COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,

U.S. HOUSE OF REPRESENTATIVES,

WASHINGTON, D.C.

INTERVIEW OF: MICHAEL T. TEAL

Monday, May 11, 2020

Washington, D.C.

The interview in the above matter was held via videoconference, commencing at 11:07 a.m.

Appearances:

For the COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE:

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Mr. Weisman. Let's go on the record.

Thank you, everyone, for being here today. My name is Matt Weisman. I am a counsel for the majority's Investigations and Oversight staff on the House Committee on Transportation and Infrastructure.

This is a virtual, transcribed interview of Michael Teal. This interview was requested by Chair DeFazio as part of the Transportation and Infrastructure Committee's ongoing investigation into Boeing's design and development of the 737 MAX aircraft and FAA's certification and oversight of Boeing's 737 MAX and related issues.

At this time, I will ask the witness to state his name for the record, and please spell it out for the court reporter.

Mr. Teal. My name is Michael Todd Teal. Michael, M-i-c-h-a-e-l; Todd, T-o-d-d; Teal, T as in "Tom," -e-a-l.

Mr. Weisman. Thank you.

And I will ask the witness to please state his current place of employment and title.

Mr. Teal. I work for the Boeing Commercial Airplane Company in Seattle, Washington, and I am currently the vice president/chief project engineer of the 777X program.

Mr. Weisman. Thank you.

I will note that the witness is joining us from Washington State and that the committee staff is joining from the Washington, D.C., area.

Court reporters are participating today to transcribe the interview, but the interview will not be recorded by anyone else. The court reporters already have a list of the names and titles of all of today's participants, but I would ask that everyone who is participating today, with the exception of the witness, who just did, identify themselves

for the record and confirm that they are not recording this interview.

If we could go down the row in relation to how folks are laid out on the screen. I believe you should be able to see on the right-hand side a list of names. So I guess I'm at the top. I'll begin.

Matt Weisman, and I am not recording this interview.

Mr. Armes. Mike Armes, also with the majority side of the House Transportation and Infrastructure Committee. Not recording.

Mr. Pasternak. Doug Pasternak, also with the majority staff. I am not recording.

Ms. Cooke. I think everyone shows at the top of the participants list themselves as being first.

Mr. Weisman. Ah.

Ms. Cooke. So do we want to have the Democratic staff go down their list and then the Republican staff go down our list?

Mr. Weisman. Sure. Why not.

Okay. So, remaining folks on the Democratic side, please identify yourselves and confirm that you're not recording.

Ms. Dudley. Lauren Dudley, counsel with the Transportation and Infrastructure Committee majority. Not recording.

Mr. Burkett. I'm Alex Burkett, staff director for the Aviation Subcommittee on the majority side. I am also not recording.

Mr. Tien. I'm Mike Tien, senior counsel with the Aviation Subcommittee. Not recording.

Mr. Bell. Brian Bell, counsel for the Subcommittee on House Aviation. Not recording.

Mr. Weiss. Adam Weiss, counsel for the Aviation Subcommittee for the majority. Not recording.

Mr. Weisman. Okay. Why don't we now go with the Republican side.

Ms. Cooke. Corey Cooke, general counsel for the Republican Transportation and Infrastructure Committee. Not recording.

Ms. Hupman. Tara Hupman, counsel for Republican Transportation and Infrastructure Committee. Not recording.

Ms. Hopkins. Jamie Hopkins, research assistant for Republican T&I Committee. Not recording.

Ms. Lyons. Holly Woodruff Lyons, staff director, Republican Aviation Subcommittee. Not recording.

Mr. Presti. And Hunter Presti, senior professional staff, Aviation Subcommittee minority. Not recording.

Mr. Weisman. Okay.

And now if we could have the other participants identify themselves and confirm that they're not recording.

Mr. Paisner. This is Mike Paisner. I'm off-screen with Michael, and I'm a counsel with The Boeing Company. Not recording.

Mr. Primis. Do you want Michael Teal to do that too?

Mr. Weisman. Sure.

Mr. Teal, if you could just confirm that you're not recording.

Mr. Teal. I am not recording.

Mr. Weisman. Thank you.

Mr. Primis. This is Craig Primis from Kirkland & Ellis for The Boeing Company. I am not recording.

Mr. Haney. Patrick Haney, Kirkland & Ellis. Not recording.

Ms. Schultes. Sarah Schultes, Kirkland & Ellis. Not recording.

Mr. Weisman. Okay. Is that everyone?

Okay. Very good.

So, moving forward, Mr. Teal, if at any point you need a break, please just let us know. We're happy to accommodate. We may take a few short breaks as needed, and we will plan to take a short lunch break, but if you need additional breaks, please just let us know.

However, if you would like to take a break and there's a question pending, we'll just ask that you first answer the question before taking a break. Do you understand?

Mr. Teal. I understand.

Mr. Weisman. Thank you.

Because we are proceeding virtually, we have established a video breakout room in which you can speak privately with your attorneys if needed. You should be able to see -- I'm not sure if it's set up yet -- a "breakout room" icon on the screen, located at the bottom toggle bar of your screen.

Mr. Armes. We're still working to set up the rooms, I think.

Mr. Weisman. Okay. Very good.

So if you do need to speak, let us know, and we'll make sure to establish that so you're able to speak privately with your attorneys.

Did you understand?

Mr. Teal. I understand.

Mr. Weisman. Okay. Thank you.

I will now describe how we will proceed.

The majority and minority sides of the committee will alternate asking questions

in 1-hour increments. The majority will ask questions for 1 hour, and then the minority will ask questions for 1 hour, and so on. We'll continue in this manner until each side has completed all of its questions.

We hope to conclude this interview roughly around 6:00 p.m. eastern time, and we'll try to do our best to do that.

For the most part, we expect one person at a time on each side to take the lead asking questions, but others from the side controlling time are welcome to ask questions as well, especially to help clarify or follow up on an issue.

Because we are proceeding virtually, I will ask everyone other than the witness and the main questioner to please mute your microphones and then unmute your microphone if and when you need to speak. That will just help us with our audio quality.

The videoconference host has locked the conference, so no one else can join without first requesting approval from the host. If anyone runs into technical trouble or falls out of the videoconference for any reason, please call or text Mike Armes of majority staff by telephone at [redacted][1]. He can authorize you to get back into the conference if you are locked out.

Mr. Teal, you are allowed to have an attorney present to represent you in your personal capacity. I understand you have counsel participating today. Will you please identify the counsel representing you by name for the record?

Mr. Teal. Michael Paisner.

Mr. Paisner. As well as others.

Mr. Teal. Yeah, as well as others. There's -- Craig's on, and Sarah's on, and --

Mr. Weisman. Can you state their full name, please?

[1] Redaction of direct cell phone number of Committee staff agreed to by Majority and Minority staff.

Mr. Paisner. Craig Primis.

Mr. Teal. Craig Primis.

Mr. Paisner. Sarah Schultes.

Mr. Teal. Sarah Schultes. And Patrick --

Mr. Paisner. Haney.

Mr. Teal. -- Haney.

Mr. Weisman. Okay. Thank you.

And I understand that we are also joined by counsel representing Boeing. Can you identify the name of the Boeing counsel?

Mr. Teal. Michael Paisner.

Mr. Weisman. And you understand that the Boeing counsel represents The Boeing Company and not you personally, correct?

Mr. Teal. Correct.

Mr. Weisman. And it was your choice to have Boeing counsel here today. Is that correct?

Mr. Teal. Yes.

Mr. Weisman. Okay.

As I mentioned, we have three court reporters here on the videoconference today who will be taking turns transcribing this interview. To help these reporters, I will ask that you please wait to respond to a question until after the entire question has been asked. I'll also ask that you please provide a verbal response to each question.

When you refer to a person's name for the first time, please provide the spelling of that name. If you use any acronyms or abbreviations, please provide the full term the first time you use it.

Do you understand?

Mr. Teal. I do.

Mr. Weisman. If at any point you do not understand a question, please do not hesitate to let us know. We will do our best to provide clarification or to rephrase the question. Do you understand?

Mr. Teal. I do.

Mr. Weisman. If we ask about conversations or events in the past and you are unable to recall the exact words or details, you should testify to the substance of those conversations or events to the best of your recollection. And if you recall only a part of a conversation or event, you should give us your best recollection of those events or parts of conversations that you do recall.

Do you understand?

Mr. Teal. I do.

Mr. Weisman. We have not sworn you in, but, as you know, there are Federal laws against lying to Congress, withholding or concealing relevant information from Congress, or generally providing false statements to Congress, including 18 USC, section 1001. This also applies to questions posed by congressional staff in interviews such as this one.

If you have any questions about this, you should discuss your questions with your attorneys.

Do you understand?

Mr. Teal. I do.

Mr. Weisman. Is there any reason you are unable to answer questions truthfully today?

Mr. Teal. No, there is none that I know of.

Mr. Weisman. This next question is a standard question we ask in these types of

proceedings. Have you taken any medication or consumed any alcohol that could impair your ability to answer questions truthfully today?

Mr. Teal. No, I have not.

Mr. Weisman. Do you have any questions for us before we begin?

Mr. Teal. No.

Mr. Weisman. Okay.

I will note, I have the time at about 11:18 eastern time, and we'll begin with our first hour of questioning from the majority side.

EXAMINATION

BY MR. WEISMAN:

Q Mr. Teal, in preparation for your interview today, did you speak with anyone either at Boeing or outside of Boeing other than your attorneys?

A Regarding these proceedings, no.

Q In preparation for these proceedings.

A In preparation, no. Only these lawyers involved.

Q Okay.

In preparation for your interview today, did anyone other than your attorneys select or recommend any documents for you to review?

A No.

Q In preparation for your interview today, did you go back and review any documents?

A Only with the lawyers.

Q Okay.

Can you very briefly describe your educational background?

A I have a bachelor of science and engineering from the University of

Wisconsin in engineering mechanics. I graduated in 1986.

Q Thank you.

When did you begin working for Boeing, and in what capacity?

A I joined as a structural engineer in July of 1986.

Q And during the MAX certification process, which was from roughly 2012 to March of 2017, what was your title and what were your responsibilities related to the MAX program?

A I was the vice president/chief project engineer of the MAX program, responsible for the requirements, the configuration, the design, the testing, the certification and overseeing of any issues in the build process, mainly the engineering work.

Q And during that time, were you also a member of any engineering associations?

A I was not.

Q And during that time, roughly how many people reported directly to you?

A As the chief project engineer at The Boeing Company, no employees actually report to me. So, at one time, I think I had an OA that was working for me, an administrator, but no engineers directly report to me. They all are functionally aligned to the engineering leaders of the company.

Q So can you explain to us how that management structure worked? Like, how would you oversee the work that was being done if no one reported directly to you?

A So the structure of the program, we had a chief -- so I was the chief project engineer. And then, for example, all of the systems engineers worked for the systems integrated product team leader; all the structural engineers worked for the structural IPT leader; had a propulsion IPT leader; integration team leader; as well as an interiors team

leader.

So all the engineers reported up through those five skills. They reported up through a director of engineering and reported to the program manager. And then I reported to the program manager as well.

But from a daily direction and overseeing of the program, you know, you could say that none of them worked for me but all of them worked for me, is what I like to say.

Q And who was the program manager to whom you reported?

A In the beginning of the program, it was a gentleman named [redacted]. I believe it was in 2013 -- I can't exactly know the exact date -- he left the program and was replaced by Keith Leverkuhn.

Q Okay. And roughly how many people are involved in the MAX program?

A From an engineering -- of the Boeing engineers involved, around 1,500 engineers, approximately. But then throughout the supply chain, you know, CFM, the engine company, I had, you know, probably a thousand engineers. And then suppliers around the world had hundreds and hundreds of engineers. I don't have an exact number for you.

Q Okay.

Were there regular meetings within the MAX program that you typically attended?

A Yes.

Q And how often were they, and who would attend those particular meetings?

A There would be a weekly management -- a program rhythm, if you would; you could call it that. There was a Technical Review Board that I hosted, which would include these executive engineering leaders that I spoke of, plus their management and any relevant engineers that the topics were on. We had program meetings on cost, we

had them on schedule, we had them on risks and opportunities. Later on, we had them on certification.

So very typical weekly meetings that occur to manage a program.

Q And were there meeting minutes or slide presentations associated with these meetings?

A On some of them, yes.

Q And other than you said that you hosted a Technical Review Board meeting, were there any of these other meetings that you typically hosted?

A I think I hosted a staff meeting with the engineering leaders once a week. That'd just be in my office. They would come in, and we'd sit and chat, how things are going on the program.

Q So, in your position as chief project engineer on the MAX program, did you normally have ultimate sign-off authority or approval authority on MAX-related technical issues?

A I had approval authority for the configuration of the airplane. So the team would bring in configuration proposals for the airplane, and I would sign off. I would also sign off on the requirements.

As a chief project engineer, I don't have technical expertise in all areas, so I rely on the technical expertise of the lower-level functions. Typically, they would bring forward a proposal that they had prereviewed in their meetings and then made a recommendation to me to approve. And for the most part, I typically would approve their recommendations.

Q Okay.

And you mentioned earlier Keith Leverkuhn was the next level above you. Did you receive your normal assignments from Mr. Leverkuhn or from someone else?

A I wouldn't phrase it in that way. You know, Keith Leverkuhn and I, we sat next to each other, our offices were next to each other, and he managed the program costs and schedule, and I managed the technical aspects of the airplane.

Q So who would be the person at Boeing who would review your work?

A Who would review my work?

Q Yes.

A I would say that, from a configuration perspective, when changes came in, they were reviewed at a lower level of the functions. And then any time we had technical details that we had to work through, there would be a functional leader of the company, maybe in systems or in aerodynamics, that would review it and make recommendations for my approval.

Q Did you get any kind of performance review? Or, you know, who would take a look at how you were doing in your position and determine whether it was doing well for the company?

A Keith would give me a performance review. We would have an annual discussion of how I was doing.

Q Gotcha. And how would you characterize your relationship with Mr. Leverkuhn? Was it good? Bad?

A I think it's a good relationship.

Q Okay. And so, like, how often would you communicate with him? Was this, like, a daily occurrence or --

A Oh, multiple times a day.

Q Would you exchange emails and texts as well as verbal communications?

A Yes.

Q Okay. And did you ever communicate with Mr. Leverkuhn socially outside

of work?

A Yes.

Q Okay.

And so, while the MAX was going through the certification process, did you ever correspond or meet with anyone from the FAA about the MAX?

A Yes. As part of our development process, the organizational delegation authority, the ODA, of Boeing, we would set up meetings between the ODA and what I call the BASOO, the Boeing aircraft certification office.

That was run by a gentleman named John Piccola. Prior to him, it was a [gentleman] named [Angelos]. I don't know [Angelos's] last name.[2] I apologize.

And we would meet on, I'd say, a monthly basis -- and as we got closer, it was probably every 2 weeks -- for a review. I would drive down to the FAA office and participate in a discussion of how things were going.

Q And so was your correspondence with the FAA limited to the BASOO office within the FAA, or did you also correspond with other offices, such as the AEG, Aircraft Evaluation Group, or the ACO, the Aircraft Certification Office?

A Typically, it would be the BASOO office of where I would do most all of the communication.

The ACO, not much.

There is the Transport Standards staff that, working through the BASOO, we may have them participate in the discussions, because they are the branch of the FAA that creates the regulations, and then the BASOO, you know, determines whether we are compliant to them.

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[2] The original transcript said “Prior to him, it was a gentlewoman named Anngelique. I don't know Anngelique's last name.” After the interview, Boeing clarified the statement as indicated in brackets. This was agreed to by Majority and Minority committee staff.

You spoke of the AEG. I didn't normally talk to the AEG, but I do recall, on one occasion, I did meet with them with the BASOO present.

Q And what was the purpose of that occasion? When was it? What do you recall about it?

A It was in the -- I think it was prior to flight test, in the middle of 2015. I don't know the exact date.

And it was a discussion that we had set up because the BASOO, John Piccola and myself, we would go and review any particular issues that either the FAA was having with the program or that Boeing was working on in terms of certification.

And one of the items that was being discussed was the training package and how the training was going to be done. And the AEG is the ones who determine on certification of the training packages.

And I asked to meet with them because our team had communicated to me that they were concerned that the AEG was potentially putting new regulations or -- I shouldn't say "new regulations," but new interpretations of existing regulations. And I asked if we could sit down and chat and make sure that everyone was aligned on how things were going.

And I thought it was a very cordial discussion that we had, and I left the meeting with a confidence that the AEG was following their processes and Boeing needs to follow our processes.

Q Was the topic of Level B training discussed at that meeting?

A I believe it was.

Q Can you tell us more about what that conversation was?

A Do I need to explain anything about what Level B is, or does the committee already understand that?

Q Oh, that's okay. We're aware Level B is a level of training that doesn't require simulator training.

I guess what I'm asking is, can you tell us what you recall about what you may have said to the AEG about Level B training and what AEG might have said back to you? Just whatever you can recall about the discussion of that topic at that meeting.

A What I recall is that the risk that was being suggested by the chief technical pilot and that organization was potentially a concern that one of the functions that we had added to the airplane, called direct lift control -- "DLC" is the term, direct lift control -- that direct lift control potentially could elevate the training requirements beyond Level B.

When I asked our technical experts how the regulations work and what the guidance material was on selecting Level A, B, C, D, or E, clearly the team said, technically, this falls squarely in Level B training, and there should be no concern on my part that we would get Level B, because we follow the process and it would be Level B.

But there was some concerns that the FAA -- I had not participated in those discussions between the chief technical pilot and the AEG -- that the AEG was saying, "Well, you know, we don't really know if it's Level B or not. We have to wait and see. We have to follow our process."

And my team kept coming back to me -- when I say "my team," the Boeing team would come back to me and say, "Hey, we're concerned that they may be levying a new interpretation of the rule which would suggest it's not Level B."

And one of the reasons that I spoke to John Piccola at the BASOO and asked him, "Maybe we should sit down and talk with the AEG as a group to make sure that we're all -- I understand the process and we're following the process."

And one of the aspects that I had asked the chief technical pilot is to get a feeling

from the AEG, were they really concerned about Level B? Did we need to make changes to the airplane to ensure that the airplane does have Level B?

And, of course, Level B, to me, was all about safety of the airplane, commonality in the fleet, ensuring that pilots that fly every day from flying an NG will fly on a MAX and fly back on the NG. That common interface to the flight deck and how the pilots interact was very important to what I believe is the safety of the product.

Q So you and/or Boeing wanted Level B training? Is that what I'm -- am I hearing you correctly?

A When you say "wanted" --

Q Is that what you were recommending?

A It was a design objective, that that's what it would be. In the end, of course, the FAA was the one that would determine whether it's Level B. But from a design aspect, we had to go through our design processes, and if we follow the design process and their criteria, we expected Level B.

And I had worked on the 747-8 Freighter as the same role, as the chief project engineer, prior to that, and we had gone through the same process with the AEG. And that project we knew from the beginning would be a Level C project. And so we followed the process.

Q All right. Thank you.

A So -- I'm sorry.

Q Sorry. Didn't mean to cut you off.

A I was -- I don't think I formally answered the statement on -- when I went to the AEG and had the conversation with the leaders of the AEG, we had the dialogue about, are we following the process or do I understand the process correctly? Yes. And they clearly told me that we would follow process. But they couldn't indicate to me

whether or not I was at Level B, C, or what the determination was until they completed their evaluation. And their evaluation would include flying the airplane through a series of what we call T1, T2, T3 tests. And we had to complete that process before they could make their ruling.

I understood, I accepted that, but I left the meeting with a confidence that, when we follow our process, we would -- the AEG was following their guidance material.

Q Okay. Thank you very much.

Just one last question. When you would communicate with the FAA, was it always part of a group communication, or did you ever, sort of, individually pick up the phone and, just one on one, call John Piccola or anyone else at the FAA to have an individual conversation?

A I had called John Piccola on occasions, especially, like, during flight tests, if. There were any issues with the airplane, I would call him. I know I had an engine problem once, and I ground the fleet, and I called him just to give him a heads-up.

Q Gotcha. Okay.

Did you ever communicate with FAA headquarters in Washington?

A FAA headquarters? I don't recall if I had. And I question that because I know on the 747 program --

Q Just with regard to MAX.

A I don't recall ever Washington --

Q Okay. Do you recall ever communicating with Ali Bahrami, the Associate Administrator for Aviation Safety at FAA, about the MAX?

A I'm hesitating because early on in the program -- I mean, I know Ali Bahrami, and I know I worked with him on the 47, as he was the head of SACO at the time, I believe. And in the beginning of the MAX program, if Ali was still there, we potentially

went and met initially on the program to share with him the program plan going forward. I don't recall.

Q Do you recall if any other Boeing officials communicated with Ali Bahrami about the MAX?

Let me rephrase. In particular, between the two crashes, let's say, between the Lion Air crash and the Ethiopia crash, do you recall if anyone from Boeing was communicating with Ali Bahrami?

A I'm not aware of that, but I will acknowledge that I left the program in November of 2017, almost a year before the first crash, and I wasn't really involved in any of the post-crash events, especially working with the FAA. I didn't participate in any of that.

Q Gotcha. Okay.

Moving on. So Mark Forkner was the chief technical pilot for the 737 MAX program. Does that mean he was the main technical pilot that interacted with the 737 MAX program?

A He was the main technical pilot that would. Now, recall, we have many types of pilots. We have our project pilots; we have the test pilots. And him being the technical pilot, which has the responsibility for the documents --

Q Right.

A -- and working through the training and then, of course, interfacing with, I believe, the AEG, the Aircraft Evaluation Group. I would expect him to be the one communicating to them.

Q So was he the main technical pilot with whom you interacted on the MAX program?

A Yes.

Q Okay. And how often did you interact with Mr. Forkner? Was this a daily, weekly, monthly experience?

A I would say probably a monthly experience, but not in the beginning of the program. It was later in the program when the concerns were raised by the chief technical pilot's office and that organization, that they had some concerns about the direct lift control and also another function that existed on the airplane called the roll control augmentation system.

And they brought it forward to me to say, "Hey, these are issues that, from a technical standpoint, when you look at the guidance material, we may have to be greater than Level B." And so we had those dialogues.

So he would come to a risk review. I explained we had different reviews that on a weekly basis we do. One was a risk review. And probably monthly he would come and share the status of those issues.

Q Did you communicate with him directly? Did you talk with him on the phone or exchange emails or texts?

A Over the course of the program, I had corresponded with him on emails, and he would send me emails on status of things. And if there were any clarifications to what he had brought to our risk meeting, I'm sure I called him to ask for more clarification of what he was trying to say so I understood.

Q We know from his emails and instant messages that he often uses some colorful language, but we'd like to know what your impression was of him as an employee. From your experience, do you believe he was competent as a technical pilot?

A Mark -- I met him. I knew he was a previous line pilot, so he had -- I am not positive, but I think he was an Alaska Airlines pilot, and he brought a perspective to

the program of what a line pilot at an airline would do and shared that perspective. And I felt he was a competent pilot from a line pilot perspective.

What you have suggested in IMs and others in terms of colorful language, I didn't experience any of that. I've seen it now in print, but I didn't really witness or really take notice of that in my communications with him.

Q Was he fairly well-respected, professionally?

A I don't really -- I don't know how I could answer that. His organization of the tech pilots were really distanced from me. When I talked about that organization structure, the pilot community and the tech pilots weren't even in that organization; they were off to the side. And so --

Q Let me ask it a different way. Did you have any reason to believe that he was unprofessional or not acting in an appropriate manner?

A From what I witnessed, working with him, I had no knowledge of that.

Q Do you know if he followed direction? Do you have any awareness of him not following direction or acting in a way that was, you know, outside of what he was authorized to do or acting in an insubordinate manner? Do you have any awareness of anything like that?

A I don't recall any awareness of that.

Q Okay.

Did anyone ever complain to you about Mr. Forkner?

A Not that I recall.

Q Are you aware of anyone at Boeing ever reprimanding or disciplining Mr. Forkner in any way?

A Not that I recall.

Q Do you have any awareness of him being disciplined or criticized for doing

anything that was contrary to Boeing's interests?

A At the time, not that I recall, no.

Q Okay.

We talked a little bit about this, but just for a little more detail, can you tell us what specifically were within Mark Forkner's job responsibilities? You had mentioned that he dealt with the FAA, the AEG. Did that also include working with the airlines directly?

A Yes, it included -- I know that he could communicate with the airlines. Yes.

Q So if the airlines needed to discuss training requirements for the MAX, would that be within the scope of a discussion that Mark Forkner would have with airlines?

A I would expect that, yes.

Q Okay.

So, in the management structure, whose responsibility was it to make sure that Mark Forkner's MAX-related assignments were completed correctly and on time?

A That would have gone up through the management chain under the tech pilots. And, to be honest, I don't even know how that organizational structure was working at the time. I don't know who his boss was.

Q Okay. Did you ever provide MAX-related assignments directly to Mark Forkner? If you needed something, would you ask him to do something?

A MAX-related assignments?

Q MAX. Sorry. 737 MAX. Like, the MAX program.

A Only the assignment of, if he would bring forward a risk, and the risk, like what we've talked about, was a technical risk, and we would give him the assignment to create a mitigation plan of, well, how are we going to resolve this risk?

And there's many ways to resolve the risk. Change the training, change the

airplane, and bring forward and work with us to resolve the issue that was brought forward.

Q So did Forkner typically keep you in the loop about his MAX-related work?

A Not generally, other than the report-outs to the risk review boards.

Q And then did you typically keep Leverkuhn in the loop about MAX-related work that you were overseeing?

A So this question is no longer about Mark Forkner?

Q Correct. Correct. I'm just trying to get a sense of, like, what was flowing up to you and then what you would pass on.

A Yes, I would share with Keith on a daily basis any issues that were going on. That flow was very constant between us.

Q So, to the extent that Forkner would have issues with mitigation plans or some of the other things you've cited, it is fair to say that those are things that then you would have communicated up to Keith Leverkuhn?

A Yes. And, in most cases, that risk review is a program meeting, and Keith would be in attendance, so we would hear it at the same time.

Q Gotcha. Okay.

So, as we talked about, you said it was a design objective of the program to achieve Level B training. Were you personally compensated in any way for obtaining the goal of Level B training on the MAX program?

A I was not personally compensated for that, no.

Q Did you receive any kind of bonus for your work on the MAX program?

A At the end of the MAX program, I received some restricted stock shares for my work on the program.[3]

[3] Please see August 31, 2020 letter from Craig Primis clarifying this statement. (Attachment 1).

Q Was it tied in any way to success that you had achieved in the program, or just completion?

A I don't recall why. It was a thank you for a job done, I suppose.[4]

Q And who made that evaluation to determine that you would be awarded that bonus?

A That's a good question, but I believe it was the head of engineering at the time.[5] And --

Q And who was that?

A -- as part of the leadership team -- at that time, I believe it was John Hamilton.[6]

Q And how were you notified of this bonus? I mean, was it sort of expected, or was this, like, an unexpected kind of surprise? I mean, how does that process play out? I mean, are you reviewed and then granted the bonus, or does everybody get the bonus?

A I was given a phone call that said, "Congratulations.[7] Thank you for our good work, and here are some restricted stock shares for you."[8] Through the phone[9] --

Q Gotcha. Okay. Thank you.

Moving on to another topic. So Boeing agreed to pay Southwest Airlines a million dollars per plane in the event that simulator training was required for the MAX. Do you know if Mark Forkner played any role in negotiating this contract with Southwest Airlines?

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[4] Ibid.
[5] Ibid.
[6] Ibid.
[7] Ibid.
[8] Ibid.
[9] Ibid.

A I have no knowledge of Mark participating in the contractual wording and working with that with Southwest.

Q But did he have any other role regarding pilot training requirements for Southwest Airlines?

A You stated earlier that one of Mark's roles was to work with the training pilots at the airlines. So he would be working with the training pilots at Southwest Airlines.

Q Okay.

A But I have no information or suggestion that had anything to do with the creating of the contract that was written.

Q Gotcha.

Did you personally play any role in negotiating the contract with Southwest in which Boeing agreed to pay a million dollars per plane if the MAX required simulator training?

A My involvement as the engineering leader would not have been to get involved in the contractual aspects of it. I was asked my opinion early in the program, in 2011, of what I felt the training program would be, based on the knowledge of what the airplane -- it was 2011. We hadn't got to firm configuration.

So I did give a -- based on my knowledge of the changes that we were planning on doing and my experience on the training from the 747, I was highly confident that this airplane could, as typical in a reengine program, would be Level B or less training. And I let the people who made these financial commitments know that I had a relatively high confidence that we could meet that.

Q And who were these people that made these financial commitments?

A I would assume our contracts organization, working with the sales

organization.

Q Right. So you said you were asked your opinion. Who asked you your opinion?

A I don't know the exact names, but it was the contracts -- the contracts organization, the ones that were writing the contracts with the airlines.

Q And you can't recall a name of anyone who worked on the contract?

A That was -- you're talking 9 years ago. I apologize.

Q Okay.

When did you personally become aware of the Southwest contract and, in particular, the provision that offered to pay a million dollars per plane if it required simulator training?

A I don't know when I became aware of that, to be honest with you. To me, the training, like we said, was about commonality and safety of the product. And the requirement that we set to the engineers was, we wanted 16 hours or less of Level B or less training as we design the requirements for the airplane to meet.

Now, whether or how that met the contract, I wasn't aware of the actual contract and the terms of the contract. Typically, in all contract negotiations, I only provide the engineering probabilities, confidence levels of meeting the technical commitments of the airplane -- fuel burn, braking distance --

Q Sure.

A -- noise.

BY MR. WEISMAN:

Q So the contract has been -- over the last, like, year or so, I mean, it's made a lot of news. Were you aware of the million-dollar provision prior to its broader reporting of it in the press?

A I don't recall. I --

Q Okay.

A -- could have known. I don't think that it would've -- had I known, it wouldn't have mattered a whole lot. The requirements of the airplane was 16 hours or less, and we achieved significantly less than 16 hours.

Q So it was your job to make sure that no simulator training was required, that the training would only be 16 hours or less, and make sure the plane fit that design to be able to meet that objective. Is that correct?

A I think it's fair to say my job is to ensure that the airplane meets all of its requirements -- the regulatory requirements, the Boeing requirements, the customer requirements. And the differences training for an NG pilot to fly common with the MAX was a part of that, the requirements that we set out to meet as a team.

Q Gotcha.

A And we evaluate status to that, and if at any time we were not meeting that status, we would mitigate. We would find a way to either change the requirement, get a deviation to the requirement, or meet the requirement.

Q Okay.

A So I saw it as any other requirement, is what I'm saying.

Q Sure.

Now, you may not know, but do you know if Mr. Forkner received any kind of bonus related to Boeing's achievement of Level B training?

A I do not know of any.

Q Do you know if anyone else at Boeing received any kind of bonus related to the achievement of Level B training?

A I do not know of any.

Q Okay.

On a slightly different topic, why did Boeing choose to seek an amended type certificate for the 737 MAX as opposed to a new type certificate?

A A derivative airplane like the 37 -- we've had many derivatives over the years of the 37. I don't even remember the exact number. A reengine of that airplane would fall under an amended-type-certificate process.

So if you're reengining an airplane and keeping everything similar to the 37 in the family, to have family commonality, an amended type cert is the accepted process for doing that. I don't think there was ever any question that we wouldn't do that.

Recall, the only change to the airplane here is reengine the airplane and put other fuel-burn improvements on the airplane and acknowledge the noise would get better for the environment, you burn less fuel, operating cost -- and other than that, we want the airplane to be the same, because we have a good airplane. The customers like it. It has a very high safety record, one of the best in commercial airplane history. We wanted to minimize change, so an amended type cert is just the process we would use.

Q So was the amended type certification a faster or a cheaper means by which to get the aircraft certified, as opposed to a new certification?

A I do not believe that at all. When you think of how the amended-type-certificate process worked, you still would go through the Change Product Rule system and evaluate every regulation against it and either accept the latest amendment and regulation or ask for, through the Change Product Rule, a step-down or

an exception back to a previous rule based upon the guidelines set forth by the FAA.

I mean, ultimately, from a schedule perspective, this was a 6-year program. And from 2011, when I joined, to deliver in 2017, that's a long time. I mean, comparatively, it's longer than it took to do the original NG and longer than we took to do the 777-200, the brand-new product.

Q Understood. But there's these two categories of certification, and I'm just trying to understand what the incentive would be for Boeing to choose one over the other if you're suggesting and I'm hearing you correctly that the amount of time it would take and the amount of expense it would impose on Boeing was pretty much similar whether you went for a new type certificate or an amended type certificate.

A Because it was a minimum-change airplane, in areas that are unchanged and unaffected, the process would allow us to use the previous certification as a carryover to the new product if it's reviewed and accepted. So we had to review all of them.

So when you say, was there any benefit to an amended type cert -- in the end, a new type certificate, we would've had to step up and make changes to every aspect of the airplane or ask for exemptions back to a previous rule. It would've been a procedural change it would have to go through.

Q And that procedural change would take more time or about the same time?

A I would suggest it would take about the same time.

To be honest, I've never worked on a new type certificate. My 747 was an amended type cert. So was the MAX. And now the 777X is an amended type cert as well.

It's just -- I apologize for just saying it this way -- it is the process that we use.

Q Okay.

So we talked a little bit before about how you'd stay on top of program risks and

the MAX process as it went forward. So, typically, who was in charge of briefing you about the program's progress, risks, challenges? Did that come up through Mark Forkner's team or the various engineering teams or all of them?

A It would be any or all of them. We have an open culture. The MAX has a very open culture where people can bring up issues. But, typically, technical issues would be in a function, in an area. If there was a systems issue, it would raise up to the systems technical review boards, and then they would elevate it to my level.

And so it would be, typically, the leaders that would bring forth, and the chief technical pilot would bring them forth, and the program and test pilots would bring issues forward.

Q And then, as we talked about, you would also keep Keith Leverkuhn advised about, up to date on how things were going. But during the development of the MAX and prior to certification, did you ever brief high-level, senior management at Boeing, like Dennis Muilenburg or other senior officials, about various aspects of the MAX program?

A There would be a status meeting where we would share. It was in an airplane development organization, and then we would share the latest status of the program.

Q And how often were those meetings?

A Oh, they were less than monthly. Might be every other month. I think they tried to do them on a monthly basis and if things came up. It might have been every other month that we had the discussions.

And that would be a very high-level status of where the top technical issues were, where we were with flight tests, how we were with schedule, were there any certification -- it was to keep them informed of the progress of the program.

Q Did you ever brief Dennis Muilenburg or other senior officials prior to

certification about MCAS?

A I do not believe so at all.

Q What about after the Lion Air crash? I understand you changed jobs, but, having done the work on the MAX, were you brought in to brief Dennis Muilenburg or other senior officials about MCAS?

A I was not. I was not brought in after the accidents.

Q During the development of the MAX, prior to certification, did you ever brief Dennis Muilenburg or other senior Boeing officials on the issue of Level B training?

A I don't recall ever doing it. And the reason was because I viewed it as a very low risk, and we would only share higher-risk items with the leaders above me.

Q So did the topic of Level B training and the -- you've described it as a design objective -- was that ever a topic of conversation in any of these briefings for Dennis Muilenburg and other senior Boeing officials, just a status update, you know, "Yes, we're on pace to hit Level B training"?

A I don't -- I don't recall.

Q Okay.

I wanted to ask you about flight simulator training, just generally. It's our understanding that flight simulator training is kind of expensive. Is that accurate?

A I don't view it as an expensive item. Flight simulator training is required to train pilots how to fly airplanes. All airplanes -- NGs, MAXes, 777s -- you have to have flight simulator training. We have simulator training.

Q Sure. No, I understand. Flying is expensive. I know lots of aspects are expensive. But, like, I mean, roughly, you know, what does it cost to purchase a simulator?

A I don't even know. Sorry.

Q Do you have any idea how much it costs an airline to either -- you know, per pilot training session, how much that costs?

A I do not.

Q It's our understanding that there's also, or at least initially were, a limited number of MAX-specific simulators. Is that true?

A So, because the MAX was a simple change from an engine change -- I say "simple" -- a derivative airplane that had an engine change, with some other minor changes to the systems to enable the engine change, the simulator training that's required to fly a MAX is really the simulator training to fly a 737 family member. So all airlines and pilots [redacted][10]. He has simulator training.

Now, MAX-unique simulators was your question.

Q Yes.

A A MAX-unique simulator would be required for an airline pilot who has no history of flying an NG. Because if you have 37 NG experience and you are an NG pilot, then you would do the differences training, and all of the aerodynamic -- what you would train on in that simulator applies to the MAX. It's the same flying characteristics. And that's part of the requirements, to meet that.

An airline that was flipping, per se -- like, an example I'd use is Air Canada, for example -- they would have pilots that were maybe flying the competitor's airplane. And to train them to begin with, they would want to just start with a MAX simulator.

So we did create MAX simulators for airlines that -- I think the terminology they use is a Code 1 -- a Code 1 airline that would be flipping and not actually flying the base model.

And, to be honest, there's very few of those, because the 737 NG is a very, you

[10] Redaction of unrelated personally identifiable information.

know, well-sold airplane, with thousands and thousands of them available. So almost all the customers that were initially buying the airplane were existing 737 family member customers.

Q So was your advice to a pilot who had not yet flown an NG, someone who was a new pilot coming on line, in order to be trained on the MAX, would they then use an NG simulator and then go through the differences training on NG to MAX? Or would they have to go to a MAX-specific simulator?

A It is my understanding that they could go through the NG pilot training and get checked out in an NG and then do the differences training.

Q Gotcha. Okay.

Are you aware --

A I think that's how the process works.

Q Okay. Thank you.

Are you aware of any economic or financial models or analysis that Boeing ever conducted to detail the potential costs or financial impact to Boeing if customers had to do simulator training or differences training?

So if the FAA, let's say, had not done Level B training and had required simulator training, do you know or are you aware of any financial analysis that Boeing had done as to what the financial implications of that would have been?

A I am not aware of any.

Q Are you aware of any financial analysis on the part of any Boeing customers as to what it would cost them if they had to incur simulator training?

A I am aware that, when customers bought the airplane -- when a customer comes in and says, you know, I have a fleet of airplanes and I want to extend my fleet or flip my fleet, training of the pilots is one of the aspects of the economic decision of

making that airplane.

So I would expect that airlines would look at structure, payload capability, takeoff/landing capability, fuel burn, and have a very large model of the overall economic value of the deal. I would assume that airline would have that, and then would look at, if I had a fleet of the competitor's aircraft and had to flip all my pilots, they would have to -- I would assume they would come into their financial models and take the cost of retraining all their pilots into account. I didn't participate with the airlines in generating these models.

Q Is it fair to say, then, that more pilot training is more expensive for airlines, less pilot training is less expensive for the airlines?

A I would acknowledge that -- that -- I don't know what percentage of their costs are pilot training. Pilots have to be trained, whether they're in NG, Airbus, MAX simulators. They have to be trained. That cost of training is keeping a pilot current.

Q Understood. But let's say, for example, an NG pilot had to go through 16 hours of training in order to fly the MAX, as opposed to a pilot having to go through 32 hours of training in order to transition from the MAX. Wouldn't that 32 hours of training cost the airline more than 16 hours of training?

A Obviously I would concede that, yes.

Q Okay.

A Of course.

Q So I guess, understanding the competitive threat that Boeing was facing from Airbus at the launch of the MAX program, I guess what I'm trying to understand is -- I guess I'm sort of surprised that you're not aware of any sort of Boeing analysis on the financial impact of Level B training versus potentially more training and what the impact would be on, you know, Boeing's ability to market the aircraft if it required more

training. You know, would they lose more business to Airbus? Or, you know, how much -- you know, running the spreadsheets, how that would cost.

You never were aware of any sort of discussion about the vitality of the design objective of Level B and what the financial implications of that would be to Boeing?

A No. But I would go back to your comment of why I wouldn't be there.

Ultimately, the airplane having the family of the airplane, have the common pilots, having the common touch and feel, having the common, you know, handling characteristics of the aircraft was all about the commonality, which I relate to safety. And it's better for the aircraft, it's better for the industry, it's better for the 75,000 pilots.

And what I would explain to people when I would talk would be, well, you've been in an airport where you've been waiting for the pilots to show up on a previous flight. You know, they land at this gate, they come over and jump on this flight and go. We want those pilots to have the exact same piloting experience between the two airplanes. It's safer for the airplane to do that.

So that was always the objective. And, to be honest, from a technical standpoint, I don't recall ever having anyone come in and say, following the processes and procedures that we use, assuming we follow the guidance material -- greater than Level B training was never really a concern.

Q Did you ever have discussions regarding the objective of Level B training and the need to avoid simulator-based training with Keith Leverkuhn, for instance?

A I'm sure Keith and I chatted that, but it was more about meeting the requirements of the program. It wasn't about not doing it; it was about meeting the requirements of the program.

Q And did you discuss meeting that requirement of Level B training of the program with anyone else, like senior management at Boeing or other senior officials, like

Dennis Muilenburg or anyone else?

A I don't recall ever talking about it, because we were very confident that we would meet Level B.

Q Gotcha. Okay.

Mr. Weisman. I just want to pause for a second to see if anyone else on the Democratic side has any questions before we complete this first hour.

Mr. Pasternak. Matt, we have about 5 minutes left, and I have two quick followups.

BY MR. PASTERNAK:

Q Mr. Teal, going back, you were talking about meetings at the BASOO, and you said John Piccola was your primary point of contact, and you would meet with him, you know, on a regular basis. Were those meetings one-on-one, or were they part of a larger group of individuals?

A It was a larger group of individuals.

Q Were there times you and Mr. Piccola met just the two of you?

A I don't recall ever meeting just the two of us. If there was something important that I felt John needed to know, I would bring the leader of the Boeing Certification Office, our team, with for that. And it would typically be, you know, maybe we had a schedule concern that we hadn't shared with everyone yet, and he needed to know from his organization, you know, maybe we're going to slide a month before I would need a particular thing. I may share in private with him, but I would include the member of the ODA in that conversation. It wouldn't just be the two of us.

Q Okay.

And one last question. I think we have, like, 3 minutes left before we switch sides here.

You know, obviously, the certification timeline is a pretty important thing to, you know, go through, and I'm sure folks are keeping track of that all along.

I understand -- and I was wondering if you could confirm this -- that you had what was described as a countdown clock to certification, either in your office or conference room, during the MAX program. Is that accurate?

A I remember there being a countdown clock, but I think the countdown clock was for first flight. And it was started in 2012, leading up to the first flight. And it was very prevalent to keep everyone on schedule to get the airplane flying. I recall that.

I don't recall whether or not we reprogrammed that clock to certification and delivery. In fact, I don't think we did, because we just -- you know, the certification would be when the FAA granted the cert, and we actually kept sliding it. So I don't recall doing that.

Q And where was this clock? Was it in a conference room or in your office?

A It was in a conference room.

Q Okay. And do you know who -- is that a normal thing on programs? Who came up with that idea of having this countdown clock?

A I don't recall who came up with the idea. Have I seen countdown clocks before? I've seen people create countdown clocks to their retirement on their iPhones. But I don't recall.

Q Okay. Thank you.

A It wasn't my idea. I don't remember it being my idea.

Q Okay. Thank you.

Mr. Pasternak. Matt, I think we have, like, a minute left, if you have anything.

Mr. Weisman. I have nothing further. I'm ready to hand over to the other side, if they're ready to start their hour.

Mr. Pasternak. Thank you, Mr. Teal.

Mr. Weisman. Thank you.

Ms. Cooke. For the stenographers, can we go off the record for a moment?

[Discussion off the record.]

Ms. Cooke. We're going to go on the record.

Hi, Mr. Teal. My name is Corey Cooke. I'm the Republican general counsel for the Transportation and Infrastructure Committee.

So I believe the time is, on mine, 12:18, and we are now starting.

EXAMINATION

BY MS. COOKE:

Q So we would like to thank you for being here today. And we hope that your family and everyone you love is safe. We know this is a challenging time for folks, so --

A Thank you.

Q -- we appreciate you being here and doing this.

In the questions, as my counterpart Matt had noted, we may have some overlap and duplicating questions, and I appreciate your patience in potentially redoing some of these statements that you've already said as we go through this.

One thing that I think we're going to want to start with relates to your work with the FAA and what relationships you may have engaged in or conversations you may have had there. And I know, again, that my counterparts covered some of that, so I apologize that we may be getting into that.

But, broadly speaking, between August 2011 and November 2017, which I believe was when you were overseeing the MAX program, can you just discuss how you may have been involved in the certification process?

A On the program, we had a certification leader. His name was [redacted]. So, when I described the functions of people that worked not for me but with me, [redacted] would lead that effort in terms of certification.

I would participate in understanding the team with the requirements. So when we came in the early phases of the program to determine, you know, the certification, the G-1 issue paper, as we call it, to say what is the program, I'm the lead applicant, by definition, in the process.

So the team would come forth and make recommendations of, here's what we think our certification basis should be, and then they would go and negotiate that process.

And I'm sure you know that the FAA owns that process. The issuance of the G-1 is not something that's delegated to Boeing. So they determine that. So we make recommendations of the Change Product Rule and how we were going to go through that process.

So I really just helped answer questions or looked at some potential things we learned on the 747 to make sure that we made equivalent changes to the 737 MAX because of the new interpretations of the requirements.

So, for example, you know, fire safety on the 747 was [redacted]. So when I came to the MAX, there's no reason to relive that dialogue. Let's just step up and make sure we meet the same intent of the design as we did on the previous program.

And other areas, as well, where we had made changes to improve the product on the 747-8 at the request of the process from the FAA, I would help guide the team to ensure that we made those equivalent changes; as well as if there were additional things the team felt they wanted to go forward with, I would review those and then accept them

as the proposal going forward.

Q Okay. Thank you.

And I apologize that my -- someone of my neighbors may be hammering, so I apologize if you hear noise.

A We cannot hear that. We're good.

Q Okay.

You've mentioned your work with Piccola, John Piccola, and the BASOO. Can you elaborate a little bit more in regards to how you interacted with them broadly, not just Piccola but potentially others you may have interacted with, and that chain of command and interaction during the MAX certification process?

A When we would go meet with them, like I said, once a month -- and then near the end, it was probably once every 2 weeks -- we would have a group of the certification organization of Boeing, of the ODA, as well as the FAA and the program PA -- program administrator I think the name is -- as well as other members of the FAA would join.

And, typically, Boeing would bring a presentation of, here are the things we're working through, and any concerns we have. Some of it would be on schedule. We had so many cert plans to get approved and so many cert test plans that had to be approved, and here's were we were, and really just managing the flow of information back and forth.

So part of the dialogue would always be about how are the teams working together and are we making the necessary progress to get through the large amount of data required to certify an airplane.

In addition, if there were any areas where our two teams weren't necessarily in alignment, we would bring those up and try to work together to ensure that the right

meetings were happening and the right people were communicating with one another to resolve the issues.

So we would go through a series of areas of concern.

Q Okay.

And were there procedures put in place to ensure BASOO, ODA -- that there was separation and independence and not any undue influence occurring on either of those ends despite these discussions that you were talking about?

A Can you repeat that, please?

Q So you have the BASOO, you have ODA, you have yourself as a Boeing team. Could you discuss or let us know if there were various processes put in place to ensure, you know, things were walled off or the independence of each to be able to go through those various tests that you were discussing, this process, and have independence in making decisions?

A Yeah, I'm struggling to answer your question because, by definition, the regulator is an independent entity. And based on that, I don't believe our team had any direct influence over their guidance or their decisions they were making.

Now, if they made a decision and we didn't understand that decision, we would potentially -- this would be a good opportunity for us to work with John and his team to say, you know, we don't quite understand why that, you know, decision was made, could we talk about it some more and understand why.

But in terms of influencing their decision, we don't influence them. We present our applicant position, and they levy a judgment on that.

Q Thank you for that explanation.

Do you know who [redacted] is? [redacted].

A I know who [redacted] is, yes.

Q Did you have a professional working relationship with [redacted]?

A She would be in -- typically was in attendance at those meetings I described. I didn't know her personally at all, other than in those meetings.

Q Did you have any -- in terms of those working relationships, did you have any discussions with her?

A I don't recall. I mean, as part of the group discussions -- because many of the specialists that were making determinations or interpretations of our work, if you will, or the certification process would flow through her. So, in the dialogue, if there were concerns with a specialist -- when I say "concerns," maybe misunderstandings or things we needed to resolve -- it would come through her organization. So that aspect would be.

Q Okay.

So, in terms of other folks that Boeing or yourself may have worked with at the FAA, are you aware who the FAA Administrator was during the bulk of the MAX certification process?

A When you say "Administrator," I guess I don't know the exact organizational structure of the FAA. I believe Jeff Duven was -- or maybe he is now. I believe at the end of the program he was in that position. And Mike Kaszycki, part of that -- was part -- working with him. Yeah.

Q So, yeah, there is -- similar to Boeing, it sounds like there's a variety. So the FAA Administrator, who would've been the head of the whole organization, was Administrator Huerta, H-u-e-r-t-a. Did you ever have any conversations or interactions with him?

A I don't recall ever, no.

Q Okay.

I'm going to ask you about a few other folks outside of Jeff Duven, who you've mentioned, that were potentially more senior. But before I do that, are there any folks, aside from Jeff Duven, that you would have categorized as FAA senior leadership, in your opinion, that you may have interacted with during the MAX certification process?

A From a senior leadership, there was -- of course, I view John as senior leadership. And then the people that worked under him, if I assume they're not senior leadership, then it would've been Jeff Duven and Mike Kaszycki.

As part of the Standards staff, I can't remember the gentleman's name, but there was a senior leader equivalent to John as part of the Standards staff. I apologize, I don't recall his name.

But that's it. No, I don't think I recall any others.

Q Okay.

Do you think that you may have had -- or do you recall hearing of anyone named Peggy Gilligan?

A I recall the name, but I don't know the function she served.

Q Okay. So, to the best of your knowledge, you would not have interacted with her?

A I don't believe so.

Q Same thing, do you know who Dorenda Baker is, and, to the best of your knowledge, did you or did you not interact with her?

A I know she was part of the Washington, D.C., office. I don't know exactly how the organizational chain -- how Jeff flows through that. But I don't recall ever having conversations with Dorenda.

Q Okay.

I'm going to make a statement, and I'm not sure if you're aware of accusations

that Boeing may have reached out to FAA senior leadership, and I am just wanting to know if you are aware of whether it's yourself or if whether you're aware of anyone else reaching out to FAA senior leadership.

Mr. Paisner. Corey, about a specific topic or just generally?

Ms. Cooke. Let's go with on the MAX certification.

Mr. Paisner. That was Mike Paisner with Boeing.

BY MS. COOKE:

Q In regards to the MAX certification, which is a broad topic, I do understand, but, yes, in regards to the MAX certification. Thank you for that clarification.

A I don't recall ever me personally reaching out. I would have always done it through the organizational delegated authority and the lead administrator through Boeing.

So the lead administrator through Boeing, I think, at the time was Beth Pasztor. I don't have any knowledge of Beth reaching out, other than communicating with them about the process or about the status. I don't recall them ever reaching out on any particular issue.

Q Okay. Do you recall them reaching out in regards to anything related to FAA technical expertise and Boeing disagreeing with instances of FAA technical expertise, there being a differing of opinions, whether this is on the MAX or other issues, and folks from Boeing reaching out to FAA on those topics with disagreements of technical expertise?

A So, in the process of -- if we received a ruling or a -- or working through an issue paper process, with stage one, stage two, stage three, stage four of that process, in terms of if a technical specialist came and made a determination and if that determination -- we did not concur with that, there was a process that we would follow

through an applicant appeal process that we would go through our organizational delegation authority, or organization, and follow a standard appeal process to discuss issues like that.

I recall issues where we did not concur with the specialist decisions, and then we would elevate it through that existing and documented process. I don't recall ever an individual calling a senior leader to discuss that.

Q Okay.

If possible, could you give an example within that appeals process where you all at Boeing would have potentially gone through the appeal and been successful and then an example where you may have gone through and been unsuccessful?

A Yes, I can.

So let me start with an unsuccessful. And when I say "unsuccessful," it was -- we were working on natural icing, in terms of engine performance during natural icing tests.

Early in the program, the FAA specialists were describing a process and their interpretation of how you would do the test. And when I say "how you do the test," [redacted] and basically the passing criteria of the test.

We've traditionally done icing in a certain way. We have expertise and technical knowledge. And we believe our icing tests -- the way it's done is compliant and is proper, yet the specialist was disagreeing with us, [redacted].

In that example, we hadn't officially ran through an escalation process. We ended up saying, okay, we will commit and we will do the FAA process. So we did. We flew the FAA process. And at the end of the test, the engine that the test was on passed the test. It passed all the criteria that was set forth in the certification plan.

But the other engine, which was not being monitored, not being tested, [redacted] The actual test was on the other engine.

And the FAA specialist disagreed with our test results and said we didn't pass because of the other engine. And that didn't make sense to us, so we brought an applicant appeal up in saying, you know, we did the test, we passed the test, the engine that was doing the test on passed, and this other engine, [redacted].

So we appealed that we had completed the test and it should be approved. In that appeal, where I actually went down in the conversations to share it -- I know Mike Kaszycki was part of that discussion, and Mike informed me that it was -- you weren't going to win the appeal, that you need to go retest, and you need to test both engines, and you need to test it in that fashion.

And part of the discussion was around foreign regulators [redacted].

So we accepted that ruling and went back and redid the test. So that's an example of where we appealed. I appealed to say we were complete, and I did not win that appeal, and so we went and retested. When we retested, we passed the test, and then we were complete.

An appeal that we won. There was an example of the [redacted] near the end of the program.

We create a certification plan, and that certification plan was given to the FAA

[redacted]

specialists to approve. They approved that plan. We executed the test and deliverables per that plan. We submitted the results that met that plan. And an FAA specialist, who was not involved initially with the agreement of "that is the plan," rejected it. He rejected it based on his belief and the interpretation that we needed to do more than what we had agreed to do.

It was near the end of the program, very close to certification, when that occurred. So we brought forward an appeal on process-wise that says, look, we worked with the agency, we did our certification plans, it was retained by the FAA, you approved it, we showed compliance to it, we followed that process, and we believe we are compliant based on the agreement that that was the plan going forward.

In that particular case, I believe the outcome was we were successful, that the FAA management concurred that procedurally we had followed everything and that we were compliant based on an agreement that we had met to the certification plan.

I will say, after that, you could say that we would -- that appeal was accepted, but I would also say that post-certification the FAA did follow up with what I call an IFCA, an informal certification action, to review the whole process and to review the design to ensure that the design did meet all of the concerns that this one particular specialist had raised. And, to my knowledge, it was accepted. And then, by reference, the Dash 9 program was then certified afterwards with no change to the airplane. So we did follow that stated process.

So that's an example of where we didn't win, or the appeal was unsuccessful, so we ended up having to retest; an example of where we won the applicant appeal -- or I shouldn't say won it. It was agreed to that we had followed process.

Q In terms of those applications -- you sound fairly knowledgeable about them -- how frequently were you the one getting involved? Or was this more a situation

of, in your role, you just knew all of them? Or did you frequently get personally involved in those process appeals?

A In a few examples, in those two examples, I was involved and participated in the conversations. And, ultimately, as the lead applicant, per process, I would be the one that would go and present to, in this case, John Piccola, Mike Kaszycki -- I don't recall if Jeff was there at either one -- and they would listen to the appeal of the process.

Q Now --

A For those examples, I believe I was the one that presented.

Q Okay.

And, based on this, over your time at Boeing, how would you describe your working relationship with FAA?

A I think I have a very professional relationship with the FAA. I would view it as cordial. I would view it as always trying to understand what the positions are of both my design teams as well as what the FAA's positions were on their interpretation of the rules and guidelines we have to live by. I viewed it very professional.

Q And would you say that was the standard, that most folks between Boeing and FAA had a cordial professional relationship?

A We expect our employees to respect the regulator. And in the conversations I've had with the regulators, in the meetings I've attended, it's been very professional.

Q So Boeing's standard guidance across the board, in terms of the work with FAA, is to respect the regulator?

A Yes. I believe that.

Q And has that been throughout your whole tenure at Boeing? Has that changed over time?

A I don't recall. I mean, my relationship working with the FAA really started on the 747-8 program. So that would have been really as it got closer in 2005. I started in 2011. So from that timeframe forward, in all that timeframe, the ODA existed and that process existed, and it's been very similar -- professional.

I hadn't in my previous roles worked with the FAA prior to that, so I don't know the answer prior to that.

Q Okay.

So you've mentioned Jeff Duven a few times. Could you explain your professional relationship with him and how that, I guess, may have evolved or what conversations you might have had with him regarding certification?

A Jeff was the leader of the organization. And I don't recall his role during the 747 program. I knew Jeff at the time, but I don't recall what his role was. He was the leader of the organization during the MAX program.

And I didn't see Jeff very often, maybe once a year. And it was just around, really, sharing -- John Piccola and myself would have a meeting, and Jeff would be there, and we would share with him our integrated -- how the program and the BASOO was working together to meet the requirements of certification.

Q Okay.

A That's about it.

Q So did you have any other -- so, in terms of the head of the FAA safety office at the time that you were going through the certification, do you recall having any discussions with that individual that Jeff Duven, I believe, worked for? It would've either been Peggy Gilligan or Dorenda Baker, would have been in more senior roles.

A I do not recall.

Q What was your relationship with the authorized representatives, commonly

called "ARs"? Or did you have a relationship, and, if so, what was your relationship?

A The ARs, which we now call "EUMs," engineering unit members, but for the purpose of this let's call ARs -- and I'm glad you said it, because that's the way I still call them, the authorized representatives -- they're members of the engineering technical team. They're typically some of the most senior and most experienced engineers we have at Boeing that are authorized representatives. And I know many of them. I don't know all of them, but I know many of them.

And when I have technical reviews, early in the program, the ARs, I view them as wearing two hats: One is, they are a technical SME to The Boeing Company, giving guidance on good, sound technical engineering judgments, making decisions; and they also have a role later in the program to find compliance to the regulations.

And the ARs that I know are very good at separating that distinction between "I'm in a role of finding compliance" versus "I'm making a technical judgment and a recommendation."

Now, obviously, the roles interact by, when they're making a technical judgment, if I happen to be in a technical meeting with them and I would ask them, well, from your understanding, does this design meet the intent of the regulation, and they would give me an answer and share. They would also bring up -- if they felt that a design did not meet the regulation, they would share that, and that was good. So we would then work forward: Okay, how do we need to change the design so it does meet the regulation?

I would point out that the ARs, they don't make regulations, and they have no authority to create guidance material or to really determine any changes of a method of compliance. As an AR, their limitations of their responsibility is to find compliance to an accepted method of compliance that has been previously accepted by the FAA. And that's their role.

And, ultimately, we have many ARs now in our process. I feel the process actually works really well, in my experience, over the last two and now the third program I'm on, because now I have several authorized representatives working directly with our team, helping us to ensure that the designs meet the requirements and, if they don't meet the requirements, help us to understand why and what we need to do, whether it's additional testing, change in the design, change in the analytical process. It's been very helpful.

And if our ARs come forward with an interpretation that is different than our understanding, that's okay. There's an elevation process within the AR community, with their AR advisor, that I have exercised.

If an AR says, I don't think this is compliant anymore, and I would ask, well, you know, the last time we did it, it was compliant; has the rule changed? Well, no, but the interpretation and guidance material that I believe I've been given from the FAA has changed. And I'd say, okay, can you show that?

And, of course, if there's documented evidence of an interpretation change, then that is the new regulation moving forward. If it's not, if it's just their opinion, we would go to an AR advisor, and the AR advisor would help us make the determination of whether or not, you know, that new interpretation is the new requirement. And we'd work through that process.

So I'm sorry for rambling, but I'm hoping that answers your question. I know many of the ARs, and they're some of the best technical experts we have at Boeing.

Q I think that's helpful.

And similar to when I asked you about the FAA and examples of the appeals process, are you able to give, when you were just talking about how you go to AR advisors, an example potentially -- we'll stick with the MAX certification, if at all

possible -- where you may have been successful and also unsuccessful if something was elevated to an AR advisor?

A Huh. I don't recall offhand. And the reason I was fluent in the previous one is because I was the actual individual doing the applicant appeal, so I was very in tune with those two examples I gave you.

In terms of any particular AR working up through an appeal -- not an appeal process, but working with their advisor, I know we had several conversations on engine fire safety between, you know, interpretations of the regulations on fire safety. [redacted] Understanding the regulation of being fireproof in that area and how we would do that analysis, I know that there was a lot of communication between the AR and the AR advisor.

I don't recall any examples where, this one, the AR advisor suggested that maybe they were not thinking of it properly or others where the AR advisor agreed. I think it's a mixed bag, and I am sure there's plenty of examples. That's why we have an AR advisor process. Sorry I don't have any particular better examples.

Q That's fine.

Moving on to a slightly different but related topic -- and you can tell me if this wasn't in your role or you're unable to answer -- are you able to explain the concept of new and novel technology in the context of aircraft certification?

A I've heard the term, a new and novel feature. And my -- I'll give you a broad understanding of it, but I would acknowledge I'm not a technical expert in the actual terminology of a new and novel feature.

But if we had a new and novel feature to the airplane, I would assume that we

would have to go through with the regulator and determine what the appropriate certification requirements would be for that new and novel feature.

I apologize. On the 777X, for example, we have a folding wingtip, which we've never done before, and I think I would consider that a new and novel feature.

Thinking about the MAX program and the engines change, the winglet changed, I don't offhand recall of any new and novel features.

Q Do you know broadly, based on your experience, who makes the determination of whether a technology is new and novel?

A I do not know.

Q Are you aware of items in certification activities and approvals related to new and novel and if they are generally delegated or retained by the FAA?

A I would assume a new and novel change would have to be retained by the FAA, because, like I said before, the ARs and ultimately the ODA only have the authority to show compliance to a previously accepted method of compliance. So if it's new and novel, by definition, there's no accepted method of compliance. So it would have to be -- I would assume it has to be retained.

Q Okay.

Can you tell us how long the certification process was for the 737 MAX?

A Well, we started the program in 2011. I don't recall the exact application date, but, you know, we started working on the certification items immediately. But from the application date to the certification, I know there's the 5-year rule associated with it from your application date, and I believe we extended past that. So it must have been beyond that. So I'd have to go and get guidance of when we did the application date, but it was actually a long program.

Q When those things happen, with the long certification process, do you know

if, during that, Boeing and FAA will continually evaluate, you know, the technologies and the systems and the changes to continually look at that and potentially if something would be new and novel or would need a different classification for certification?

A During that period of time where, I'll say, the certification basis is at the -- where you start the process, where we put our application date in, I do know that we continue to review the new regulations, new amendment levels that happen between when we begin to when we end the program.

And, in many cases, we can choose, as an applicant per a process to follow, to voluntarily step up to those particular regulations. And we have done that. And then, of course, if we exceed the 5 years, then it's not voluntary. We have to address any that fall into the new 5-year window.

For example, on the 777X program, on the amendment levels, you know, based on looking at the latest regulations that have come forward since we've done our application date, I am working with our team to voluntarily step up to most, if not all, of the latest amendment levels in the certification of that product.

Q Okay.

So I'm going to circle back to stuff related to FAA and senior leadership and just ask if you are aware or had heard or recall.

Do you know if your CEO at the time was Muilenburg during the certification process, correct?

A Correct. Dennis Muilenburg was the CEO in Chicago during the duration of the program -- or during the certification at the end.

Q Do you know or are you aware of him having conversations with the FAA in regards to the MAX?

A I am not aware. I don't know if it happened or not happened. I don't

know.

Q Would you have expected anyone in your organization outside from Muilenburg to have made any calls to the FAA Administrator, who would have been Huerta at the time?

A I don't recall. I don't know of anyone.

Q When you spoke about Jeff Duven earlier, I believe he was in the Transport Aircraft Directorate. Does that sound accurate to you?

A You mean before -- you mean back on the 747 days?

Q No, on the 737 for the MAX certification.

A I'm not familiar with the names of the organizational structure within them. I just viewed Jeff as the head of the Seattle branch. I don't know. If that's the transport branch, then yes.

Q So, if you had an issue with the FAA, you would have gone to John Piccola or Jeff Duven, based on what you've said thus far?

A I would go, internally, to the ODA first, through our lead administrator, and then over to John, as the head of the BASOO. That is the pipeline for the conversations.

Q And you mean John Piccola.

A John Piccola.

Q As opposed to John Hamilton.

A John Piccola.

Q Okay.

A That's a "yes."

Q Okay.

Ms. Cooke. I think we have about 15, 18 minutes left. I'm going to do similar to what Matt did and just ask if anyone on my team has any questions.

I don't think we do. So, with that, we can go off the record.

[Recess.]

[1:17 p.m.]

Mr. Weisman. Okay. We're back. I'll note the time is -- I've got 1:17 eastern time, and now we're going to start our next hour of questioning.

BY MR. WEISMAN:

Q Mr. Teal, we'd now like to ask you some questions about the addition of MCAS, which is short for the Maneuvering Characteristics Augmentation System, to the MAX. Did any Boeing employees ever approach you about concerns regarding MCAS?

A No, not that I recall.

Q Did you ever get any emails, phone calls, text messages, or personal visits from any Boeing employee raising concerns about the design or operational implications of MCAS on the 737 MAX?

A I don't recall anyone bringing forth any concerns during the development of MCAS.

Q If not directly to you, were you ever informed by others of any concerns that had been raised by any Boeing employees about MCAS?

A During the development and certification, no.

Q Since then?

A Only in preparatory discussions for this discussion.

Q Okay. And would those be discussions -- I don't want to ask about any discussions you had with attorneys. So would they have been discussions with non-attorneys?

A No, just the attorneys.

Q Okay. So during development of the 737 MAX, was it your understanding that MCAS was capable of activating repeatedly?

A I had no knowledge that MCAS had a repeat function in it during the

development.

Q Why would you not have known that?

A That is a technical detail that would be the technical leaders well below my level would have gone into that level of detail. So we have organizations down in the stability and control and flight controls working with the pilots. They would go into the details of the requirements for any particular function. My exposure to it would've been simply the team coming forward and saying we need a new function called MCAS, Maneuver Characteristic Augmentation System, on the airplane to pass certification requirements. That's the detail I would have gotten into.

Q Would they have provided you with a description that would have described how and when it would operate, and would that description potentially have included that it would activate repeatedly in some circumstances?

A I would not get into that level of detail.

Q Okay. So not being aware of it, you didn't have any concerns about it activating repeatedly because you were not aware that it had the capability of activating repeatedly. Is that fair to say?

A That is fair to say.

Q Okay. And did anyone come to you -- raise any concerns or were you aware of any concerns about it activating repeatedly -- having the capability to activate repeatedly at the time?

A No.

Q Okay. So Boeing had since announced that one of the fixes that they're going to do to MCAS is to ensure that it does not activate repeatedly. Do you think Boeing made a mistake when it originally designed MCAS to enable it to activate repeatedly?

A First of all, I have not been part of the process of post the first accident -- or post leaving, so I'm not familiar with the changes that are being made to MCAS. I didn't know that they were actually removing the repeat function. I assumed it was remaining, but I don't know that for fact.

Q This is public information. It's on Boeing's website. They've very loudly announced it to the world that this was one of the several key changes that they're --

A Okay.

Q -- making.

A I'm not caught up. I apologize.

No, I think from the MCAS design, from what I understand and looking back and seeing, the team followed the process that we use to design, you know, flight control systems and went through the process of working with the pilots as well as the stability and control organization. And all the technical experts got together and made the decision that this was the right design for the airplane, and it met the regulatory requirements and the safety requirements of the aircraft. So at the time, I agree, they followed process.

Q Right. My question wasn't whether they followed the process. My question was whether or not you believe it was a mistake to allow MCAS to activate repeatedly. In your professional opinion, was that a mistake? Should it have been designed that way?

A I don't believe it was a mistake, only because of what the intent of it really is there for, and it is an augmentation, so that maneuver characteristic augmentation is when you're coming up into a stall, whether it's a wind-up turn stall or a slow stall.

If the pilot were stalling the airplane and then the augmentation system kicks in and then it's coming down but the pilot goes and starts stalling the airplane again,

because they're in a cloud, they're disoriented or whatever reason, if they continue to try to stall the airplane, it needs to continuously fire. So I would assume it was appropriate for any concerns, and if there were any, you know, issues in the past where continuous stalls you would needs continuous activation.

Q So it was intended to help prevent the pilot from getting into a stall. Is that --

A It is not to help them get into a stall but to --

Q No, to prevent them from getting into a stall.

A It does not prevent them from getting into a stall. It's an augmentation system to ensure the handling characteristics. So as the airplane is approaching stall, you have downward forces that the column is being pulled down so that the pilots are -- the airplane wants to come down. Let the airplane come down. It doesn't stop the stall. It helps them with their --

Q It helps the pilot from getting into a stall?

A Well, it's the feel. We call it the flying characteristics of the airplane. The characteristics of the airplane as it approaches stall needs to have a downward-nose feel.

Q I apologize. So what if it didn't have that feel? What is the risk of not having MCAS on the plane? If it didn't have that feel and the plane was continuing to angle up on approach to a stall, MCAS isn't there, what harm, if any, might befall the aircraft?

A My understanding in talking and asking why MCAS was on the airplane is because there's a certification requirement that the feel of the airplane has to do that. So not having it on the airplane, the airplane would be not certifiable. It wouldn't meet the guidance material given by the regulator of what's required for certification.

Q Okay. So at the time that MCAS was first being put on the plane, were you

aware that it relied on only one AOA sensor to gather angle-of-attack information?

A I was not aware of that.

Q Do you know if anyone at Boeing ever raised any concern about the fact that it was relying on one AOA sensor?

A I did not participate in any discussions that suggested that anyone had concerns.

Q Did you ever raise any concerns at the time about that or you were just unaware so --

A No, I didn't raise any concerns.

Q So when did you first learn that MCAS did rely on a single AOA sensor?

A After the first accident.

Q And how did you find that out?

A Most likely through the press.

Q So you had no discussions with anybody after Lion Air? Even though you had supervised the program, no one came to you and said, hey, guess what?

A I did not participate in the conversations that the team was having that there'd been a -- close to a -- well, over a year since the certification. It had passed on to the new team. The new team had a new chief project engineer, and they were working it through the safety process. I did not participate in the safety process discussions to go in those details.

Q Not even informally, just with former colleagues or friends within Boeing?

A I had conversations with the current chief project engineer, but I don't recall us ever having any conversation on the single AOA sensor.

Q So what would you have talked about with the current project engineer after the Lion Air crash?

A It would only be, do you have any -- do you need any help? Do you need any -- is there anything I can do to help? And the answer was no. They had the technical experts working it. My background, as I told you, is a structural engineer. My background was not in aerodynamics or stability and control or flight controls. They had the technical experts of the company working on it.

Q Okay. So Boeing has since announced recently, actually earlier, that it's no longer going to rely on just a single AOA sensor. That's another change that they've announced that they're going to be making to MCAS. In light of that, do you believe that Boeing made a mistake in its original design in having it rely on a single AOA sensor?

A Looking back, the team followed the process of what the baseline airplane had, and my understanding is that the baseline airplane and the speed trim system, which MCAS is a sub routine within the speed trim, speed trim on the NG has always relied on a single sensor. That's what I've learned since. And having it always relied on it, the safety record of the 737 program has been good, and so, hence, I don't see why they would have changed that.

Now, going forward -- as I said, I haven't been involved in the changes, but I did know they were looking at incorporating dual. We continuously learn and continuously learning that we need to do that is a change that the program made to go forward.

Mr. Pasternak. Matt, can I jump in just very quickly?

Mr. Weisman. Sure.

Mr. Pasternak. So just to be clear, at the very beginning I think you said that you had ultimate approval of the design and certification requirements for the aircraft. And I understand you're at the, you know, 40,000-foot level not down into the weeds, but in terms of MCAS, so you were unaware that MCAS relied on a single sensor and you were also unaware that MCAS had functioned repeatedly -- could function repeatedly at the

time of certification. Is that accurate?

Mr. Teal. That is correct.

Mr. Pasternak. Okay. Thank you.

BY MR. WEISMAN:

Q So moving forward a little bit, did you ever discuss with anyone or put into writing the potential impact that the addition of MCAS to the MAX could have on pilot training requirements?

A I believe I did, but I believe it wasn't -- in terms of -- I don't recall the MCAS ever being a concern associated with level B training. I do recall that as part of the configuration process of the airplane, as we were configuring the airplane, there would be open configuration items, and one of the items that we spoke about earlier in terms of the training was are there any risks to the simulator training requirements.

And one of those risk items was a -- I talked about it earlier -- the Roll Control Alerting System. And the Roll Control Alerting System is totally independent of MCAS, but from a certification standpoint, if we decided to put the Roll Control Alerting System on the airplane, then that would require us to recertify the -- that that potentially had the act of requiring higher than level B training.

So I believe that leading up to the firm configuration, we needed to make a decision about how we were going to handle that. But that it wasn't an MCAS issue. It was more of the Roll Control Alerting System issue.

Q Gotcha. And just, I apologize for going backwards, just one thing I maybe should have asked in our previous question. So you signed off on the -- you were the authority signing off on the composition of MCAS and the addition of MCAS to the plane but were not aware that it could activate repeatedly or that it relied on a single AOA sensor. Is that correct?

A At the top level configuration, I agreed through -- I signed off on the configuration of the airplane to include the MCAS function.

Q So whose job would it be to look more specifically at those design functions and sign off on those functions are okay and safe and, you know, what we want to do going forward? If obviously at your level you weren't looking at the details, who was like the next level that would have known that it was only one AOA sensor and would have known that it activated repeatedly and would have said, hey, let's forward this on up to Mr. Teal to get it signed off?

A I would say that the lead engineers and the technical leaders of the stability and control group, the flight controls organization and the pilots that were all working together, and that's typically how flight control laws are worked with that -- the technical leaders of those organizations.

Q Do you recall who any of those individuals were at the time?

A I know the stability and control leader was a gentleman named [redacted]. Flight controls leaders, I don't recall who was the leader. From the pilots' perspective, there would've been [redacted] was our chief pilot as well as [redacted] was the deputy chief pilot. So I'm assuming those groups of people working together would understand the details of it and work through it.

Q Okay.

Mr. Weisman. Doug, did you have a -- I just noticed your camera went on.

Mr. Pasternak. Yeah. So what role would the ARs have in that in terms of looking at MCAS from a technical design issue?

Mr. Teal. In the development phase back before firm configuration or in the certification phase? Could you clarify?

Mr. Pasternak. Yes. Prior to certification, what role would ARs have in looking

at MCAS and raising questions or concerns they may have had?

Mr. Teal. The ARs early in the design process wouldn't be acting as ARs. They would be acting as the technical subject matter experts. So the expertise that they are participating in ensuring we had a good design that ultimately meet all the safety and certification requirements. They would participate in the design.

Mr. Weisman. Moving a little bit --

Mr. Burkett. Hey, Matt, sorry, could I chime in real quick?

Mr. Weisman. Sure. Go ahead.

Mr. Burkett. Thanks, Matt.

BY MR. BURKETT:

Q Mr. Teal, Alex Burkett with the Aviation Subcommittee. I just want to circle back to the issue of process. I know you're not an aerodynamics guy but you're a structures engineer. Are you familiar with the Lockheed Electra?

A Not in particular, no.

Q Okay. You mentioned that the process was followed with respect to MCAS in the design. Would you agree that processes can be flawed and lead to a potentially unintended or unanticipated outcome?

A I would say we follow our processes and the processes are continually improved. The process for design, safety analysis, certification, the process we use we rely on.

Q Processes are designed by people, right?

A I guess, sure.

Q And are people perfect?

A I think over time, processes continually evolve and we learn things. And when we have the process, we follow it, and that's fundamentally how we design and

certify airplanes. We follow a process.

Q And so the process in the 737 MAX case was not perfect because it evolved and has evolved. Is that a fair characterization of your opinion?

A No, I wouldn't say that. I think we designed the airplane per the knowledge we had, per the assumptions that we knew and have over the past several decades found to be true in industry and following those processes of what those assumptions are. But the team completed their project and designed and certified the airplane, and there's no reason to believe that those processes were flawed at that time.

Q You're familiar with the DC-10?

A I am.

Q And you're familiar with the cargo door blowout on the DC-10?

A Not exactly, no.

Q But as an aerospace engineer, you know what happened with respect to the DC-10?

A I don't know where you're going here. I don't know. I know there was an accident on a DC-10 where a cargo door blew out. I just don't remember when it happened or how it happened. I don't know the details.

Q Are you aware that the DC-10 was grounded ultimately?

A I was not aware of that.

Q You were not aware that the DC-10 airplane was grounded by the FAA and air carriers in 1979?

A I am not. I joined the company in 1986. I'm not aware of that.

Q Are you aware that the 787 was grounded?

A Yes.

Q Would you agree that the 787 was designed and certified pursuant to a

process?

A Yes.

Q And would you agree that that process led to an outcome that was not intended by the Boeing company with respect to the airplane being grounded?

A I think the company followed our -- I was not involved in the 787 at all. I'm not familiar with exactly what processes they used on that program, but I feel that if we followed our processes, that the intent is that that met the safety and certification requirements for a safe airplane.

Q Is it your opinion that when the 787 was grounded that was an error by the FAA?

A I did not -- I was not involved in the 787 program nor the 787 grounding. I don't have the background to answer that.

Q But as an engineer and someone who is knowledgeable about airplanes, you would not agree that when an airplane is grounded it does not meet, in fact, the certification and design standards?

A Could you repeat that?

Q Sure. Not asking you as a member of the 787 team, but just as an engineer, someone who's been involved in aviation, as you say, since 1986 or before as an employee of the Boeing company, would you not agree that when an airplane is grounded, a regulator has determined that the airplane does not meet the certification or design standards that apply to that airplane?

A I don't know exactly why the airplane was grounded, and obviously I know that there was battery issues, but I have no knowledge of whether or not that was a certification or a process or what led to that. I have no knowledge of that.

Q So you don't have an opinion as an engineer as to whether if an airplane -- if

the regulator determines that an unsafe condition exists in the design of an airplane and the airplane is grounded, you do not have a position on whether that airplane met the required standards in the Federal Aviation Regulations?

A I think when we followed through with our processes, both the regulator and the OEM, in this case Boeing, we follow that and we follow our design standards and certification process and we complete the certification and get an acceptance of it, it is a safe airplane to go onto service.

Now, as in all things, you can learn things, and if you've learned something post that certification, I'm not going to point back and say mistakes were made, I don't know if mistakes were made. Maybe it's purely a new learning and we need to follow process with the FAA and Boeing through our safety processes post entering into service to determine how to rectify any issues going forward. To me, that doesn't invalidate that we met the certification requirements at the time of entering the service, if that's what you were asking.

Q Gotcha, okay. That's very helpful.

Mr. Burkett. Thank you, Matt. Back to you.

Mr. Weisman. Okay. Thanks.

BY MR. WEISMAN:

Q Just moving ahead to March of 2016, when Boeing made a decision to change MCAS to enable it to activate at lower speeds, who ultimately authorized that change to MCAS?

A The change to MCAS was worked through -- I was knowledgeable of the flight squawk that occurred. The flight squawk occurred and determined that they had stall characteristics issues. A group of engineers were assigned to go resolve that issue, and ultimately, the team came back and gave a recommendation that they would expand

MCAS into the low-speed region to resolve the issue.

At the time that I was there and -- or I was there and when they presented that here is the solution, and so I suppose I would say I approved it. I approved that the team came forth with that recommendation for that change, and I concurred that the team followed the process and did it.

Q And what role did Keith Leverkuhn have in the approval at all of that change to MCAS?

A From a configuration standpoint, the program manager would not have any responsibility for that.

Q Okay. And do you know, was Mark Forkner aware that this change was happening to MCAS? Was he part of any meetings that you might have had discussing the change to MCAS when it was happening?

A I'm not aware of Mark being involved -- of any meetings that I had on the subject. I don't know any involvement he had outside of me.

Q So whose job would it have been, if there were going to be a change in MCAS, to inform the chief technical pilot or the other technical pilots about the change that was being made?

A The team would have to create a coordination sheet defining the changes that were being done and share it throughout the team. I'm assuming it went through the pilot organization, and the pilot organization would ensure that it got to the appropriate people.

Q So --

A I don't know exactly how that process works. I'm not --

Q But is it your expectation that a change like the change that was done to MCAS would have been information that would have been shared with the technical

pilots? It wouldn't have been held secret from them, would it?

A It wouldn't. It would not have been held from them, no.

Q Okay.

A It should have been shared.

Q Do you know whose job it would be at Boeing to inform the FAA about a change like that to MCAS?

A Certainly. As part of the team that came forth with the change and the recommendation, they brought forth to me a communication plan to the FAA where we would go and share with the FAA technical specialists the changes that we're doing. As well as, I certainly know that pilots at the FAA would get involved, because the pilots would end up having to fly the enhanced -- or not enhanced. That's the wrong word -- expanded MCAS functionality. They would have to fly it for certification purposes. So the pilots would know and the technical experts would know and the certification plans would have to be updated and ultimately the certification deliverable. So the engineering team would do that.

Q And when you say -- so it wouldn't have been the technical pilots that would have informed the FAA, would it?

A The technical experts at Boeing from the design engineering perspective would share that. The pilots would talk to the pilots, and I would expect that the AEG, like we talked earlier, the prime role was between AEG and the chief technical pilot, so I would assume that's where that communication would occur.

Q So you would assume that the chief technical pilot would be aware of the change to MCAS and that the chief technical pilot would communicate that to the AEG at the FAA. Is that fair?

A That would be that role. That would be that communication path, the way

I understand it.

Q Gotcha, okay. So around the same time that Boeing was approving this change to MCAS, and this is March of 2016, Mark Forkner asked officials at the AEG if it was okay to remove MCAS from the flight crew operations manual and training material.

Did you personally ever discuss with anyone at Boeing the removal or proposed removal of references to MCAS from the flight crew operations manual or training materials?

A I don't recall ever having a discussion about that decision. I know I was aware that in the differences training, that it was -- not the differences -- the differences table, that MCAS was being proposed to be removed from the differences table. But one had to go through the process and review it with the AEG appropriately.

Q Right. So at the time, in March of 2016, when Mark Forkner made this request to the FAA to remove MCAS from the FCOM and MAX training materials, were you aware that he was going and doing that?

A I don't recall exactly the timeframe that that was -- of when that was.

Q When did you first learn that a request had been made to remove MCAS from the FCOM and training materials? Was it before the request was made or not until after the request had been made?

A I don't recall.

Q Do you recall roughly, was it near the time that the request was made or was this something you didn't learn until, you know, months or years later?

A Well, it would've been near the time the request was made, but I don't know exactly when that was.

Q Did you ask Forkner to make that request to the FAA?

A No.

Q Did he tell you in advance that he was thinking about or planning or might make that kind of a request?

A I don't recall.

Q Our understanding was that there was a meeting on March 30th with Keith Leverkuhn about the change to the MCAS system where there was sort of a final presentation made about what the parameters would be and sort of proposal for approval for that. Do you know -- were you aware of the request to remove MCAS from the FCOM prior to that meeting?

A I don't recall when I knew that.

Q Okay. I now would like to turn your attention now, look at a document. You should have received a document, a PDF entitled "Meeting Minutes CTRL09042954."[12]

Mr. Paisner. We have that. We have that document, and I'm just pulling it up for Mr. Teal now.

BY MR. WEISMAN:

Q Okay. Are you able to see the document?

A Yes, I am.

Q Okay. So this is an internal Boeing email from June of 2013 describing Boeing meeting minutes discussing MCAS. If I could draw your attention to what items are numbered. Item 2 says, quote, "If we emphasize MCAS as a new function, there may be a greater certification and training impact," end quote. Number 3 says, "Treat as an addition to speed trim." And number 4 says, "Externally we would communicate it as an addition to speed trim."

Have you seen this document before?

[12] See Exhibit 1.

A Only through the lawyers in preparation here, not prior to that.

Q Okay. Were you aware of this meeting back in 2013?

A This is a -- when I look through it, it says an ITRACS discussion, so this was the lower-level team, engineers getting together. And noting the date of June of 2013, this would've been prior to firm configuration where the team hadn't formally decided all the details of how we were going to implement MCAS.

Q So have you ever discussed the goals reflected in these meeting minutes with anyone? I mean other than your attorneys. I'm not asking about your attorney conversations, but this notion of -- that emphasizing MCAS as a new function may have greater certification and training impact and that externally to communicate it as an addition to speed trim, have you ever discussed those kinds of goals or that kind of an agenda with anyone at Boeing?

A No. And frankly, I don't really understand it, because ultimately, MCAS is an addition to speed trim. That's just a fact. That's a sub routine within it. And we continuously shared that MCAS was a new function on the airplane. And being a new function on the airplane, whether it was part of a speed trim or whether it was considered a standalone function, of course, had to meet all its certification and training impacts.

And I do know that by the time we got the firm configuration in the middle of 2013, MCAS was openly shared with everyone, the configuration, it was shared with the regulators, it was shared with the airlines through different venues. We continuously shared and talked about MCAS. So I'm not familiar with any reason to emphasize the function.

Q So I guess the question is not about whether MCAS was mentioned. There's been a lot of discussion about how it was mentioned, as to whether or not it was

described as a new function or whether or not it was described as merely an addition to speed trim.

So I guess what I'd like to know is, did you ever discuss in any way, shape, or form with anyone at Boeing the pilot training implications of describing MCAS as a new function as supposed to just as an addition to speed trim?

A I don't recall that, no.

Mr. Pasternak. Matt, can I just jump in?

Mr. Weisman. Sure.

Mr. Pasternak. So, Mr. Teal, I think you said that you continually shared MCAS with regulators and described it as a new function on the airplane, I think you said to both regulators and airlines. Did I understand that correctly that you believe that during the whole certification process you described MCAS as a new function?

Mr. Teal. I don't -- I won't go so far as to say that exact words. I don't know that from a new function versus a function of speed trim. I'm assuming it was described as a function within speed trim, a new function within speed trim.

Mr. Pasternak. Okay. But you believe it was a new function on the airplane?

Mr. Teal. It was a new function within speed trim, yes.

Mr. Pasternak. Okay. Thank you.

BY MR. WEISMAN:

Q Was it your understanding or belief at any point during the development of the 737 MAX that if Boeing emphasized or otherwise characterized MCAS as a new function, there would be greater certification or training impact?

A I don't recall that, no.

Q Did you understand that if MCAS was determined to be a new function or new system on the MAX, that it could have had greater training or certification impact?

A No. MCAS, to my knowledge, was never brought up as a concern about adding additional training. I don't recall it ever being an adding additional training. From a certification, you step up and you meet the latest regulations whenever you make a change.

Q So there was no concern about the addition of MCAS resulting in greater certification or training aspects?

A To my knowledge, the function of MCAS as part of the speed trim was not a concern.

Q No. But what I'm asking is, were you ever aware of any concern that the addition of MCAS as a new function would result in greater certification or training impact?

A I am not aware of MCAS as the function doing that, and I will say back to the conversation about RCAS, the RCAS function there were concerns about the training, not certification but training for RCAS, and whether or not the RCAS function would be and then ultimately was RCAS required.

And ultimately -- I shouldn't say ultimately. But if MCAS is a change to the flight control system, it's no longer an unchanged, unaffected system so you have to meet all the latest regulations. To meet the latest regulations, you may have to put RCAS on the airplane and RCAS could potentially drive additional training. The team didn't know whether it would or not.

So it was -- my recollection was during the configuration phase of the airplane, we were having dialogue about the Roll Control Alerting System and how that could potentially impact training. But I don't ever recall it -- MCAS as a function causing it. Potentially, MCAS as a process requiring -- it's no longer an unchanged, unaffected system, so that potentially could add it as indicting the RCAS having to be added to the

airplane.

But ultimately, the RCAS function is one we decided was a safety feature and we put it on the airplane, and it's level B training.

Q Okay. Very quickly, I'd like to direct your attention to another document. It's a PDF entitled, "November 6, 2018, Boeing FCOM Bulletin."[13]

Mr. Paisner. Okay. We've got it up. He's just looking at it.

BY MR. WEISMAN:

Q Okay. Did you review this bulletin before it was made public in any way? I know this is shortly after the Lion Air crash. You may have been in a different position, but --

A I did not review this document.

Q Do you recall when you first -- have you seen this before?

A No. This is the first time I've seen this document.

Q Really?

A I know we released it. I knew what was in it, but I'd never seen it before.

Q Well, I can give you a minute to look it over, but I can tell you, it doesn't mention the term "MCAS" by name. This was the bulletin that was issued by Boeing 8 days after the Lion Air crash. And by this time, even a few days after the Lion Air crash, a major focus of accident investigators and the public had been MCAS as one of the key factors in the crash investigation.

To your knowledge, was there any concern at Boeing about including the term "MCAS" in a document like this in the wake of Lion Air?

A No. To my knowledge, there was -- I did not participate in generating this document, and, hence, I was not part of any of those discussions.

[13] See Exhibit 2.

Q Do you think Boeing should have mentioned MCAS in its update to pilots in the FCOM after Lion Air?

A I would say that processwise, the flight crew operation manual bulletin going through it is really targeted to go tell the airlines what to do, what improvements or enhancements need to be done. In this case, it's to emphasize the procedures provided for runaway stabilizer, non-normal checklist.

A conversation of why, you're asking should we be incorporating all the details of engineering of why they need to emphasize that, I'm not -- I've never really been involved in generating flight crew operations manual bulletin so I don't understand -- I've never participated in knowing what should and shouldn't be in there in terms of the clarification.

What I do know is that subsequent to this bulletin that went out, a multi-operator message went out to all the airlines explaining MCAS so they could understand the linkage between the MCAS function and this flight operations manual bulletin. I can't -- having not been part of that process in the past, I don't know if that was the right way to do that, but that is the way that the company chose to do it.

Q Okay. And just very briefly, one more document to put in front of you. It should be the third one that you have there, which is 11/7/18 FAA Emergency Airworthiness Directive.[14]

Have you seen this before?

A I had not.

Q Okay. This is the emergency airworthiness directive that was put out on November 7, 2018, so this is the day -- so Boeing put out its FCOM bulletin on November 6, and then the very next day the FAA put out its emergency air worthiness

[14] See Exhibit 3.

directive, again, to inform pilots in the wake of Lion Air what they thought they needed to know.

Just like the FCOM bulletin, this also doesn't mention the term "MCAS." Are you aware of anyone at Boeing advising or recommending the FAA that they not include the term "MCAS" in the emergency airworthiness directive?

A I'm not aware of that.

Mr. Weisman. Okay. Does anyone else on the majority side have questions?

Mr. Pasternak. Yeah. I have just a few follow-up questions.

When I was asking before just about MCAS and the fact it relied on one AOA sensor and it could activate repeatedly under certain conditions, I had asked about the role of ARs. And I just wanted you to clarify what you said on that.

I thought you had said that the ARs at that time were acting as subject matter experts, and I just wanted to clarify, were they acting as subject matter experts for Boeing and not ARs representing the FAA, and when did that role change? I was just confused by your statement that they were acting as subject matter experts for Boeing and not FAA, not representing FAA at that time.

Mr. Teal. I apologize. Was this back in the 2013 timeframe?

Mr. Pasternak. So this would've been from 2015, 2016 timeframe. Matt, is that right? I believe so.

Mr. Weisman. For the ARs that were working on MCAS?

BY MR. PASTERNAK:

Q Yeah. So, yes, it would've been 2015, 2016 when there were some ARs that raised some issues on MCAS. And I always believed they were acting as ARs for FAA, but your response made me question whether they were actually acting as Boeing subject matter experts at that time.

A Well, I view them, the ARs -- I know you explained this in the previous dialogue -- but that ARs wear two hats, a subject matter expert hat to come up with a good technical design solutions, and then they have the role in terms of finding compliance. Does that design solution, is that compliant to the regulation? And I apologize if I confused the discussion.

When engineers are in the mode of finding a design solution, I view them as working as subject matter experts for the design. I apologize for saying that they never wear dual hats at the exact time, because they do. They look at it both ways, because -- but at the time of making the design decisions, they are not making a recommendation of compliance. They're not doing a final certification compliance recommendation at that point in time.

Now, they can, as part of the process when they're working through it, give insight to whether or not that when it's time to certify the product, that this will have a likely outcome of being acceptable for certification and let the design team know that this isn't meeting all the requirements.

So it's kind of a -- they have two hats to wear, but my comments were more of they're not acting as an AR officially until they are making a finding of compliance. And in the design phase, they're not making a finding of compliance. Does that help?

Q And do you view any of that as a conflict? It seems, not being an aviation expert or, you know, being intimately familiar with the FAA process, that sounds like a huge conflict for the ARs.

A Actually, I don't view it as a conflict. I view it as an enhancement, because it enables -- in the previous system, prior to having ARs, the individuals that were going to be making the final compliance finding only saw it at the end of the process. So I don't see it as a conflict. I view it as an enhancement where they --

Q Sorry. Apologize. That they're representing Boeing one day as the subject matter expert and then the FAA the next day regarding certification, you don't view that as a conflict?

A Well, it's not the next day. The certification aspect is long after the design decisions are made and it could be up to a year afterwards, after we've done all of the analysis, all the single and multiple failure, all the FHAs, all of the showing of compliance. That's not done in the design phase. That's done after you get the design all the way working through it.

So the ARs are finding compliance at the end when all of the documentation is complete, and it's a showing that it meets all the requirements. I don't view it as a conflict of interest at all.

Q Okay. Matt, just one very quick followup. In terms of -- I asked this before about interactions with John Piccola, with him, have you socialized with any of the FAA officials that you dealt with on the MAX program outside of work?

A I do not socialize with any of the FAA employees outside of work. I will say, on one occasion when one of our top certification leaders within Boeing retired, I saw him at a one-hour retirement get-together, but that was it. I can't think of any other scenario.

Q Okay. Thank you.

Mr. Weisman. Just one quick followup. You mentioned that the change to MCAS in 2016 was the result of a flight squawk on stall characterization issues. I wonder if you could tell us, what was the stall characteristic issue that necessitated making the change to MCAS?

Mr. Teal. During the flight test program we do engineering test flights to ensure that the product is meeting all its Boeing and regulatory requirements before we submit

the airplane for type inspection authorization to give formal certification credit. We fly stability and control. We fly many things.

One of the tests that we fly to meet the stall characteristics, the pilots flew the stall characteristics, and as they were approaching stall, the report came in that the column instead of as it was approaching stall wanting to pull the airplane down, so actually pulling the pilot, it was actually doing the opposite and not having any pressure on the column. And the pilot, which in this case is an AR pilot, they weren't finding compliance that day because it wasn't a certification test, it was the Boeing test. But the pilots came back and said in their opinion that this characteristic does not meet the guidance material from the FAA.

So when we had to show compliance and fly it with either the FAA on board or them acting as the FAA and the AR, they said that it would not be compliant, so we needed to make a change. They did not say at that time that MCAS was the solution. They came and said, we have a stall characteristic and the flying characteristics that needed to be improved to be certifiable.

Mr. Weisman. Gotcha. And I think Alex has a question.

BY MR. BURKETT:

Q Just real quick. I know we've got 3 minutes left. But, Mr. Teal, I think you referenced earlier special conditions or exemptions. But in the event that my memory is wrong there, are you aware of special conditions, exemptions and exceptions issued by the FAA with respect to compliance with part 25 of the FARs?

A As part of the G-1 issue paper as we come up to our certification basis, there are exemptions and exceptions as part of the certification basis, yes.

Q Was there ever any discussion of seeking some relief from the FAA from the requirement that you've described with respect to elevator feel such that MCAS would not have been necessary on the 737 MAX, any discussion at all about that?

A Are you asking any discussions with the FAA? Can you clarify?

Q Either internally within Boeing or at the FAA, but mainly within Boeing.

A Within Boeing, I don't recall any conversations about exemption, though I will say that as the pilots shared with me the characteristic, I would have said, well, is it a requirement, do we need to fix this.

And, in fact, I will also acknowledge that because it is a characteristic that the pilots have -- it's their opinion, it's how it works, I actually asked another pilot -- a couple pilots to go fly the same conditions and report back and say do they concur with the first pilot's position that this is uncertifiable. So I had multiple pilots fly and they said it's uncertifiable.

In a conversation that I do think we had, I sort of recall, was, well, is this something that we could get an exemption from or exception or whatever, and the pilots told me that on previous aircraft certifications we had to fix this. So there was no reason to have the conversation because previous aircraft we needed to fix this so we just need to go fix this.

So at that point, I took them at their word. They are ARs that ultimately would have to, at the showing of compliance, be in agreement. And my AR pilots, not acting as ARs but giving me recommendations as ARs, were telling me we needed to fix it. So we went forward to fix it.

Q Very good. Thank you.

A I'm sorry. You cut out. We couldn't hear you.

Q Sorry. I said thank you very much. I believe that concludes our time, but I'll turn it back to Matt.

Mr. Weisman. Yes. I think that we have completed our second hour. Do we want to hand off or do we need to go off the record and take a break?

Mr. Teal. Can we take a 10-minute break?

Mr. Weisman. Sure. Let's go off the record. We'll take a break.

[Recess.]

[2:29 p.m.]

Ms. Cooke. We're going to back on the record. It is 2:29, close to 2:30.

BY MS. COOKE:

Q Corey Cooke again for the Republican side of the committee. Again, we'll say thanks for being here, and apologize if some of the questions are duplicative of things before, so I appreciate your patience with us.

I wanted to go back to the ODA and discuss your role during 737 MAX and your relationship with the ODA. So just to clarify, during that time period, who was in charge of the ODA?

A I believe it was Beth Pasztor. In the early phases of the program it was John Hamilton.

Q Okay. And do you know where John Hamilton went when he left the ODA or was no longer in charge of it?

A I think he became the vice president of engineering for commercial, a [Boeing][15] commercial [airplane][16] company.

Q And is that common for someone to go from the ODA at Boeing into another role like that?

A I think it's the first time I've seen that done. So the ODA is -- there's only been a few leaders, and I know some of them retired so, no, I wouldn't say it's common.

Q Okay. Broadly, could you just elaborate on how your office interacted with the ODA? What was the communication like? Who would you have gone to? Would folks -- and you said no one directly reported to you, but within your peripheral, would

[15] Bracketed language was added after the interview for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

[16] Bracketed language was added after the interview for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

folks -- we'll call them below you or who -- you know, would they have gone to the ODA instead?

A So the ODA as an organization assigned a leader through the regulatory administration office, reg admin they call it. That person's not an AR, and that person was on our leadership team, and I would directly work with that person. It was a gentleman named [redacted] early in the program, and later in the program it was a gal named [redacted], and it moved on to another person, Jeremy -- I forget Jeremy's last name. I apologize. No, Jordan. Jordan's his first name. I forgot his last name, I apologize.

But that person from that regulatory administration would be my first contact point to the ODA. That's the person I would coordinate with to do our biweekly or monthly conversations with John Piccola, and they would attend all of my technical review boards and participate.

Q So what processes were in place to ensure the independence of the ODA office and its employees?

A The employees of the certification group is reporting up through the separate chain, through the regulatory administration, through the ODA, and doesn't report up through the program leaders, the systems chief, the structures chief, those IPT leaders, as I call them, integrated product teams. I apologize.

Now, the ARs, the EUMs as we now call them, are sprinkled within those teams. So there is -- ultimately, the ODA has a separate organization, but the ARs that do the finding of compliance are sprinkled in and they work with the ODA.

Q So are there processes in place for independence or is that negated by the way the ARs functions operate?

A Can you explain more what you're asking in terms of processes for

independence? What do you mean by that? They have a different management structure, if that's what you're asking.

Q So -- right. Basically, are they able to be influenced by you when they're meant to be independently looking at you?

A They have a separate management chain, and hence, processwise, if an AR feels that they are being intimidated or being -- I'm trying to think of the word we use. But the ARs have a process by which they can fill out and say, I feel like I'm having undue pressure put on me, and that that process allows -- the undue pressure process goes then through the ODA and then a process will come back to do a determination of whether there's undue pressure being put on this individual or not. So there's that process.

Q Are you aware of that occurring during the MAX certification in relation to any team that you would've been managing or overseeing?

A I don't recall any undue pressure being levied against me, any reports being written that I imposed any undue pressure. I think there was probably one individual who felt there was undue pressure going on in the propulsion organization, and they went up through the ODA and followed the process. And I don't recall whether or not it was accepted as undue pressure or not. I don't recall.

Q Can you just -- and I apologize if you feel like you've said this. Could you just slightly more in a detailed thing explain what that process would be, like who would file to who and how long would it take and then how kind of would that go up the chain?

A Not being part of the ODA and not really understanding and working in that organization, I don't have a firm understanding of how that process works. All I know is they have a process. They can lodge an undue pressure complaint. I don't know -- it goes up through the lead administrator's organization. I don't know how it works.

Q Okay. I'm going to circle to a slightly different topic, which is getting back

to some of the Level B training and some things that had been asked, I believe, during the first hour related to some of your performance reviews and compensation.

So did you feel that your job was dependent on Level B training determinations being made by the FAA?

A No, I did not feel that.

Q Okay. I know that you mentioned during the first hour some compensation stock, I believe. But were you aware of any of your performance reviews or bonuses being specifically reliant on the MAX training or certification decisions being made by FAA?

A No, not to my knowledge.

Q Okay. Do you know if there was anyone at Boeing that you are aware of that had that level training tied to their compensation arrangement?

A I'm not aware of any of that.

Q Okay. Are you aware of the FAA being knowledgeable of Boeing's compensation arrangements or bonus structure in general?

A I have no knowledge of what they do or do not know.

Q Okay. Did you ever specifically press employees or indicate to them in a performance or review setting that their bonuses or compensation were or were not tied to Level B training or timely certification?

A No, I did not.

Q All right. Thank you. Now, circling back to something that I believe you said during the prior hour of questioning during some of the MCAS discussion. It sounded as though you mentioned that following Lion Air, there was a potential for more than one notice being sent and that after Lion Air Boeing was going -- after Boeing sent out the flight crew operations bulletin, that there was a second document sent to Boeing

customers. Could you clarify or elaborate what document you're referring to?

A We call it a MOM, and that stands for a multi-operator message. I have been told that it was sent to them. I don't necessarily -- I didn't know it at the time or see it, but subsequently, I've been told that it was sent.

Q So you've been told that it was sent. Have you seen the document yourself?

A I do not believe I have.

Q Okay. Without going back and asking the court reporters to specifically read that part of the record, I believe that you also said it explained MCAS in detail, and based on what you're saying, that just would've been on someone telling that to you as you have not seen the document?

A That is correct.

Q Okay. Getting back to MCAS, and, again, I apologize, I know that you've been asked some of these questions, but could you just elaborate on when you learned about MCAS as it was called MCAS being put into the MAX and what your understanding was of what MCAS was supposed to do?

A I was aware that MCAS was a feature on the airplane from the beginning of the program. Its initial, what you say what it's supposed to do, early in the program the aerodynamicist determined that because the engines were going to be installed more forward on the wing than the previous aircraft, the airplane would have a bigger -- a pitch-up feel to it, just aerodynamically it would feel different. And it was determined by our technical community that during a, what we call a high-speed windup turn, which is a certification flight that we need to demonstrate, we would need this Maneuver Characteristic Augmentation System to ensure we passed the certification requirements.

So that was on the program from the initial state when I showed up, and that was

the understanding of the function within the speed trim that I was aware of.

Q Okay. What role did you play in decisions related to MCAS throughout the certification process?

A I didn't have any role into that. Ultimately, when the engineers came forward with -- they were going to take the existing MCAS and expand it into another region of the operating envelope or the -- it's really the outside of normal operation. But when the engineers were done, they had the responsibility then to update the certification plans, create the certification deliverables, submit them through the ARs, and if they were retained, through the FAA for their acceptance. I would not have gotten involved in any of that detail.

Q Would you have gotten involved with any of the discussion about any changes to MCAS with either FAA, other folks at Boeing, or Rockwell Collins?

A I would not have communicated with Rockwell Collins. That would've been much lower level than me. In terms of communication with the FAA, like I stated earlier, when we made changes, the expansion of MCAS where it's now in the low-speed regime, the communication plan that was going to happen between the specialist as well as the pilots would have been done at a lower level in the organization. And I just knew that it was going on. They proposed -- they showed me the plan they were going to follow, but I was not directly involved in any of that.

Q So procedurally, would you have signed off on or approved changes to or inclusion of MCAS on the 737 MAX?

A From a certification perspective, if that's where you were asking your previous question, I do not sign off for the certification documents. That's done by the technical leaders through the ARs, ultimately through the FAA. I don't sign those.

In terms of the configuration change to say do we have the authority to make this

and put it on that and then follow the process for certification, they did come to me and ask me my approval for -- to approve their recommendation, and I agreed and said yes.

Q When you say "they," do you recall who the "they" is?

A It was the technical leaders at the time. I do not recall who came to and discussed the final solutions.

Q Okay. Do you recall the time period?

A Oh, yeah. It would've been in the -- I'm trying to think. It was before TIA, so hold on a second. I don't know exactly. It would've been in the April-May timeframe of 2016 where -- after they had flown those conditions and found, like we were talking earlier, that the aircraft was not certifiable as the configuration has existed. It took them a month or so to come up with a plan. So in that timeframe.

Q And just broadly speaking, if we step away from MCAS, is a month or so a standard timeline to come up with a plan? Does that seem fast? Does that seem reasonable? Does that seem slow?

A I think it's reasonable. It was obviously one of the -- when we did our pilot report for the FAA to get our type inspection authorization, it was something we shared with the FAA. It is a characteristic of the airplane that was not certifiable that we needed to make this change. So we did have all of the leading experts at a full -- fully supported to create that solution as quickly as possible.

Knowing that we already had the MCAS function in the windup turn region, to use it in the low-speed function, the amount of time to come up with a solution, test it in the engineering cab and prove that it worked and actually flew it to prove that it works, you know, 4 weeks, 6 weeks is very reasonable. There's still more time required after that to finalize the design and do all the documentation, but to come up with a firm concept of what the solution is, that's a reasonable time.

Q And just to follow up on something, you mentioned that this happened because the FAA flagged it. So the process where you're going and the FAA is flagging things, you feel like worked in this instance, that you guys had an issue, they flagged as not certifiable, and the process to come back?

A In this particular case, it was the Boeing company that flagged it in saying our aircraft is not certifiable for this particular requirement. The Boeing company flagged it as part of our type inspection authorization submittal to the FAA. So we shared with them that it was not compliant.

Q Okay. And was that your office? Was that the ODA? Was that the technical pilots you've talked about? Who shared that?

A It was part of the total TIA or it was part of -- the ODA would've been the final TIA submittal, but it's all the technical team leading to that TIA process. And TIA stands for type inspection authorization. It's a culmination of all the technical leaders, ARs working through the ODA to submit to the FAA that we have tested the aircraft, it meets the requirements, now we need to go show you that it meets it.

Q Okay. And I do not believe this was asked when we initially were going over your background, but are you yourself a pilot?

A I am not.

Ms. Cooke. Okay. I think that I'm going to open it up -- I know that's pretty short, but I want to be respectful of everyone's time. I do not believe anyone else on my side has questions, but I will give them 30 seconds or so to tell me otherwise. And if they don't, then I'm happy to turn it back over to the majority for their next hour. All right. We can go off the record.

[Discussion off the record.]

Mr. Weisman. Why don't we go back on the record. And we're now going to

start with our next hour. Looks like it's about -- I have 2:50, 5-0 -- sorry, 2:51 p.m. eastern time.

BY MR. WEISMAN:

Q So, Mr. Teal, are you aware of any Boeing employee telling any potential MAX customers that no simulator training would be required prior to the FAA's determination that Level B training was what would be required?

A As part of the marketing material for the program, one of the traditional charts that we would present would be the differences training. So I am aware that there would be a differences training that explained our expectations. Clearly, they were our expectations based on process, but anytime we would share something like that, it should have an asterisk or something against it that says, you know, ultimately it's up to the FAA to make that determination, but it is our expectation that it would be this differences training.

Q So separate and apart from the marketing materials, of which we've seen some of those, are you aware of any conversations, you know, representations that folks from Boeing may have made to customer airlines, you know, in meetings or in phone calls or other kinds of communications saying that no simulator training would be required before the FAA had made that determination?

A I would say that, well, even myself, airlines that were taking deliveries of next generation airplanes would ask for a program update. And so several airlines, and I can't recall -- there's multiple that we would share. And I would share the marketing material with them and say that that is our plan and we're moving forward with a configuration that meets those requirements.

Q So do you recall which airlines you would have talked to about Level B training?

A I don't recall.

Q How many airlines do you typically talk to? Is that part of your -- was that part of your job while you were overseeing the MAX --

A When the marketing and sales department would ask us to talk to airlines, and we have multiple, you know, literally -- I won't say hundreds but we had several, several customers that have purchased the MAX, you could look it up. Yeah, it is very typical for them to ask me, can you give them a status update on the program and answer any questions they have.

Q Prior to the FAA's decision to accept Level B training, did you ever personally have discussions with any FAA officials about pilot training requirements for the MAX?

A Only in the conversation we had earlier about the regular meetings we had with John Piccola at the BASOO and how I had added it to the concern list of how the teams were working together in terms of their direct lift control function. That's what I recall. And that wasn't a personal conversation. I was part of that process sharing.

Q Did you ever tell anyone at the FAA that simulator training for differences training between the NG and the MAX was unnecessary?

A I don't recall that. Differences training is necessary. It's part of the process.

Q I'm sorry, simulator training for differences training is unnecessary.

A I don't recall actually saying that to anyone in particular. I do recall conversations around following the process, knowing the guidance material for how we do differences training, how the decisions are made. If we follow that process, our technical teams were advising me that unique simulator training would not be required. Did I share that with any FAA official in conversations, I don't recall. I may have.

Q Okay. Did any airlines ever inform you that they wanted simulator training

for their MAX pilots or ever sort of ask you if they needed simulator training for their MAX pilots or otherwise just sort of ask your opinion about whether they should offer simulator training for their MAX pilots?

A I don't recall any airline asking me that specifically.

Q Did you ever, even without having been asked the question, did you offer any advice to airlines as to what their simulator training may or -- what kind of simulator training they may or may not need?

A I don't recall any conversations. I do know that we had a good relationship with Southwest Airlines, and their tech pilot -- or not -- their chief pilot, I'm sure in conversations with him we discussed it. But I think it was just a joint conversation about the status of the program.

Q And in that conversation, would you have said that your expectation is that there would be no simulator training necessary for differences training?

A It would've been we would be following our process, and based on the configuration changes of the airplane following process, that the differences training would be at Level B.

Q So, recently, several emails came to light that showed a Boeing employee or employees talking multiple airlines out of simulator training for the MAX, including Lion Air. Did you ever have any discussions with chief technical pilot Mark Forkner about inquiries from airlines asking about MAX simulator training or even discussions about what to do if they asked about receiving MAX simulator training?

A Not that I recall, no.

Q And, again, as chief technical pilot, inquiries about training requirements would have been part of his portfolio of work, right?

A I believe so, yes.

Q Okay. So if you hadn't spoken with Mark Forkner about these inquiries from airlines seeking simulator training, when was the first time that you learned that airlines had been attempting to -- had been asking about simulator training and had been talked out of simulator training?

A To my knowledge, I learned it as part of prepping for this session with the lawyers.

Q Okay. And, again, I don't want to ask anything about your conversations with attorneys.

So did you ask or in any way encourage any employees at Boeing to discourage MAX customers from requesting simulator training?

A Not that I recall.

Q To your knowledge, was anyone else or anyone in Boeing management aware that an employee or employees were talking airlines out of simulator training prior to Mark Forkner's departure from Boeing, which I think was July of 2018?

A Not that I know of.

Q Based on the emails, it looks like an employee was working to discourage simulator training by Lion Air and several other airlines. Are you aware of who the other airlines are that the employee discouraged from using simulator training?

A No, I'm not.

Q Could it have been PT Garuda?

A Now that you mention that, as part of the prep for this conversation, there was discussion of airlines in that region, so it could've been.

Q Caribbean Airlines? Could that have been included?

A I don't recall. Don't know.

Q Okay. I'd like to now go to a document that you should have access to.

It's a PDF with the title, "Friggin Lion Air CTRL00435901."[17]

Mr. Paisner. Matt, I don't know, have these documents been sent out?

Mr. Weisman. They should have been. I hope so.

Mr. Armes. Yes. I sent them out about 5 minutes ago.

Mr. Paisner. I have not received anything. I don't know if the other lawyers on the call have gotten anything?

Mr. Primis. Mike Paisner, this is Craig Primis. I did get the email. I'll forward it to you now. Maybe it comes to you through a different route.

Mr. Weisman. Thank you for your help.

Mr. Primis. Sure.

Mr. Paisner. Just got it. Just came in. Takes a second to get through our system.

Which one did you want to look at, Matt?

Mr. Weisman. It's a PDF entitled, "Friggin Lion Air."

Mr. Paisner. Okay. I just wanted to make you say that again.

Mr. Weisman. Those are the words from the document. Those are not my own opinions.

I guess, just first, have you seen this document before?

Mr. Teal. As you know, this is an IM that I wasn't a part of, and I saw it as part of prep over the last couple days. That's all.

Mr. Weisman. Okay. So based on your review of this, do you have any idea who the employees are in this instant message conversation?

Mr. Teal. Only through what --

Mr. Primis. Yeah, this is Craig. I think that might call for privileged information.

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[17] See Exhibit 4.

His knowledge of that, if he has it, might come through privileged conversations.

BY MR. WEISMAN:

Q So not asking for anything that you've discussed with your attorneys. I don't want to get into that. Based on the language, some of it quite colorful in this document, could you hazard a guess as to who one or more of the participants may have been?

A Well, I will say that, as a Boeing executive, I certainly am disappointed in language like this that is not fitting of the behaviors that we exemplify at The Boeing Company, so I'm disappointed in it. And my knowledge of who the individuals were in this was obtained through the privileged communication.

Q Okay. So if I could draw your attention to this first page at 6:57 p.m., that's where one of these Boeing employees says, quote, "Now friggin Lion Air might need a sim to fly the MAX and maybe because of their own stupidity. I'm scrambling to figure out how to unscrew this now. Idiots," end quote.

Were you aware at the time -- and this is a text conversation from June of 2017. So were you aware at that time that Lion Air might have needed or wanted simulator training for the MAX?

A I was not.

Q Why would you not have been aware of this? Would that not have been sort of within the scope of the type of activity that you would be overseeing?

A No. At this point in the program, the airplane was certified, and I was working on the 737 MAX-9 flight test program, and conversations that go on between individual airlines after getting the airplane certified I don't typically get involved in. Different organizations do.

Q Did you discuss Lion Air's potential need for simulator training with Mark

Forkner or anyone else at any time before the Lion Air crash in 2018?

A Not that I recall.

Q Okay. If we can look at another document that was sent over. This is one with the PDF entitled, "Sick amount of" -- and four dollar signs.

Have you seen this document before?

A I don't recall seeing this particular one.

Q Okay. This is, you know, based on what's on the first page, it's a communication -- a conversation with Boeing employees and it's dated December 12, 2017. Down at the bottom of the first page it says, quote, "I just jedi mind tricked this fools. I should be given $1,000 every time I take one of these calls. I save this company a sick amount of" -- and then there are four dollar signs.

Turning to the next page, a couple lines down it says, "to make them feel stupid about trying to require any additional training requirements."

Based on the language in this document, do you have any idea who the Boeing employees may have been that were engaging in this conversation?

A Only speculation based upon the privileged information I've been shared. I don't condone the conversation at all.

Q In your prior experience with Mark Forkner, did you ever hear him use the phrase "jedi mind trick"?

A I have not.

Q Okay. So it looks like at least one of these unidentified employees is sort of suggesting that the lesser requirements for pilot simulator training saves Boeing a sick amount of money. Is it true that it costs Boeing less money if less simulator training is required?

A Could you elaborate that question, please? What do you mean by that?

Q Sure. This person in this email is sort of saying, you know, that he was just convincing an airline not to -- where did he say it. He said, I jedi mind tricked these fools, and then on the next page, "to make them feel stupid about trying to require any additional training requirements." So -- and he says that that's --

A I don't know what he's talking about. I don't know what training requirements are being suggested here, so I don't know what's being implied here. NG training? Recurring training? I don't know what it is.

Q So then taking it separate and apart from the document, just as a general matter, is it true that lower training requirements is less expensive for Boeing? If there are more training requirements, is it more expensive for Boeing?

A I would say that I don't think that the cost is a concern here. Like we've talked earlier, pilots need to be trained and pilots have a baseline training to go through and then recurring training, and if we're going from one airplane to another, differences training. And differences training, I think, is a small piece of the overall cost to the airline from a training perspective. The training required for pilots to fly and their recurrent training is a standard cost required for all operators to fly aircraft.

Q Sure. But Level B differences training, as you said, was an objective of the design of the plane. We've already talked about how the contract with Southwest Airlines guaranteed them $1 million per plane if simulator training was a requirement.

Given the overall competitive environment with Airbus and the need to compete, you know, and if airlines had to spend more money on training, you know, in theory, that could put Boeing in a less competitive position. In the context of all of that, let's say if a regulator required more than Level B training, are you suggesting it would have no financial impact on Boeing?

A If a regulator were to require additional level of training, regardless who that

regulator is, the first question that I would ask is why would it require and ultimately that we have failed in meeting our requirements of having a safe airplane from the -- you know, I view the training requirement of -- is about commonality between the fleets and safe operation of pilots jumping in an airline from each version of the airplane, which is how they operate this family of airplane.

To me, this is a safety conversation. It's not about the dollars and cents associated with what I consider a minor cost of the delta training differences. It's about the safety aspect.

Q I'm a little confused because it sure seems to me, as you've told us specifically, Level B was a design requirement. Why would it be a requirement if there was no financial aspect attached to it?

A You're suggesting requirements are financially motivated. Our requirements are related to certification requirements, safety requirements, performance requirements, you know, the [fuel] mile[age] requirements.[18]

Q Okay. So let me just --

A -- [not][19] financial requirements.

Q Just to boil this down, is it your statement that had regulators required more training for the MAX, that would've been totally fine with Boeing, Boeing wouldn't have lost any money because of that, and no one would've been the least bit upset?

A You said three things there. Can you repeat the three?

Q Sure. Had regulators required more than Level B training --

A Correct.

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[18] Bracketed language was added after the interview for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

[19] Bracketed language was added after the interview for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

Q -- are you saying no one at Boeing would've had any problem with that, it wouldn't have had any financial impact on Boeing, and everybody at Boeing would've been happy?

A I would start with that if it required greater than Level B, then that was the determination was made and that the design that we made ended up requiring level -- greater than Level B and we would have dealt with it. We would have created a higher-level training and done that.

Would airlines have been pleased with that, of course they would not have, because we had been signaling to them per process that we were confident that we were not going to have any higher than Level B, so of course they would be disappointed.

And as part of whether or not The Boeing Company would be upset about it, it's not about being upset. It's about understanding what procedurally we didn't do right so we can improve. Because ultimately, there was no concern on this program of whether or not this was a Level B training. It's just --

Q We know it would've had at least one financial impact on Boeing in that it would have cost them $1 million per plane to Southwest. Is it your statement that it would've had no financial impact on Boeing? Is that what you're saying?

A I didn't say it had no financial. It had minimal financial impact. We would work through it.

Mr. Pasternak. May I just jump in to clarify some of this?

So previously we'd asked -- Matt had asked about the cost of simulator training and whether there was any financial analysis done. And Boeing is a very profitable, successful company. I can't for the life of me imagine that Boeing did not run any economic analysis or financial analysis regarding the cost to Boeing if the FAA required simulator training on the MAX.

Is your testimony that during the entire certification process that issue specifically about the cost of simulator training never came up in a conversation with you?

Mr. Teal. To my knowledge, it did not come up.

Mr. Weisman. So you said -- sorry. Please continue. I didn't mean to interrupt.

Mr. Teal. I say it did not come up based upon we never had -- the technical community continually informed us, myself, that we clearly had an airplane that was Level B, so we didn't really determine that.

BY MR. WEISMAN:

Q Do you think there's any chance that Boeing would have lost any sales had more than Level B training been required, that some airlines might have opted for Airbus instead of Boeing?

A I can't answer that. I don't know.

Q And would there have been enough simulators at that time, MAX simulators at that time to have accommodated a requirement for simulator training?

A I don't know. We would have -- we did the T1, T2, T3 tests early in the process and got it accepted. So there would have been some time to react if we had to react. I don't know if we would have been able to react in time or not.

Q Okay. Moving on, you should have another document in front of you or soon to be in front of you. It's a PDF entitled, "Establish a precedent."[20]

Have you seen this document before?

[20] See Exhibit 5.

[3:17 p.m.]

Mr. Teal. This is a six-page document. Would you like me to read it all? By scanning the first two pages, I don't recall ever seeing it.

BY MR. WEISMAN:

Q Okay. That's fair. So let's look at that first page. So, up at the very top, it identifies as from and to Boeing employees. And this is June of 2017. The subject line is "MAX Level B Differences Solution."

Notice that one of the Boeing employees in the signature block is identified as a 737 chief technical pilot. The 737 chief technical pilot was Mark Forkner, correct?

A Correct. I don't know if on June 7, 2017, he was still there. I don't know when he left.

Q I believe he left in 2018.

A Okay.

Q So, assuming he was still employed at Boeing, is it fair for us to assume that this is Mark Forkner participating in this conversation?

A I think it's fair.

Q Okay.

Looking at the second page, the paragraph under June 7, 2017, 11:23 a.m., the paragraph, I guess it's the third full sentence, starts with, quote, "I am concerned that if," and then there's a word redacted, "chooses to require a MAX simulator for a pilot beyond what all other regulators are requiring that it will be creating a difficult and unnecessary training burden for your airline, as well as potentially establish a precedent in your region for other MAX customers," end quote.

Was there a concern at Boeing about establishing a precedent of MAX simulator training that you were aware of?

A Not that I was aware of.

Q Can you explain why setting a precedent of simulator training would have been problematic?

A I was not involved in these conversations. I don't know what they're getting at. Ultimately, the airplane was certified at this point. And the agreed-upon regulators, including foreign regulators, had reviewed our training packages and had agreed to them. So it had been certified at this point.

So if an airline chooses to do simulator training, they're always free to do whatever training they like. We set a minimum that we would like them to do.

Q Well, so that's kind of the point, is, in documents that we've reviewed, most of which have been made public, what we see is airlines inquiring about simulator training, regardless of whether it's a requirement -- some of it might be optional, that they just feel they want it. And we've seen sometimes-identified, sometimes-not-identified Boeing employees strongly discouraging them from doing that.

So I guess what I'm trying to understand is, you know, we've seen what the documents say, but, you know, you were at a pretty high level during this activity. You know, just wondering if this is consistent with what your understanding of what Boeing's position was with regard to simulator training.

You know, was there a concern that if an airline opted to choose to have simulator training, even if not required by the regulator, that it might cause other airlines to also choose to have simulator training, and would that be problematic for Boeing?

A Once again, I was not involved in these conversations, and I'm not familiar with what they were talking about, other than what you read yourself. I see your question. I just -- I was not participating in any conversations like this and did not know that it was going on in the background.

Q Okay. Separate and apart from this conversation -- and I take your point that you weren't part of this conversation -- I'm asking you more generally, were you aware of any concern at Boeing that if an airline opted to choose to have simulator training, that might prompt other airlines to choose to have simulator training and that that was of any concern to Boeing? Are you aware of it?

A Not that I'm aware of.

Q Okay. So is it your sense that Boeing was basically agnostic on the issue of simulator training, if airlines wanted to choose to have simulator training even if not required by regulators, that that was A-okay with Boeing?

A I'm not an expert in training with the airlines of how we work with that training and how they do things differently at different airlines. I'm not an expert or -- not even an expert -- I've not been involved in those types of discussions in my career. So I don't know how to answer your question.

Q All right. Why don't we move on.

So, in January of this year, Boeing announced that it would now recommend simulator training for the MAX to the FAA. Do you agree with that decision?

A Do I agree with the decision or do I agree that the decision was made? What was your question?

Q Sorry. Did you agree -- so --

A I understand Boeing has made that recommendation, yes.

Q Yes. And did you agree with Boeing making that recommendation to the FAA?

A I haven't been part of that conversation. Like we said, I left the program in 2017. And the way I would say on that is, I am not familiar with all of the changes that have been made on the MAX for its return to service. So I can't really comment on

whether or not simulator training is required or not. I know the company has recommended it.

Q Right. I'm asking, do you personally -- I know you may not have been part of that process as a formality, but in your personal/professional view, do you agree with that recommendation to recommend simulator training now?

A You know, my personal/professional -- that's what you asked -- point of view here is we learn and we have to act upon our learning.

One of the learnings that we've had here on this program is that engineers make assumptions based on previous designs, previous certification programs, as well as advisory guidance material from the regulator. And one of those is what we can expect from the pilot pool.

So, you know, one of the changes that we are making and, actually, I'm working on on the 777X right now is to review all of our failure hazards assessments, our system safety analysis, with an eye on: Is the safe operation of the airplane -- is it a requirement that a pilot can detect an issue and, once detecting it, can diagnose what that issue is, and then can they manage that issue?

These same three questions were asked prior in the MAX, and consequently the outcome was not what -- well, you know what the outcome was. Previously, those assumptions were accepted.

Now, in addition to that, it's -- and, also, our people have the proper training to ensure that they meet those assumptions. So, if you're asking me if, you know, pilots should be trained to ensure that they can detect issues, they can diagnose the issue and manage through it, per what we assume in our safety analysis, the answer is yes. We should go forward as a learning to make sure that the pilots are trained to the assumptions that we've made in the engineering.

That's a learning we've had on this program. It's a learning that we are now putting forth on the new aircraft. And if that is what's driving this going back and adding additional training, then my professional opinion, it's a good thing.

Q Okay. Thank you.

Moving on to another topic, were you routinely provided with Boeing's internal coordination sheets as those were produced and refined?

A It depends on the coordination sheet. I don't routinely get -- if they're sent to me, then I get them, but if they're not sent to me, I don't get them.

Q Were you sent coordination sheets on MCAS?

A I don't recall.

Q Were you aware that Boeing had concluded as early as 2012 that if a pilot did not respond to unanticipated MCAS activation within 10 seconds the results could be catastrophic?

A You asked me when did I understand that or if I understood it?

Q Were you aware?

A I am aware, and I was aware, that we have a speed trim function on the aircraft, and that speed trim function has failure modes that pilots have to be able to recognize, diagnose, mitigate. And they're trained to do that.

And that function, in a stabilizer trim runaway, I don't know if it's exactly 10 seconds. I know that it's a certain amount of time. And that exists today on the 37, and going forward to the MAX is the same, with the MCAS being a function within speed trim. So that same failure mode exists.

Q Right. So, yes or no, were you aware that Boeing was aware if a pilot did not respond to uncommanded MCAS activation within 10 seconds the result could be catastrophic? Was that a piece of information you were aware of?

A Not in detail at the time.

Q When did you first learn that Boeing knew that if a pilot didn't react within 10 seconds to unanticipated MCAS activation that it could be catastrophic?

A When did I know? In exactly the conversation about the 10 seconds that you're referring to, I learned it as part of this preparation, though I've always known that a stab trim runaway would have catastrophic effects if the pilots did not intervene.

Q Right.

Mr. Pasternak. Just --

Mr. Weisman. Sorry, Doug. Did you have a question?

Mr. Pasternak. Yes.

BY MR. PASTERNAK:

Q Just to be very clear, the question is specifically: Boeing had knowledge at the time during development of the 737 MAX that if the pilot hadn't responded in 10 seconds or more to uncommanded MCAS activation the results would be catastrophic. You are testifying that you were aware of that during the certification?

A No, I am testifying I did not know that exact statement on MCAS. I am aware that the speed trim function has a stab trim runaway failure mode. I knew that as part of the certification, but not uniquely any discussion about MCAS.

Q Do you believe that that is information that should have been shared with you, as the chief project engineer on the MAX?

A I think that the team going through the details of the safety analysis and the failure hazards assessment with the technical leaders in flight controls, S&C, and the pilot community work through that, and if they conclude, when they were done with that, that it is safe, it meets our processes, and it is compliant to the regulations, then I would not expect them to bring me that level of detail.

If there were concerns about it that the team didn't work through together, I would expect them to be elevated. And typically what happens is, if there's a technical issue that people are concerned of, of course they will work together to resolve it, and if they resolve it on their own, I wouldn't expect it to be brought to my attention.

Q Okay.

So just one followup. And we've got about 17 minutes left or so, and I know Matt has some other questions.

I believe this is the third or so time that you've mentioned that, in the development of the MAX, that Boeing was compliant with FAA regulations. I believe you mentioned that related to MCAS. You're mentioning it now related to the 10-second pilot reaction time.

I understand that there may not have been a specific requirement to inform the FAA or their customers, you know, about some of these things. What does that tell you about the FAA's process for certification?

It seems like you're acknowledging that the MAX was compliant. I mean, this is obvious, but two planes have crashed, 346 people have died. It's been over a year. Boeing is still reconfiguring the MAX to make sure it is actually a safe airplane now. Does this give you any pause in terms of what the FAA requirements were at the time?

A You asked if it gives me any pause. Like I said, I've worked here for 34 years, and we follow the processes we have and the knowledge we have to date. So the fact that we were following process, following the guidance, and demonstrating compliance and going through our safety process with the integrated technical team coming up and making conclusions --

Q But doesn't this point to something being broken in the system? You're saying that you followed the process, and the process killed 346 people.

A I did not --

Q Do you think that's okay?

A I did not say that. I said we followed the process --

Q You're saying you followed the process. And the process led to 2 airplanes crashing and killing 346 people. That's a fact.

A I am not going to discuss whether or not the process is what was the cause of the accidents. The cause of the accidents is a very complex thing, that there are multiple things that occurred, and I don't even know all of them that occurred.

You asked me if I take pause associated with, if following the process, do you have a safe aircraft. We believed that we have a safe aircraft as designed, as intended, and put out with the designs and the training associated with it.

I will acknowledge with you that we have had a learning. Unfortunately, we've had two learnings. And we have to take pause from those learnings and move forward with changes, with improvements, because we need to improve.

Q Okay. I'll stop, but just to be clear -- so, because you followed the process, your testimony is that the 737 MAX was safe when it was certified.

A My testimony, that by defining and delivering and certifying the aircraft, it has been determined as safe. That is the process we worked through.

Q Okay. Thank you.

BY MR. WEISMAN:

Q And just to refresh my recollection, at the time that you approved MCAS, you were not aware that it operated from a single AOA sensor, you were not aware that it could activate repeatedly, and you were not aware that Boeing was aware that if a pilot didn't react in 10 seconds to an MCAS activation the result could be catastrophic.

At the time you signed -- this was all information that you were not aware of when

you signed off on MCAS.

A That is correct.

Q Okay.

I'd like to ask you about another issue very quickly, the AOA disagree alert. When did you first learn that the AOA disagree alert was not working on most 737 aircraft?

A I believe I learned about it when it showed up in the press.

Q Okay. Do you believe it was right for Boeing not to tell customers that the AOA -- not to tell the FAA and customers that the AOA disagree alert wasn't functioning?

A Once again, when the engineering team realized that the supplier had made a mistake, they convened a discussion and a safety determination that it was non-safety, and then a conversation was around whether it was a compliance issue.

And from a compliance issue, from my understanding, there's no requirement to have it on the aircraft. It is not required for safe operations. In fact, there's no pilot action that is associated with the AOA disagree that goes with it.

So, based on that, the team followed our process -- I know you don't -- you're telling me you don't like the word "process," but we followed the process --

Q I apologize for interrupting. We're just running a little bit short on time. So is that a "yes" that you think it was the right thing to do?

A Yeah, I think they followed their processes. That was true.

Q And I will note that the FAA Acting Administrator has said that it was a requirement because it was part of the type certification; that it was optional. Boeing opted to put it on the plane. But once Boeing opted to put it on the plane, as part of the type certification, it becomes something is that required to be operational.

So my next question is, do you believe it was right for Boeing, once they knew it

was not functioning, to keep manufacturing planes with the same part not functioning and then continually building and delivering more planes with the nonfunctioning AOA disagree alert without telling any of the customers that they're receiving a plane with this alert not working?

A Well, for one, I typically -- or I don't get involved in conversations like that post-certification of an airplane, So I'm not familiar with all of the processes that the team goes through to make those determinations.

The team that made those determinations followed the guidance and the processes that we use, and, consequently, I think that the -- my understanding is they followed their process. But I will acknowledge that I was not involved in any of that at the time, so I can't speak to any great detail on it.

Q Okay.

So, separate and apart from the FAA requirements, just your personal view, do you believe that Boeing had any ethical obligation to tell the FAA or its customers when it knew that there was a part on the airplane, in the cockpit, that wasn't working?

A Say that again, please.

Q Do you believe that Boeing had any kind of ethical obligation to alert the FAA or its customers that it was continuing to manufacture and put out planes with a piece of equipment in a cockpit that they knew was not working?

A I don't really know how to answer that question. From my training, it was not required for certification. It was not required -- my understanding, it was not required for cert, and it was --

Q Your ethics.

A -- not required for safe operations.

Q I'm asking about your ethics. Do you think they had an ethical obligation to

let the FAA and customers know that they now knew that a piece of equipment in the cockpit wasn't working?

A I think we have to follow the processes that we typically use. And I don't know if this --

Q Is that a "no"?

A I don't know the answer.

Mr. Primis. Hey, Matt, it's Craig. Can you just let him finish his answers?

Mr. Weisman. Please. Yeah.

Mr. Primis. That was, like, three or four times you cut him off while he was trying to explain himself.

BY MR. WEISMAN:

Q By all means, please give a full answer.

A Well, my answer is, I don't know the answer, because the processes we use when we determine there is, you say, parts missing -- in this case, it was functionality that was not available. Do we openly share that every time something like that comes up? I don't know the answer to that.

Q Okay.

Mr. Weisman. Doug, did have you a question? I think you're on mute.

Doug, I think you're muted.

Ms. Pasternak. Sorry.

BY MR. PASTERNAK:

Q Not to belabor this point, but just as a quick followup -- and this may not be a very careful analogy, but, if I'm sold a car, and the manufacturer knows the speedometer is not working and it's broken, and they neglect to tell me that, and they know this as a fact, do you think that's okay?

A In your analogy, the speedometer would be required for safe operations of the vehicle.

Q So what if my radio was broken, and they know that the radio is not functioning and it's broken, but they charged me $2,000 for that radio, and they sell it to me knowing it isn't working? Is the radio a piece of safety equipment?

It's a simple question. Do you believe Boeing had a moral obligation to tell its customers they were providing something they knew was not functioning?

And from your response, I assume you're saying, yes, it was okay because it didn't violate any regulations.

A I am not saying -- I am not saying yes, or I am not saying no. I do not know, process-wise, what level of detail a feature has to go through before we go out and disclose. I don't know. I'm not involved in post-delivery configuration changes, post-delivery items of how we go about doing that business.

Q I understand, and you don't need to respond to this, but I think, again, you're missing the point. I'm not asking about regulations. I'm asking about the ethical obligation of Boeing, as a company, selling to consumers and knowingly selling them something that's not working.

That's all. I'll stop. You don't need to respond.

Mr. Weisman. I just had some closeout questions. Are there any other questions our side has before I finish up?

Doug, did you -- you're on mute.

Mr. Pasternak. Yeah, so just one more.

BY MR. PASTERNAK:

Q Circling back, I think Corey had asked this question about undue pressure at Boeing, and you spoke a little bit about that.

Are you familiar with an internal survey that Boeing did in the 2016 timeframe that showed, I think it was, 39 percent of Boeing employees, including Boeing ARs, felt they had been subject to undue pressure? Are you aware of that survey?

A I was aware of that survey based upon prepping for this conversation, through the attorneys.

Q Okay. Thank you.

Mr. Weisman. Can we go off the record very quickly for just a minute or two?

[Discussion off the record.]

Mr. Weisman. I guess we can go back on the record.

BY MR. WEISMAN:

Q Okay. Just real quickly, just to sort of wrap things up, in retrospect, from a lessons-learned perspective, do you feel Boeing should have done anything differently, and, if so, what?

A You know, we continue to -- I sound like a broken record, but we follow our processes; we work and follow our guidance material to design and deliver the aircraft; and then we learn from incidents and we learn from the accidents.

We have learned from this accident, and we've made lots of changes. We've made changes associated with organizational changes, and we now are putting more efforts into ensuring that the safety assessments associated with the pilot reactions, whether the assumptions we are making in those are consistent with the training associated with what pilots get. And we're just going to continue to improve on that.

Q And, likewise, do you feel, in retrospect, the FAA should have handled anything differently?

A I don't have any comment on the FAA processes. They seem to have -- I view them as good processes, but, like all processes, we can learn and improve from

them.

Q I mean, anything you would suggest the FAA should do to change their processes or procedures?

A Not off the top of my head, no.

Q Okay.

Mr. Weisman. Unless anyone else on our side has any other questions in the last minute? That's all I have.

Okay.

Well, Mr. Teal, thank you very much. I know this has been a very long afternoon. I know we still have another question-and-answer period with the other side, but since this is our last hour, I just want to thank you very much for participating, especially given everything going on right now. I know this is especially challenging, to partake in one of these, so we very much appreciate it.

Ms. Cooke. Sorry. I was waiting for Matt to say "off the record."

Mr. Weisman. Sorry.

Ms. Cooke. That's okay. So, I think, off the record for a moment.

[Discussion off the record.]

Ms. Cooke. We're going to go back on the record. It is 4:02 p.m. eastern standard time. And, again, Corey Cooke for the Republicans.

BY MS. COOKE:

Q We know it's been a long day, so we appreciate your cooperation.

Circling back to some things that they -- sorry. It's eastern daylight time. I've been corrected.

Circling back to some things that we said initially, you discussed in, I think, your first hour or two of questionings with folks, can you just describe again the organizational

structure of your office?

I know you said that folks didn't directly report to you, so could you kind of just lay out how that went, how it was set up, who you actually reported to? I know you mentioned Leverkuhn, but then, from him, kind of, who went from there to the next person?

A So are you interested in above, below, or both?

Q Both if possible, please.

A Okay.

So, on the program, Keith Leverkuhn, at the time of certification, was the vice president/general manager. I reported to him but was kind of an equal as the chief project engineer.

And we had engineering leaders for systems, structures, propulsion, interiors, and an integration leader that all reported to Keith. And then the engineers reported up through those five. Some of those worked in a core engineering organization and took their direction from core folks, but, you know, daily management came from those five engineering leaders.

These five formally reported to Keith initially, and then, as we brought in a director of engineering for the program, then they reported to the director of engineering to the program. But they didn't report directly to me.

I had no direct reports, and that's one of the things Boeing does, in terms of the chief project engineers not having direct reports. It enables them to focus clearly on the product integrity and safety of the airplanes. So I don't have any budget responsibility or, really, the schedule. I support and participate, but, really, I'm focused clearly on product integrity and safety.

And the engineers working those teams do have to work their schedule and cost

and technical, but when they're working technical, they work it through me. When they're working schedule and cost, they would work through Keith.

Does that make sense?

Q It does. And --

A Above Keith -- I'm sorry. Go ahead.

Q No, I was just -- I think you were about to answer the question, so that's fine. Thank you.

A Yeah. Above Keith, at some point in the program, we had a leader of airplane development, where all development, new products that were being designed and certified were working for a gentleman named [redacted].

Then the organization changed, and, near the end, Keith reported directly to the 737 vice president and general manager of the entire program, so the NG and the MAX combined. And that was, oh, [redacted] -- I forget his name. It's not [redacted]. Anyway, there was a person above them.

And then that person reported directly to the CEO of the commercial company, which at the time was [redacted].

Q Okay. And how often were you in meetings with the senior person, [redacted], or, in the new organization, the [redacted] gentleman?

A [redacted] was probably, you know, once a month, in conversations, us giving status of where the program was at.

And the other [redacted], he didn't come to any meetings. He really focused his attention on the production side of the Next Generation and the production side of building up the MAX production system, where I was focused on the design and certification of the new product.

Q And when did that organizational structure change to bring in that new

individual?

A I don't recall. It was probably a year before certification, something like that. Don't know exactly.

Q And I know you've been asked a lot of questions, but is it possible for you to just give a synopsis, a clear explanation of what your role was, so, you know, maybe what your position description would be?

A My position description would be -- it's the chief project engineer, and it's overseeing the requirements for the program, the configuration of the product, the design of the product, the testing of the product, and the certification of the product and how it integrates into the production system, as well as coordinating with the sales organization to ensure that they understand what the product is so they can represent that to future customers in sales campaigns.

Q Okay.

In terms of the ODA that we've discussed, were any ODA personnel working directly for you?

A No.

Q Are you aware of them working for Mr. Leverkuhn?

A No. My understanding is that -- and I'm pausing because the -- I said there was a regulatory administration leader on the program that helped us coordinate with the organizational delegation authority, the ODA, but he reported up through the regulatory administration, not Keith.

Q Okay. So, to the best of your recollection, nobody in the team that you worked for was also working on the ODA.

A That's correct. If you the consider the ARs that are sprinkled within the organization as part of the ODA -- I mean, they're an extension of the ODA, but of

the -- they are part of the engineering team, but they don't report directly to me.

Q Okay.

Getting into, sort of, the relationship with Mark Forkner, which I know you've been asked about several times throughout today, he did not specifically report to you.

A No, he did not.

Q Ultimately, did he report to Mr. Leverkuhn?

A No.

Q Are you aware of who Forkner directly would have reported to or ultimately reported to?

A I do not. He was in the training organization, and that was, at the time, part of the BGS organization, Boeing -- it's a services -- I don't know what the "GS" --

Mr. Paisner. Boeing Global Services.

Mr. Teal. Boeing Global Services. Sorry.

BY MS. COOKE:

Q Do you know, in his role -- you've stated that you had, I think you said, a cordial or a decent working relationship with Mark Forkner in the times that you dealt with him?

A In the times I dealt with him, as part of those risk reviews, it was cordial.

Q Okay. Are you aware of Forkner ever applying for or attempting to change positions or get a promotion during the time that he served in his role as the chief technical pilot?

A I'm not.

Q Okay. So you would not have been in a position to affect any of his personnel or promotion decisions.

A No, I would not have.

Q Okay.

Following up on something you were asked, I believe, in the prior hour of questioning, in terms of anytime there's an airplane accident or a fatality, obviously that's a great tragedy. Would you agree with that statement?

A I would agree.

Q Do you think that aircraft accidents are the result of multiple factors and whether that was the case with the two MAX accidents? And, if so, what do you think were contributing factors?

A I would say, yes, I believe that the accidents were a result of multiple contributing factors. I am not very familiar with the details of the Ethiopian event, and in the Lion Air event, my knowledge of that has purely come from reading the formal reports that come out. So my understanding of the multiple factors are purely coming from those reports.

Q Had you ever worked on aircraft that had been involved in crashes or accidents where you've had to look at contributing factors previously?

A In my role as a chief structural engineer, back in the 2001-to-2005 timeframe, there were accidents that were caused by some structural issues. And so I wasn't involved in the certification or design of those, but, obviously, I was part of the overall effort that looked at them and said what changes need to be made.

In this case, you know, it could be an inspection, a structural inspection, due to a tear or a crack that wasn't expected or a decompression event. So we are continuously looking at the incidents in the fleet and following our processes in terms of responding to in-service events.

Q Okay.

I think, finally, I guess -- and I believe Matt had done this as well, but is there

anything you feel we should know that we haven't asked you or that we have asked you that you would like to clarify or elaborate on?

A No, I can't think of anything.

Q Okay.

Ms. Cooke. Well, I want to again, as Matt said, thank you for your time. And I know this is a hard time in America, with everything that's going on, so thank you for taking the time to do this. We really appreciate it and hope that everyone in your life is doing okay. And thank you again.

And, with that, we're done on our side, so we can go off the record.

[Whereupon, at 4:17 p.m., the interview was concluded.]

Exhibit 1

From: [redacted]@ussevm18.cs.boeing.com [redacted]@ussevm18.cs.boeing.com]
Sent: 6/7/2013 9:13:10 PM
To: [redacted]@boeing.com]
Subject: PRG - 37MAXFCI-PDR_AI22 - MCAS/Speed Trim

```
+-------------------------------------------------------------------------------+
| You are identified as requiring notification of any progress on this item.    |
| Progress has been added or modified since 06-JUN-2013 21:12:47 (US Pac)       |
+-------------------------------------------------------------------------------+
| The following is a summary of the item info and the new progress data         |
| For full text of item, select the link below or use itracs                    |
+-------------------------------------------------------------------------------+
```

To view and/or edit the ITRACS item, select this item number link 37MAXFCI-PDR_AI22

```
Item No: 37MAXFCI-PDR_AI22
Title: MCAS/Speed Trim

        Category:
        Model:                              737 MAX -8
        Phase:                              COMPLETE
        Effort:
        Need Date:                          JUL-01-2013 00:00:00
        ECD:
        Next Phase Due:

Coordination Responsibility:
        Company:                            Boeing
        Resp_1:                             [redacted]
        Resp_2:                             [redacted]

+-------------------------------------------------------------------------------+
|  when       what         who              (by who            when added/updated)|
|                                                                (US Pacific Time) |
+-------------------------------------------------------------------------------+


07-JUN-2013  ANALYSIS [redacted]      [redacted]    07-JUN-2013 08:29:23
6/7/13 Meeting Minutes:
1) GTTA left the name as MCAS but treated as analogous function as a speed trim
type function.
2) If we emphasize MCAS is a new function there may be a greater certification
and training impact.
3) Treat as an addition to Speed Trim.
4) Externally we would communicate it is an addition to Speed Trim.
5) Internally continue using the acronym MCAS (within variable names etc).
6) Work with AR on certification perspective to ensure this strategy is
acceptable.
7) Make sure EASA Fam Tech presentation is consistent with intent that MCAS is
an addition to Speed Trim.



07-JUN-2013  PROP_RES [redacted]      [redacted]    07-JUN-2013 12:18:39
After speaking with the Autoflight AR, concurrence was provided that we can
continue to use the MCAS nomenclature internally (variable names, etc) while
still considering MCAS to be an addition to the Speed Trim function. This will
allow us to maintain the MCAS nomenclatue while not driving additional work due
to training impacts and maintenance manual expansions.
```

Exhibit 2

5.11 Boeing Flight Crew Operations Manual Bulletin number TBC-19

BOEING

Flight Crew Operations Manual Bulletin
for
The Boeing Company

The Boeing Company
Seattle, Washington 98124-2207

737

Number: TBC-19

IssueDate: November 6, 2018

Airplane Effectivity: 737-8 / -9

Subject: Uncommanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason: To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Information in this bulletin is recommended by The Boeing Company, but may not be FAA approved at the time of writing. In the event of conflict with the FAA approved Airplane Flight Manual (AFM), the AFM shall supersede. The Boeing Company regards the information or procedures described herein as having a direct or indirect bearing on the safe operation of this model airplane.

THE FOLLOWING PROCEDURE AND/OR INFORMATION IS EFFECTIVE UPON RECEIPT

Background Information

The Indonesian National Transportation Safety Committee has indicated that Lion Air flight 610 experienced erroneous AOA data. Boeing would like to call attention to an AOA failure condition that can occur **during manual flight only.** This bulletin directs flight crews to existing procedures to address this condition.

In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- Inability to engage autopilot.
- Automatic disengagement of autopilot.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the AOA indicator option is installed)
- FEEL DIFF PRESS light.

Operating Instructions

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8 /-9, in conjunction with one or more of the above indications or effects, do the Runaway Stabilizer NNC ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

Note: Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used after the STAB TRIM CUTOUT switches are moved to CUTOUT.

Administrative Information

Insert this bulletin behind the Bulletin Record page in Volume 1 of your Flight Crew Operations Manual (FCOM). Amend the FCOM Bulletin Record page to show bulletin TBC-19 "In Effect" (IE).

This Bulletin remains in effect until Boeing provides additional information on system updates that may allow this Bulletin to be canceled.

Please send all correspondence regarding Flight Crew Operations Manual Bulletin status, to the 737 Manager, Flight Technical Data, through the Service Requests Application (SR App) on the MyBoeingFleet home page.

Exhibit 3

FAA
Aviation Safety

EMERGENCY AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/

DATE: November 7, 2018
AD #: 2018-23-51

Emergency Airworthiness Directive (AD) 2018-23-51 is sent to owners and operators of The Boeing Company Model 737-8 and -9 airplanes.

Background

This emergency AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. This condition, if not addressed, could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

FAA's Determination

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design. Due to the need to correct an urgent safety of flight situation, good cause exists to make this AD effective in less than 30 days.

AD Requirements

This AD requires revising certificate limitations and operating procedures of the airplane flight manual (AFM) to provide the flight crew with runaway horizontal stabilizer trim procedures to follow under certain conditions.

Interim Action

We consider this AD interim action. If final action is later identified, we might consider further rulemaking then.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

Presentation of the Actual AD

We are issuing this AD under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator.

2018-23-51 The Boeing Company: Product Identifier 2018-NM-151-AD.

(a) Effective Date

This Emergency AD is effective upon receipt.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all The Boeing Company Model 737-8 and -9 airplanes, certificated in any category.

(d) Subject

Air Transport Association (ATA) of America Code 27, Flight controls.

(e) Unsafe Condition

This AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. We are issuing this AD to address this potential resulting nose-down trim, which could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Revision of Airplane Flight Manual (AFM): Certificate Limitations

Within 3 days after receipt of this AD, revise the Certificate Limitations chapter of the applicable AFM to include the information in figure 1 to paragraph (g) of this AD.

Figure 1 to paragraph (g) of this AD – *Certificate Limitations*

Required by AD 2018-23-51

Runaway Stabilizer

In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

(h) AFM Revision: Operating Procedures

Within 3 days after receipt of this AD, revise the Operating Procedures chapter of the applicable AFM to include the information in figure 2 to paragraph (h) of this AD.

Figure 2 to paragraph (h) of this AD – *Operating Procedures*

Required by AD 2018-23-51

Runaway Stabilizer

Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.

Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

An erroneous AOA input can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOUT switches are moved to CUTOUT.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For further information about this AD, contact Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3548; email: Douglas.Tsuji@faa.gov.

Issued in Des Moines, Washington, on November 7, 2018.

Original signed by
Chris Spangenberg,
Acting Director,
System Oversight Division,
Aircraft Certification Service.

Exhibit 4

From: [redacted]@boeing.com>
To: Boeing Employees
Sent: 6/5/2017 11:19:13 AM
Subject: Conversation with [redacted]

[redacted] **6:54 PM:**
Morning, just got to Gatwick. First day in sim tomorrow
[redacted] **6:55 PM:**
how were the flights?
[redacted] **6:55 PM:**
Copy me in on emails if you dont mind, so that i can keep up to speed with what is going on at home, in particular RTL and wind additive
Flight was good, but weird business seat layout on [redacted]
[redacted] **6:55 PM:**
do you know if MAX sim in MIA has the overrun and speedbrake warnings activated, or capable of being activated?
[redacted] **6:56 PM:**
Not bad, but i would probably choose another airline over their 787
I don't know. But I will fire of an email right now to find out
[redacted] **6:56 PM:**
I already sent one to [redacted]
[redacted] **6:57 PM:**
Good
[redacted] **6:57 PM:**
Now friggin Lion Air might need a sim to fly the MAX, and maybe because of their own stupidity. I'm scrambling trying to figure out how to unscrew this now!
idiots
[redacted] **6:58 PM:**
WHAT THE F%$&!!!!
But their sister airline is already flying it!
[redacted] **6:58 PM:**
I know
I've asked for a webex so we can thru this with the DGCA
not sure if this is Lion's fault or DGCA yet
[redacted] **6:59 PM:**
Let me know if you need me to go down for a day while im there, not ideal but if we have to we have to
[redacted] **7:00 PM:**
one of the DGCA guys is coming for the delivery so we can always get him there
but supposedly they're making a training determination on Wed, so that's why I'm trying to jump on this tonight with them
[redacted] **7:01 PM:**
You definitely want to be in front of that one!
Unbelievable, when will these curve balls stop coming...
[redacted] **7:01 PM:**
its unreal man
if we can make it thru summer we'll be ok, in theory
[redacted] **7:02 PM:**
haha, I do recall saying and hearing the same thing at the end of last summer!!
[redacted] **7:02 PM:**
ha! good point
little did we know
who should I send a VNAV and Flight Director question from [redacted] to?
[redacted] **7:03 PM:**
Prbably [redacted] he has helped me out recently
Or if it is more FMC then [redacted]
Or both
[redacted] **7:04 PM:**

ok, [redacted] is claiming they're having level off issues with the split cue FD now that they've switched to it

[redacted] **7:04 PM:**

What??? No, I've never had an issue.

[redacted] **7:06 PM:**

I'll fwd

[redacted] **7:07 PM:**

ok

Exhibit 5

From: **Boeing Employee**
To: **Boeing Employees**
Sent: 6/7/2017 3:47:26 PM
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

Haha, I'll send you to negotiate piece in the Middle East next. Goes to show what a little bit a accurate info can do to sway an operator in the right direction...

From: **Boeing Employee**
Sent: Wednesday, June 7, 2017 10:01:41 AM
To: **Boeing Employees**
Subject: FW: MAX LEVEL B DIFFERNCES SOLUTION

Looks like my jedi mind trick worked again!

These are not the droids you're looking for….

737 Chief Technical Pilot

BOEING

From:
Sent: Wednesday, June 07, 2017 12:12 AM
To: @boeing.com>
Cc:
Subject: Re: MAX LEVEL B DIFFERNCES SOLUTION

Dear

I have received the presentations and I accept and agree the training requirement for Boeing Max as CBT is source for transition training from B737800 to Boeing Max.
Those presentations you send me was very helpfull.
Regarding CAT II/ CAT III and ETOP B 737 training materials can i have it for free or any sugestion to have those training material ?
Will call or email you if i have further question ,we will keep in touch.

Thank you..

Best regards

On Jun 7, 2017, at 11:23 AM, [redacted]@boeing.com> wrote:

[redacted]

Please see email I sent to [redacted] yesterday. We had a good phone conversation. I am concerned that if [redacted] chooses to require a MAX simulator for its pilots beyond what all other regulators are requiring that it will be creating a difficult and unnecessary training burden for your airline, as well as potentially establish a precedent in your region for other MAX customers. I have suggested some alternatives to requiring a MAX simulator below. Please review with your team and let me know if you would like to discuss further. I also attached a few presentations showing just how similar the MAX is to the NG.

Thank you,

[redacted]

[redacted]
737 Chief Technical Pilot
[redacted]

BOEING

From: Boeing Employee
Sent: Monday, June 05, 2017 10:59 PM
To: [redacted]@boeing.com>
Cc: [redacted]
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

[redacted]

Thank you for the call. I have attached the technical and operational differences presentations here for your team. Please keep in mind that the supplementary and non-normal procedure differences are considered Level A, or Handout differences only, as they are read-and-do procedural differences. I would be happy to present these briefings to your team if you would like, or you can review them and if you have any questions please do not hesitate to ask.

Rather than require a simulator event, you may want to consider what other airlines have thought about, such as requiring a minimum hours requirement on the 737NG before doing the MAX differences training, or perhaps requiring the first flight on the MAX be with another pilot who has already flown it. I believe, based on other operator inputs, that you will find any of these solutions to be acceptable. A simulator training requirement would be quite burdensome to your operation.

I look forward to working with your team as you prepare to bring the 737 MAX into your operation.

Regards,

[redacted]

[redacted]
737 Chief Technical Pilot
[redacted]

From: [redacted]
Sent: Monday, June 05, 2017 9:33 PM
To: [redacted]@boeing.com>; [redacted]@boeing.com>
Cc: [redacted]
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

Dear [redacted]

Thank you for the explenation.
I will discuss further with my team.

Regards

[redacted]
Deputy Training B 737

[redacted]

From: [redacted]@boeing.com>
Sent: Tuesday, June 6, 2017 11:01:40 AM
To: [redacted] **Boeing Employee**
Cc: [redacted]
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

[redacted]

There is absolutely no reason to require your pilots to require a MAX simulator to begin flying the MAX. Once the engines are started, there is only one difference between NG and MAX procedurally, and that is that there is no OFF position of the gear handle. Boeing does not understand what is to be gained by a 3 hour simulator session, when the procedures are essentially the same.

Perhaps we should discuss at your earliest opportunity. The FAA, EASA, Transport Canada, China, Malaysia, and Argentinia authorities have all accepted the CBT requirement as the only training needed to begin flying the MAX. I'd be happy to share the operational differences presentation with you, to help you understand that a MAX simulator is both impractical and unnecessary for your pilots.

Please let me know when would be the best time to have a webex discussion.

Thank you

[redacted]

[redacted]
737 Chief Technical Pilot
[redacted]

From:
Sent: Monday, June 05, 2017 8:42 PM
To: @boeing.com>; @boeing.com>
Cc:
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

I'm still on going with the team .
The syllabus still on progress .On my side i decide to gave the transition pilot with 1 sim familirization.
And also gave them 24 hours ground class room including CBT that Boeing gave us and flight technique compile with company guidance procedure.

Actually i have question regarding ETOP for Boeing 737 MAX

as a Technical Pilot B 737 at will intouch with you

I will give you a call after I discuss with my team on syllaby.

Best regards

Deputy Training B 737

From: @boeing.com>
Sent: Tuesday, June 6, 2017 10:29:27 AM
To: **Boeing Employee**
Subject: RE: MAX LEVEL B DIFFERNCES SOLUTION

I would like to discuss what if any requirements beyond the Level B CBT the DGCA has required of you, or if your airline has determined any additional training is required. Please call me today on my cell phone, at your earliest convenience. Do not worry about what time it is here for me.

My cell is

Thank you,

737 Chief Technical Pilot

From:
Sent: Monday, June 05, 2017 8:26 PM

To: [redacted]@boeing.com>; [redacted]@boeing.com>
Subject: Re: MAX LEVEL B DIFFERNCES SOLUTION

Dear [redacted]

Updating my cell no is [redacted]

Thanks

[redacted]
Deputy Training B 737

[redacted]

From: [redacted]@boeing.com>
Sent: Tuesday, June 6, 2017 10:21:06 AM
To: Boeing Employee
Cc: [redacted]
Subject: MAX LEVEL B DIFFERNCES SOLUTION

[redacted],

I just spoke with [redacted] at his mobile # below. Currently in FFS and busy rest of day. He welcomes you call him this time tomorrow at number below (and attached). The number shall be:

[redacted]

This would be 11:00 AM Jakarta time.

Best Regards,
[redacted] | Boeing Flight Services | Regional Sales Manager | APAC
[redacted] Singapore | UTC/GMT + 8 hours

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<Procedural Differences.pdf>
<NG to MAX Differences.pdf>

Attachment 1

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August 31, 2020

By E-mail

Douglas S. Pasternak
Director, Investigations & Oversight,
Committee on Transportation and
Infrastructure
U.S. House of Representatives
586 Ford House Office Building
Washington, D.C. 20515
doug.pasternak@mail.house.gov

Re: May 11, 2020 Interview of Michael Teal

Dear Doug:

Per your request, I write to follow up on our June 9, 2020 clarification regarding one portion of Michael Teal's May 11, 2020 interview with Committee staff.

During his interview, Mr. Teal stated his recollection that he received a bonus in the form of restricted stock shares for his work on the 737 MAX program at the end of the MAX program, and was notified of the award by Mr. John Hamilton.

Following the interview, Mr. Teal reviewed his records and would like to clarify his testimony. He did receive a bonus grant of restricted stock shares in connection with his work on the MAX program. However, he received that additional grant in February 2016, following the 737 MAX's first flight, not at the end of the 737 MAX program, and he received notification from Michael Delaney, not John Hamilton, as he had initially recalled during his testimony.

Sincerely,

Craig S. Primis

Craig S. Primis, P.C.