100 he mentions the roof control module  
8 is connected between the internal sensors, switches and  
9 electronics in the automobile or truck. It is removing  
10 or altering data exchanged between integrated and closed  
11 systems to allow additional operations normally not  
12 available to operate an automatic folding -- just one  
13 second, I'll find the other spots.

14 MR. HELGE: And just so you know, you may want to  
15 speak a little slower so that --

16 THE WITNESS: Oh, sorry about that, she's got to  
17 write all that down, I apologize, I was just reading it  
18 out.

19 A Sorry, my eyes are very dry right now, it's difficult to  
20 read, I'm sorry.

21 Okay. Sorry for that. I had lost where it was. I  
22 have a section, Column 6, Paragraph 49 through, I  
23 believe, 65.

24 BY MR. NIX:

25 Q You said 49 through 65?



1 A Yeah.

2 Q Okay. Let's go -- anywhere else?

3 A Also in my report I point out that Negley has some  
4 references, as well.

5 Q Okay, but we were talking about Munoz. You said  
6 Figure 1 and Column 6, 49 to 65. The question was does  
7 Munoz anywhere else discuss spoofing?

8 A Figure 1 and that section and --.

9 Currently I don't see any other spots, but again,  
10 I'm just re-reading it with my eyes a little bit on the  
11 dry side, I apologize. I think that's it.

12 Q Okay. Then let's discuss Figure 1. Where in  
13 Figure 1 --

14 THE WITNESS: Do you mind -- I've got some  
15 eyedrops. Do you mind if we -- I can put my eyedrops  
16 in.

17 MR. NIX: Of course.

18 MR. HELGE: Do you want to take a five-minute  
19 break?

20 MR. GOSS: Yeah.

21 MR. NIX: That's fine.

22 MR. HELGE: Off the record, thank you.

23 (Whereupon a break was taken  
24 from 10:44 to 10:57 a.m.)

25 BY MR. NIX:

1 Q We were going to talk about Munoz Figure 1, you said it  
2 shows spoofing. Where exactly does he show that?

3 A Munoz describes in 100 altering data exchanged.

4 Q Okay.

5 A And in altering the data, he's spoofing the identifiers  
6 of existing messages that are coming from 105 to 110.

7 Q So the word "altering data" is what discloses spoofing,  
8 correct?

9 A The CAN bus has a frame, the frame has an identifier and  
10 data. The identifier is not being altered, however, the  
11 data is, so he is altering the data, thus maintaining  
12 the identifier, thus, spoofing.

13 Q And where does he say maintaining the identifier?

14 A He says he is operating the automatic roof and/or  
15 sunroof, operating the automatic folding roof. In order  
16 to operate these, he must maintain the identifier, as  
17 it's expected by 110 to be the same identifier.

18 Q So does he use the word "identifier" anywhere on  
19 Figure 1?

20 A I believe Figure 1 has no -- the word "identifier" is  
21 not there; however, the concept of CAN frames indicate  
22 that there must be identifiers.

23 Q So you are concluding that there must be spoofing, but  
24 does he show it?

25 MR. HELGE: Object to form.

1 A He mentions that he has modified data. There are two  
2 parts of the CAN frame, identifier and data, and in  
3 order to continue the operations, he must maintain the  
4 identifier. I think anybody who has an understanding of  
5 CAN bus would understand that.

6 BY MR. NIX:

7 Q So if someone comes -- if a young engineer comes and you  
8 said you are teaching spoofing, you could give them  
9 Figure 1 of Munoz and they would understand what  
10 spoofing means?

11 MR. HELGE: Object to form.

12 A I think that if someone understands CAN bus, they  
13 would read this and say altering data means -- well, if  
14 they used the word "spoofing," that's one thing, they  
15 would use the word that came into their head, it  
16 would -- potentially "spoofing" they would say. By  
17 altering the data, I wouldn't be necessarily altering  
18 the identifier, as 110 would be expecting that  
19 identifier and would understand that the roof control  
20 module 100 is spoofing the original identifier coming  
21 from 105, yes.

22 BY MR. NIX:

23 Q And could "altering data" refer to anything else?

24 A I don't believe so, no.

25 Q And "altering" means changing, correct?

1 A Altering means modifying, changing, making it not the  
2 same as it was before.

3 Q So in your understanding, there is communication from  
4 105 to 110, and that is being altered or changed,  
5 correct?

6 A That's correct.

7 Q And that is being done by changing some data, but  
8 leaving an identifier intact?

9 A That is correct.

10 Q And that, you understand, is inherent from the words  
11 "altering data"?

12 MR. HELGE: Object to form.

13 A I believe that the CAN bus has just two portions, the  
14 identifier and the data portion, very specifically  
15 talking about altering the data; however, anybody who  
16 has used CAN bus understands that changing the  
17 identifier is in fact not effective for maintaining  
18 functionality, so not changing that identifier is  
19 important. So he doesn't mention that because it's not  
20 necessary in that situation.

21 BY MR. NIX:

22 Q Let's go to Column 6, lines 49 to 65. Does he describe  
23 spoofing in there in more detail?

24 A He describes sending factory signals such as the roof  
25 close -- the close roof signal and the roof -- and

1 talking to the roof close mechanism, so he describes  
2 spoofing the factory message.

3 Q Could you identify the line, please?

4 A Sorry. That is 52 and 53.

5 Q So Column 6, lines 52 to 53 refers to sends a close roof  
6 signal to the roof control mechanism for 26 seconds.

7 How do you send a CAN message for 26 seconds?

8 A You send the same CAN message for 26 seconds over and  
9 over again.

10 Q And what do you do after the 26 seconds?

11 A You stop sending that message or send the original  
12 message. The unaltered message.

13 Q And the roof signal is an altered message. How is it  
14 altered?

15 A In this instance, I believe it's altered by indicating  
16 that the button is being pressed when in fact it isn't  
17 for the roof close button.

18 Q Okay. Let me ask some general questions about Munoz.  
19 Do you think it's a well-written document?

20 MR. HELGE: Object to form.

21 A I believe that -- I don't have an opinion on whether  
22 it's well written or not, I don't, I don't know what  
23 that means.

24 BY MR. NIX:

25 Q Did you understand everything he says?

1 MR. HELGE: Object to form.

2 A I didn't have a test, if that's what you're asking,  
3 afterward, of the patent.

4 BY MR. NIX:

5 Q Do you feel that you have a good understanding of what  
6 Munoz discloses in his patent?

7 A I do, yes.

8 Q And you understand everything he wrote?

9 A I speak English and, thus, I believe that I can  
10 understand the words inside the document, yes.

11 Q But do you understand the content of the document?

12 A I work in the automotive field and aftermarket  
13 electronics and understand vehicle network systems, so I  
14 understand it from that perspective, as well.

15 Q So is that a yes, you understand Munoz?

16 A I understand the patent language and terms, yes.

17 Q Is there anything in Munoz that you do not understand?

18 A There is a hyperlink in Column A, lines 27 -- or 28 and  
19 29 that I have not visited, so I don't know what's  
20 there.

21 In Column 2, lines 24 and 25, there's a company  
22 called Wilhelmy IT, Incorporated; I'm not familiar with  
23 that company.

24 Similarly, there's a patent referenced in Column 2,  
25 line 35, according to Moore; I don't believe I've viewed

1           that patent.

2                   Otherwise, I believe I understand the words and  
3           phrases in the document.

4    Q    Okay. And now that you have had the break and hopefully  
5           have the eyes back --

6    A    Thank you for that.

7    Q    -- working, anything that comes to mind where else Munoz  
8           discloses spoofing that you may not have been -- seen  
9           before?

10   A    Let me just check.

11                   So Column 2:65 through Column 3:3 has a paragraph  
12           that relates to the concept of using the CAN bus to  
13           operate factory vehicle controls.

14   Q    And that, you're saying, discloses spoofing?

15   A    Just one second.

16                   This references adding convenience functions using  
17           the CAN bus and activating factory functions, which  
18           would likely be done via spoofing.

19   Q    You say would likely be done. Does that mean it can  
20           only be done through spoofing?

21   A    It would require -- it would require it to be -- to use  
22           the same identifier if he wants to use the factory  
23           function, so, thus, it would need to be done via  
24           spoofing, correct.

25   Q    And does Munoz say that?

1 A Does he say what I just -- what I just said?

2 Q That it can only be done by spoofing, yes.

3 A He does not.

4 Q So he does not disclose spoofing in that paragraph that  
5 you mentioned, Column 2:65 to 3:3?

6 A Sorry, is that a question?

7 Q I'm asking, did he identify -- or did he refer to  
8 spoofing in that portion that you cited in Column 2,  
9 line 65, to Column 3, line 3?

10 A That is -- that is what I'm trying to say, yes. A  
11 person with ordinary skill in the art would understand  
12 sending factory commands would require spoofing.

13 Q Okay. But he doesn't say that; that's what you are  
14 saying, correct?

15 A I think the original question was does he disclose  
16 spoofing, and my response was in this section he talks  
17 about sending a factory command to -- over the CAN bus,  
18 which would require spoofing, that's what I'm saying.

19 Q Okay. Let me refer to Column 6, lines 22 to 25. How  
20 does Munoz define CAN bus?

21 MR. HELGE: Object to form.

22 A Line 22, Munoz references CAN bus and he says it refers  
23 to any of the various serial bus standards and local  
24 networks for connecting to ECUs.

25 BY MR. NIX:



1 Q And that includes LIN bus?

2 A It is not limited to just CAN bus, it also includes  
3 LIN bus or FlexRay or other automobile -- automotive  
4 networks.

5 Q So FlexRay is a CAN bus?

6 MR. HELGE: Object to form.

7 A Munoz believes that FlexRay is a CAN bus.

8 BY MR. NIX:

9 Q Do you believe that FlexRay is a CAN bus?

10 A I believe FlexRay is a serial data network.

11 Q Do you believe FlexRay is a CAN bus?

12 MR. HELGE: Object to form.

13 A I believe FlexRay is FlexRay.

14 BY MR. NIX:

15 Q Is FlexRay a CAN bus?

16 MR. HELGE: Object to form.

17 A I believe that if you connected a CAN bus adapter to  
18 FlexRay, you could not interact with it.

19 BY MR. NIX:

20 Q So is FlexRay a CAN bus?

21 MR. HELGE: Object to form.

22 A I believe FlexRay is FlexRay.

23 BY MR. NIX:

24 Q I think it's a yes or no question. Is FlexRay a CAN  
25 bus?

1 A I think I've answered that question.

2 Q I did not hear a yes or a no.

3 A Understood.

4 Q So is FlexRay a CAN bus?

5 MR. HELGE: Object to form, he's asked -- it's been  
6 asked and answered, the question, multiple times.  
7 Again, Axel, just because you want a yes or no answer  
8 doesn't mean that's what the answer is going to be that  
9 he's going to give.

10 MR. NIX: I'm entitled to truthful testimony and  
11 I'm asking a yes or no question.

12 BY MR. NIX:

13 Q Is FlexRay a CAN bus, yes or no?

14 MR. HELGE: Object to form.

15 A A FlexRay network without data could be used as a CAN  
16 bus.

17 BY MR. NIX:

18 Q So you're saying FlexRay is a CAN bus?

19 MR. HELGE: Object to form.

20 A I am saying FlexRay is FlexRay.

21 BY MR. NIX:

22 Q Why is it so hard to answer the question with a yes or  
23 no whether FlexRay is a CAN bus?

24 MR. HELGE: Hang on a second, Axel, we're not going  
25 to have this kind of discussion. He's given you an

1 answer. What you just asked was an argumentative  
2 statement designed to -- you know, maybe you're  
3 frustrated or whatever, but it's an argumentative  
4 statement designed to get him to answer a question the  
5 way you want the answer to read. He's given you an  
6 answer. I just want you to know what you just asked is  
7 not a proper question in this deposition.

8 MR. NIX: Then I may have --

9 MR. GOSS: Wayne, your objection is noted. Are you  
10 instructing him not to answer the question?

11 A I believe I have answered the question.

12 MR. GOSS: Wayne, are you instructing him not to  
13 answer Axel's last question or are you simply noting an  
14 objection for the record?

15 MR. HELGE: I think you have an answer. If you  
16 look at the record, I think Axel has got his answer  
17 multiple times, he just wants it in a yes or no format.  
18 I'm saying I'm objecting to the form and what Axel just  
19 said was why can't you answer it the way I want you to  
20 answer it; that's not a proper question. I'm --

21 MR. GOSS: So your --

22 MR. HELGE: -- (inaudible) Mr. Leale to answer that  
23 question.

24 MR. GOSS: Your objection is noted, but I have not  
25 heard any instruction not to answer.

1 MR. HELGE: Correct.

2 A I believe I have answered the question.

3 BY MR. NIX:

4 Q I did not hear a yes or no answer. Is FlexRay a CAN  
5 bus, yes or no?

6 MR. HELGE: Object to form.

7 A I believe FlexRay is FlexRay, it is FlexRay.

8 BY MR. NIX:

9 Q Is LIN a CAN bus?

10 A I believe LIN is LIN. If you hooked up a CAN bus tool  
11 to LIN, you would not see any messages.

12 Q Does Munoz define CAN bus other than you do?

13 A I believe Munoz defines CAN bus in this reference and  
14 he's referring to serial data networks as a concept and  
15 wants us to think of CAN buses as serial data networks.

16 Q So when you in your Declaration used the term "CAN bus,"  
17 does that equally apply to FlexRay and LIN?

18 A Can you give me an example?

19 Q Take paragraph 76 where you use the term "CAN based  
20 networks." When you wrote "CAN based networks," did you  
21 mean FlexRay?

22 MR. HELGE: Object to form.

23 A In 76 when I say "CAN based networks," I'm referring to  
24 networks based on the CAN protocol, but not necessarily  
25 limited. As we're speaking here, gateways, and gateways

1 is a network topology concept, and so I was simply  
2 referencing gateways as they pertain to CAN bus, but it  
3 could be any type of network, not just serial data  
4 networks, thus is CAN bus.

5 BY MR. NIX:

6 Q So when you wrote "CAN bus," you also thought of it  
7 being FlexRay, correct?

8 MR. HELGE: Object to form.

9 A When I wrote of "CAN bus" here, I thought of it being  
10 CAN bus.

11 BY MR. NIX:

12 Q Okay. Did you point out anywhere that Munoz'  
13 understanding of a CAN bus includes FlexRay or LIN?

14 A Are you talking about anything in particular that you  
15 want me to look at or do you want me to talk about the  
16 entire document?

17 Q No, I asked whether you pointed that out in your  
18 Declaration?

19 A Pointed what out? I'm sorry, can you repeat that?

20 Q That Munoz understands a CAN bus to include FlexRay?

21 A I don't believe I did.

22 Q So when you read Munoz and you read the term "CAN bus,"  
23 did you always check whether it could include FlexRay?

24 MR. HELGE: Object to form.

25 A I'm sorry, you cut out there, could you please repeat?

1 BY MR. NIX:

2 Q When you read the term "CAN bus" in Munoz, did you  
3 consider that that includes FlexRay?

4 MR. HELGE: Object, form.

5 A At the time, I don't recall right now what I -- if I  
6 considered that or not.

7 BY MR. NIX:

8 Q Okay. Let me share a new exhibit, 2026.

9 (Exhibit 2026 introduced.)

10 A Sorry, I have to get closer.

11 MR. GOSS: I just shared a link too. I don't know  
12 where you're situated in relation to your computer, but  
13 it's shown on the screen, but I also sent a link.

14 THE WITNESS: This is probably the best, this is  
15 the best view.

16 MR. GOSS: Okay.

17 BY MR. NIX:

18 Q In that annotated Figure 1 of Munoz, trying to summarize  
19 what I believe you're saying in your Declaration, and I  
20 would like to walk with you through that, whether I've  
21 got your understanding correct.

22 The original Figure 1 of Munoz does not show what  
23 is inside the original dashboard 105, correct?

24 A That is correct.

25 Q And you're saying it includes a microprocessor and a

1 transceiver, correct?

2 A Can you please reference what you're -- what you're  
3 talking about when you say I say?

4 Q Is it your understanding that the original dashboard 105  
5 must include a microprocessor and a transceiver?

6 A I believe that is correct.

7 Q And you're saying that the line between the original  
8 dashboard 105 and the roof control module 100 is a first  
9 data bus, A; is that correct?

10 A I believe that is correct, yeah.

11 Q And the line between the roof control module 100 and the  
12 sunroof electronics 110 is a second data bus?

13 A That is correct.

14 Q The original Figure 1 of Munoz does not show what is  
15 inside the roof control module 100, correct?

16 A That is correct.

17 Q And I understand you to say it includes a  
18 microprocessor?

19 A That is correct.

20 Q And I understood you to say that the first Bus A and the  
21 second Bus B are different or electrically isolated?

22 A They are separate networks, correct.

23 Q And is it fair to show that in the form of two different  
24 transceivers as illustrated in this exhibit?

25 MR. HELGE: Object to form.

1 A I believe that there are two separate CAN controllers,  
2 as well, inside of the microprocessor.

3 BY MR. NIX:

4 Q Okay. So it's fair to say there are two different  
5 transceivers there, even two different CAN controllers,  
6 in your understanding?

7 A Upon first review, there is likely two CAN controllers  
8 and two trans -- two individual transceivers connected,  
9 as there would have to be because of two data buses,  
10 correct.

11 Q And the processor in the roof control module 100  
12 transmits all messages from Bus A to Bus B, correct?

13 MR. HELGE: Object to form.

14 A I'm not sure that it transmits all messages, but it -- I  
15 don't know if it transmits all messages.

16 BY MR. NIX:

17 Q We'll get back to that. But it would trans -- but it  
18 does implement a gateway, correct?

19 A The roof control module is capable and does take data  
20 from Bus A and transmit -- retransmit similar  
21 identifiers on to Bus B.

22 Q Similar identifiers?

23 A Or identical identifiers, I apologize.

24 Q And in --

25 A I apologize.



1 Q -- the opposite direction from Bus B to Bus A?

2 A Yes, it also transmits the status information and other  
3 information from the roof control back to Bus A, yeah.

4 MR. HELGE: Just make sure you --

5 THE WITNESS: Oh, I apologize, yeah, I thought he  
6 had finished.

7 MR. HELGE: Me too, but I'm seeing --

8 THE WITNESS: Fair enough.

9 MR. HELGE: Don't talk over me and don't talk over  
10 him because --

11 THE WITNESS: I didn't think I was, I apologize.

12 MR. HELGE: Thanks.

13 BY MR. NIX:

14 Q I understand you to say that there is a first message,  
15 which is a roof open or close message, on the first data  
16 bus, correct?

17 A Do you have a reference?

18 Q I don't right now. Is it your understanding that the  
19 module 105 sends a roof open message to the module 100?

20 A It sends it on to the vehicle network, of which the roof  
21 controller is also on that same network, but I wouldn't  
22 say it sends it to it, no, I would say that it is  
23 received by the roof control module.

24 Q Okay. So 105 sends the roof open message and 100  
25 receives it, correct?

1 A That's correct.

2 Q And that also includes vehicle speeds, correct?

3 A That is also correct.

4 Q Okay. And then there's a second message which is a roof  
5 open or close message sent from the roof control  
6 module 100 to the original sunroof electronics 110,  
7 correct?

8 A The roof control module resends and retransmits that  
9 original message on to Bus B, that is correct.

10 Q And that is then referred to as the second message in  
11 your Declaration, correct?

12 A I believe that's correct, yes.

13 Q And that includes modified data as to vehicle speeds,  
14 correct?

15 A It can, yes, yes, I believe so.

16 Q Looking at Exhibit 2026, do you see anything that is  
17 incorrectly summarizing your Declaration?

18 MR. HELGE: Object to form.

19 A I'm not sure that this is -- I -- this is the first time  
20 I've seen this, so I -- I'd have to take some time to  
21 look at it and verify it before I could make a statement  
22 like that.

23 BY MR. NIX:

24 Q I understand. And please take the time, I understand  
25 you're seeing it for the first time. Looking at it now,

1 do you see anything that you can identify as being  
2 wrong?

3 A Upon first review, I don't see anything currently, no.

4 Q I didn't discuss yet the factory cabriolet top  
5 open/close buttons. Those are not shown in original  
6 Munoz Figure 1, correct?

7 A That is correct.

8 Q And is it your understanding that this button is wired  
9 to the original dashboard 105?

10 A I believe so, yes.

11 Q Okay. The switch 120, was that originally in the  
12 vehicle or has it been added during the retrofit?

13 A I believe it was added during the retrofit.

14 Q What purpose does this switch 120 serve?

15 A When the switch is closed, it reconnects the first data  
16 bus to the second data bus.

17 Q And when would that switch be closed?

18 A When the user chooses to disable the -- the figure 100  
19 roof control module.

20 Q So the switch 120 is operated by the user?

21 A I believe so, yes.

22 Q And it has been added to the vehicle as part of the  
23 retrofit?

24 A That is correct.

25 Q In Column 3, lines 35 to 37, doesn't Munoz say that his

1 device relies on existing controls without the need for  
2 new buttons, knobs or switches to be added to the  
3 vehicle?

4 A He does, yes.

5 Q So his device doesn't rely on it, but the switch 120  
6 that is shown in Figure 1 has been added as part of the  
7 retrofit?

8 A That is correct.

9 Q Does that seem inconsistent?

10 A It does not.

11 Q Why not?

12 A So in the aftermarket -- in the aftermarket space,  
13 activating features, this is activating the feature that  
14 you're adding, in his case, opening or closing the roof  
15 control module, often there would be a switch or a  
16 button or a key fob that might be added that would have  
17 extra cost specifically to activate the function that  
18 you were intending to install in the aftermarket system,  
19 and those switches would likely, as he states,  
20 be ergo -- essentially mess with the ergonomics, I don't  
21 recall the exact verbiage, I can look it up, but he uses  
22 the word "ergonomics" in the vehicle, essentially  
23 implying that it doesn't flow well with the feel and  
24 interfacing, the user's interface with the vehicle.  
25 Those are switches that you would use to activate the

1 features, that you would use all of the time, buttons,  
2 knobs, switches in that sense.

3 The switch 120 isn't that type of switch, it would  
4 be used very seldomly, likely hidden away close to  
5 the -- close to the actual module that you've installed  
6 and would only be useful for disabling the entire  
7 function of the device. I don't believe when he's  
8 referring to switches in this context he's referring to  
9 that switch, switch 120, that's why he added it to the  
10 diagram 1. Or Figure 1, sorry.

11 Q But it's a -- it's still a user-controlled switch that  
12 disables this functionality?

13 A That is correct.

14 Q And how does it disable the module 100 if I -- if I  
15 connect the two buses together?

16 MR. HELGE: Object to form.

17 A The functionality here would also be to disable  
18 the -- not just the -- or to reconnect A and B, but  
19 simultaneously, the switch would likely disable  
20 potentially power. I'd have to check Munoz, but he -- I  
21 think he speaks of it here. I can check, just one  
22 second.

23 This might be faster if I can search  
24 electronically.

25 MR. GOSS: That's okay.

1 MR. NIX: I don't know if we can. Let's try it.

2 MR. GOSS: I don't know what your capabilities are  
3 on your end, but I wouldn't have any objection to doing  
4 it if it helps you find what you're looking for.

5 THE WITNESS: Okay. Just say the word "disable."

6 A It's not there. Maybe search again. Okay.

7 MR. GOSS: Guys, we'll do searching within the  
8 document on this one to find the word "disable." I  
9 don't know if this is going to come up again in the  
10 course of the deposition, so maybe it doesn't matter,  
11 but -- we don't have any objection to you doing searches  
12 on your end, but I don't know if that's something, you  
13 know, after we get through this line of inquiry, if  
14 that's something we should be doing on our end.

15 Do you have -- I can't see. Do you have a computer  
16 in front of you or are you just looking at it up on  
17 a --

18 THE WITNESS: Just on paper.

19 MR. GOSS: You just have the paper, okay.

20 A Currently I don't have the language inside -- I don't  
21 know where the language inside of that reference is, the  
22 switch as disabling, right now, but from my  
23 recollection, I remember the switch essentially -- and  
24 it only has the one reference right there and that's the  
25 section you have highlighted right now, Column 6.

1           However, you know, somebody who has installed this  
2           device would have -- if they would have installed that  
3           switch in order to resume the control, they could easily  
4           remove the device to disable it, as well, remove and  
5           close that switch, that would probably be the easiest  
6           solution.

7           BY MR. NIX:

8           Q     So --

9           A     It's a retrofit device which can easily be -- just like  
10           it was added, it can easily be removed if you wanted to  
11           disable the functionality.

12          Q     And that is done by -- so disabling this roof control  
13           module is done by removing it and closing the switch; am  
14           I understanding that correct?

15          A     I think, you know, just from looking at this diagram, we  
16           understand that this is an aftermarket device, right, we  
17           understand this is a retrofit, and we've cut the wire A  
18           and B, so since we've cut that wire and added that  
19           second CAN bus, second CAN bus B, we would have this  
20           switch here in order to close that connection so that A  
21           and B are now one bus again, and we would remove the  
22           roof control module in that situation. Because if this  
23           was a disable, we wanted to disable it, either we would  
24           remove power to the roof control module or remove it  
25           entirely in order to resume functionality.

1 I guess that switch just is there to let the user  
2 know that they'll have to reconnect the A and B again if  
3 they want to resume the overall operation, just sort of  
4 indicating, in a way indicating that these are two  
5 separate buses, they are -- they are separately  
6 electrically disconnected, they have been -- there is no  
7 physical connection anymore between them, so we need to  
8 switch -- in its open state, we would operate normally,  
9 and when we're closed, we would essentially reconnect  
10 the buses together again.

11 Q Have you installed retrofit devices before?

12 A Yes.

13 Q Have you ever installed a switch between two CAN buses  
14 like that?

15 A Not to my knowledge, no.

16 Q Okay. The bus between 105 and 110 that has been  
17 separated, is that a dedicated bus between just those  
18 two modules?

19 A From the diagram, this diagram indicates that there's  
20 only two nodes on this bus; however, in reality, there  
21 are likely more.

22 Q And these other modules, could those be what he refers  
23 to in -- was it 120, an engine control unit,  
24 transmission control unit, telephone control unit,  
25 man/machine interface, door control unit, seat control



1 unit, they might also be connected to this bus, correct?

2 A They may be, yes.

3 Q So we wouldn't -- you wouldn't expect this to be a  
4 dedicated bus, but, rather, one that has other modules  
5 connected to it?

6 A That is correct.

7 Q Okay. Where are these other modules, on Bus A or on  
8 Bus B?

9 A Likely on Bus A.

10 Q Okay. Does Munoz say that?

11 A I don't believe he does.

12 Q What makes you say they're likely on Bus A?

13 A Having performed installation of aftermarket devices, I  
14 would try to put the roof control module as close to the  
15 device that I wanted to control as possible so it could  
16 not affect communication on the rest of the bus, since  
17 I'm cutting it, so I would likely put it closer just  
18 from experience. But really, you can install it  
19 wherever you'd like, but it's just easier.

20 Q Okay. Let's talk about the first message. We said that  
21 is a roof open message that is transmitted from the  
22 original dashboard 105, correct?

23 A That's correct.

24 Q Where does Munoz disclose that message?

25 A Can you repeat the question?

1 Q Where does Munoz disclose the first message?

2 A Figure 3, 314.

3 Q Sir, you're saying in bus 314 of Figure 3 where it says  
4 "Send open roof message," that is a message that is  
5 being sent out from the device 105?

6 A I'm sorry, no, that's not correct.

7 Q So that figure does not show the first message, correct?

8 MR. HELGE: Object to form.

9 A That shows -- this particular -- 314 and 312 show the  
10 roof message or the existence of the roof message, and  
11 somebody understanding vehicle systems would understand  
12 that that message, they didn't -- they didn't create  
13 that message, it was something that was already there,  
14 so it implies that that message exists on the vehicle  
15 network originally, so without -- without the retrofit,  
16 that message is still there, so yes, it does show the  
17 existence of that message, yes.

18 BY MR. NIX:

19 Q Does that 314 where it says send message, to which  
20 module does the term "send" refer, to 105 or to 100?

21 A To 100. Or from 100 to 110.

22 Q So that is what you refer to as the second message?

23 A That is correct.

24 Q That is what's shown in 314.

25 My question is where's the first message shown in

1 Munoz?

2 MR. HELGE: Object to form.

3 A The first message exists because the second message  
4 exists, they have the -- the message is from -- it is an  
5 original factory message, so it is coming from 105, as  
6 well, it originates from 105.

7 BY MR. NIX:

8 Q So does Munoz anywhere specifically say there is a first  
9 message coming from 105?

10 A I don't believe he specifically said that.

11 Q And you are deducting the existence of the first message  
12 because he shows a second message --

13 MR. HELGE: Object to --

14 BY MR. NIX:

15 Q -- right?

16 MR. HELGE: Object to form.

17 A I'm saying that this message exists because anyone with  
18 an understanding of vehicle network systems would know  
19 that a message that's being sent to the roof controller,  
20 from 100 to 110, would understand that if this message  
21 is being sent, it must be programmed by one -- into 110  
22 to be receiving it; thus, it's a factory message, thus,  
23 it is coming from the other side of the bus, it is not  
24 originating from -- from -- it doesn't originate or it  
25 was not created by the aftermarket system, it was

1           created by the factory system, so the factory system, in  
2           this case 105, would be the originator of that message.

3   BY MR. NIX:

4   Q   And what would cause 105 to send that first message?

5   A   The programming internal to that controller would cause  
6       it.

7   Q   How would the programming cause that?

8   A   The application running on 105 would send this message.

9   Q   Would the factory cabriolet top open/close buttons have  
10       anything to do with that?

11   A   I don't believe so, no.

12   Q   Okay. So walk me through opening the roof.

13   A   The buttons, their state would be broadcast on a  
14       message, the roof open/close message.

15   Q   So --

16   A   (Inaudible).

17   Q   Sorry.

18   A   Their state would be broadcast, the state of the button,  
19       whether it's open or closed would be broadcast on a CAN  
20       frame with a particular identifier, we'll call that  
21       first message, and then the roof control module would,  
22       if it wanted to alter that data, would then on the same  
23       identifier an altered state of the button to 110.

24   Q   But you said the factory cabriolet top open and close  
25       buttons would not be involved in sending the first

1 message?

2 A I guess when you say "involved," their states are  
3 encoded into the data, but the -- there isn't a  
4 particular state that would stop or start the  
5 transmission of the data.

6 Q So you're -- are you saying the first message is a  
7 periodic message?

8 A It is a periodic message.

9 Q Where does Munoz say that?

10 A He does not.

11 Q How do you know that it's a periodic message?

12 A Munoz uses a two-network system, two networks, he has  
13 the first bus and a second bus, and he does that because  
14 the bus, so as to alter the data, and if that message  
15 was not periodic, then he need only connect to the bus  
16 to send the information, he would not need to open the  
17 network.

18 Q But again, he does not say it's a periodic message,  
19 correct?

20 A He does not say that, that's correct.

21 Q And you are deducting that it is because you are saying  
22 he separated the bus, and that to you indicates it must  
23 have been a periodic message?

24 A No, he's saying he separated the bus by saying that he  
25 is terminating the network into the roof control module

1 and he's also added switch 120 in there to reconnect the  
2 bus, so I believe he's saying that.

3 Q But the first message contains the status of the factory  
4 top open/close buttons, correct?

5 A It does, yes.

6 Q How do you know that the factory cabriolet top  
7 open/close buttons are connected to the module 105?

8 A I do not.

9 Q But if you don't know where that button is connected, it  
10 could be connected to the module 110, correct?

11 A If that were the case, then he could have used the CAN  
12 bus to alter the data.

13 Q So if the button, the factory cabriolet top open/close  
14 button was connected to module 110, there wouldn't be  
15 this first message, correct?

16 A If the factory buttons weren't connected, then the  
17 functionality of the roof control module wouldn't be  
18 available and Munoz's -- the application wouldn't be  
19 useful to -- there would -- there would be no  
20 functionality of the particular module. The factory  
21 buttons must be connected to a CAN bus module and that  
22 CAN bus module must be transmitting the message over the  
23 CAN bus in order for the roof control, the factory roof  
24 control 110 to receive it, and because the buttons are  
25 located further away from the actual roof control,

1 typically roof control modules are in the rear by the  
2 roof motors, so -- and the buttons in this case are at  
3 the dash, which he talks about in his -- in the patent,  
4 that the roof control buttons are at the dash  
5 controller, or the cluster, I believe, I don't recall  
6 which one, but are located closer to the driver to  
7 operate the button and connects to the CAN bus, it's the  
8 case that these buttons are being sent -- the status of  
9 the buttons are being sent over the CAN bus to 110 from  
10 105.

11 Q So if the factory cabriolet top open/close button was  
12 connected to 110, you would expect Munoz not to work,  
13 correct?

14 A If the factory buttons were connected, Munoz would not  
15 have a functional -- would not be able to function,  
16 that's correct.

17 Q And that is because the only way to open the roof is  
18 with a normal mode CAN message, correct?

19 MR. HELGE: Object to form.

20 A I don't -- I'm not aware of the particulars of this  
21 particular vehicle that he's referencing, but the way in  
22 which aftermarket and electronic systems alter data, the  
23 way he calls it, he's altering data exchanged between  
24 integrated and closed systems, indicates that he is  
25 modifying the roof control message or altering that

1 data, so in this situation, it's clear that those  
2 buttons are connected directly -- and he also indicates  
3 that they're connected to the original dashboard of the  
4 electronics, so in this situation, it's obvious to me  
5 that those buttons are directly connected to the 105,  
6 and since they're directly connected, he is using the  
7 first message to open and close -- open or close message  
8 for the status of those buttons in order to modify that  
9 to 110.

10 BY MR. NIX:

11 Q But just to clarify, he does not say that it's  
12 connected, that is your deduction, that the cabriolet  
13 top open/close button is connected to 105, that is your  
14 deduction based on how Munoz words -- or your  
15 understanding of how Munoz words it?

16 MR. HELGE: Object to form.

17 A Just one second.

18 No, actually, he does say it, section -- Column 6  
19 where he's describing Figure 1, 26 through 30. He  
20 indicates that 105 illustrates the vehicle factory  
21 dashboard electronics and controls that are used to  
22 control the roof control electronic 110, so no, he does  
23 say that.

24 BY MR. NIX:

25 Q Okay. He does refer to Figure 1 as the operation of the



1 roof control module in various embodiments of the  
2 invention, correct?

3 A That's correct.

4 Q So as part of the invention, somehow the original  
5 dashboard 105 is involved in the control of the roof  
6 electronics 110, correct?

7 A That's correct.

8 Q Where does he say what the status was before the  
9 invention?

10 MR. HELGE: Object to form.

11 A Column 4:10, line 10 starts with, "Factory cabriolet top  
12 controls often require that the user hold down a button  
13 as the top is opened or closed. The device improves  
14 upon the conventional vehicle system by allowing the  
15 cabriolet top to be opened or closed by pressing the  
16 control button only one time," so he indicates that the  
17 factory control top is connected through those buttons  
18 that he refers to, they are connected to the original  
19 dashboard that control the cabriolet top. And --

20 BY MR. NIX:

21 Q But --

22 A -- he also indicates that there's a CAN bus connected in  
23 105 to 110, the original factory system.

24 Q Okay. But he still does not say where that factory  
25 cabriolet control is -- how it is wired, correct?

1 A Munoz Figure 1 indicates that 105 and 110 were the  
2 original factory controls and that they -- and since  
3 they're original, I think anybody with ordinary skill in  
4 the art could understand that these two were on the same  
5 network because they were the original controls needed  
6 to flow from one controller to the other.

7 Q But where does he say that the button that operates the  
8 roof is wired into module 105?

9 A In the section that I just had you read. I can go back  
10 to it, if you'd like.

11 Q Yes, I would.

12 A Column 6:27, I believe. Yeah. "Factory cabriolet top  
13 controls often require that the user hold down a button  
14 as the top is opened or closed." And then also in  
15 Column 6, we see that he's talking about the roof  
16 control electronics being controlled from 105, so the  
17 factory dashboard electronics and controls that are used  
18 to control the roof are all part of it.

19 Q So what's shown in Figure 1 would show us his invention,  
20 correct?

21 MR. HELGE: Object to form.

22 A His invention is actually the roof control module, not  
23 the original factory system.

24 BY MR. NIX:

25 Q But Figure 1 shows the state after the vehicle has been

1 retrofitted, correct?

2 A Well, actually, only the -- the roof control module is  
3 the only thing that he's adding, not changing the  
4 location or reprogramming the vehicle, I don't believe  
5 that's correct, no.

6 Q Does Figure 1 show the original vehicle before the  
7 retrofit?

8 A It shows --

9 MR. HELGE: Object to form.

10 A Figure 1 shows the original 105 and the original 110,  
11 yes.

12 BY MR. NIX:

13 Q And it also shows the roof control module 100, correct?

14 A It does show the roof control module 100, correct.

15 Q Was the roof control module 100 originally in the  
16 vehicle?

17 A It was not.

18 Q So by showing the roof control module 100, can't we say  
19 that Figure 1 shows the state after it has been  
20 retrofitted?

21 MR. HELGE: Object to form.

22 A We can say that the roof control module was added to the  
23 system, that's correct, not -- it is not the  
24 original -- that is not the original roof control module  
25 100.

1 BY MR. NIX:

2 Q Now, we talked about the first message and you deducted  
3 its existence based on the second message, correct?

4 A Say that again?

5 Q You deducted the existence of the first message because  
6 of the existence of the second message, correct?

7 MR. HELGE: Object to form.

8 A I noted that there is a -- the second message controls  
9 the first -- it's controlled and the first message must  
10 exist because the second message also exists.

11 BY MR. NIX:

12 Q And did I understand you right that you said there  
13 wouldn't be another way to open the roof if it wasn't  
14 for this first message?

15 MR. HELGE: Object to form.

16 A I did not say that, no.

17 BY MR. NIX:

18 Q Okay. How could the roof be opened?

19 MR. HELGE: Object to form.

20 A It's an electronic control system, but it could be done  
21 manually, as well.

22 BY MR. NIX:

23 Q Okay. Is the roof opened by sending the second message?

24 MR. HELGE: Was there a question pending? I don't  
25 think we got any audio here.

1 BY MR. NIX:

2 Q I was asking whether the roof 110 is opened by sending a  
3 roof open second message?

4 A I guess -- actually, I'll have you repeat the question  
5 again, please.

6 Q Is the original sunroof control 110 instructed to open  
7 the sunroof by sending a second message?

8 A The sunroof control module will respond to the roof open  
9 command sent by 110 by opening -- by opening the roof.

10 Q Okay. And that command, you are saying, if I understand  
11 you correctly, is spoofing a first message; is that  
12 right?

13 A The roof message is essentially the same identifier and  
14 data bytes as the first message if the first message  
15 were also the command to open the roof.

16 Q And I think you're saying the first message you're  
17 identifying as the one that relays the status of the  
18 factory top open/close buttons, correct?

19 A That's correct.

20 Q So the second message mimics that first message,  
21 correct?

22 MR. HELGE: Object to form.

23 A The second message is the same data and status of the  
24 open message that goes into -- that would make the 110  
25 react to opening the -- the roof.

1 BY MR. NIX:

2 Q Okay. Is it also the same identifier?

3 A It is, correct.

4 Q And could there be a second message that has a different  
5 identifier to open the roof?

6 A I don't believe this embodiment of this -- the invention  
7 would have a different identifier, no.

8 Q Can you think of any other mechanism where you could use  
9 the CAN bus to instruct the roof control electronics to  
10 open the roof?

11 A I can, yes.

12 Q Okay. What would the other alternative be?

13 A There may be a diagnostic mode.

14 Q Okay. So the second message could be a diagnostic  
15 message and it would cause the roof to open, correct?

16 A I don't believe so, no.

17 Q Why do you not believe so?

18 A Because in that situation, the vehicle speed message  
19 would need to also be modified and potentially  
20 wouldn't -- in some situations, diagnostic messages will  
21 only start the process, specifically with roof closure  
22 systems. Diagnostic messages are good for opening the  
23 roof, but closing, because of all the safety systems  
24 that they put in there, diagnostic messages can't do  
25 that.

1 Q And how do you know that?

2 A Because I've worked with the systems before.

3 Q Okay. And which systems in particular did you work with  
4 where you could not use diagnostics to close the roof?

5 A The Pontiac G6.

6 Q And do you think that is as to every vehicle, that it  
7 couldn't be used to close the roof with a diagnostic  
8 message?

9 A I think that the safety systems would likely prevent  
10 roof closure, and they likely would also prevent, if you  
11 weren't also spoofing vehicle speed correctly, they  
12 would also prevent closure of the roof in that  
13 situation.

14 Q Now, in the Pontiac G6, was there a factory roof  
15 open/close button?

16 A I believe there was, yes.

17 Q How was it wired?

18 A It was -- I don't recall. I believe it was connected  
19 directly to the body control module in that one.

20 Q But you're saying it wasn't connected to a roof control  
21 electronics?

22 A That's correct.

23 Q And you know that?

24 A This was 12, 13 years ago, I don't recall.

25 MR. HELGE: It's almost 12:30. We've been going

1           probably close to an hour and a half in this section,  
2           maybe over. Two questions: Do you want to take a short  
3           break and/or do you want to start thinking about a time  
4           to break for lunch, take a longer lunch break? Or,  
5           third option, do you want to try to go through it  
6           and not stop for lunch? Just what are you thinking  
7           here?

8           MR. NIX: I think it's a good time to break for  
9           lunch.

10          MR. HELGE: Okay.

11          MR. GOSS: I don't know how long you need. I mean,  
12          I would think a half hour so we can get through it, but  
13          feel free to -- do you guys need more time than that?

14          MR. HELGE: Forty, 45 minutes might be good, if  
15          that's okay.

16          MR. GOSS: Okay. Back on at 1:15 then.

17                   (Whereupon a lunch break was  
18                   taken from 12:29 to 1:15 p.m.)

19                   (Mr. Gowdey is no longer in attendance.)

20          BY MR. NIX:

21          Q     I think we were just discussing the second message  
22                potentially being a diagnostic message. What did your  
23                attorneys have to say about that?

24          A     Say that again?

25          Q     The second message potentially being a diagnostic



1 message, what did your attorneys have to say about that?

2 A I don't believe we had any discussion about that.

3 Q Okay. Let's move on to the second data bus where you  
4 said that the first data bus A and the second data bus B  
5 are separate buses. Where does Munoz say that?

6 A Munoz says that in Figure 1, 115, where the original  
7 connection will be terminated and all communication has  
8 to go through the roof control module, and also says  
9 that in him using the -- altering the data exchanged,  
10 and in both terminating that to 100, the data into 100,  
11 and altering the data, also 120 indicates a switch,  
12 which if -- and because it's open, that indicates that  
13 these two are separate buses.

14 Q When he says "will be terminated," when is that?

15 A Upon installation of the retrofit module.

16 Q Now, in Figure 1, he says it will be terminated,  
17 but -- where is my -- on the left side he says the roof  
18 module is connected.

19 MR. HELGE: Axel, just to let you know, we don't  
20 have any figure showing up on our screen.

21 MR. NIX: Oh.

22 MR. HELGE: It says you started screen sharing?  
23 There we go.

24 MR. NIX: I apologize.

25 BY MR. NIX:

1 Q Can you see it now?

2 A We can.

3 Q Perfect. So in box 115 -- let me repeat the  
4 question -- he says it will be terminated and on the  
5 left side in box 100 he says the roof module is  
6 connected, do you see that?

7 A I do, yes.

8 Q So when he uses present tense, it is connected, but at  
9 the same time he says the data connection will be  
10 terminated, that's future tense, correct?

11 A That's correct.

12 Q So when you -- but you said it will be terminated upon  
13 installation and Figure 1 shows it already being  
14 installed, doesn't it?

15 A Understood.

16 Q Do you know why it -- why he would say this module 100  
17 is installed, but refer to the termination as a future  
18 event?

19 A Sorry, you cut out again. Can you please repeat?

20 Q Do you know why he would refer to the roof module being  
21 connected in present tense and to the termination of the  
22 data connection as a future event, in future tense?

23 A So the roof control module is an aftermarket device,  
24 it's being installed. The device opens the network and  
25 is terminated into -- from 105 to 100. I believe it's

1           just a matter of his semantics, using the word "will,"  
2           but maybe his tenses don't agree with the terminology he  
3           uses in 100, but they're -- but the fact of the matter  
4           is he's disconnecting or opening that connection between  
5           100 and 110, or 100 -- 105 and 110, sorry.

6       Q     So when he says "will be terminated," he should have  
7           said "has been terminated," correct?

8       A     When he says "will be terminated," he's referring to it  
9           will be terminated during installation.

10      Q     Okay. And then in box 100, shouldn't he say the roof  
11           module will be connected, for consistency?

12      A     In 100, he says that it is connected, which I believe is  
13           correct.

14      Q     But so when the roof module is connected, the  
15           termination of the data connection is still in the  
16           future?

17      A     The termination could happen at the same time, but I  
18           don't believe there's a fundamental difference between  
19           when he's saying the word "will" and "is."

20      Q     Because future tense or past tense is basically the  
21           same?

22                   MR. HELGE: Object to form.

23      BY MR. NIX:

24      Q     Is there any other indication in Munoz that there's no  
25           connection between what you refer to as Bus A and Bus B?

1 A Can you repeat the question?

2 Q I was asking if there's any other indication in Munoz  
3 that Bus A and Bus B are not connected?

4 A I believe that it indicates that Bus A and Bus B are not  
5 connected, but -- because 115 says it will be  
6 terminated, 110 says that the data will be -- or may be  
7 altered, it is removing or altering data exchanged  
8 between integrated and closed systems, also switch 120  
9 is open, indicating that there's a disconnection between  
10 the two networks.

11 Q Okay. And the switch 120 being open, that was the  
12 indication that the roof module is on, correct?

13 A The switch being open indicates that the roof -- that  
14 the networks are separated.

15 Q Okay.

16 A The roof control module is functioning as a -- the  
17 module that takes a message from 105 to 110 -- or to 100  
18 and then -- and puts it on to one -- between 100.

19 Q So when we relate that to Figure 3 -- I can't figure out  
20 how to rotate only one page in this document. The  
21 module being on, is that related to the state of the  
22 switch 120?

23 A I believe that's related to the -- to the -- is there  
24 power or is the module active.

25 Q Okay. So if the module is not on, what's the state of

1 the switch 120?

2 A I believe the state is open.

3 Q And if the module is on, what's the state of the  
4 switch 120?

5 A I believe the state is open.

6 Q So in both cases, the switch is open?

7 A That is correct.

8 Q And when is the switch -- but didn't you say the switch  
9 being closed is when I turn the device off?

10 A I did not, no.

11 Q Okay. And when a user closes the switch, what happens  
12 to the roof control module?

13 A I don't believe anything happens to the roof control  
14 module.

15 Q So the roof control module still operates even if the  
16 first Bus A and the second Bus B are connected through  
17 that switch 120?

18 A Can you repeat the question? I'm sorry.

19 Q Does the roof control module 100 still operate when the  
20 first Bus A and second Bus B are connected by closing  
21 the switch 120?

22 A Could you help me out with the word "operated"? I'm  
23 having trouble understanding what you're -- what  
24 exactly --

25 Q Is it still doing something when the switch is closed?

1 A If the module is still powered, it is possible, but I  
2 don't -- I don't know.

3 Q Okay. So it's possible for the roof control module 100  
4 to operate when the first Bus A and the second Bus B are  
5 connected?

6 A Functionally, I don't think it would open or close the  
7 roof, no.

8 Q And why is that?

9 A Because the factory top and vehicle speed messages would  
10 be sent on the second Bus B; thus, the roof control  
11 electronics would likely lock out any functionality.  
12 Despite the second message still being sent, the first  
13 message is also being received by 110, and the conflict  
14 would likely cause issues with the functionality of the  
15 roof control electronics.

16 Q And that was because, you said, the first message is a  
17 periodic message?

18 A That is correct.

19 Q Now, if the first message was not a periodic message,  
20 then it would work, correct?

21 A If the first message was not a periodic message related  
22 to the factory open and close, the vehicle speed  
23 would -- would be a periodic message and would still  
24 lock out the functionality at 110.

25 Q And what if the second message was a diagnostic message,

1 would Munoz require the first Bus A and the second Bus B  
2 to be separate?

3 A I believe it would, yes.

4 Q And why is that?

5 A It's often when you send diagnostic requests to  
6 controllers, they still have sanity checks, specifically  
7 related to sending a diagnostic request specifically for  
8 an I/O control, which is likely what you would use to  
9 do an I/O -- to do a command, it's using -- depending on  
10 what type of vehicle this is on, if it's a GM vehicle,  
11 you'd use the device control service AE to send a  
12 diagnostic request. The roof control electronics module  
13 would -- and it does, particularly on GM vehicles, have  
14 a -- a way of indicating that the status -- or states  
15 for controlling this particular system are not correct,  
16 specifically a negative response function, negative  
17 response code 22, which is conditions not correct.  
18 Likely, whenever I've tried to activate features related  
19 to the closure systems and the requirements aren't met  
20 such as vehicle speed, they will often send this  
21 negative response code indicating that even though you  
22 want to control the roof control module and you've sent  
23 a properly formatted command, it's unable to do that  
24 because the vehicle speed is incorrect, it's reading it  
25 as a non-zero number in that situation.

1 Q Is Munoz discussing any of this?

2 A I believe that somebody with ordinary skill in the art,  
3 somebody who's worked with CAN bus in the past would  
4 understand it. So he does not discuss it.

5 Q So he, for example, does not mention a vehicle speed  
6 signal, correct?

7 MR. HELGE: Axel, could you repeat that last  
8 question?

9 MR. NIX: Could we ask the court reporter to repeat  
10 it?

11 MR. HELGE: Sure.

12 (Record repeated by court reporter.)

13 MR. HELGE: Vehicle -- I still couldn't hear  
14 it -- what kind of signal?

15 MR. GOSS: Vehicle speed.

16 MR. HELGE: Okay, thanks. I thought that's what I  
17 heard, but it was a little bit garbled.

18 A So in section -- in Column 2:21 to 22, he talks about  
19 the speed requirement for the system, so I believe he's  
20 talking about the vehicle speed there.

21 BY MR. NIX:

22 Q He talked -- he talks about the vehicle traveling at a  
23 slow speed, he doesn't talk about a vehicle speed  
24 signal.

25 A I believe that he is talking about a vehicle speed



1 signal there, yes.

2 Q Okay. In what way? Does he mention the word "signal"?

3 A I believe all of these are signals, they're signals that  
4 you would find in a vehicle system, so easy to see him  
5 discussing functionality and operation of the system.

6 Q And they're listed as alternatives, correct?

7 MR. HELGE: Object to form.

8 A I don't believe so, no.

9 BY MR. NIX:

10 Q When he says automobile manufacturers require the  
11 transmission to be placed in park, an emergency brake to  
12 be engaged, or the vehicle to be traveling at a low  
13 speed, you do not consider that to be alternatives?

14 A I'm not following the question. Is it that these are  
15 alternatives to each other? Is that --

16 Q Yes.

17 A One or the other?

18 Q Yep.

19 A I believe he's saying the manufacturer may use one, two,  
20 three, or -- of any of these as gating factors for the  
21 functionality of the roof control system.

22 Q So it could be, since you interpreted those to be  
23 signals, a emergency brake signal or a vehicle speed  
24 signal or a transmission signal?

25 A One, two, or three of any of those.

1 Q Okay. Let me go back to your Declaration, Exhibit 1003,  
2 paragraph 145.

3 A Okay.

4 Q You're saying a POSITA would know -- and I think you're  
5 referring to this lock-out -- can only be accomplished  
6 if the aftermarket roof control module or device  
7 suppresses speed or other signals, correct?

8 A Correct.

9 Q Why can it only be achieved that way?

10 A The receiving module is programmed to accept signals to  
11 prevent the functionality under certain conditions.

12 Q Does Munoz say that?

13 A I believe he says that in that section that we had just  
14 read, yeah.

15 Q That the lock-out is implemented in the original roof  
16 control electronics 110? Can we please take another  
17 look at that and confirm that that's what he says?

18 A He says that, "For example, automobile manufacturers  
19 often require that an automobile transmission be placed  
20 in park, that an emergency brake be -- brake be engaged,  
21 or a vehicle be traveling at slow speed, prior to  
22 allowing the opening and closing of the cabriolet top."

23 This is a CAN bus system, which is, as you know, a  
24 multiplexed system. All of these different parameters  
25 would likely come potentially from different

1 sources: park would come from the transmission control  
2 module; the emergency brake might come from a body  
3 control module; the vehicle speed might come from a  
4 brake control module, an ABS system, so all of those  
5 systems -- and anybody who understands how CAN bus works  
6 understands because of all of these systems, the end  
7 logic lives not in those individual systems negated just  
8 for the roof control module, but rather, for them just  
9 to broadcast their status, and because their status is  
10 being broadcast, the roof control module then listens to  
11 that determination and makes decisions based on that.

12 So anybody who understands vehicle networks and CAN  
13 bus systems would understand that to mean that the 110  
14 device would be the controller that ultimately makes  
15 that decision, not the brake -- park brake system or the  
16 emergency brake system or the vehicle speed.

17 Q And why couldn't it be the dashboard 105 that makes this  
18 decision?

19 A The dashboard 105 making what decision? I'm sorry.

20 Q To not send a open roof message when the vehicle is  
21 driving too fast?

22 A If that were the case, then the -- the roof control  
23 module aftermarket system wouldn't function, thus, would  
24 logically not be needed, and so in the case where when  
25 that -- when the negating factor lives inside of the

1 roof control electronics, that would be where it was.

2 Q And you're saying it wouldn't work based on -- let's  
3 take a look at Figure 3, for example, in Munoz. You  
4 receive a lock/unlock signal and sends a roof open  
5 message. Why wouldn't that work?

6 MR. HELGE: Object to form.

7 A I guess can you repeat the question to include what you  
8 were talking about before?

9 BY MR. NIX:

10 Q Let me get back to this and move on to another topic.

11 In the roof control module 100, if I understand you  
12 correctly, you're saying there's a gateway implemented  
13 in here; is that correct?

14 A I believe there is a gateway in there, correct.

15 Q And where does Munoz say that there's a gateway inside  
16 the roof control module 100?

17 A Munoz in Figure 1 indicates that he is -- in Figure 1,  
18 Munoz says that he will be able to remove or alter data  
19 exchanged between the integrated and closed systems. In  
20 that case, he is creating a functional gateway between  
21 them.

22 Q You're saying the only way to remove data is with a  
23 gateway?

24 A I'm saying that by removing the data from a CAN bus  
25 system having connected two networks, he is gatewaying

1 the message, messages, yes.

2 Q Okay. And I believe you're also saying he does that  
3 when the module is off, correct?

4 MR. HELGE: Object to form.

5 A I'm not sure where he says that, no.

6 BY MR. NIX:

7 Q Doesn't he -- does the gateway operate when his module  
8 is off?

9 MR. HELGE: Object to form.

10 A Can you define "off"?

11 BY MR. NIX:

12 Q Does his gateway operate when the module is not on?

13 A I believe it does.

14 Q And let's take a look at Figure 3. There is actually a  
15 flow diagram and it has a question, "Module On?" Do you  
16 see that?

17 A I do, yes.

18 Q And there's a transition, a "No" transition that goes  
19 from box 305 to box 300, do you see that?

20 A I do.

21 Q What does that transition mean?

22 A It means it goes back to checking to see if the module  
23 is on.

24 Q Does it do anything else as it goes back?

25 A It does not.

1 Q And in Figure 4, there's a similar transition between  
2 box 400 and 402, correct?

3 A That is correct.

4 Q And again, if the module is off, it transitions back to  
5 start and does nothing, correct?

6 A That is correct.

7 Q And in Figure 5, do you recognize a similar transition  
8 between box 500 and 502?

9 A I do.

10 Q Again, if the module is not on, it does nothing?

11 A That is correct.

12 Q And in Figure 6, same thing?

13 A Same thing.

14 Q And in Figure 7, same thing?

15 A That is correct.

16 Q And you're saying when the module is not on, off, it  
17 operates as a gateway. Where is that shown?

18 MR. HELGE: Object to form.

19 A Can you repeat the question? I apologize.

20 BY MR. NIX:

21 Q The question was where Munoz shows the gateway function?

22 A I thought we had answered that question, so -- is that  
23 still the question?

24 Q Yes. We went through the specific instructions in the  
25 flowcharts and the question was if there is any

1 equivalent disclosure of the gateway functionality?

2 A The answer is in 100, he says "removing or altering data  
3 exchanged between the integrated and closed systems to  
4 allow additional operations."

5 Q Okay. So Munoz was specific in all of the features he  
6 explains to say to draw a transition, if the module is  
7 not on, do nothing, and he relies on the reader to  
8 understand that removing or altering data means  
9 implement a gateway; is that your understanding?

10 A My understanding is that a gateway takes data from one  
11 network and places that either the same or -- same data  
12 or different data on another network using the same  
13 identifier, so I believe he does say that, yes.

14 Q Without using the word "gateway"?

15 A I'm not aware of Munoz's vocabulary choices at the time,  
16 so I can't really answer if he understood the word  
17 "gateway."

18 Q Does Munoz use the word "gateway" anywhere in his  
19 specification?

20 A I don't recall if he does or not. I don't think so.

21 Q You don't think he used the word "gateway"?

22 A I don't recall the word, no.

23 Q And you're saying he discloses receiving the first  
24 message, which I understand is the roof open and close  
25 message. Where does he show that?

1 A Can you repeat the question? I guess -- I thought we  
2 already went over this one, but we can try again.

3 Q Does Munoz show in any one of the diagrams, Figure 3  
4 through Figure 7, receiving the first message?

5 A I don't believe he had any -- the word "receives,"  
6 receiving that particular message, but he is able to  
7 receive data on the same bus as 105.

8 Q So he shows, for example, in step 308 of Figure 3  
9 "Receive lock/unlock signal," correct?

10 A That is correct.

11 Q But you can't locate anywhere in these flowcharts  
12 receiving a roof open or roof close message, correct?

13 MR. HELGE: Object to form.

14 A The message is a message that is being sent normally by  
15 105; it's not a part of the diagrams because he doesn't  
16 use it in his -- in the programmatic functionality.  
17 That doesn't mean he doesn't receive it, it just means  
18 that he doesn't reference it in the programming  
19 functionality in those figures.

20 BY MR. NIX:

21 Q And implementing a gateway, is that something you could  
22 just do in software in the roof control module 100?

23 A Implementing a gateway is typically done in software,  
24 yes.

25 Q Does it require additional code to implement a gateway



1 versus not implementing a gateway?

2 MR. HELGE: Object to form.

3 A The gateway may require additional code if the hardware  
4 doesn't support enabling.

5 BY MR. NIX:

6 Q Does Munoz say anywhere that the hardware of the roof  
7 control module 100 supports a gateway?

8 A I don't believe he does.

9 Q And would you need a more powerful hardware to implement  
10 a gateway versus not implementing a gateway?

11 MR. HELGE: Object to form.

12 A I don't believe so, no.

13 BY MR. NIX:

14 Q Let me open up Exhibit 1015.

15 (Exhibit 1015 introduced.)

16 BY MR. NIX:

17 Q Do you recognize this exhibit?

18 A I do.

19 Q In this exhibit, if I could direct your attention to the  
20 lower right portion of page 1, what does that say?

21 A The whole paragraph?

22 Q Yeah. Or you could read it and summarize it.

23 A "In general, the gateway functionality could be  
24 implemented in software, as long as several CAN modules  
25 are available in the ECU. But a large amount of

1 messages would cause a high load on the CPU, leaving  
2 less performance for the ECU controller applications  
3 until real-time operation can no longer be guaranteed."

4 Q Okay. Does that seem to contradict what you just said,  
5 that a gateway could be implemented easily in the  
6 module 100?

7 A I don't believe so.

8 Q How not?

9 A Well, this reference says if you have a -- it clearly  
10 depends on how many messages are being broadcast, right,  
11 so the message amount is what matters. If the message  
12 amount is two or three, it's not a very high message  
13 amount and, thus, could be performed with a less capable  
14 controller. And also, do you need realtime  
15 functionality, do you need to modify the data, is data  
16 changing, or are you just copying and pasting it from  
17 one register to the other? If that's the case, it could  
18 be done quite simply. If you need to process a lot of  
19 information, change a lot of data bits, then you might  
20 need more time or processing power or RAM.

21 So I don't believe it does, no, this is -- it just  
22 sort of depends on the amount of messages that are on  
23 the bus and how many you're going to actually gateway  
24 between the controller, if it's everything, if it's most  
25 of it, if it's just the things that you're interested

1 in. I guess, in short, there's a lot of information  
2 that you need to understand before you can just say it's  
3 going to take more.

4 Q And what does Munoz say about that, how many messages is  
5 he gating?

6 A I don't know that he does say how many messages.

7 Q If you were to develop a retrofit device like Munoz, how  
8 many do you expect would need to be gated?

9 A Well, I have developed one similar, not this specific  
10 one. But in different applications, we take a look at  
11 what messages might be required for both sides of the  
12 network for the operation to function, and when we  
13 create these gateways, we make a decision based off of  
14 how much timing -- you know, sort of the timing  
15 requirement. So it's not just how many messages.

16 If we want to pass everything through and we can do  
17 it on our current module, then great. If not, we can  
18 start to reduce the number of messages that likely  
19 aren't going to be received by the module that we're  
20 sending data to and limit the identifiers that might get  
21 through to the second data bus. Similarly, if there are  
22 messages that we're not interested in transmitting back  
23 to the first data bus, we might make a decision there.

24 So it's just a -- it's a very complicated process  
25 sometimes if you -- if you have limitations, so if you

1           have no limitations and you have the best CPU and the  
2           best programming and you can do things really quickly  
3           and maybe just have everything figured out later, so it  
4           just depends on what you're trying to do. It's not a  
5           very simple question and answer.

6       Q     So if I spend more money and afford a more powerful CPU,  
7           I could more easily gateway all the messages, correct?

8       A     If you have -- it doesn't really matter how -- it  
9           matters about your timing requirements, the amount of  
10          data you're going to send across, and what messages are  
11          really important for your function, functionality. But  
12          if you have an infinite budget and you don't really  
13          care, maybe it's just a one-off prototype, you might  
14          just have the most powerful thing so you don't have any  
15          particular limitation related to messages sent.

16      Q     And which one of those do you think Munoz uses?

17                   MR. HELGE: Object to form.

18      A     I believe his patent doesn't have any indication of what  
19          he's using.

20      BY MR. NIX:

21      Q     So he may be gating some messages, he may be gating all  
22          messages, he's not specifically informing you about  
23          that, correct?

24      A     He tells me that of the -- of the messages he is gating,  
25          it would need to be whatever is the requirement not of

1 his system, but of the vehicle system that he's  
2 connecting to, so it doesn't -- anybody who works with  
3 vehicle network systems would understand that if you  
4 don't send the messages to make the other end system  
5 work, then the other end system won't work, so that's at  
6 least the minimum that you'll be sending, right, the  
7 things that make the actual functionality work for the  
8 customer.

9 Q And in that case, say the module is off, wouldn't it be  
10 easier to close the switch 120 so that I don't need a  
11 gateway?

12 A It depends on the user, if that's easy or not.

13 Q How does the user play into that?

14 A Well, the user doesn't want to press the switch and just  
15 wants the module to do the work for it, seems like a  
16 really smart way to -- to design the system, but the  
17 user would be involved because that switch is external  
18 to the module itself, so there would need to be some way  
19 for that switch to be closed.

20 MR. NIX: Okay. It's been an hour. I think we can  
21 take a five-minute break, if that's okay.

22 THE WITNESS: That's fine.

23 MR. HELGE: Sure.

24 (Whereupon a break was taken  
25 from 2:13 to 2:26 p.m.)

1 (Exhibit 1018 introduced.)

2 BY MR. NIX:

3 Q I want to now switch to Exhibit 1018, that's the Allen  
4 reference. Do you recognize this reference?

5 A I do.

6 Q And let's look at Figure 1 of this reference. Can you  
7 maybe at a high level explain what Allen's disclosure is  
8 about?

9 A Can you repeat that?

10 Q What is Allen's patent application or -- patent  
11 application about?

12 A In general, it's about taking an OEM remote and their  
13 control functions and making that using an aftermarket  
14 system.

15 Q And what is the goal, why would you do that?

16 A Not limited to, but definitely to increase range.

17 Q Okay. And what parts in Figure 1 does he add to the  
18 vehicle in a retrofit?

19 A Control interface 20.

20 Q Okay. What is in the dashed box 20?

21 A Correct.

22 Q And the vehicle has a vehicle data bus, correct?

23 A It does, yes, 14.

24 Q Number 14 is the vehicle data bus. I think in your  
25 Declaration -- let me start over.

1           The signal that goes from the OEM transceiver 16 to  
2           the intermediate function control module 12, is that on  
3           the vehicle data bus?

4    A    It is not.

5    Q    It is not. And is that the one that the control  
6           module 21 emulates in Allen's disclosure?

7    A    Can you repeat the question?

8    Q    Is that signal that goes from 16 to 12 what the control  
9           module 21 emulates?

10   A    That's correct, to 12, yes, from 21 to 12, yeah.

11   Q    Is Allen emulating -- do you consider those bus  
12           messages?

13   A    They could be bus messages, yes.

14           MR. HELGE: (Inaudible) copy here of (inaudible).

15           (Clarification requested by court reporter.)

16           MR. HELGE: I'm sorry. I was just telling Axel  
17           that we have a paper -- a printed paper copy of this  
18           reference now here, as well.

19   BY MR. NIX:

20   Q    So the messages from the OEM transceiver 16 to 12, I  
21           believe you just said they could be bus messages?

22   A    To my recollection, yeah, I think they could be bus  
23           messages.

24   Q    But would they be vehicle data bus messages?

25   A    I don't believe they would be, no.

1 Q Okay. So does Allen disclose emulated vehicle data bus  
2 messages?

3 A Yes.

4 Q And where does he say -- talk about those?

5 A Between 21 and 14, that line.

6 Q And does he use the word "emulated" in respect to these  
7 messages from 21 to 14?

8 A In Figure 2 he uses the words "Control Module 21  
9 communicates command and feedback signals from the  
10 Command Module Transceiver between the Vehicle Data  
11 Bus 14."

12 Q So the question was does he use the term "emulated  
13 messages," and what you just read did not seem to  
14 include that term, did it?

15 A It did not have the word "emulated," so far I have not  
16 seen that word. I am continuing.

17 I don't see the word "emulated" in the text. But I  
18 could have missed it, I mean, I'm reading terms as fast  
19 as I can. I don't see it.

20 Q Okay. But then maybe more based on your understanding,  
21 the control module 21 is communicating on the vehicle  
22 data bus 14, correct?

23 A It can, yes.

24 Q And when it does so, what kind of messages does it send?

25 A The command messages that would normally have come from



1 12, the intermediate function control module.

2 Q And how do you know that it would be those messages that  
3 would normally come from 12?

4 A Because the control module is emulating or attempting to  
5 emulate the whole keyless system, it's acting as if it  
6 were the IFCM, or 12, so it's sending the messages that  
7 the IFCM would normally have sent.

8 Q Does Allen actually say that somewhere, that it is that  
9 message?

10 A It says control module 21 communicates command feedback  
11 signals. Those command feedback signals, the command  
12 signals -- it's not reprogramming the vehicle, so the  
13 command signals, somebody who understands how CAN buses  
14 work would understand that the signals that it would be  
15 sending would be the ones that the OEM systems would  
16 respond to, so it would be the messages that are sent by  
17 the IFCM.

18 Q Could it be a diagnostic message?

19 A It could be.

20 Q So the control module 21 can send a diagnostic message  
21 which would not emulate one that comes from the  
22 intermediate function control module 12?

23 A I would recommend it, yes.

24 Q The question was could it be a diagnostic message that  
25 is not sent from the intermediate function control

1 module 12?

2 A If it wanted to work as a functioning unit, it would not  
3 be.

4 Q And why is that?

5 A Similar to Munoz. Diagnostic messages are great for  
6 testing systems, but not actually useful for integrating  
7 functionality into systems, especially on the OEM level.  
8 Very specifically, I do a lot of work with vehicle  
9 closure and opening systems and door lock and unlock,  
10 and anybody who works at -- at a small amount, like in  
11 my basics classes I teach people this, like a 101,  
12 almost everybody wants to do this particular function,  
13 lock and unlock, and lock and unlock suffers from  
14 something very -- very interesting, that you can lock  
15 the vehicle with diagnostic messages all day long, but  
16 unlocking them is virtually impossible because of  
17 security systems built in, so I'm fairly certain that  
18 that wouldn't be a very commercially-viable product.

19 Q And there's no security system for the message that you  
20 think comes from the module 12?

21 A Say that again?

22 Q Is there no security system coming from -- applied to  
23 messages coming from the intermediate function control  
24 module 12?

25 A I believe there is, yes. I mean, this is a locking

1 closure system, the vehicle -- the locking closure  
2 systems are by their very nature securing the vehicle.

3 Q And so what is the difference between sending a  
4 functional message and sending a diagnostic message to  
5 open the -- say open the doors?

6 A Likely, the vehicle -- if the vehicle was locked with a  
7 factory key fob, it would not unlock using a diagnostic  
8 message. Because diagnostic messages can be sent really  
9 anywhere from any connector, so they basically don't  
10 work, they don't work.

11 Q But the message from the intermediate function control  
12 module could also be sent from anywhere and any  
13 connector, could it not?

14 A But it wouldn't use a diagnostic message; it would use a  
15 normal command that was programmed into the system and,  
16 thus, not have that same limitation.

17 Q But the access to the vehicle data bus is the same,  
18 correct?

19 MR. HELGE: Object to form.

20 A Not necessarily. Diagnostic command messages can come  
21 from other networks and be gatewayed through secure or  
22 unsecure gateway modules.

23 BY MR. NIX:

24 Q Let's talk about Lobaza. In your Declaration,  
25 Exhibit 1103, can you explain what that annotated

1 Figure 3 of Lobaza is telling us?

2 A Can you repeat your question?

3 Q I asked you to please explain what your annotated  
4 Figure 3 of Lobaza shows?

5 A This annotated figure emphasizes the pre-impact system.

6 Q Why do you emphasize the pre-impact system 104?

7 A Because we reference it in 350.

8 Q And what do the words "retrofit based on Allen" mean in  
9 the annotated figure?

10 A We are referring to Allen as -- oh. We're referring to  
11 the U.S. Patent Publication Number 2007/0016342, also  
12 referred to as Allen, we're referring to that as a  
13 indicator of how we might retrofit that pre-impact  
14 system based on those -- Allen.

15 Q So you're proposing that the retrofit -- that the  
16 pre-impact system 104 could be retrofitted, correct?

17 A Correct.

18 Q And Lobaza discloses that pre-impact system 104 as a  
19 factory-installed component, correct?

20 A I believe it does, yes.

21 Q And you think it could be retrofitted instead of  
22 installing it at the factory?

23 A It could be retrofitted, that's correct.

24 Q When you retrofit that -- actually -- yeah, that's  
25 Lobaza.

1           What is Lobaza's patent about?

2    A    Vehicle communication system with integrated pre-impact  
3           sensing.

4    Q    So in there, it says right in the title "integrated  
5           pre-impact sensing," you're suggesting to turn it into a  
6           retrofitted pre-impact system?

7    A    That is correct.

8    Q    And when you do that, which module do you modify?

9    A    Can you repeat that question?

10   Q    Which module that Lobaza shows in Figure 3 would you  
11          have to modify?

12   A    I guess is the question which of the other two  
13          components would be modified, is that the question?

14   Q    Yes.

15   A    I don't know that either one would be.

16   Q    So as part of the retrofit, would you change the  
17          functionality of the impact detection controller 106?

18   A    I don't believe so.

19   Q    Would you change the functionality of the  
20          telecommunication apparatus 102?

21   A    I don't believe so.

22   Q    And the car would have been designed without a  
23          pre-impact system 104, correct?

24   A    I believe so, yes.

25   Q    Because that, you're saying, would then be retrofitted

1 into the vehicle?

2 A Correct.

3 Q When we walk through the functionality in Figure 4 of  
4 Lobaza's patent, it starts, and then at step 202 there's  
5 a question, "Imminent Impact Detected?" Who performs  
6 that step 202?

7 A In the Lobaza patent, I believe it's the pre-impact  
8 system would likely perform that if it needed to, yeah.

9 Q Okay. And then if an imminent impact is detected, an  
10 affirmative signal is sent to the VCS in step 204,  
11 correct?

12 A Yes.

13 Q And that affirmative signal indicates an imminent  
14 impact, correct?

15 A I believe so, yeah.

16 Q So the VCS must have been -- well, in -- is the VCS  
17 shown in Figure 1? In Figure 3? Sorry.

18 A It is, yes.

19 Q Which one is the VCS?

20 A 102.

21 Q Okay. So in order for the VCS or telecommunication  
22 apparatus 102 to receive that signal, does it have to be  
23 configured to do so?

24 A I believe so, yes.

25 Q Now, if the pre-impact system wasn't in the vehicle to

1 begin with, why would the telecommunication apparatus be  
2 expecting a signal from something that didn't exist in  
3 the vehicle?

4 A There are a lot of applications in which the  
5 telecommunication apparatus might have information that  
6 we could use that are potentially other signals to  
7 indicate -- like any other retrofit application, we  
8 could indicate an error or maybe there was another  
9 button that the user would press or another automated  
10 system that we could mimic or spoof to send the -- to  
11 the telecommunication apparatus in order to send an  
12 affirmative signal to the VCS using a different system's  
13 messages.

14 Q I'm not sure that I understand your answer.

15 The pre-impact system sent a signal to the  
16 telecommunication apparatus in the production vehicle,  
17 correct?

18 A Understood, yes.

19 Q And if the car was not designed to have a pre-impact  
20 system, the telecommunication apparatus wouldn't expect  
21 to receive any signals from that pre-impact system,  
22 correct?

23 A That is correct.

24 Q Okay. Then how do you retrofit it if it has -- if  
25 it -- if that system sends a signal to 102 that doesn't

1 expect the signal?

2 A So the telecommunication apparatus does receive signals,  
3 likely from any number of modules, that's why it's on  
4 the vehicle network. The telecommunication system may  
5 receive a signal from another device, not a pre-impact  
6 system, but a -- a secondary system, but press  
7 something -- some other application that's sitting also  
8 on the CAN bus, and we can simply spoof those messages  
9 for our use in our pre-impact retrofit system.

10 Q So we just send it some other message and hope that it  
11 will do the right thing?

12 A We created a retrofit system, so we spent time working  
13 on developing the software and understanding the  
14 communications of the vehicle network insofar as to  
15 actually know what messages will do, so we've sent  
16 messages or received message -- or seen messages on the  
17 vehicle network that we're going to spoof. We'll take  
18 those messages and install that into -- and program our  
19 pre-impact system to send those messages maybe under  
20 different conditions. Maybe the existing system had a  
21 limitation where the pre-impact system -- or not a  
22 pre-impact system, but a factory-installed pre-impact  
23 system was there, but we wanted our pre-impact system to  
24 maybe work at a better range or under better conditions  
25 or maybe we're using different radar technology that



1 functions better in different situations; thus, we  
2 create a retrofit application that uses the existing  
3 pre-impact messages that are already there. Just  
4 because we're adding a pre-impact device doesn't mean  
5 there isn't already an existing pre-impact device on the  
6 vehicle, we're just making an enhancement to the  
7 existing system.

8 So there are a lot of situations in which we could  
9 add a pre-impact system and either re -- and augment the  
10 system. Just like we had in the last one you just  
11 showed, we just looked over, where there was an existing  
12 RKE system or a key fob system and we just added a  
13 secondary one to extend the range of the key fob system,  
14 we could extend the range of a pre-impact system to make  
15 it better than the factory one, so I think that's very  
16 possible.

17 Q So you're saying the pre-impact system 104, there is  
18 already one in the vehicle, and you are putting a better  
19 one in in addition to the existing one?

20 A That is a possibility, or we're -- maybe we're not  
21 putting a better one, maybe we're putting one in and  
22 using other messages that might also trigger the  
23 telecommunication apparatus in the same way that the  
24 pre-impact system might.

25 Q And what does the telecommunication apparatus do when it

1 receives that imminent impact message?

2 A It sends a VCS query to impact detection controller.

3 Q And why does it do that?

4 A It appears it does that to verify the impact was real.

5 Q Okay. And you said, well, maybe there's some other  
6 message that will make the telecommunication apparatus  
7 do that. Why would -- would there be such another  
8 message in the vehicle?

9 A It's possible, yes.

10 Q Does Lobaza describe this other message?

11 A They do not.

12 Q Does Allen describe this other message?

13 A I'm not aware if it does or not, no.

14 Q So you can't locate any other message that would trigger  
15 the VCS to query the impact controller?

16 A I do see a message in this Lobaza that does query it,  
17 yes. Is that the question?

18 Q I understand, but that's the message because Lobaza has  
19 the pre-impact system factory installed, correct?

20 MR. HELGE: Object to form.

21 A I believe it's -- no. I believe it's because it has the  
22 102 installed, the telecommunication apparatus  
23 installed.

24 BY MR. NIX:

25 Q So even before -- even if the car didn't have a

1 pre-impact system, the telecommunication apparatus would  
2 be expecting a message from a pre-impact system, is that  
3 your statement?

4 MR. HELGE: Object to form.

5 A My statement is the telecommunication in that step, if  
6 you go back down to that step, you see that that message  
7 originates from the VCS, so the VCS receives an  
8 affirmative signal and in this scenario would then query  
9 the impact detection control. So it originates not from  
10 the pre-impact system, but from the telecommunication  
11 system, thus --

12 BY MR. NIX:

13 Q I'm just --

14 A -- (inaudible) --

15 Q Why does the VCS query the impact controller?

16 A Because it received a signal at 204.

17 Q And that is from the factory installed pre-impact  
18 system?

19 A Or from our retrofit system.

20 Q So you're saying Lobaza expects that message even if the  
21 pre-impact system is not already installed in the  
22 vehicle?

23 A What I'm saying is the programming is clear inside of  
24 your flow graph that the telecommunication system sent  
25 this message on, and we're talking about where is this

1 coming from, and that's where it's coming from, it's  
2 coming from the telecommunication, which is part of the  
3 factory-installed system, not the retrofit system. The  
4 reason why it sends it is because it received an  
5 original signal and it's trying to validate that signal.

6 Q Okay. You were just discussing with respect to  
7 Allen -- where's Allen? -- that you have a lot of  
8 experience in hacking the door systems of cars; is that  
9 fair?

10 A The lock and unlock, so closure systems, yes.

11 Q And is that something you're -- is that something you're  
12 doing as part of your business?

13 A I've been doing it for -- before I started my business.

14 Q Are you still doing it?

15 A I am still, yes.

16 Q Are you installing retrofit apparatuses as part of that  
17 activity?

18 A Yes.

19 Q And are you spoofing CAN messages?

20 A Yes.

21 Q So when I look at the '505 patent, for example,  
22 Claim 10, are you practicing what that claim says?

23 MR. HELGE: Object to form.

24 A I don't think so. I don't think so.

25 BY MR. NIX:

1 Q What are you not doing when you hack a vehicle and  
2 control the door locks?

3 MR. HELGE: I'm going to put an objection on the  
4 record here as to relevance and my colleague and I are  
5 going to step out of the room a moment before Mr. Leale  
6 can answer this question.

7 MR. GOSS: You're going to -- I don't  
8 understand --

9 MR. HELGE: I'm going to tell him not to answer the  
10 question until I come back in the room. We're going to  
11 confer outside, attorneys only, the witness is staying  
12 in the room.

13 MR. GOSS: Okay.

14 (Mr. Helge and Mr. Wilson stepped out  
15 of the room and then returned.)

16 MR. HELGE: So can you read me your last question?

17 BY MR. NIX:

18 Q The question was which element of Claim 10 are you not  
19 practicing when you are hacking vehicles?

20 MR. HELGE: Okay. And so I'm going to instruct the  
21 witness not to answer this question because he's already  
22 said that he doesn't practice Claim 10. We're well  
23 aware that Success has brought lawsuits and that the  
24 purpose of this deposition is not designed to be a  
25 pre-litigation investigation for you to seek discovery

1 on Mr. Leale's company. If there's a reason, a  
2 legitimate reason you can identify to have him answer  
3 that question, I am willing to do so, but otherwise,  
4 he's instructed not to answer.

5 MR. GOSS: Wayne, the legitimate reason is  
6 this: This goes directly to Mr. Leale's interest in the  
7 outcome of this matter.

8 MR. HELGE: So you're saying that there's a bias,  
9 is that what you're saying?

10 MR. GOSS: Potentially. That's what we're  
11 exploring.

12 MR. HELGE: Okay. Well, he just said he wasn't  
13 practicing it.

14 MR. GOSS: My client has a right to know the answer  
15 to this question to get to the bottom of why he thinks  
16 he's not practicing Claim 10 of the patent.

17 MR. HELGE: Okay, I disagree, I'm going to maintain  
18 my instruction for him not to answer it.

19 MR. GOSS: Okay. This will be the subject of  
20 motion practice, it's your choice.

21 MR. HELGE: If you want an answer, call the Board  
22 today and we'll -- I'm happy to explain to the Board  
23 what we think is going on, and if you want to make a  
24 bias argument, I welcome it, but if the Board wants him  
25 to answer it, they'll tell him to answer it, but I'm

1 going to give him the instruction not to.

2 MR. GOSS: Okay. Let's call the Board right now.  
3 We can go off the record.

4 MR. HELGE: We should stay on the record.

5 MR. GOSS: Do you think we should stay on the  
6 record while we're looking for the phone number? I  
7 think we should go off just for the moment, okay?

8 Let's take a five-minute break, please.

9 (Whereupon a break was taken  
10 from 3:16 to 3:29 p.m.)

11 MR. GOSS: We're back on the record. We just  
12 conferred off the record briefly about handling the  
13 dispute we had. Wayne, could you repeat for the record  
14 what you just said?

15 MR. HELGE: So our position here is that we have  
16 conferred with the witness on this point to decide  
17 whether he could answer this question and I will allow  
18 him to answer this question. If you have further  
19 questions, we may need to reinstitute our instruction  
20 not to answer further, but I'm going to allow him to  
21 answer this now.

22 I understand, Max, you already left a message for  
23 the PTAB. In the past, I've had situations where the  
24 PTAB has taken a long time to get back to us and while  
25 we sit around waiting, if the PTAB does get back to us,

1 we have resolved the dispute and generally my practice  
2 or my experience is to send the PTAB a text to that, so  
3 I hope --

4 MR. GOSS: Absolutely.

5 MR. HELGE: I hope our accommodation will satisfy  
6 you. If not, again, we reserve the right to reassert  
7 this instruction should it be necessary, but why don't  
8 you go ahead and restate your last question?

9 MR. GOSS: Okay. And all of that is understood and  
10 well taken and let's just take it one step at a time and  
11 see where it goes.

12 MR. NIX: I think the pending question was related  
13 to Claim 10 of the '505 patent, after Mr. Leale said  
14 that he as part of his business is hacking vehicles and  
15 spoofing CAN messages, which part of Claim 10 he  
16 believes not to be practicing.

17 MR. HELGE: And my objection is, obviously, as to  
18 form, but relevance, improper purpose, et cetera, those  
19 objections are maintained, but I will allow Mr. Leale to  
20 answer this question.

21 A So sorry, after that, can you repeat the question again?

22 BY MR. NIX:

23 Q What part of the limitations of Claim 10 are you not  
24 practicing when you're spoofing CAN messages in a  
25 vehicle?



1 MR. HELGE: Same objections.

2 A So when we're spoofing messages, we are typically  
3 sending -- for our applications, we're typically doing  
4 it as a -- as a concept, we're not integrating it  
5 ourselves into any hardware that we have, so for us,  
6 we've come up with a different method to interact with  
7 the -- using -- typically for us, not in all of the  
8 cases, but typically for us for we're using diagnostic  
9 requests because our customers are interested in  
10 receiving data and not necessarily controlling, and in  
11 the case where they're interested in controlling, we  
12 simply give them the information without us actually  
13 doing the function.

14 BY MR. NIX:

15 Q Okay. But earlier you said for hacking a door unlock,  
16 you would not use a diagnostic message, correct?

17 A In that situation, again, we are not the ones performing  
18 the function, our customers are. So I guess to your  
19 question was what are we doing, and I would say we  
20 aren't doing any of it. We are providing -- we are  
21 merely providing the reports, if you will, on how it is  
22 done, and what they do with that information is up to  
23 them, but we don't receive or transmit in this way, we  
24 write reports.

25 Q And tell others how to do it?

1 MR. HELGE: Object to form.

2 A We tell others what the messages are. If they choose to  
3 do it using that method, that is up to them.

4 MR. NIX: Okay. I do not have any further  
5 questions.

6 EXAMINATION

7 BY MR. HELGE:

8 Q Mr. Leale, today we've talked about Exhibit 1003 from  
9 the '671 patent IPR and Exhibit 1103 from the '505 IPR.  
10 Do you still stand by all of the statements in these  
11 exhibits with the sole exception of Paragraph 19 in  
12 Exhibit 1003 as we discussed this morning?

13 A I do.

14 MR. HELGE: I have no other questions.

15 MR. GOSS: Axel, you're done -- well, you have to  
16 be done because -- well, that concludes today. We'll  
17 all be back on Friday. Wayne, let me ask, is your  
18 witness planning to read and sign the transcript or will  
19 he waive that right to expedite things?

20 MR. HELGE: Yes, he will be reviewing and signing,  
21 thank you.

22 MR. GOSS: Okay. Unless we're missing anything, I  
23 think that's all that we have.

24 (Deposition concluded at 3:35 p.m.)

25 \* \* \*

1 State of Michigan )

2 County of Oakland )

3 Certificate of Notary Public - Court Reporter

4

5 I certify that this transcript is a complete, true, and  
6 correct record of the testimony of the witness held in this  
7 case.

8

9 I also certify that prior to taking this deposition, the  
10 witness was duly sworn or affirmed to tell the truth.

11

12 I further certify that I am not a relative or an  
13 employee of or an attorney for a party; and that I am not  
14 financially interested, directly or indirectly, in the  
15 matter.

16

17 I hereby set my hand this 19th day of August, 2020.

18

19

20

21

*Elizabeth G. LaBarge*

22

Elizabeth G. LaBarge, CSR-4467

23

Certified Shorthand Reporter

24

Notary Public, Wayne County, Michigan

25

1  
2 DEPOSITION ERRATA SHEET  
3  
4

5 Our Assignment No. 12193

6 Case Caption: Dataspeed Inc. vs. Success LLC  
7

8 DECLARATION UNDER PENALTY OF PERJURY  
9

10 I declare under penalty of perjury that I have read the  
11 entire transcript of my deposition taken in the captioned  
12 matter or the same has been read to me, and the same is true  
13 and accurate, save and except for changes and/or corrections,  
14 if any, as indicated by me on the DEPOSITION ERRATA SHEET  
15 hereof, with the understanding that I offer these changes as  
16 if still under oath.

17 Signed on the 26th day of August, 2020.  
18

19  
20 

21 ROBERT LEALE  
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DEPOSITION ERRATA SHEET

Page No. 61 Line No. 11 Change to: "Could" should be "couldn't"

Reason for change: Transcription error.

Page No. \_\_\_\_\_ Line No. \_\_\_\_\_ Change to: \_\_\_\_\_

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SIGNATURE:  DATE: 8/26/2020

ROBERT LEALE

DEPOSITION ERRATA SHEET

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ROBERT LEALE

<hr/> <b>Exhibits</b> <hr/>			
<b>Exhibit 1001</b> 3:14 19:5,7		56:22 57:5,20 58:5,6,9 59:2,4, 8 61:7 62:10 63:5,13,20 64:5, 23 65:1,8,16 66:10 73:25 74:5 75:17 82:17,19 87:7,15	<b>2026</b> 45:8,9 49:16
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