

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,  
U.S. HOUSE OF REPRESENTATIVES,  
WASHINGTON, D.C.

INTERVIEW OF: KEITH LEVERKUHN

Tuesday, May 19, 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:

MOHSIN SYED, CHIEF COUNSEL

LARRY WHITTAKER, IT SYSTEMS ADMINISTRATOR

DOUGLAS PASTERNAK, DIRECTOR, INVESTIGATIONS AND OVERSIGHT STAFF

MATHEW WEISMAN, COUNSEL, INVESTIGATIONS AND OVERSIGHT STAFF

LAUREN DUDLEY, COUNSEL, INVESTIGATIONS AND OVERSIGHT STAFF

MIKE ARMES, GOVERNMENT ACCOUNTABILITY OFFICE (GAO) DETAILEE TO  
INVESTIGATIONS AND OVERSIGHT STAFF

ALEX BURKETT, STAFF DIRECTOR AND SPECIAL ADVISOR ON AVIATION SAFETY,  
SUBCOMMITTEE ON AVIATION

MICHAEL TIEN, SENIOR COUNSEL, SUBCOMMITTEE ON AVIATION

BRIAN BELL, COUNSEL, SUBCOMMITTEE ON AVIATION

ADAM WEISS, COUNSEL, SUBCOMMITTEE ON AVIATION

COREY COOKE, MINORITY GENERAL COUNSEL

TARA HUPMAN, MINORITY COUNSEL

JAMIE HOPKINS, MINORITY RESEARCH ASSISTANT

HOLLY WOODRUFF LYONS, MINORITY STAFF DIRECTOR AND SENIOR COUNSEL,  
SUBCOMMITTEE ON AVIATION

HUNTER PRESTI, MINORITY PROFESSIONAL STAFF, SUBCOMMITTEE ON AVIATION

For THE BOEING COMPANY:

RYAN ARCHER, COUNSEL, THE BOEING COMPANY; and

CRAIG PRIMIS, ESQ.

PATRICK HANEY, ESQ.

YAFFA MEERAN, ESQ.

Kirkland & Ellis LLP

1301 Pennsylvania Avenue NW

Washington, D.C. 20004.

Mr. Weisman. 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 Keith Leverkusen being conducted by videoconference.

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 737 MAX and related issues.

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

Mr. Leverkuhn. My name is Keith, K-e-i-t-h, and the last name is Leverkusen, L-e, V as in "Victor," -e-r-k-u-h-n.

Mr. Weisman. Thank you. And I'll ask the witness to please state his current place of employment and title.

Mr. Leverkuhn. I am employed at The Boeing Company, and my title is the vice president of propulsion systems.

Mr. Weisman. Thank you. I'll 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 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 they are not recording this interview.

I will start with myself and my colleagues on the majority staff. Again, Matt Weisman with the majority side of the Transportation and Infrastructure Committee, and

I am not recording this interview.

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

Ms. Dudley. Lauren Dudley, counsel with the T&I majority staff, and I am not recording.

Mr. Armes. My name is Mike Armes, also from T&I majority, not recording.

Mr. Burkett. Alex Burkett, staff director, Aviation Subcommittee, majority staff, not recording.

Mr. Tien. Mike Tien, majority staff Aviation Subcommittee, senior counsel, not recording.

Mr. Bell. Brian Bell, House Aviation majority counsel, not recording.

Mr. Weiss. Adam Weiss, House majority. Aviation counsel. Not recording.

Mr. Weisman. Thank you. I'll now ask minority staff to do the same.

Ms. Cooke. Corey Cooke, Republican general counsel, not recording.

Ms. Hupman. Tara Hupman, Republican counsel, not recording.

Ms. Hopkins. Jamie Hopkins, Republican research assistant, not recording.

Mr. Presti. Hunter Presti, Republican senior professional staff, not recording.

Ms. Lyons. Holly Woodruff Lyons, Aviation Subcommittee staff director, minority staff, not recording.

Mr. Weisman. Thank you. And now I'll ask those representing Mr. Leverkusen in his personal capacity, and those representing The Boeing Company to please do the same.

Mr. Primis. This is Craig Primis from Kirkland & Ellis for The Boeing Company.

Mr. Weisman. And can you confirm that you're not recording?

Mr. Primis. Not recording.

Mr. Haney. Patrick Haney, Kirkland & Ellis for The Boeing Company, not recording.

Ms. Meeran. Yaffa Meeran, Kirkland & Ellis for The Boeing Company, and I'm not recording.

Mr. Archer. This is Ryan Archer with The Boeing Company in-house counsel, not recording.

Mr. Weisman. Okay. If there's anyone else besides the court reporters and IT staff who have not identified themselves, please do so now. Okay. Thank you.

Mr. Leverkuhn, if at any point you need a break, please let us know. We are happy to accommodate. We may take a few short breaks as needed, and we will take a short break for lunch. But if you need additional breaks, please just let us know. However, if you would like to take a break and there is a question pending, we'll just ask that you answer the question first before we take a break. Do you understand?

Mr. Leverkuhn. I do understand. Thank you.

Mr. Weisman. Because we are proceeding virtually, we will establish a video breakout room in which you can speak privately with your attorneys if needed. In addition, separate breakout rooms will be established for the committee majority staff, committee minority staff, and court reporters to allow for private conversations during breaks in the interview. You will see a breakout room icon located at the bottom of the toggle bar on your screen once the rooms are established. That will provide you with access to your breakout room. Do you understand?

Mr. Leverkuhn. I do. Thank you.

Mr. Weisman. I'll 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. We will try our best to do that.

For the most part, we expect one person at a time on each side will take the lead in 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.

For everyone, we would ask, if you're not attempting to ask a question or raise another issue, that you turn off your video monitor so that it is less distracting for the witness. Because we are proceeding virtually, I will also ask everyone, other than the witness and the main questioner, to please also mute your microphones and then unmute your microphone if and when you need to speak. This will help with our audio quality.

The videoconference host has left 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 the majority staff by telephone at area code [REDACTED]<sup>1</sup>. He can authorize you to get back into the conference if you're locked out.

Mr. Leverkusen, 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. Leverkuhn. Yes. That's Ryan Archer from The Boeing Company; Craig Primis, Patrick, and Yaffa from Kirkland & Ellis.

Mr. Weisman. Okay. Just to clarify, which counsel is representing you in your

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<sup>1</sup> Redaction of direct cell phone number of Committee staff agreed to by Majority and Minority staff.

personal capacity?

Mr. Leverkuhn. Craig Primis.

Mr. Weisman. Okay. And I understand, as you've indicated, that there are attorneys from The Boeing Company, and can you just identify those counsel that are representing The Boeing Company in this proceeding?

Mr. Leverkuhn. Yes. Yes. Sorry. That's -- Ryan Archer is here in the room with me in Seattle and representing The Boeing Company.

Mr. Weisman. Okay. And was it your choice to have Boeing counsel participate today?

Mr. Leverkuhn. Yes.

Mr. Weisman. Thank you.

As I mentioned, we have three court reporters here on the videoconference today who will be taking turns transcribing this interview. To help the reporters, I will ask that you please wait to respond to a question until after the entire question has been asked. I will 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. And if you use an acronym or abbreviation, please provide the full term the first time you use it. Do you understand?

Mr. Leverkuhn. Yes.

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. Leverkuhn. Yes.

Mr. Weisman. If we ask you 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. Leverkuhn. Yes.

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 at interviews such as this one. If you have any questions about this, you should discuss your questions with your attorney. Do you understand?

Mr. Leverkuhn. Yes.

Mr. Weisman. If, at any time, you knowingly make false statements or intentionally withhold information from the committee, you could be subject to Federal prosecution. Do you understand?

Mr. Leverkuhn. Yes.

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

Mr. Leverkuhn. No.

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. Leverkuhn. Not today.

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

Mr. Leverkuhn. No.

Mr. Weisman. Okay. Then I am going to note I have, looks like it's 11:18

eastern time, and we'll start with our first hour of questioning now.

#### EXAMINATION

BY MR. WEISMAN:

Q In preparation for this interview today, did you speak with anyone either at Boeing or outside of Boeing other than attorneys?

A No.

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

A No.

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

A Yes. I looked at the interim report from the Lion Air accident and the final report from the Lion Air accident involving the 737 MAX.

Q Very good. Thank you.

Can you very briefly describe your educational background?

A Yes. I have an undergraduate degree in aerospace engineering from St. Louis University, and a masters in business administration from Seattle University.

Q And when did you begin working for Boeing and in what capacity?

A I started in May of 1985 as a structural engineer working on the 767 airplane.

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

A I joined the MAX program in April of 19 -- excuse me, in 2013, and I then carried on in that role as vice president and general manager of the MAX development

through till April of 2018.

Q And what were your responsibilities in that capacity?

A I was responsible for the general management of the MAX development, including engineering, including manufacturing, supplier management, responsible for the technical schedule and financial performance of the MAX program.

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

A About a dozen, and it varied during the program from about nine to 12 people.

Q And were there regular meetings within the MAX program that you typically attended?

A Yes.

Q And can you explain who attended those meetings? Did you typically lead them?

A Sure.

Q What was the purpose of --

A Yeah.

Q -- the meeting?

A Certainly. Regularly, we would have what's called a BPR, which is a business plan review, and that was really all-encompassing. And the primary participants there were the leaders of what we call the integrated product teams, or IPTs. In the structure of the development program, we create these teams, and we essentially break the airplane out into its constituent elements: Structures, systems, propulsion, interiors.

In that meeting, of course, we would also have our chief engineer. We also would have our business operations leader, and the business operations leader was

effectively responsible for the running of the meetings and the coordination of the meetings.

And then, of course, we -- excuse me, Mr. Weisman, you had a question?

Q Oh, no. Please continue.

A Okay. We would also have our functions, such as human resources, finance, they would also participate in the BPRs.

We would then have special-attention meetings on a weekly basis, and these would be topics that required extra focus. They would rotate by topic depending upon, you know, what happened to be a significant issue that particular week. Those, again, would be scheduled by our business operations review and that would be based upon invitations by whoever is dealing with the particular issue at hand.

We would have our risk reviews every week where we would take a look at the program risks and understand how we were doing in mitigating those risks. We would have our manufacturing reviews, how was the factory being ready for the MAX coming on board. We would have the regular meetings involving supplier management.

In particular, we would have a weekly meeting with the engine manufacturer, who, for the MAX, was CFM International. And so there were -- again, nearly every day, there were standing meetings and then we would create space for ad hoc sessions as necessary.

Q And how often were those BPR meetings? Were those also weekly?

A Yes, they were weekly.

Q And did Michael Teal participate in those meetings?

A Yes, Michael Teal, as the chief project engineer, was certainly involved in all of those meetings.

Q And were technical pilots involved in those meetings?

A Not typically, but the chief pilot of the program, or person from his team, was almost always present at those meetings.

Q So as vice president and general manager of the 737 MAX program, did you normally have ultimate signoff authority or approval authority on MAX-related financial issues?

A Well, it depended. It depended upon the level of what was being discussed. So at a certain financial level, we delegated that down, deeper into the organization, and then we had a tiered approach, such that if something was what we would consider to be programmatically significant in either a schedule change or a financial change, then that would come into what we call our CCB, or our change board, and that would happen whenever there was a topic that needed to be brought in there. And, again, that was if there was something that was impactful to the program schedule or the program financials.

Q And did you normally have ultimate signoff authority and approval authority on technical or design issues?

A Now, that typically is left to the chief project engineer on development programs. Certainly, I was made aware of those, but in the technical realm that was really the purview of the chief project engineer. But certainly on key technical issues, I was involved.

Q Gotcha. And during the development and certification of the MAX, to whom did you report?

A I reported to [REDACTED], and [REDACTED] was the head of airplane development. At the time, we had three different development programs occurring. That was the 787-10, the 777-X, and the 737 MAX. And [REDACTED] was responsible for the development of those airplanes.

Q And can you spell his last name for the court reporter.

A Yes. That's [REDACTED] as in "[REDACTED]," [REDACTED].

Q And so was [REDACTED] in charge of reviewing your work and evaluating your performance?

A Yes.

Q And did you receive annual performance reviews?

A Yes.

Q And were they in writing?

A Yes.

Q Okay. And then to whom did [REDACTED] report, just to get a sense --

A [REDACTED] report -- yeah. Yeah -- to Ray Conner, C-o-n-n-e-r. Actually, at the beginning of my tenure, I believe it was Jim Albaugh, A-l-b-a-u-g-h, but then Jim retired. I'm sorry that I can't remember exactly the timing, but Jim was the CEO of Boeing Commercial Airplanes and then was replaced by Ray Conner. So the majority of my tenure, Ray Conner was the Boeing Commercial Airplanes CEO, and that's spelled C-o-n-n-e-r.

Q Thank you. And were you in charge of evaluating Michael Teal's performance?

A Yes, I was.

Q And were you in charge of evaluating anyone else's performance or just his?

A Yes. No, those IPT leaders that I had mentioned, and, again, those are the integrated product team leaders who were instrumental leaders on the program, as well as my business operations leader. And then, of course, I participated in the review of others that didn't directly report to me that were on the leadership team, such as our leader of finance, leader of marketing. I participated with their direct bosses in their

reviews.

Q So were you in charge of making any decisions about who received bonuses in the MAX program, and how much those bonuses would be, or what kind of bonuses people would receive, such as cash or stock or stock options?

A You know, those weren't really part of the performance evaluation. The performance evaluation was really around their performance, and then the compensation was effectively based upon where they fell with respect to their peers. And it's actually quite a, as you can imagine, convoluted process given the size of Boeing and the size of the pools that are involved with the people who are being compensated and reviewed.

Q So were there written criteria guiding how those decisions were made, or were there some discretion?

A Mr. Weisman, can you repeat the question? When you talk about those decisions, I'm sorry, could you elaborate a little for me?

Q Sure. So the decisions about compensation, bonuses, not base salary, but bonuses, stock options, cash bonuses, things of that nature. Were decisions about those made according to a written criteria, a written guidance, or was that a discretionary process?

A No. And I think it's probably worthwhile, if I may, just kind of describing that, and for a moment, let's use the executive pay, if we could. The bonuses, the annual compensation is exclusively based upon, number one, the individual's performance, and number two, the corporation's performance.

So there isn't really a bonus structure, per se. It's really defined by those two criteria. And there are, if you will, mathematical formulas that determine what the company score is. And then with respect to the individual, it's not only based upon their performance, it's based upon their respective -- the significance of their role and then

how they compared to their peer group.

So there isn't a dedicated, for instance, bonus structure, or a dedicated stock option structure; that really is a fallout of those two elements.

Q So can we maybe take an example, like Mr. Teal. Were you involved in Mr. Teal's bonus consideration?

A Well, again, I want to tell you that there is no dedicated bonus. There is a compensation package, depending upon your level, and that is a defined amount. The amount, then, will vary depending upon your personal success as well as the company's success.

So, for instance, for a given executive, there is a portion of their salary that is dedicated as a bonus pool and that is multiplied by their own score and the company's own score.

So I think what you're getting at, Mr. Weisman, was were there, for instance, extra bonuses that were paid, or extra stock options that were paid and the answer is that, no, that's not the way our system works. It's simply what was your performance for the year, what was the company performance for the year, and then there is a multiplier that determines whether the bonus -- what the bonus actually is.

Q So just, again, with respect to Mr. Teal, were you involved in considering what his bonus would be?

A I was involved in giving him his performance evaluation, and in conjunction with engineering leadership, because, of course, Michael was part of engineering, and that evaluation resulted in a personal score for him, which then, taken in with the company's score, was that determined what the bonus was.

Q Do you recall what it was or what it was relatively?

A No. There is -- again, I'm sorry, I think we're speaking in cross purposes



here. There is no dedicated bonus structure. It is just a --

Q I understand.

A -- mathematical --

Q Do you know how much his bonus was in his last year on the MAX program?

A Well, it's just part of his compensation. There isn't a bonus, per se, there's an annual compensation. There's an annual compensation factor, and then there's a long-term portion of the compensation.

Q I understand. I asked you a question. Do you know how much he received in a bonus in his last year on the MAX program, yes or no?

A There was no bonus given to Michael Teal.

Q That's not what he told us.

A Well, again, I'm trying to -- and I don't mean to be splitting hairs here, but the annual compensation formula is just -- it's just built. I gave Michael a score. I don't know what his annual compensation was based upon that personal score.

Q Okay. Moving on, how often did you interact with Mr. Teal?

A Daily.

Q Okay. And did you have regularly scheduled meetings with him, or was he just a colleague that worked nearby and talked throughout the day?

A Yeah. But, again -- yeah. As I mentioned, all those meetings that I discussed, well, Michael was in those meetings as well, and our offices were adjacent. So there wasn't any dedicated Keith-and-Michael meeting, but because we sat right next to each other the level of coordination was high.

Q And did you socialize with Mr. Teal outside of work?

A Yes. Michael is a friend.

Q Gotcha. Okay. And did you conduct any work relating to Boeing's

marketing and sale of the 737 MAX?

A Yes. Yes. I was often involved in speaking directly with customers about the MAX.

Q Okay. And did you prepare or review marketing materials?

A That was left to our marketing team, but certainly I reviewed them, and, in some cases, actually presented them.

Q And did you ever offer advice on how to describe aspects of the plane, its functionality or operational performance to the marketing team?

A Not that I recall, no.

Q And you mentioned that you did communicate with some MAX customers, or potential MAX customers. Do you recall which ones?

A Oh, Mr. Weisman, there were many. And because the customer base is so large, it is difficult for me to list them, but there were many that I would talk to.

Q Did that include Lion Air?

A I never actually spoke with Lion Air, no.

Q Did it include Ethiopian Air?

A No, it did not.

Q Did it include Southwest Airlines?

A Yes.

Q Okay. Thank you.

Did it include PT Garuda?

A No.

Q Caribbean Airlines?

A Not that I recall.

Q And in any of these conversations with customer airlines or potential

customer airlines, did you discuss pilot training requirements for the MAX?

A Oftentimes, that would be part of the conversation, yes.

Q And in that conversation, was there discussion about whether or not simulators would be necessary for differences training?

A It was along the line of our intention of making the airplane highly common to the NG, and through that commonality, achieve a training level that would not require simulators.

Q While the MAX program was going through the certification process, did you ever correspond or meet with anyone from the FAA about the MAX?

A Yes, I would. There would be -- they weren't really regularly scheduled, but about, I would say, probably every 6 months, I would go to the local FAA office and give them a briefing on how the program was going in its development and where we were in any respective stages.

Q And do you recall which specific office within FAA you met with?

A Yes. It was exclusively with the SACO, the Seattle Aircraft Certification Office.

Q Okay. So you were not meeting with the AEG or the BASOO. Is that correct?

A Well, with the BASOO, BASOO was typically included in those briefings, but the AEG, no, I did not meet with the Aircraft Evaluation Group.

Q And outside of those formal meetings, did you ever communicate directly with anyone at the FAA about the 737 MAX?

A I can recall very few phone calls with Mike Kaszycki, who was a senior leader with the Aircraft Certification Office. And I'm sorry, I cannot spell Kaszycki, so my apologies for the court reporter.

Q Did you ever feel the need to pick up the phone and call or text anyone other than Mike about the MAX program at the FAA?

A No. No, not that I recall. I believe there was a single conversation with Mike and Jeff Duven, and it was about something that had gone through a formal appeal process, and I'm afraid I can't even remember what the topic was. But that was really it. It was limited to a few conversations with Mike, briefings with Mike that would also include the BASOO, in particular, John Piccola, P-i-c-c-o-l-a, I believe is the correct spelling. He was the head of the BASOO. And that was about it. I had limited engagement with the FAA over the --

Q Did you ever have communications by email, phone or text with Ali Bahrami, the associate administrator for aviation safety at the FAA?

A No, I did not.

Q Do you know of any other Boeing officials communicated with Mr. Bahrami about the MAX?

A I don't, no. No, I don't.

Q So going back to the structure organization of the meetings that you described, did you -- we talked a moment about technical pilots. Did you typically interact with 737 MAX technical pilots?

A Not typically, no.

Q Did you ever interact with chief technical pilot on the 737 program, Mark Forkner?

A Yes, I did.

Q Can you explain generally often and in what --

A Yeah. It was quite infrequently, Mr. Weisman. I probably spoke directly with Mark half a dozen times over the course of the program. When I remember

specifically speaking with Mark, it was around the conversations that were occurring around common-type rating.

As you may know, the variants of the 737 that are currently flying include what we call the classic, which is the 300, 400, and 500, and then the NG, and now the MAX. So my main conversations with Mark were around his conversations with the FAA about whether or not pilots were going to be able to achieve that common-type rating on all three variants. And that was around the middle of the program, but that was mainly my direct conversation with Mark.

Q And was he typically involved in the meetings that you described about those 737 MAX progress?

A Not typically, Mr. Weisman. It was, I would say that we would see Mark -- I would see Mark sometimes during a SAM meeting, the special attention meeting, depending upon what topic was being discussed. But my main interaction with the pilots was through our chief pilot office, and at the time that was [REDACTED].

Q Thank you.

Mr. Primis. Matt, this is Craig. Can I just pop in for one second?

Mr. Weisman. Sure.

Mr. Primis. I didn't want to interrupt earlier on when you asked about tech pilots attending meetings, and I think Mr. Leverkusen responded that he would typically deal with the chief pilot, [REDACTED]. I just didn't want it to be unclear earlier in the record. He wasn't talking about tech pilots commonly going to those meetings, he was talking about the test pilots. And I know you understand the difference between them, but I just wanted that to be clear.

Mr. Weisman. Thank you.

Mr. Primis. You could ask him if that's what he was saying, but I'm 99 percent

sure that's what he was saying.

BY MR. WEISMAN:

Q Okay. Mr. Leverkusen, would you like to --

A Yeah. Mr. Primis is correct. The attendees at those standing programmatic meetings were the chief pilots' office. That was [REDACTED] and [REDACTED] [REDACTED]. Those were the main interactions that I had with the pilot.

Q Okay. Thank you.

So we know from Mr. Forkner's emails and instant messages that he often used colorful language, but we'd like to know what you knew of him in terms of an employee. From your experience, do you believe he was competent at his job?

A Yes. I had no reason to believe that he wasn't. In any of my engagement, there was no suggestion that he wasn't competent and capable.

Q Was he known for acting professionally or acting unprofessionally?

A To the extent that I knew, yes, I didn't have any issues raised with Mark.

Q Do you know if he followed direction, or of any instances in which he did not follow direction?

A I'm sorry, Mr. Weisman, I can't speak directly to that because I don't know.

Q Are you aware of anyone ever complaining about him?

A No.

Q Okay. From your understanding, and I do understand what you've described as your relationship with the technical pilot, but just from that vantage point, what did you know about what the responsibilities were for the 737 -- what Mark Forkner's responsibilities were with respect to the 737 MAX program?

A Yeah. My main understanding was that Mark was our key communicator

into the aircraft evaluation group associated with pilot training, training curricula, system descriptions, working with our flight operations teams. So he was a key conduit between our program and the aircraft evaluation group at the FAA.

Q Did his duties also include speaking with 737 MAX customer airlines and potential customer airlines?

A Yes. Yes. When it came to their own training and what the airline was going to have to do for their respective training, I know that Mark and the chief technical pilots do get involved in that.

Q So did you ever provide MAX-related assignments directly to Mr. Forkner?

A I did not.

Q And did you ever provide any MAX-related assignments to Mr. Forkner through Michael Teal or through someone else?

A No. No, I never provided direct -- again, I want to -- I would like to say, though, that in those meetings where we were discussing, again, as I said, the common-type rating, we worked on defining what a strategy might be in discussing with the FAA. Mark would come back and share with me what he had heard from the FAA, and whether or not we were going to be able to -- whether there was something that we were going to be able to do to accommodate this common-type rating or not. So I wouldn't say it was direction, Mr. Weisman, it was conversation.

Q Okay. And did you typically keep Michael Teal in the loop about MAX-related work that you were overseeing?

A Yeah, certainly. Again, very, very close relationship, very close proximal relationship, and in nearly all the same meetings.

Q Okay. And would that have included any MAX-related issues regarding the cost of the program or cost of certain aspects of the program?

A You know, the costs that Michael got involved with were really around engineering staffing, working with those IPT leaders who were predominantly engineers. But in terms of the actual cost of the program, Michael was peripherally aware but that really wasn't his responsibility.

Q So, for example, if there was discussion about the cost of adding a new feature to the MAX, and what the various staffing levels would be necessary for that, that would be the type of cost information that you would have discussed with Mr. Teal?

A Yes, absolutely, for instance, if there were a change that were going to be coming on to the airplane. And the way that that process works, Mr. Weisman, is if, in fact, an engineer recognizes that there's a change to the airplane, that engineer has to come -- again, based upon the level of cost -- has to come with a fully packaged change, if you will, that includes what the engineering hours would be, what the supplier cost would be. And, in that effort, certainly Michael was keenly aware.

Q And what about the implications of changes that might impose cost if it's not a -- sort of speaking beyond the direct cost of design and manufacture, if there's a change to the aircraft, what the implications could be for the certification or sale or marketing of the plane, would those be topics of conversations between you and Mr. Teal?

A Yes, certainly. I'm trying to think of any specific, Mr. Weisman, but, again, very close relationship with Michael and I. Michael was a key leader on the program, and so he would understand that any change, what that would drive to.

And let me specify: There are nonrecurring costs and those are those costs associated with the actual development of the airplane, and then there are the recurring costs and that's just the cost of building every airplane. So certainly, Michael was aware of what those implications were on changes to the airplane.

Q So our understanding is that making sure that nothing higher than level B



non-simulator differences training was needed for the MAX, was a key goal of the 737 MAX program. Is that accurate?

A Well, I would say that level B training would be an outcome of what our primary effort was, which was to make the MAX as common to its predecessor, the NG, as possible. Knowing that the NG had a terrific safety record, terrific maintenance record, we knew that that airplane was familiar and ubiquitous throughout the world.

So our goal was to make the MAX technically better, but make it as common as possible to the NG while making it technically better. Level B would be an outcome of that effort associated with commonality.

Q So, and Mr. Teal told us that level B non-simulator training was a design objective of the program. Is that a fair characterization?

A Yes, certainly.

Q And were you personally compensated in any way for the obtaining of this design objective of level B non-simulator training for the MAX program?

A No.

Q In your performance review, or any bonuses that you received, was it at all noted that the achievement of level B training had, in fact, been achieved?

A No.

Q Okay. Were you ever compensated, even indirectly, for like meeting program objectives or something a little bit more broad like that?

A Certainly. And the way that process works, Mr. Weisman, is that at the time, [REDACTED] and I would sit down early in the year and describe the objectives for the year, which were largely already laid out because of the program schedule. So it was based upon achieving what we set out to do, and that included the technical performance of the airplane, the financial performance, as well as the schedule

performance.

Q Okay. And did that include achieving a plane that was sufficiently similar to the NG?

A Well, because that was already kind of baked into the plan, which was that we were setting out to make it common to the NG, there was really nothing specific in my performance evaluation that talked about that level of commonality. It was really about achieving program objectives, yeah.

Q Okay. So Boeing agreed to pay Southwest Airlines \$1 million per plane in the event that simulator training was required for the MAX. Do you happen to know if Mark Forkner played any role in negotiating that contract with Southwest?

A I don't, but I would highly doubt it. That really isn't a part of the chief technical pilot's role.

Q Do you know if he had any other role regarding pilot training requirements for Southwest Airlines?

A Other than communicating with Southwest and his counterpart at Southwest, no, I'm not aware of any.

Q Did Michael Teal play any role in the contract with Southwest Airlines regarding \$1 million per plane in the event that simulator training was required?

A I don't know. I can't speak to that, Mr. Weisman.

Q Did you personally play any role in negotiating the contract with Southwest in which Boeing agreed to pay \$1 million per plane if the MAX required any simulator training?

A No, I did not.

Q Do you know who did?

A I don't, Mr. Weisman. Usually that is -- we have key people who are

negotiating those things. Certainly the sales director, the sales vice president, the contract people, and then there will often be communication back into the program about specifics. When I say "the program," what I really mean is the people directly involved with the MAX. But with respect to that contract, I'm sorry, I can't speak to who would have been involved.

Q Gotcha. When did you personally become aware of that provision in the contract?

A You know, actually it was probably about a year after I had taken over for the program. It wasn't something that was front and center in terms of my working the program. I became aware of it almost anecdotally as opposed to somebody -- you know, it wasn't something that we were tracking on a regular basis or frankly that I had any awareness of.

Q And do you recall what your reaction was to it?

A You know, we --

Q Were you surprised by it?

A You know, I really wasn't surprised by it, Mr. Weisman, because in any airplane contract, we had often put in concessions or concessionary elements that are important to a particular airline. So I wasn't tremendously surprised, no.

Q Do you know if Mark Forkner received any kind of bonus related to Boeing's achievement of level B training?

A I am not aware, but I don't think so.

Q Okay.

Mr. Pasternak. Matt, can I --

BY MR. WEISMAN:

Q Do you know if anyone else at Boeing received any kind of bonus related to

Boeing's achievement of level B training?

A I don't believe so. I'm not aware of any.

Q Okay.

Mr. Pasternak. Matt, can I --

Mr. Weisman. Sure.

Mr. Pasternak. -- jump in quickly?

BY MR. PASTERNAK:

Q Thank you, Mr. Leverkusen. Just on the Southwest Airlines contract, you initially said that as part of the MAX program, you dealt with budget, engineering, you know, you had a wide portfolio. And you were never aware at the beginning that Boeing had cut a deal with Southwest that they would pay them \$1 million per airplane if simulator training was required? It seems to -- you know, that's a huge financial issue for the corporation, and I'm surprised that the folks dealing with that contract would not have spoken with the senior most people in the MAX program.

A Well, Mr. Pasternak, it's likely important to note, first of all, you talk about it being a huge issue when, candidly, given the size of the program and the revenues that were being generated by the program, I would hesitate to call it huge.

Q But --

A But nonetheless --

Q Sorry. My understanding is that Southwest had ordered, I believe it was close to 300 MAX aircraft from Boeing before the Lion Air crash, so close to \$300 million was not a big deal for the MAX program. Is that your testimony?

A Well, my testimony is this, Mr. Pasternak: Given the number of sales of the MAX, and the revenues generated by those sales, certainly \$1 million is a large amount. But given the overall size of the program, that's my characterization, not calling it huge.

To answer your question, however, Mr. Pasternak, specifically, if I may, my focus was really on --

Q Well, I'm sorry. I apologize to cut you off, but we have a lot to get through, so I just want a very clear response. Your testimony is that you were unaware of the contract with Southwest while it was being negotiated. Is that correct?

A That's correct.

Q Okay. Thank you.

BY MR. WEISMAN:

Q Another topic. Why did Boeing choose to seek an amended-type certificate for the MAX as opposed to a new type certificate? And within that question, another question, which is, was the amended-type certificate a faster or cheaper process for Boeing to pursue as opposed to getting a new type certificate?

A Important to note that during that time I was not on the program, but my knowledge is that any time we create a derivative aircraft on any of our models, the process with the FAA is that going to an amended type is our routine process, that if we're going to create a derivative.

So it's not uncommon; in fact, it's quite common. And you can look at all of our models, 787, 777, 767, any subsequent derivative off of that model is almost always an amended-type certificate.

And your second question, Mr. Weisman, is it less expensive or less timely, not really, because the time of the program was really not affected by whether we received an amended-type certificate or whether it was a full type certificate.

But what it did do was allowed us, in those areas where the airplane, the MAX, remained common to the NG we didn't have to go through another full certification of it, which made sense, again, given our goal of commonality. So I wouldn't say that it was

cheaper or less timely -- or excuse me, less schedule --

Q If --

A -- but it did allow us to -- go ahead.

Q Sir, I apologize. If Boeing had opted to go to a full certification, is it your testimony that it would not have cost Boeing any more money?

A It would have, but it would not have been a huge increment compared to what the overall program costs were already. That's my assessment.

Q Okay. So we talked a little bit about how you were briefed on the program's risks and challenges, and I guess what I'd like to know is who did you brief about the program's progress, risks, and challenges, going up the ladder?

A Yeah. It was weekly with [REDACTED], who I mentioned; it was about monthly with Ray Conner and Ray's leadership team; and then quarterly, with our CEO Dennis Muilenburg, and sometimes members of his executive committee.

Q Gotcha. So during the development of the MAX and prior to the FAA certification, did you ever brief Ray Conner, Dennis Muilenburg, members of the board, or other senior Boeing officials on MCAS?

A No.

Q Why not?

A Well, let me go back, Mr. Weisman, and I want to amend that. The only time that MCAS was briefed was post flight test, when we got into flight test, and we discovered a low-speed stall identification issue during the flight test, early on in flight test. And when we determined that the remedy to that issue was going to be with MCAS, that was really the only time that I can recall briefing anything about --

Q Okay. So our understanding is that was in March of 2016. So in March of 2016, did you brief Ray Conner, Dennis Muilenburg, members of the board, or other

senior Boeing officials about the expanded range that was being changed for MCAS?

A Not exclusively, Mr. Weisman. Really what I recall as being my briefings was that the issue during flight test had been identified. We were studying a range of potential remedies, and that ultimately MCAS was chosen as the most effective remedy. The details associated with that MCAS change, I did not brief anyone, to Mr. Conner or Mr. Muilenburg.

Q So just to clarify, you had or had not described MCAS as a solution to an issue that had emerged on the plane during its development to Ray Conner, Dennis Muilenburg, members of the board, or other senior officials?

A I do not recall briefing either Mr. Conner or Mr. Muilenburg specifically. However, I would say that it is probable that in defining what the issue was and then being able to describe the solution, I may have told them that MCAS was the solution.

Q Okay. And did they approve or sign off on that as a solution, or is that a decision that is made lower?

A Correct. That is entirely contained within the program, yes.

Q And who decided that -- who authorized MCAS as the solution to the issue that had emerged on the plane?

A It is a collaborative effort between our chief pilot, between our chief project engineer Michael Teal, and myself.

Q Okay. Who has the ultimate authority? Who signs a form or formally sanctions that as a solution? Who's responsible for it?

A Well, as the chief engineer, Michael Teal is responsible for the

[configuration] change[s] [to the aircraft].<sup>2</sup> In this case, our integrated product team leader, [REDACTED], would have been involved; [REDACTED], our chief pilot, would have been involved.

But to answer your question specifically, Mr. Weisman, there isn't, for instance, a form that gets signed that says this change is approved. To my knowledge, there was no such form. There was a briefing that was provided. I do recall a briefing that was provided to me in the March or April timeframe after the technical team had devised the solution and ruled out other possibilities. We discussed MCAS. And at that meeting, I gave de facto approval, without signing anything, Mr. Weisman, that said let's go forward with MCAS. But that solution had already been largely concluded by that time.

Q Okay. And when you briefed senior management at Boeing about MCAS, were there slides or written materials that were provided to senior management as a part of that briefing, or was this just a purely verbal update?

A My recollection, Mr. Weisman, is that it was verbal, again, defining that there had been an issue that had been discovered during flight testing and that a solution was available. And that was probably the extent of the conversation that I had with -- that I recall with Mr. Conner.

Q Okay. During the MAX development and prior to certification, did you ever brief Ray Conner, Dennis Muilenburg, members of the board, or other senior Boeing officials on the issue of level B non-simulator training?

A We actually -- I was carrying -- you will recall earlier in the conversation, Mr. Weisman, I described that a standing meeting that we had was our risk meeting.

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<sup>2</sup> The original transcript said "Well, as the chief engineer, Michael Teal is responsible for the change traffic." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included those changes for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.



Part of my role was absolutely to make sure that we understand all the risks associated with the program, you know, whether it be the technical, financial schedule.

And level B training was a risk that we were carrying at my level knowing what the impact would be, that -- and there was no detailed conversation around it, other than for them to know that that was one of the probably half a dozen program risks that I was carrying.

Q So you said knowing what the impact would be. What would have been the impact if the FAA required simulator training?

A We would have had the provision financially for simulators, enough simulators as we began to ramp up in our production rate. There would need to be now enough simulators be able to train the crews as the airplanes came out.

Another impact might be is that the airlines might not be able to put the MAX into service as soon as they anticipated. That was really what the issues were, and that would have been early in the delivery ramp-up.

Q So those would have been fairly significant financial implications. Is that fair to say?

A As I mentioned to Mr. Pasternak, they're significant impacts, certainly something that -- again, because our -- what it also would have meant, and more significantly, I believe, is that we would not have been able to achieve our commonality goal that we had set. So I think certainly it would've been an impact.

Q Are you aware of any economic or financial model or analysis that Boeing ever conducted or conducted for Boeing that detailed, or considered the potential cost or financial impact on Boeing if the FAA had mandated simulator differences training on the MAX?

A I'm not aware of any, Mr. Weisman.

Q So how did Boeing go about estimating the various financial implications? And some of those you just described needing to have more simulators, customers not being able to roll out their planes as quickly into service. Another implication, which I'm wondering, is could it have impacted sales of the aircraft? Might customers have opted to go with Airbus instead of Boeing if it was going to take more time or more money to invest in simulators?

I mean, how was it that Boeing, if there wasn't a formal analysis, how did you know what the costs were, ballpark? I mean, are we talking another \$300 million, like, for Southwest or is this like getting into the billions of dollars like -- you know, without a formal analysis, how did you come to estimate that?

A Yeah. Certainly we know the cost of a simulator.

Q And what was that?

A It's between \$[REDACTED] and \$[REDACTED] million, Mr. Weisman. And so we knew that we would have to likely accelerate the development and the purchase of those simulators, so certainly there's the cost of those.

The bigger issue, I believe, would have been -- certainly to your point, there would've been a financial issue, certainly in Southwest. I'm not aware of any other airlines that had contractual provisions regarding level B.

But what I think the issue would have been, again, the lack of commonality would have meant that we did not achieve our program goals, and the cost of training would've been something that we would've had to negotiate with each of the airlines. And I think that, again, when you compared that to the entirety of the revenue of the program and our programmatic costs, it was something that we would be able to absorb.

With respect -- you asked the question, Mr. Weisman, about competitiveness, you know, against the Airbus. I'm not sure that that would have been a key discriminator

because as the market was developing it was really -- those airlines that already operated the NG were choosing to opt for the MAX.

Similarly, those airlines that were already flying the initial variants of the A320 were choosing the A320, and it was clear that the market was developing that way. [REDACTED]

[REDACTED] And, of course, for them we were going to have to provision for simulator training for those flight crews anyway.

So it would have meant an acceleration of costs associated with getting enough simulators in to be able to train flight crews. And the larger impact, I think, would have been on the airlines, which we likely would've had to concede in some manner.

Q And didn't American Airlines end up ordering some Airbuses and not going exclusively with the MAX?

A They did, certainly. They had been an all-Boeing operator, and when they made their single-aisle decision they decided to split their order between the A320 and the MAX, yes.

Q So had the MAX required simulator training, might it have lost some sales to American Airlines?

A In my estimation, Mr. Weisman, no. The airlines are adept at -- you know, all of their crews have to take recurring training, things like that, for which they have to provision time and cost. I don't believe that it would have become a competitive disadvantage.

Q So real quickly, did you ever have discussions regarding the need to achieve level B training, or the need to avoid simulator-based training with Dennis Muilenburg?

A Again, the level B was going to be an outcome of the success of our initial mission which is going to be commonality. As I had mentioned prior to, I was carrying

the risk of level B training as a programmatic risk, so certainly he would see it. But I don't recall briefing Mr. Muilenburg in any detail associated with that risk.

Q But as you said, it was described as a risk you were carrying, so would that risk have been reflected in, you know, in a portion of a broader briefing or update on the program?

A Yes, it would have.

Q And likewise, wouldn't that have similarly been briefed to Mr. Conner?

A Yes.

Q And Michael Teal would have been aware of that as well?

A Yes.

Q Any other senior officials that would have also received a similar level of briefing even understanding that it was a risk that was being carried as and it was part of a broader briefing?

A No. No. And again --

Q Any other members of the board --

A No. No, sir.

Q Okay. Doug, did you have questions?

Mr. Pasternak. I'll wait. Are you done, Matt?

Mr. Weisman. No. I'm happy to hand over if you want to close out the hour.

Mr. Pasternak. Okay. Sure.

BY MR. PASTERNAK:

Q Mr. Leverkusen, just two quick questions unrelated to what Matt was asking. Our understanding is that in the 2016 timeframe, I believe it was in March 2016, that there was an incident with the MAX test flight where one of the engines went out. It was the engine number one had cut out, and it was due to the fuel valve cutting off fuel

to that engine where the pilot had -- inadvertently and unknowingly had triggered that cutoff because it was the technical issue not with Boeing, but with the supplier. Are you aware of that incident?

A Mr. Pasternak, no, I'm not, and which is rather surprising because I think I would have recalled that, given that an in-flight shutdown is a significant event.

Q Okay. So that never, you know, came to you that there was -- the engine went out because of that?

A No. It's not in my recollection, Mr. Pasternak.

Q Okay. I apologize for the dog barking in the background.

A It's our new world, that's for sure.

Q Yes.

Also, we understood that there was what was described as either a certification clock or a first-flight countdown clock in your conference room or Mr. Teal's conference room for the MAX. Do you recall any of that? Is that accurate?

A Yes. Actually, that was my desire to have -- we had clocks that were two major milestones. One was power on, and that's where the airplane is in the factory and is powered up for the first time, and then first flight, yeah. We did have those countdown clocks.

And just to elaborate, that was in the conference room where we would have our larger meetings, our business performance reviews and our SAM meetings and technical review boards, yes.

Q Okay. And what was, just generally, you know, this may be obvious, but what was the purpose of having that clock there?

A You know, early on in the development program, it seems like you had a lot of time to go through the designs and the technical maturation. Mainly what it was is to

generate excitement that, in fact, that sometimes it can be cold and sterile in conference rooms, but, in fact, over the course of the development program, we're actually working toward that key milestone and the excitement of first flight and getting that airplane built.

Q But it was also to keep people on schedule, to make them aware of the schedule that you had?

A It wasn't the -- it really wasn't the intent, Mr. Pasternak. But certainly, with a clock that defines that, it also -- one of the mantras that we had was the value of a day, and making sure that we were being prudent with our time, that we were being thorough, but yet, that there was a schedule that needed to be met, and, in fact, again, the importance of what we were doing, because ultimately, this was a product that was going to be flying millions and millions of passengers throughout the sky.

So really, Mr. Pasternak, it was more about an excitement generator to remind people that we were doing something remarkable on the development of the program.

Q Okay. Thank you.

BY MR. WEISMAN:

Q I guess we just have like 2 or 3 minutes left. I guess I'll just ask you real briefly: It's been publicly reported that during the development of the MAX, an engineer recommended adding synthetic air speed to the MAX, but that it was -- that suggestion was rejected because of the cost concerns. Was Boeing's decision not to add synthetic air speed to the MAX based at all on cost?

A I only became aware of that when it became public in the media, Mr. Weisman. But what I can say is that changes to the airplane, we had a very, very detailed process associated with any change that was being forwarded to make its way on the airplane, and sometimes, those changes were not accepted and it was either due to

schedule or cost, or frankly, functionality that wasn't required.

So in the case of synthetic air speed, I'm afraid that I cannot speak to the decision to or to not incorporate it on the MAX or the NG.

Q Gotcha. Okay. That's all I have. Just real quickly, we have like 1 or 2 minutes, if anyone else on the Democratic side has a last question before we close out?

Okay. Seeing none, that -- oh, sorry. Alex?

Mr. Burkett. I said none for me. Thanks.

Mr. Weisman. Sorry, Alex, did you have a question?

Mr. Burkett. No. Matt, I was just saying no questions from me.

Mr. Weisman. Ah, very good. That will wrap up the first hour. Why don't we go off the record.

[Discussion off the record.]

#### EXAMINATION

BY MS. COOKE:

Q Mr. Leverkusen, as I think you know, I'm Corey Cooke. I'm the general counsel for the Republican side for the House Committee on Transportation and Infrastructure, and we really appreciate you being with us today. I know that a lot of stuff is going on, so I hope your family is well, I hope your friends are well, but we do appreciate you taking the time to be here. I know it's a difficult time.

Also, since Matt and the Democratic -- my counterparts went first, I apologize that there is likely going to be questions that may seem duplicative, or that we're asking you to re-elaborate or re-explain, so I apologize for that. We have been paying attention. There's just certain things we may want clarified, and I appreciate your patience as we do that.

So initially going back, and, again, some things that you have stated, could you

just, again, give me the months and dates that you were actually in your role overseeing the MAX program?

A Yes. I took over the role as vice president/general manager in March, April of 2013, and then I left the role in April of 2018.

Q Okay. Thank you.

So we're going to initially go into a little bit of things during that time with your relationship with FAA, which I realize you'd already been asked some questions about. But just initially, what was your office's relationship with the FAA's Boeing Aviation Safety Oversight Office, abbreviated as the BASOO? Can you just elaborate on your relationship there and the interactions you had?

A Yes. We had routine interactions with the BASOO, Ms. Cooke. Those were mainly through, I would say, three of our leadership members of the program: Mr. Teal, as the chief project engineer; [REDACTED], that's [REDACTED], who was our regulatory administration leader for early in the program; and then it was [REDACTED], [REDACTED], and those were our key interface with the FAA and the BASOO. And then [REDACTED], who I mentioned, which was our airplane-level integration team leader. Between those three, there were very -- lots of interactions, multiple times a week, whether they be phone calls or meetings with the BASOO.

Q And so were you typically involved or were you only involved in some of those monthly or weekly meetings that you mentioned previously?

A Yeah. My interaction with the FAA was limited to those briefings I mentioned, and, Ms. Cooke, those happened much less frequently. They were probably on the order of every 6 to 9 months during the program development.

Q Okay. In terms, though, of your interactions and of what you know about the BASOO, do you know what processes were put in place to ensure the independence



of it, and if you know about them, could you describe them or elaborate on those?

A Just to clarify, Ms. Cooke, are you talking about internally to the FAA?

Q Well, between how Boeing would react and relate to the BASOO, so internally, from Boeing, how you would work with them.

A Right. Right. Again, it would always be through our regulatory administration, or our organizational delegated authority office. The two people that I mentioned, [REDACTED] and [REDACTED], worked for the ODA, and so, all of our interactions would be with the ODA present, almost exclusively, that we would have an ODA member and an ODA leader present.

Q Okay. And I will circle back and we'll discuss more about the organization's designated authorization office, the ODA, so we will talk about that in a little bit, just for your awareness.

A Okay.

Q In terms of a little bit more about the FAA, did you -- I know that you have sort of discussed who you worked with, but just to clarify for the record, during the time, are you aware of who the administrator at the FAA was while you were in your role with the MAX office?

A Ms. Cooke, it's something I should know, but I don't, I'm afraid, because I had no reason to deal with the administrator.

Q Okay. So I'm going to say that the administrator, from January 2013 to January 2018, was Administrator Huerta.

A Yes.

Q So did you ever meet with him? Did you ever talk to him?

A No.

Q Okay. Would someone in your role typically have meetings with the FAA

Administrator?

A No.

Q Do you know who Peggy Gilligan is?

A Yes, I am aware of Ms. Gilligan, and, nominally, her role in the FAA.

Q Okay. Can you say what that role was?

A I know that she was a leader in the FAA, and I know that our leadership, our local leadership at the aircraft certification office in Seattle had a reporting relationship to Ms. Gilligan.

Q Okay. So, again, just for your awareness, she was the associate administrator for aviation safety.

A Okay.

Q She retired, I believe, in March 2017, but given that what you've said, did you ever personally meet with her or speak with Ms. Peggy Gilligan?

A I did not.

Q Okay. Did you speak with anyone in the aviation safety office?

A I did not.

Q Okay. Next question, do you know who Dorenda Baker from the FAA is or was?

A Yes, and I believe that over the course of time, I have actually met Ms. Baker. When we would have our semiannual meetings with the FAA and the FAA leadership, I believe I may have met Ms. Baker once.

Q Okay. Do you know what role she served in?

A I don't.

Q Okay. She would have been the director of the aircraft certification office. Would you have been aware of others on your team given that the MAX was being

certified working with her office?

A No. I don't think that we ever had an occasion to meet with Ms. Baker, and had we, that really would have been the purview of the leadership of our ODA team.

Q Okay. Are you aware of any other high-level officials such as, you've mentioned some of the leadership team, whether that's Ray Conner or Dennis Muilenburg, having discussions with the FAA regarding the 737 MAX certification?

A No.

Q Okay. Did you receive any guidance or training on how Boeing should interact with the FAA?

A Not specific training, Ms. Cooke, but, certainly, with the establishment of our ODA organization, we knew that engagements with the FAA were really to be led through the ODA. Now, that doesn't mean that it was necessarily a "Mother, may I" kind of relationship internally between the program and the ODA, but we also knew that if there were going to be specific engagements with the FAA to be requested from the program, that the ODA was to be included. So while no specific training, certainly we -- I understood the role of the ODA and the ODA leadership quite well.

Q Okay. So let's just shift into the ODA. What was your program office's relationship with the ODA, and how did you all interact and communicate during the MAX certification process?

A Yeah. It was -- as I mentioned, there were representatives from the ODA and the ODA leadership on the program, and so, it was a very, very tight relationship. The leadership of the ODA, at the time that I took over the program, was John Hamilton. And during the course of the program development John became the head of engineering and Beth Pasztor, P-a-s-z-t-o-r, became the head of the ODA.

And from time to time during our monthly reviews, we would have what are

called gate reviews, meaning that there are scheduled gates of the program, and Beth or John would routinely attend those. So we had quite a close relationship with the ODA. And were there any questions around the FAA and the FAA's actions, we would engage the ODA.

Q So when you say "close relationship," can you elaborate on what that means? Was that monthly meetings? Week -- what does that mean? Daily calls?

A Yeah. Well, yeah, and I want to be clear again, a member of the ODA was on our leadership team, so it was -- and that member, again, [REDACTED] or [REDACTED] were with us in all of our meetings, all of our business. But all of the meetings that I had mentioned before they were there and they were part of those.

Q Okay. So what processes were put in place then to ensure the ODA -- like the ODA's independence of its office and of those employees?

A Well, really that comes down to the AR community to make sure that those representatives, those authorized representatives to act on behalf of the ODA and of the FAA. Clearly, we receive training on how to deal with potential conflicts with ARs, and to make sure that while those ARs were often subject matter experts in the area that they were responsible, they also had responsibility for compliance findings.

So we were certainly aware of the independence, the necessary independence of those ARs, during the time that they were making compliance findings, or responsible for compliance finding.

Q And did you feel, in your work with them, that independence was preserved and there were no conflicts of interest?

A I do. I do. I think that we would often have conversations with those individuals as subject matter experts, but when it came to their role of compliance finders, we understood the role, and we understand that we had to do everything we

could to keep them un-conflicted.

Q Okay. So I'm going to try to limit this to the MAX certification process, and if you don't have an answer, you can say that. In terms of that when we're talking about those ARs and that subject matter expertise, were there any times during that, if you could provide an example potentially of, yes, this happened and we were successful and, yes, this happened and we weren't where potentially there was a conflict, and you all had to either appeal or go against something the AR said and you all would have been viewed as being successful in overturning it versus not being successful? Is there examples you could provide of each one if they exist?

A Yeah. I'll try to define the process a little bit. There are -- I would say that far more often than not, the position that an AR had taken was usually upheld by the FAA. What our process was is that as the AR developed their thinking around a compliance finding, if, in fact, based upon our own expertise, we believed that that finding was counter to what we believed, we had a process as the applicant by which we could approach the ODA and subsequently the FAA.

One of the things that comes to mind, Ms. Cooke, is the topic of engine fan case fire. And I don't mean to dig too deep into details, but it was a topic that, based upon the guidance that the AR at the time had been given, there were -- it was quite an unusual approach that we had to take. As a result, we, as the applicant, entered into a process by where we appealed to the FAA directly, and in that case, the FAA subsequently said that the AR was correct and that we had to adhere with what the AR had mentioned.

It's hard for me to actually come up with anywhere we generated an applicant position, and then went to the FAA where the FAA then subsequently overruled an AR. In fact, I can't think of any at the time. I'm not suggesting that it didn't happen, Ms. Cooke, but none come to mind.

Q Okay. Are there any times where you can think about a decision made by the FAA that Boeing didn't concur with and maybe appealed?

A Yes, several. And during the course of any development program, there can be, based upon reasoned engineers, and subject matter experts looking at the same data and the same regulations, there can be disagreements. And so it was -- in those cases, oftentimes, there is something raised called an issue paper, where if there is going to be a difference in compliance finding or verification or validation, we negotiate with the FAA on what the topic is, what the applicable regulation and guidance material is, and then how we'll go about validation.

We had over 100 issue papers during the development of the program. And often, there would be disagreements between us and either the FAA, specifically specialists, or AR positions. And it's part of what we consider to be a robust process as part of designing an aircraft whereby opinions are rendered, interpretations are discussed, and then the FAA ultimately has the authority to make the determination of which direction to go.

So it's not unusual, Ms. Cooke, that those, if you will -- I hesitate to call them disagreements. I would say that they are differences of opinion in approach, or in validation methods. It's not unusual at all, and there are processes by which those can be disposed of, adjudicated, however you want to think of them.

Q So in what we're just discussing, do you have an example of where you all, during this MAX certification with those issue papers, appealed a decision and were successful and another example where you appealed and were not successful?

A Again, the issue paper themselves have a built-in appeal process. There are actually four stages of an issue paper. The first one is the FAA generates the issue paper and, you know, essentially creates the background and the situation for a particular

design concept or a validation concept. And then there is a formal back and forth between the FAA and Boeing, and it actually goes through very fixed stages. It goes through four stages, and the fourth stage is the FAA rendering their opinion on the topic.

And, again, Ms. Cooke, it seems to me that what stand out in my mind are those that we had disagreements with the FAA, and the FAA stood with their position and didn't take our position. As I said, I'm sure there are examples where we, in fact, through conversations with the FAA, our position was supported, but I can't think of any right now.

Q Okay. So in going back to sort of where I was asking questions about individuals, so in those conversations where it did get elevated, did you personally ever, you know, elevate anything to someone in FAA, whether that's Dorenda Baker or Peggy Gilligan? Did you ever do that, or are you aware of others from Boeing going to those folks in FAA senior leadership?

A I did not. And I am not aware of anybody else doing that. In fact, I can state with confidence that all of our engagements from the program were with the local aircraft certification office in Seattle. I am not aware of any time when anything had to be adjudicated at a higher level. I'm not aware of any.

Q And just, again, as a reminder, who was in the Seattle office as that head that you were dealing with?

A Right. And I'm afraid that I don't understand -- I probably won't get their roles specifically correct, but the leader that I interfaced most often with was Mike Kaszycki -- and, again, I apologize that I'm not going to be able to spell Kaszycki. And then I can recall, on one occasion, speaking with Jeff Duven, D-u-v-e-n. And, again, I believe that Mike Kaszycki had a reporting relationship to Jeff Duven.

Q Okay. So going into a little bit more of the certification process that you all

engaged in, are you aware of the timeline, the testing that occurred for MAX? Are you broadly familiar with that?

A Yes.

Q Okay. And are you able to tell us how long that testing occurred and whether or not, based on your experience, that was standard or not standard for Boeing aircraft and certification with FAA?

A We started flight test in -- our first flight was in January of 2016, and I believe we completed our last flight test in February of 2017. And for a program this size, I think that we would have expected that we would've been done sooner. We did run into issues with engine configuration that resulted in some additional flying, but I would say that a 12-month flight test program is largely typical of a derivative of this size, yeah.

Q So that's just the flight testing. What about the whole certification process?

A Yeah. And, of course, that begins all the way back with the application of the amended-type certificate. The MAX actually took longer than its predecessor, the NG, the overall program timeline. And I would suggest, Ms. Cooke, that from the beginning of the program we begin conversations with the FAA about amended-type certificates, whether there will be exemptions or exceptions to rules, again, a formalized process.

We actually started testing components as early as 2014, where we began doing what are called qualification tests, and oftentimes, those qualification tests are fully conformed and do comprise certification data. And so, those were happening as early as 2014.

Q And do you know the names of -- on your team, the senior leadership who oversaw that MAX certification process? I know you mentioned some of them, but is



there any way for you to give us a more detailed understanding of that?

A Well, again, the certification of any particular component, and let's pick an air valve, that is the responsibility of the AR that has authority over that area, if it has been delegated to the AR from the FAA via the ODA. If it has not been delegated, then the AR witnesses a test and then recommends certification, recommends approval to the FAA, or they get to do it themselves if they've been delegated that authority.

[12:39 p.m.]

Mr. Leverkuhn. So it's really between the AR, ODA, and the FAA.

BY MS. COOKE:

Q And since you mentioned the delegation of authority, do you know what usually causes something to be delegated, or can you describe the process and concept of new and novel technology in terms of aircraft certification?

A Two questions in there Ms. Cooke, I think, I heard. And with respect to the delegation, there are some things that the FAA just does not delegate. And, for instance, fire tests are those, so the FAA holds responsibility for fire testing, for instance. And I believe that the remainder of the changes are really dependent upon the FAA's determination of the significance of the change, the comparison to changes that are already -- or excuse me, to components that are, for instance, that are already there.

New and novel designs which is actually a very specific term. New and novel designs will often result in an issue paper, as I mentioned, or what's called a special condition. And a special condition is really one where the FAA faced with a new technology that has not ever been conceived of before determines new and novel, and they often have to create effectively de facto regulations within a special condition.

So I don't know if that answers your question, Ms. Cooke, but that concept of new and novel is a very specific term and results in a different type of discussion with the FAA.

Q And just in terms of MCAS, specifically, do you know if that was considered new and novel for the purposes of the MAX or not?

A No, not to where a special condition was necessary. I mean, really what MCAS is is a revision of a software in the flight control computers. So in that case it really wasn't considered, to my understanding, new or novel.

Q Okay. And for the MAX, in general, are there any examples of items that

you -- I know you mentioned the fire testing which you said the FAA always retains. But, specifically, are you aware of anything with the MAX the FAA retained rather than delegated?

A I'm sorry, Ms. Cooke, I don't. I can't -- I can't tell you what -- I can talk broadly about percentages. I believe on the MAX 8 that we had about 15 to 20 percent of the design was delegated to the FAA -- or excuse me to the ARs and the ODA and the remainder.

In fact, Ms. Cooke, I'm sorry, I am going to -- that is probably a faulty recollection on my part, so I would like to retract that. I don't know specifically how much was delegated and how much was retained.

Q Okay. So that in terms of your role, that wouldn't have been something that you oversaw?

A No, that really would have been left to our regulatory administration team via the ODA.

Q Okay. And just circling back to a couple of things that you had said through the conversation, when you were talking about the extended amount of time and the certification process, do you know what led to any of that extension?

A I think you're talking about when I mentioned that the program was actually longer in its execution from launch of the certification. Frankly, I do think that there were new approaches that we took with the FAA that resulted in issue papers. And some of those took a little longer to work through. But I think it is really a matter of making sure that we had created enough schedule where we weren't having to compress a lot of work.

We gave ourselves enough elbow room in that schedule to be able to accomplish the program in the timeframe that we did. So it was really just an acknowledgment that

we wanted to make sure we had plenty of time to execute -- schedule and deliver to the customers on commitments that were made.

Q Okay. And I think you also when you were talking about your work with the Seattle aircraft office, you did mention that you may have had a conversation with Jeff Duven at some various points. Are you able to elaborate on what that may have been about?

A You know, Ms. Cooke, I apologize. I know that there was an issue that we had appealed to the FAA on -- and that Jeff -- and Jeff Duven and Mike Kaszycki called me to let me know that the FAA did not agree with our position.

But it didn't have anything to do with MCAS. In fact, right now sitting here, I can't recall what the topic was. But they were providing effectively a formal followup via the phone call to me to say that they were not in agreement with our position, and that FAA position was going to hold.

Q Okay. And just in that they called, they let you know, who would you have reported that to, or were you the last stop in that?

A Yeah, I think I would have been -- obviously, I would have communicated to my team and whoever was responsible for that particular area. But there would have been no further communication at that point.

Q Okay. And going back to this new and novel and delegated -- and again, it's okay if you say you don't know. I understand we're asking a lot of you and throwing a lot of things -- was there anything on the MAX that was so new and novel enough that was enough to warrant a special condition?

A Not that I am aware of. I cannot recall if we had any special conditions on the airplane. I'm not aware. Again, as I mentioned, we had a lot of issue papers, but I'm not aware of any special conditions.

Q For special conditions, just based on the fact that you have obviously been for a very long time handled different aircraft, are special conditions common, not common?

A They're quite rare. And it really happened during development, during airplane development.

And so one that I can recall, Ms. Cooke, was back in the days of the 777 development. That's our large twin engine wide-body aircraft was the topic of ETOPS, which is Extended Twin Operations, which is flying long distances over the water. I was involved in that special condition where new rules were being developed, whereby the 777 was going to be able to fly those long distances over water without accumulating a lot of experience. That required a special condition.

So, yes, there are -- those are considered unique situations, Ms. Cooke.

Q Okay. Thank you. That's very helpful.

Switching slightly, I know some questions were asked of you the prior hour about Level B training and Boeing's desire potentially to remain in Level B training. In your opinion, how important was it to Boeing that the MAX remain consistent with Level B training?

And if you would like to explain Level B training to us, that's fine. Just for the record, just state. Level B training is training that does not involve simulators, correct?

A That is correct. Yes. It was important -- it was certainly important -- it was going to be important for our customers, but I would like to amplify that the importance was really around achieving a high degree of commonality with the NG. Level B was an outcome of that.

So Level B training really began early on -- by that I mean, that the roots of the Level B training were based upon the initial architecture of the airplane and how we were

going to approach the architecture and design of the aircraft to achieve that high degree of commonality with NG.

Perhaps you have heard me say that Level B is effectively a proxy for our success in achieving that commonality with the NG, which we felt was very, very important.

And the reason for that importance was that we knew that flight crews were going to be potentially flying an NG in the morning and then flying a MAX in the afternoon. So for safety reasons, we wanted the MAX to have as close as possible to the same look and feel of the NG as possible for all of the flight crews around the world that fly the NG.

And then Level B was effectively an outcome. So as has been discussed, certainly, there would have been a commercial impact associated with not achieving Level B. But I would say that the larger impact for us would be that we had not achieved that level of commonality that we wanted between the MAX and the NG.

Q So in that elevating, can you elaborate on how Boeing maybe evaluated the various training needs of its different MAX and various MAX customers, the NG, the 737 MAX, and about -- can you just elaborate on that?

A You know, Ms. Cooke, I can't. I am not, I am certainly not an expert in the world of pilot training. But, of course, what we do know is that every airline operates under the authority of its local regulator, and that local regulator is responsible for the training necessary for that airline. But I am sorry, Ms. Cooke, beyond that, I can't speak.

Q Okay. So just for me to reiterate or summarize to make sure I understood what you have said. The specific objective was actually to achieve commonality between the NG and the MAX, not specifically the Level B training in and of itself?

A That is correct, Ms. Cooke.

Q And are there other functions that you could potentially discuss that plan if possible between the NG and the MAX that were commonalities that you thought were

important that helped with that amended-type certificate?

A Well, I'm not sure that commonality and amended type certificate -- I think amended-type certificate is simply a negotiation with the FAA about what the relevant rules are, what amendment level those rules are going to be applicable. For those areas of the airplane that will have changed, obviously we have to step up to the latest amendment in the rules.

But I think that it's difficult for me to comment on commonality vis-à-vis the amended-type certificate. I'm not an expert in the area of amended type, but what I do know is that -- where applicable, those areas of unchanged -- unchanged aspects of the airplane would be part of the -- go back to an original amendment level, or an earlier amendment level.

Q Okay. Is there anything that you can be like yes, this was the same between NG and the MAX?

A Well, for instance, the structural design, you know, for the most part, much of the structure was unchanged in the fuselage. Much of the structure was unchanged in what we call the empennage, which is the tail of the airplane. So certainly the structure we had to accommodate for the larger engines and the larger wing in certain areas, but a large part of the structure was unchanged.

We had to change almost all of the wiring on the airplane to step up to new rules. The landing gear on the MAX family, the 8th, and the 9th, and the 7th are largely unchanged. A little bit thicker to carry the additional weight of the engines.

But I would say broadly that area of structures and the interior, because much of the interior changes we had already incorporated on the NG, there were other systems changes that we had made on the NG prior to the MAX, so we were able to make it common with the NG.

So I am sorry, Ms. Cooke, there are -- there are many examples of that commonality but none that I can speak to other than the structure and the structural area which was largely common.

Q Okay. To your knowledge -- and, again, I know some of this was brought up already -- but, to your knowledge, were any assurances made to Boeing customers about the level of training that would be required for MAX pilots prior to FAA's determination on the MAX pilot training?

A Yeah, as discussed clearly we made a -- we created a contractual element with Southwest. And in much of our conversations with the airlines early on, we -- we did communicate that it was our intent to achieve that level of commonality which would result in the Level B training.

So certainly the customers were aware of our intent. As was stated, there was a commitment to Southwest that that would be the case, and if that wasn't the case, then we would have contractual revenues available. But we were communicating to the airlines that our commonality goal would result in Level B -- we hoped, that it was our intent that it would be Level B. It was a design objective of the airplane.

Q Okay. Is that common? Does Boeing typically do that?

A It's not uncommon for us to communicate early with the airlines about what our expectations will be around training. That's not uncommon. As you can imagine, the airlines at least want some indication early on of what the expectations are.

Q Okay. Did you feel that your job was dependent on having a Level B training determination by the FAA?

A No.

Q Do you think that anyone that you directly oversaw who reported to you felt that their job was dependent on Level B training?



A Subsequent to the accidents, I, of course, have seen correspondence from Mr. Forkner. In preparation for these conversations, I have seen correspondence from Mr. Forkner where he made clear that he felt that he was responsible for Level B training. And in fact, as I mentioned, Level B training, the roots of Level B training go all the way back to the initial architecture of the airplane.

So I understand what Mr. Forkner had -- subsequently now I have understood what he has written. I believe it's incorrect [and]<sup>3</sup> again Level B was dependent upon all of the engineers and all of the management team achieving that commonality objective.

Q So did you, to the best of your knowledge, recollection, would you have given that direction or impression to Mr. Forkner?

A No.

Q Do you know who would have given Mr. Forkner that impression?

A I can't say, Ms. Cooke. I think that in Mr. Forkner's role as our chief technical pilot where he was, as I had previously mentioned, kind of the key communicator with the FAA on training requirements and training curriculum, I might understand how he could feel that way, personally, but certainly there was no one on program leadership that would have suggested that.

Again, because we knew that it wasn't whoever was communicating to the FAA that was going to be able to, you know, achieve Level B on their own. This was really the large team of engineers and experts who architected the airplane that resulted in that commonality.

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<sup>3</sup> The original transcript said "I believe it's correct that again..." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

Q And just as a reminder, who did Forkner, who was his immediate boss? Was that [REDACTED] or?

A No, as a matter of fact, the chief technical pilot reported to a different organization than [REDACTED], who reported up through the chief pilot's office. So it was a different organization.

Q Okay. So do you have any idea who Mark Forkner reported to directly?

A I do not.

Q Okay. And again, I know that some of this was asked before, but were any of your performance reviews or bonuses -- and I apologize, I know you have explained the structure -- but were any of those reliant specifically on the MAX training or certification decisions that were being made by the FAA?

A No.

Q And are you aware of other individuals potentially in the BASOO or in ODA -- are you aware of anyone discussing any sort of bonus structure or compensation agreements Boeing may have had with folks at the BASOO, at the ODA, at other entities?

A I can't speak to that, but it would be highly irregular if they did. And again, our -- and I'm sorry that I did an imperfect job with Mr. Weisman, but you know our compensation structure is effectively set, and it is set by the particular level that you are in corporation. There are no implied bonuses for achieving a specific goal.

So, no, I am not aware, Ms. Cooke, and I would reiterate that were there to be any that would be highly irregular.

Q Okay. In terms of the Level B training determination, are you able to, in your role again, I'm not sure if you were, but are you aware of any sort of senior leaders, whether that being Ray Conner, Dennis Muilenburg, are you aware of anyone making that point to lower level staff about that importance?

A I am not aware of any.

Q Okay. Sorry. I'm trying to -- in terms of commonality, if we circle back to that. Actually, I am sorry, I am going to take that back.

Are you by any chance a pilot yourself, or do you have any certifications to fly?

A I -- it's an important point. I'm glad you asked, Ms. Cooke. No, I'm not a pilot. However, in my role over the years at Boeing, of course, I have interacted very closely with the pilot community. But, no, I am not a pilot.

Q Okay. I say that because the next thing just going back to the commonality, just knowing that you are not a pilot or understanding the work you have done with them, could you just further elaborate on the importance to Boeing about that commonality between NG, MAX, and why Boeing may have felt that was important, or what you have heard from airlines or pilots about that commonality importance?

A Yeah, again, and I think the conversation that I mentioned earlier about would it be possible to achieve a common -- I think I am using the term correctly, a common type rating between the classic, the NG, and the MAX.

Ultimately, it was determined that that just was not going to be possible because the changes between those three, particularly, the classic, were too significant to expect the pilot to be able to, for instance, operate all three on any given day. And that was a determination made not only by the FAA but certainly internally at Boeing as well.

So the commonality approach is to assure that when a pilot flies an airplane for which he is type rated and knowing that there is a possibility of flying on, you know, flying from Houston to Kansas City on an NG, and then from Kansas City to Detroit on a MAX, does the airplane have the same look, feel, flying characteristics, handling characteristics so that the pilot is not having to constantly remember, you know, which airplane he

might be flying on? Particularly in an airplane that is as ubiquitous as the [737]<sup>4</sup> and as popular as the [737]<sup>5</sup>, we wanted to make that commonality very, very close, which is why we -- while we introduce new technology, that new technology was introduced with a very clear idea that we wanted to keep that look and feel of the airplane as close as possible.

Purely for safety reasons, there was obviously an economic benefit, if we can do that with Level B training. But primarily it was around the knowledge that the industry would be safer were we to achieve that level of commonality.

Q And not -- you're unfortunately not talking about the current crisis that's occurring obviously with the pandemic. But traditionally speaking prior to 10 years, are you aware if there's a pilot shortage or if there is typically enough pilots?

A Yeah, no, I was aware that enough globally there was a concern about pilot shortages. Given the increased level of air travel, that there were certain areas of the world that were experiencing pilot shortages, particularly in the regional operators.

Something that, you know, I wasn't aware of that there was an issue with any of mainline carriers. But, certainly, I had heard about the concern about pilot shortages.

Q And is it your understanding commonality can help with the pilot shortage issue?

A Ms. Cooke, I am not saying, I never drew that link. Frankly, I was really thinking about the person that had been flying an NG for years and then would be able to

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<sup>4</sup> The original transcript said "777." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

<sup>5</sup> The original transcript said "777." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

step into a MAX and go, oh, yes, this is a very familiar airplane to me.

So I guess I hadn't made that link to a pilot shortage, and commonality was really more just around thinking about that pilot and whether he or she was going to be able to be as effective in the MAX as they would be on the NG, without having to do a lot of thinking and comparing.

Q And just quickly, based on the dates that you have given -- I'm not sure if this is applicable -- but what was your role, if any, in Boeing's response to the first MAX accident, the Lion Air crash?

A Yes, I was not involved, Ms. Cooke. And the accident protocols that we institute when there's been an accident as laid out by ICAO, we do adhere to them. I was very much at arm's length, Ms. Cooke, in all of its proceedings.

Q And, similarly, the second accident that the European airlines crash, what role, if any, did you have in that response?

A Yeah, I had no role.

Q Okay. I think that we're about ready to go off the record. I am going to give my colleagues a minute or two to let me know if they have anything.

But we want to thank you again for your time in this hour and make sure that we're doing well, and we're going to go off the record.

A Thank you, Ms. Cooke.

[Recess.]

Mr. Weisman. If everybody is ready, let's go back on the record.

BY MR. WEISMAN:

Q Mr. Leverkusen, before we begin our second hour, I just understand, you might have some clarifications you wish to make about your prior testimony?

A Yes. Thank you very much, Mr. Weisman. Two things: Number one, I

inadvertently used the name [REDACTED] as part of the flight test pilots. It's [REDACTED]. [REDACTED] was part of our ODA organization. So I want to correct the record, it's [REDACTED] that I was speaking of, not [REDACTED].

The second thing is that Mr. Pasternak had asked me about an engine shutdown during the flight test. I told him that I didn't recall it. Subsequent thinking, I do remember [the event] quite well.<sup>6</sup> So those are just two things that I want to make sure that we are aware of as we go forward.

Q Okay. I have, looks like it's about 1:26 p.m. eastern time. We'll begin our second hour on the majority side now.

Very quickly, were you aware of an internal Boeing survey on undue influence in November of 2016?

A As part of the preparation with counsel, I was shown that survey that was done, yes.

Q I'm not asking about your preparation with counsel, prior -- in 2016 or soon thereafter were you aware of that survey?

A Yes.

Q And were you aware at that time of what the results of that survey were?

A Yes.

Q So the survey that found that 39 percent of respondents encounter situations where they perceived potential undue influence, that was something you were aware of at the time, is that correct?

A Yes.

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<sup>6</sup> The original transcript said "Subsequent thinking, I do remember quite well that that inflected down in the cost." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

Q Okay. Thank you. I will now like to ask you some questions about MCAS.

Prior to the Lion Air crash, were you aware of any concerns raised by any Boeing employee about the design or operational implications of MCAS on the MAX?

A No, I was not.

Q Okay. Prior to the Lion Air crash, was it your understanding that MCAS was capable of activating repeatedly?

A I was not aware.

Q So is it your testimony that you never heard about anyone within the aerodynamic stability and control group or any test pilots raising any concerns about MCAS activating repeatedly?

A No, Mr. Weisman, I was not.

Q Okay. Boeing has since announced that one of the fixes to MCAS is ensuring that MCAS does not activate repeatedly. So do you think it was a mistake that MCAS was originally allowed to activate repeatedly?

A No, Mr. Weisman, I think that based upon the -- our knowledge and the assumptions at the time, I do not believe that that was an error. I understand why now the design change is occurring. But at the time, no, I don't -- I don't believe that there was a mistake made.

Q And looking at the time, would that also include the time after the Lion Air crash but before the Ethiopian air crash?

A I need to be careful here because not being in on the accident investigation, I think that since MCAS was a contributor to the accident, I think that as part of our normal course, subsequent to these tragedies, we have to take a look at the accident and the accident causes and respond accordingly.

And I do believe that given the fact that the Lion Air crew was fighting MCAS for

that period of time, I think clearly a change needed to be made to the MCAS system, yes.

Q But the change was not made before the Ethiopian air crash, is that correct?

A My understanding, Mr. Weisman, is that a change was in work, and that the -- the remedial solution was to remind flight crews of the training associated with stab trim runaway.

Q Okay. Prior to Lion Air crash, was it your understanding that MCAS used only one AOA sensor to gather angle of attack information?

A I was not aware of that, Mr. Weisman.

Q When did you first learn that MCAS relied on a single AOA sensor?

A It was subsequent to the Lion Air crash.

Q Did you ever hear anyone in the aero -- hear about anyone in the aero-stability and control group having concerns about the fact that MCAS relied on a single AOA sensor?

A No, I was not aware.

Q And you're sure -- have you since become aware?

A I know that there were -- again, in preparation for this conversation and reviewing some material, I know that there was a question that was raised, within the community, about the architecture of the MCAS system and the single AOA sensor, and that conversation did occur, and, ultimately, it was determined that a single sensor was the appropriate architecture.

Q So when did you first learn that it was dependent on the single AOA sensor that was -- sorry. After Lion Air --

A Yes, it was after Lion Air, Mr. Weisman.

Q So now Boeing has announced that its flight control system, [feeding]



information<sup>7</sup>, MCAS will now compare inputs from two AOA sensors. Do you think it was a mistake that MCAS originally relied on just one AOA sensor?

A Again, Mr. Weisman, I think that -- I think based upon our understanding and our assumptions of flight crew actions, that it wasn't a mistake. But clearly, post Lion Air and post Ethiopian, it has given us reason to question those assumptions.

Q Are you aware of any discussions within Boeing about the potential impact that the addition of MCAS on the MAX could have on pilot training requirements?

A No, again only subsequent to Lion Air crash and further review of the material.

Q Okay. So in March of 2016, Boeing made a decision to change MCAS to enable it to activate at lower speeds. Who ultimately authorized this change?

A Yeah, Mr. Weisman, you had asked that question earlier, and I want to make sure that I'm being clear here. I was made aware of the solution to that -- the low speed stall identification being through MCAS. That was brought to me -- to Michael Teal after a lot of consultation with the pilots. So, certainly, I was part of that decision, but it's not something that required, as I mentioned, you know, some signing of a piece of paper saying go and do that. But, certainly, I was involved in that decision.

Q Had you not agreed to that change, would it have not gone forward?

A That is a likelihood, yes, that if I had asked for more information or if I had asked for a different approach, then I think the team would have been obligated to go search for a different approach. But, by that time, you know, all of our relevant experts, including our pilots, had reviewed the range of potential solutions. And by that time,

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<sup>7</sup> The original transcript said "heating information." Majority staff clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity as agreed to by Majority and Minority committee staff.

you know, I'm using the collaboration of the experts. You know, this was the solution that was chosen.

Q Okay, it's our understanding that there was a meeting on March 30, 2016, in which you were briefed about the proposed change to MCAS to expand the range to let it activate at lower speeds, is that correct?

A Yes.

Q Was Mark Forkner at that meeting?

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

Q Do you know if he wasn't there. Do you know if he was aware that the meeting was occurring, or was he briefed about the meeting subsequently?

A Well, I can't speak specifically, Mr. Weisman. My expectation would certainly be that given that this change occurred to a critical system, our flight control system, that Mr. Forkner would have been briefed, yes.

Q Whose job is it to make sure that technical pilots are informed about this kind of a redesign for MCAS?

A Yeah, that, I -- really would depend upon our piloting community to do that. Obviously, in conjunction with the subject matter experts, but that key linkage is really through our [chief] pilot office in liaising with the chief technical pilot.<sup>8</sup>

Q So was the chief pilot in the meeting on March 30, 2016?

A I don't recall if he was in the meeting, but I was keenly aware that he had already rendered an opinion on it. He had flown the MCAS, revised MCAS in the simulator. So I know that he was part of it. I am sorry, Mr. Weisman. I don't recall

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<sup>8</sup> The original transcript said "Obviously, in conjunction with the subject matter experts, but that key linkage is really through our key pilot office in liaising with the chief technical pilot." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

whether he was at the meeting or not.

Q But it is your expectation that he or someone in his office would have made sure to bring the technical pilots up to speed on the change to MCAS, and that would have included Mark Forkner who was the chief technical pilot, is that correct?

A Yes. Yes, that's correct.

Q Okay. Did you, by any chance, ever happen to discuss the MCAS redesign directly with Mark Forkner at any point?

A No. No, I didn't.

Q Okay. Whose job was it at Boeing to inform the FAA about this change to MCAS?

A In a change like this, I would have expected that both the -- or all of the relevant ARs would have communicated with the FAA. That the flight controls, AR, the pilot, the pilot AR, the stability control AR -- my expectation would be that they would be communicating with the ACO on the details of this change. ACO. Sorry. Aircraft Certification Office.

Q And is it your expectation that any other offices within FAA would have been also made aware of the change to MCAS or just the ACO?

A Clearly, the ACO, in my mind, was the primary, the primary party that needed to be aware of the change.

Q Was it your expectation that the AEG, Aircraft Evaluation Group, AEG, would also be informed about a change like this to MCAS?

A Yes, I do. And I think that that -- again, as part of the normal flight test, as changes occurred during flight test, that the AEG continue to be informed about what those changes are, yes.

Q And whose job would it be to inform the AEG of a change like this to MCAS?

A That was Mr. Forkner.

Q Did you personally inform anyone at FAA about this change to MCAS?

A No, I did not.

Q Whose job was it at Boeing to make sure that MAX customers knew about the final configuration of MCAS including this change?

A Well, the overall change packages to the airplane would have -- it's not likely that the change to MCAS would have uniquely been communicated to the airlines, as it was already on the airplane, there was a change made to it, the functionality was there.

But there are a myriad of people whose responsibility is -- certainly our fleet support team, our customer engineering team, our sales teams, and in some cases our piloting teams who would have those conversations.

Q And so given the fact that MCAS was already on the plane, and I am assuming some MAX customers had already been learning about the MAX prior to March 30 of 2016, is it your expectation that MAX customers would have been briefed subsequently about MCAS and the changes that were made to MCAS in March of 2016?

A No, I don't. I don't, Mr. Weisman. I don't know that the change -- or certainly at the time believe that the change was significant enough that we needed to make a dedicated effort to inform the airlines. It was my belief that it was a change to an existing system and largely would be invisible to flight crews and to maintenance crews.

Q So right around that same time in March of 2016, Mark Forkner asked officials at FAA's AEG if it was okay to remove MCAS from the flight crew [operations]<sup>9</sup> manual and other training material. Did you personally ever discuss with anyone at Boeing the removal of, or post removal of, references to MCAS from the flight crew operations manual or any other 737 MAX training or maintenance materials?

A No, no, I didn't.

Q Were you aware in March 2016 that Mark Forkner was making this request to the FAA to remove references to MCAS from the FCOM?

A I was not aware.

Q Were you aware that he asked to have MCAS removed from pilot training materials?

A I was not aware.

Q When did you first learn that he had made this request?

A Again, as part of the preparation for this conversation, Mr. Weisman, I saw a lot of the community communications that had gone, that were internal, that Mr. Forkner had made.

Q Why would you not have been aware of this at the time?

A Well, I -- the conversations -- look my expectation would be in all of our dealings with regulatory agencies, customers, that there would be transparency. Certainly, I made that clear in my own dealings. So my expectation is that since Mark Forkner was the individual responsible for those communications, that he had the responsibility of having all of those conversations with the FAA. So it -- I did not feel it

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<sup>9</sup> The original transcript said "So right around that time in March of 2016, Mark Forkner asked officials at FAA's AEG if it was okay to remove MCAS from the flight crew information manual and other training material." Majority staff clarified that statement as indicated above in brackets after the interview was completed. We have included that change for clarity as agreed to by Majority and Minority committee staff.

necessary to actively oversee what Mr. Forkner was communicating or was not communicating.

Q Whose job at Boeing would it have been to ask Forkner to make this request to the FAA?

A I am not sure that it would be anyone's job to say what should be included or should not. I really am dependent upon, again, those transparent conversations between Boeing and the FAA, in this case, Mr. Forkner leading those conversations with the AEG, and then mutually making the decision about what should go in, and what should be included and what should not be included.

Q Right, but who was Mark Forkner reporting to at this time? Even if he wasn't asked to make the request, who would he have then said, Hey, boss, I asked the FAA, they agreed. It's not in the FCOM. Like, who would he be keeping apprised of his work?

A Yeah, again, as I stated earlier, I actually didn't know who Mark's direct supervisor was. But one of Mark's key interfaces back into the program was our, what we call our commercial aviation services leader at the time was Don Anderson. And, certainly, he would be communicating with our chief pilot [REDACTED], and in his office, [REDACTED].

Q Is it your expectation that he would have kept Michael Teal in the loop on this request to the FAA to remove FCOM -- remove MCAS from the FCOM?

A No, I don't know that that's a clear link, no. Again, these are in my view, Mr. Weisman, this is really a series of conversations between Mark and the FAA about what should and what should not be included.

Q Prior to Forkner's request, did anyone at Boeing ever discuss with you the issue of removing MCAS from the flight co-operations manual or pilot training materials

or maintenance materials?

A No.

Q Are you aware of any conversation about that topic?

A No.

Q Let me ask this. On the topic of Level B training, you mentioned previously that you had seen emails or communications concerning Forkner thought it was sort of job imperative to achieve Level B training.

Are you -- are you aware of any other Boeing employees who may have felt that achieving Level B training was a critically important goal?

A Yeah. I do. I think that there wasn't likely an engineer that was working on systems that were pertinent to piloting of the aircraft or display that wasn't aware of our drive for commonality.

And so I think that there were any number of engineers who understood clearly that commonality was a key requirement of the program, which then ultimately we hoped would end up in Level B training.

Q If I could direct your attention now to the one of the documents that we emailed over, it's titled Meeting Minutes CTRL09042954.<sup>10</sup>

A I'm not going to remember all those numbers, but --

Q If you just remember meeting minutes, that's probably easy enough.

A Yeah, okay. May I have a moment to review this document?

Q Sure.

A Okay.

Q Okay. So this is an internal Boeing email from June 2013 describing Boeing

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<sup>10</sup> See Exhibit 1.

meeting minutes discussing MCAS. You will see there are items numbered in the top half. Number (2) says, "If we emphasize MCAS as a new function, there may be a greater certification of training impact." Number (3), "Treat as an addition to Speed Trim." (4) "Externally we would communicate it as an addition to Speed Trim.

I guess first, have you seen this before?

A Yes. In preparation for this conversation.

Q But prior to that, was that the first time you had seen this document?

A Yeah, that was the first time I had seen it.

Q Okay. Have you ever discussed this meeting or the goals reflected in these meeting minutes with anyone other than your attorneys?

A No, no. Mr. Weisman. I haven't. This has really been limited to this conversation.

Q Did you ever discuss in any way, shape, or form with anyone at Boeing the certification or pilot training implications describing MCAS as a new function could have on the MAX program?

A No, I did not.

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 could be greater certification or training impact on the 737 MAX program?

A No, I hadn't. But as I had mentioned earlier, Mr. Weisman, I think that there are -- there were always considerations being given as new designs were evolving on what the implications were going to be for commonality.

And so I'm not sure that I find this particular conversation out of the norm with other system changes that the team is trying to understand what the impacts on commonality might be for a system that was going on the air --



Q Understood. What I'm trying to get at is was the terminology and the method of describing MCAS as opposed to just the architecture of MCAS itself. And in that being, did you understand that if MCAS was determined to be a new function or a new system on the MAX, that it could have had greater certification impacts on the MAX program, it may have also impacted pilot training requirements?

A No, I don't think there's a time in the program where I was involved in any conversations about MCAS and the impact or potential impact on crew training, including at the time of this ITRACS event.

Q And that would include the terminology or characterization of MCAS? Is that included with your answer?

A Yes. Absolutely.

Q Okay. Going briefly to another document that you have, which was the flight crew operations manual bulletin from November 6, 2018.<sup>11</sup> Hopefully, you have access. It's the only document that was emailed over.

A Yeah, I think it's -- Mr. Weisman, I would like to say though and obviously what came to fruition is that we did use an MCAS terminology internally and externally. So the conversation within that particular ITRACS notation, the end result was that the community said, yes, let's use MCAS internally and externally.

Q Well, let's take a look at this document and see if you want to --

A Okay. Okay. Okay. I have it up in front. This is the FCOM number 2DC-19.

Q Right. I assume you have seen this before?

A I have, yes.

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<sup>11</sup> See Exhibit 2.

Q Did you have a chance to review this bulletin before it was made public?

A No, I was not involved in that.

Q When did you first see this document?

A It was shortly after the publication of it, I did receive a copy internally. And it was -- I don't remember who it was from, but obviously since I was interested in what was going on, I had seen this FCOM before, yes.

Q So you just told us right before we looked at this document that Boeing did use the term MCAS. But curiously after the crash, after there had already been discussions very publicly about MCAS possibly being a factor in the crash, this bulletin that was sent out doesn't use the term MCAS. There's no mention of it in this document.

To your knowledge, was there any concern at Boeing that including the term MCAS in this document could have impacted certification or training or the FAA's response to the Lion Air crash?

A I am not aware. But I would not expect so.

Q Did you ever have discussions with anyone at Boeing about whether or not the term MCAS should be used in a bulletin like this?

A No, I was not involved in the development or publication of this document.

Q If we could look at the one other document that I think was sent over to you which is FAA's Airworthiness Directive from November 7, 2018.<sup>12</sup>

A Yes, I see it.

Q Okay. I assume you have seen this before as well?

A Yes, but again only in the prep for this conversation.

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<sup>12</sup> See Exhibit 3.

Q So --

A Mr. Weisman, I was certainly aware that the AD existed, I just had not seen the AD.

Q Did you have any role in advising the FAA on what to put into this document?

A No, I did not.

Q Are you aware of anyone at Boeing advising or recommending to FAA that they not include the term MCAS in this emergency airworthiness directive?

A I'm not aware of any such conversations.

Q Are you sure? Did you ever hear of this secondhand?

A I never heard of it secondhand, no.

Q Okay. I'm going to pause here for a moment and see if any of my colleagues on my side have questions they would like to ask.

Mr. Pasternak. Sure Matt. I have a couple of quick questions.

BY MR. PASTERNAK:

Q So Mr. Leverkusen, in the last hour, I have asked about that engine out issue, and you said that you did recall some of this. Can you just tell us what your recollection of that is?

A Right. It was on the aisle stand, which is that area between the two pilot seats where the throttles are, there are the two fuel control switches, and those are effectively on/off switches for the engines. And in the case of that in-flight shutdown, it appears as though one of them had been bumped. Because the switch was not in what we call the full run detent. It came out of that detent, and fuel was cut off to the engine.

Q Okay. And so the engine was shut down, and my understanding is that the

test plane returned, but you know it was safely returned. And then what did Boeing do to correct that issue?

A I believe that because of the commonality with those switches between the MAX and the NG -- but Mr. Pasternak, I better stop right here, because I specifically do not know. I believe that there was coordination with the supplier on assuring that this can't happen. But beyond that, I'm sorry, I can't comment.

Q Sure. And do you recall at all the rough timeframe? I thought this was in March of 2016. Do you know if that's correct?

A You know, Mr. Pasternak, I think that's right. I think it was around that timeframe, April/May. Because what I do recall is that the airplane was remote. It was -- I believe it was in Victorville, California, doing specific testing. It wasn't at home bases yet.

Q And one other question, on the issue of compensation or bonuses, I believe your testimony was that speaking about yourself and Mr. Teal, that bonuses were not tied to specific program goals. Is that accurate?

A Yeah, let me try this again. And I'm sorry, I certainly don't mean to be obfuscatory, but really we sit down with our bosses at the beginning of the year, and we describe what our goals are for that year. And then at the end of the year, it's a matter of did you achieve those goals, did you achieve some of those goals, did you achieve all of those goals? Which then results in a numerical value of somewhere between -- centered around 1.0.

Q Okay. So when Mr. Teal testified last week, he had said that at the end of the MAX program, that he did receive what he described, I think, his term was a bonus in terms of deferred stock options. Was that not accurate from what you understand?

A No, I believe that's true. Now what those were, I believe, and this only

came from conversations with Michael, but our CEO has the flexibility to grant restricted stock units. And what they're really intended to be are retention stocks. And by that I mean for those seasoned employees who are valued, they receive these restricted stock units that vest in 3 years time. So they're more of a -- it's an acknowledgment of work that's well done, but it's also more importantly effectively a retention tool.

Q So Mr. Teal testified that he believed it was directly related to his performance on the MAX program. Did you receive any similar stock options?

A I did not.

Q Okay. Thank you.

A Mr. Pasternak, I want to clarify this. Again, several years prior, early on in the MAX, I did receive those. But, again, these are at the behest of the CEO and are granted to any number of employees in a given year for retention.

So I did not view them, obviously, since we were very early in the MAX. I did not -- I did not attach those to any particular performance on the MAX, but more as -- more about the compendium of the work that I have done and the desire for Mr. Conner to retain my services as I approach retirement age.

Q Okay, and that's fine. Okay. Good enough. Thank you.

BY MR. WEISMAN:

Q Just real quickly to follow up. Did you ever characterize MCAS to anyone within Boeing or outside of Boeing as an addition to Speed Trim?

A No.

Q Did you ever encourage anyone at Boeing to describe MCAS as an addition to Speed Trim?

A No.

Q Did you ever encourage anyone -- discourage anyone at Boeing from

describing MCAS as a new feature, new function or new system?

A No, I did not.

Q Okay. Thanks.

Mr. Weisman. I just want to check to see if our colleague Alex has questions at this time.

Mr. Burkett. Thanks, Matt.

BY MR. BURKETT:

Q Mr. Leverkuhn, good afternoon, Alex Burkett. I'm the Staff Director and Special Adviser for the Aviation Subcommittee. Thank you again for your time.

I just wanted to explore a couple of items that you mentioned earlier in your testimony. First, I want to go back to the Lion Air accident, and the months between that accident and the Ethiopian accident.

You said, I believe, that before the Lion Air accident, you are not aware that MCAS was driven by a single angle of attack being input, is that correct?

A Yes, that's correct, Mr. Burkett.

Q Okay. Did that surprise you when you learned that it was?

A Let's put it this way, Mr. Burkett, I was curious about the process that it rendered that design configuration. So I wouldn't say it was a surprise simply because I understand the discipline that goes into particularly the architecture of flight control systems. So I would say it was not a surprise, but I was curious about the details at that point, yes.

Q And what conclusion did you reach about the process? Did the process lead, in your mind, to an outcome that was the proper outcome with respect to the design of MCAS and the flight control system?

A I do. I think the process that was followed is again the same process that

we use on all of our aircraft. The hazard classifications. The industry standards.

What I would say, Mr. Burkett, is I clearly what was in error was our assumptions regarding the human machine interaction. Because the process relied on the industry standard of pilot reaction to a particular failure. And what was clear post accidents was that that assumption was incorrect.

Q And with regard to assumptions, that's actually a good segue, are you aware of what assumption the team made with respect to the speed at which it becomes impossible for a pilot to manually move the stabilizer -- horizontal stabilizer trim wheel?

A I know that there was -- I am aware that there was quite a bit of investigation into that post accident, but I am not actually aware of what that number is. I know that subsequent review -- and, again, part of the preparation for this testimony, I have seen internal memoranda where we used the industry standard crew response, but there was an awareness that at some point left unchecked that a runaway stabilizer could result in a catastrophe.

Q Right, but with respect to the speed at which the aerodynamic forces on the horizontal stabilizer render it -- caused the situation to be such that a pilot of average strength is not able to move the stabilizer trim wheel, the Ethiopian accident investigators concluded in the interim report released in March that that speed is within the normal flight envelope for the airplane. Did you know that, and does that surprise you?

A Mr. Burkett, I was not aware, nor am I aware of any investigations that have gone on inside Boeing. Suffice to say that I believe that there are certainly conditions that can -- again, if crew doesn't take appropriate response that a hazardous or catastrophic condition can occur. And I believe that's on any number of systems. But to your specific question, Mr. Burkett, I was not aware.

Q Okay. Were you aware of whether anyone in Boeing considered the

potential for a crew to become task saturated with multiple cautions and warnings that would accompany an erroneous MCAS activation due to an altitude failure?

A You know, we have a very robust human factors team that works with our flight operations and our flight tech team to assess just that about the level of saturation. And, certainly, that's been going on, Mr. Burkett, generationally going all the way back to the days of --

Q Now, Mr. Leverkusuhn, I'm sorry, I don't want to interrupt you. But just in response to the question with regard to the 737 MAX, I know Boeing has a history of -- of obviously of -- of human factors research and integration. But with respect to the 737 MAX, are you aware whether Boeing conducted any assessment of the pilot reaction time considering the cautions and warnings that would accompany an erroneous MCAS activation?

A I am not aware of any investigation, Mr. Burkett.

Q Okay. And when we're talking about the assumptions, I just want to be clear, what is your -- what is the assumption that you reference? What's that amount of time for a pilot to recognize and respond to an event such as an erroneous MCAS activation?

A I subsequently understood, Mr. Burkett, post accidents, that that standard -- industry standard that we were using was 4 seconds to respond to that kind of a [non-normal]<sup>13</sup> situation.

Q Okay. Very good. Thank you, Mr. Leverkusuhn. I appreciate your responsiveness.

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<sup>13</sup> The original transcript said "... industry standard that we were using was 4 seconds to respond to that kind of a novel situation." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.



Mr. Burkett. Matt, I don't have any further questions.

BY MR. WEISMAN:

Q Okay. Thank you.

Just real quickly to follow up. I know it's something we talked about a while ago, when you mentioned that you briefed Dennis Muilenburg in senior Boeing management. Generally incorporated within that briefing, that would have included the risk of achieving Level B training and making sure that -- understanding what the potential implications of that could be.

In those briefings, would there have been any documentation of those briefings? Would there have been any sort of preparatory memo or contemporaneous emails, or again any kind of PowerPoint or slide presentation that would have accompanied that briefing?

A Yes, typically, Mr. Weisman, we would send to Mr. Muilenburg's office the presentation that was going to be shared. They were typically PowerPoint presentations. And with respect to Level B training, the only time that that would have come up, we have a graphical representation tool regarding the risks on the program. We call it BORIS, and it means Boeing Opportunity Risk and Issues System. And that would have been the only time, when I showed the -- what we call the risk cube, that would have been the only time that Mr. Muilenburg would have seen any risk associated with Level B training.

Q Do you know, approximately, when that would have -- when that briefing would have occurred?

A Well, as I mentioned, Mr. Weisman, I typically brief Mr. Muilenburg quarterly on the progress of the MAX, as did all the other development programs. And so there likely would have been numerous times when that risk would have been shown

over the course between 2015 and 2017.

Q I got you. And, likewise, would the briefing be identified as a briefing to Mr. Muilenburg or to the board or to senior management? Or would it just say like generally update on the MAX program and not identify to whom it was being sent?

A Yeah, I think it was that, Mr. Weisman. Never did we say presentation for Mr. Muilenburg or presentation for Mr. Conner. It was usually just titled, MAX Updates.

Q Okay. How would you know that the update was or presentation was briefed? How would you keep track of to whom those presentations were made?

A Yeah, it was usually by date. Because those quarterly meetings were scheduled.

Mr. Weisman, you know, we might have designated it for ExCo or for senior review. Frankly, I don't really recall.

Q And also in those briefings, just to nail down, would that all -- you said at some point they -- and if I heard you correctly, and I apologize if I may not have, but at some point the expansion of range for MCAS would have been included within one of those briefings you think?

A Yeah, I -- and I apologize for a relatively hazy recollection. But what I believe I would have briefed, what I believe I did brief was the fact that we had this stall identification issue identified during flight tests, and that a solution that had been chosen was that we would use the flight control software in MCAS to remedy that situation. I don't think it would have [] been any deeper than that.<sup>14</sup>

Q Okay.

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<sup>14</sup> The original transcript said "I don't think it would have not been any deeper than that." Boeing clarified that statement after the interview was completed that the word "not" should be removed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

A Issue solution available.

Q Okay. Just real quickly, I'll just check to see if any of my colleagues have any additional questions at this point.

Mr. Weisman. And, Doug, did I see you had a question?

BY MR. PASTERNAK:

Q Just one again for clarification. I know we spoke about this. Matt asked about this, and you spoke about this quite a bit in the previous hour.

In terms of Level B training or keeping commonality with the 737 NG, I think you would agree, you know, in our discussions that this was an important part of the program that, you know, it was described as a design objective. You were, you know, from my understanding the senior person on the program that was also dealing with finances of the program as well.

I'm just surprised that you don't have a better clearcut, like monetary value on what it would have cost Boeing if the FAA said you need to put all the pilots through simulator training, that it was going to be above Level B training.

And I just want to clarify that you were unaware of Boeing doing any sort of analysis like that, never saw any budget issues on that, you know, what it would cost if the FAA decided to do that. And I note from your bio, you know, you have a master's of business administration, you participate in a program at Harvard Business School on advanced management. It seems like a key thing in terms of making sure the program was -- was cost effective.

And I just want to clarify again, so no one at Boeing that you're aware of ever ran those numbers?

A I'm not aware of this. Mr. Pasternak, and if I may explain why. You know, as I mentioned, commonality was the objective from the beginning. As we continue to

go through the design, we did our own assessment, obviously, of the level of risk associated with Level B training based upon the success that we were having in keeping the systems common.

Now, obviously, we were depending upon our internal experts for that. But as we continue through to the gestation of the program, we recognize that we were achieving those commonality goals, which we believe would also result in Level B training. So it wasn't just a, you know, a wild bet that we were hoping would happen, it was a methodical approach to understanding what the risks were based upon how the flight deck and the flying characteristics of the airplane were coming together.

Q Okay. You know and at no point, you know, no one ran those numbers to see what it would have cost?

A No, because I didn't direct it, Mr. Pasternak, because again, it was felt that the level of risk associated with that was relatively low based upon how we were going through our design [development].<sup>15</sup>

Q Okay. And I'm surprised at that, because I don't want to get into it or present it now, but there's clearly -- FAA had serious concerns about whether or not Boeing would reach -- be granted Level B training, you know, up until late in the program. So, you know, I'm surprised that you thought it was running smoothly all along.

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<sup>15</sup> The original transcript said "No, because I didn't direct it, Mr. Pasternak, because again, it was felt that the level of risk associated with that was relatively low based upon how we were going through our design illusion." Boeing clarified that statement as indicated in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff

A Well, clearly, Mr. Pasternak, first of all, it is the FAA's call. And the ultimate determination was going to be putting the pilots on the airplane from the FAA and the other regulatory agencies. To your point, which was relatively [late]<sup>16</sup> in the program, I believe, it was around the August/September timeframe of 2016.

But again, we, we believed that we had sufficiently created a common design where we were assessing that risk as relatively low. You have evidence of communication within the FAA. Certainly, I wasn't aware of that. But our internal assessment was that the commonality objectives had largely been met.

Q Okay. Thank you.

Mr. Weisman. Why don't we go off the record.

[Recess.]

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<sup>16</sup> The original transcript said "To your point, which was relatively linked in the program, I believe it was around the August/September timeframe of 2016." Boeing clarified that statement as indicated above in brackets after the interview was completed. We have included that change for clarity per Boeing's suggestion and agreed to by Majority and Minority committee staff.

[2:26 p.m.]

Ms. Cooke. We are requesting to go back on the record. I have that it's approximately 2:26 eastern daylight time.

BY MS. COOKE:

Q Again, thank you for being here. I'm Corey Cooke; I'm the Republican general counsel. And if we cover things that have been covered previously, I appreciate your patience of us.

In the previous hour, you mentioned some items about Boeing's assumptions at the time when you were discussing MCAS with my colleagues on the Democratic staff. What were Boeing's assumptions at the time of the design and certification of MCAS?

A Well, I think the key one, in light of the Lion Air accident in particular, was the assumption regarding crew action associated with a failure of MCAS which would result in a runaway stabilizer trim. The assumption was that in identifying that the stabilizer trim was doing something unexpected, that the crew would rely on their training regarding what to do for a runaway stabilizer trim, of which a failure of MCAS would be evidenced. And so the assumption was that the crew would be able to deal with that failure of MCAS as part of their normal training. And as was evidenced, as I understand, from the accident investigation, the flight prior to the Lion Air accident event, the MCAS system had been firing and that crew did execute the runaway stab trim procedure and landed safely, but obviously on the subsequent flight, they did not with the loss of lives.

So our assumption of crew action associated with a failed MCAS system was proven flawed. And so really what I was trying to do was kind of separate the idea of the process that resulted in MCAS, which I believe the process was correct and appropriate, but that assumption underpinning that process was proven to be incorrect.

Q Okay. And what were Boeing's assumptions related to pilot actions when you were considering the appropriateness of a single AOA, angle of attack sensor?

A Yeah, it was just that, Ms. Cooke, is that it would be a matter of the crew relying on their training, the stab trim runaway procedure, and that they would execute that procedure which would then result in a disconnect of the MCAS system.

Q Okay. And so Boeing has customers from all over the world, correct?

A Yes.

Q Okay. So did Boeing's assumptions take into consideration the experience level and skill sets of pilots outside of the United States?

A Well, we certainly had thought so. I used the term "industry standard" in previous conversation around what we would expect a pilot, how a pilot will respond to a failure, and we utilize those industry standards. And I think that what these accidents have exposed is that those industry standards are now -- need to be challenged and reviewed, because they were proven to be incorrect in the event certainly of the Lion Air accident.

Q Can you elaborate by what you mean with industry standards? Is there a certain industry standard you're specifically referring to or what do you mean there?

A Yes. It's what can we expect, how can we expect, how fast can we expect a trained crew to respond to a failure condition. And in this case it's the runaway stab. And the assumption was that we could expect the pilots to respond in about 4 seconds. And as evidenced by Lion Air, certainly the captain was responding by trimming the airplane and continuing to trim the airplane, but then ultimately, without disconnecting the -- without following the specific procedure for a runaway stab trim, the airplane was lost with the loss of life.

So the industry standard which I speak is really about what should we expect from

flight crews in a nonnormal situation.

Q Okay. I know in the prior hour as well you were asked about some various bulletins that were released.

A Yes.

Q Okay. So during last week's interview with Michael Teal, he made reference to a second document that was sent by Boeing following the release of that bulletin. He referred to it as a multi-operators memo or a MOM. Are you familiar with those types of memos?

A Yes, I am.

Q All right. Can you first explain to us in general what those memos are? And then the second part of the question would be, if you are familiar with a memo, a MOM being sent prior to that bulletin -- or sorry, subsequent to that bulletin?

A Understood. So to answer your second question first, Ms. Cooke, I was not aware of a MOM that went out, but I'll distinguish between the two. The flight ops bulletin that was released and then subsequently AD'd by the FAA, it goes directly to the flight crews and gets inserted into the ops manual of the aircraft, which is how do you operate the airplane. And I believe that was No. 19, if I recall. So subsequent to that, there had been 18 other flight ops bulletins that had been put out.

A MOM is a more encompassing communication method that we use, and it can be used for maintenance issues. It can be used for awareness issues; but it is a memo that goes out largely to the maintenance crews and fleet teams within the airlines.

And so a MOM is one that we don't send to just one operator, we send it to all the operators. And anytime we put out an operations bulletin, we also put out a MOM, just as an awareness to the fleet teams within the airlines that this has occurred.

Q And how common is it that Boeing sends out MOMs?



A Quite routine. As I said, it can encompass any kind of communication, whether it's maintenance. Sometimes we will put out MOMs to let people know of conferences that are coming up. So it's a pretty routine communication.

Q So to clarify, are you familiar or aware of a MOM being sent out that explained MCAS in detail?

A I am not aware of that MOM.

Q Okay. Since you are not aware or familiar of it, given how you've described MOMs, would it surprise you that a MOM would have been sent out about MCAS?

A No, it would not surprise me. And, again, as I said, usually if we put out a flight ops bulletin to all the airlines, it is often accompanied by a MOM, almost always. But I cannot speak to the content of the MOM or what was actually in it.

Q And just to clarify, on November 10, 2018, which is our understanding of when this MOM was sent out, what role were you in?

A I was in my current role as the vice president of propulsion systems.

Q And, again, I know I've asked this already, but to further clarify, in that role you had nothing to do with the response to these tragedies and the accidents?

A That is correct.

Q Okay. I am going to go a slightly different direction now, and I just want to get some clarification about your organizational structure when you were working in the MAX office. So just to go through that, can you just elaborate on how that office was set up and who some of your, I don't want to say direct reports were, but how some of that direct reporting system functioned and if while you were there that organizational structure changed?

A Certainly. You actually said it correctly, Ms. Cooke. There were about, I believe, 9 or 10 people who are direct reports to me, and those individuals, as I

mentioned, were the chief product engineer was Michael Teal, and then the integrated product team leaders were also direct reports to me; [REDACTED], who was the structures IPT leader, [REDACTED] -- I'm sorry I'm not spelling these names and I'm not sure that it's relevant. But those line leaders were direct reports to me.

And then there were members of the leadership team that did not actually report to me or if you can think about it thusly, a dotted line relationship to me. So, for instance, I mentioned our regulatory administration leaders, [REDACTED] and [REDACTED], for instance, they did not directly report to me. They reported into the ODA, but they were part of the MAX program. And that really comprises most of the leadership team which was support people that were dedicated to the program but did not report to me.

The structure largely stayed the same, Ms. Cooke, but there were a lot of personnel changes over that period of time where, you know, people rotated into the jobs that were different than who started within the positions.

Q Okay. Second question, so direct reports is the correct term for you. Do you know what Boeing calls the term for where that dotted line where you're the direct report but potentially people below you oversee them, are those skip level managers, or what's the term that you all use?

A Can you ask your question one more time, Ms. Cooke? I'm trying to track with you.

Q So you had direct reports. You had 9 to 12 direct reports at anytime. Given that you described them as senior leaders, managers, I presume that they oversaw and had folks direct reporting to them as well, correct?

A That is correct.

Q So what would you then -- for those folks one layer down, what would you have been called? Were you the skip level manager? How was that phrased?

A You know what, I don't think we actually used that terminol- -- I mean, we have used it, but I'm not sure that we necessarily designate it as skip level. You know, all of the direct reports in those IPT leadership positions were executives to the corporation, and then below them they typically had nonexecutive senior managers that directly reported to them. But then they also oversaw functional -- what we call functions. Those are the people on the side that aren't directly reporting into the program, but yet they are responsible for executing tasks for the program.

So, yes, Ms. Cooke, we use the term every now and then "skip level," so I understand the term, and while we don't use it often, I get it.

Q I think I'm trying to figure out, if we roll up, if we do this rolling up function, how many people potentially from that rolling up would have said, well, my direct boss is X, but he reports to Mr. Leverkus?

A Yeah, I understand. At our peak, the number of people that were working on the MAX were about 1,500. And I would say that the vast -- not the vast. Let me be more clear in my terminology. The majority of those people did not directly report to the program. They were in those functional areas that were responsible for, you know, their experts in the particular area for their responsibility, but they were charging into the program because they were doing work on behalf of the program. By "charging" I mean their time was spent working for the program, if that makes sense, Ms. Cooke.

Q Okay. In terms of the way reassignments occur at Boeing, could you help us understand the reassignment process and how that occurs?

A Sure, sure. For instance, if someone is up for a promotion that worked on my team, I would be made aware that that person was being considered for the promotion, and then obviously I would be aware of the outcome of that. Sometimes individuals' expertise were required elsewhere, so I would be made aware. And

usually -- let's zero in on engineering, for instance. If we had a senior manager that worked on the program that was in a particular level of expertise but they were more needed over on another program, I would be informed, and then it would be engineering's responsibility to provide an equal fit senior manager, for instance. So that would -- I would be informed, I would be part of that discussion, and it was usually handled by what we called broadly the functions, if that makes sense, Ms. Cooke.

Q Yep. So I am just trying to understand. Obviously, there were public press reports about folks being reassigned who worked on the MCAS function and the MAX. Did you have any involvement with any of those reassignments?

A No, I did not.

Q And in the current role that you're in, was that considered a reassignment or was that you taking a different opportunity?

A Since I serve at the behest of the CEO, the CEO requested that I go lead propulsion systems because of some issues that we were having in the world of engines and engine supplier, so it was a reassignment.

Q Okay. And the CEO at the time who made that request was Dennis Muilenburg?

A Actually, I'm sorry, it was the CEO of commercial airplanes, which at the time was [REDACTED].

Q Okay. Thank you.

And I believe that I have discussed this previously, but just circling back since you have made some comments in prior hours in regard to the BASOO and the ODA. Do you feel in your opinion that there was independence between those FAA entities, the ODA, the BASOO, and Boeing that everybody had their separate independent roles?

A I do, I do. I think, while the ODA had only been in existence I think

probably for less than 10 years, you know, the procedures were well established. And there was no question about our understanding of the independence of the BASOO, as well as the ODA, and how they fit in between the program and the FAA and ODA effectively as the oversight for what was going on in the certification process of the MAX.

So, no, I absolutely understand the independence of each one of those organizations, yes.

Q To the best of your knowledge, did you ever attempt to influence the ODA or the BASOO in any way?

A Let me describe it this way: I certainly, over the course of the program, disagreed with some of the positions that the FAA was taking, particularly in the world of issue papers. So did I attempt to influence? No, but I certainly raised my disagreements with the leadership in the program and with the ODA, and had those conversations about whether or not those disagreements were going to get raised to the FAA as part of, if you will, a formal appeal or an applicant position.

So -- but in terms of -- using the term "influence," Ms. Cooke, I think it would just go under the normal heading of I'm looking at a situation in one direction, the FAA views it differently, and how do we resolve those disagreements.

Q All right. So that would fall under the category of this was -- you followed the normal process that you described earlier in terms of the appeals and the issue paper four-point process?

A Absolutely, yes.

Q Okay. Did you have any concerns that others who either reported to you or who were on these teams may have not understood the independence of something like the ODA?

A No, I don't think so. I think that even the newest first-line supervisor

understands the criticality of that independence and of that oversight. It's really a crucial element of how we do business.

Q Okay.

Ms. Cooke. I'm going to give my team a few more minutes to see if anyone thinks of any other questions.

But if not, I will thank you again for your time, and I will, with the others, say that we are done with our time for this hour. We can go off the record.

Mr. Primis. Hey, Matt, can I get a short break?

Mr. Weisman. Yeah, absolutely. How long do you need?

Mr. Primis. Maybe 10 minutes. I know you're next up and Corey was pretty brief there, but I could use a quick break.

Mr. Weisman. Sounds good.

Mr. Primis. Thank you.

[Recess.]

Mr. Weisman. Is everybody back? Are we ready to proceed or are we still waiting on some folks?

Mr. Leverkuhn. We're good here in Seattle, Mr. Weisman.

Mr. Weisman. Okay, Great.

Everybody on, Corey, Tara, everyone on your side ready?

Ms. Cooke. Yep, we're good to start. Thanks.

Mr. Weisman. Okay. All righty. I have 3:02 eastern time, so I will begin our last hour now.

BY MR. WEISMAN:

Q So the MAX doesn't have an Engine Indicating and Crew Alerting System -- it's the acronym EICAS, E-I-C-A-S, which is a system that can help crews

prioritize how to respond when they experience multiple alerts. The FAA granted Boeing an exemption so that Boeing wasn't required to add it to the plane.

In light of the two MAX crashes and all the investigations and analysis that's come forth since, do you believe, in retrospect, Boeing should have had EICAS on the MAX?

A No. No, I don't, Mr. Weisman. I do not believe that EICAS per se would have or could have prevented the accidents that occurred. The way that the faults are displayed, I don't think that the difference between the EICAS and the MAX or the NG indicating system would have played an appreciable part in preventing these accidents. So, no, I don't consider that to be an effect of the accident.

Q Was cost at all a factor in Boeing's decision to not include EICAS and ask for an exemption from the FAA?

A Well, Mr. Weisman, it was really about, again, back to that commonality. I think that had we put an EICAS system onto the 737 MAX, it would have been then a very, very different airplane. It would have been --

Q The airplane wasn't -- I apologize for interrupting. I just want to make sure because we're a little pressed for time. Did -- but the question was, did cost have anything to do with Boeing's decision? And I understand you're speaking to commonality. Based on what we talked about earlier, as I understood it, the degree you ventured further away from commonality would -- as I understood it from what you said, would impose a cost. So am I correct in interpreting that there would have been a cost associated with adding EICAS to the --

A Yes. Yes, there would have been a cost associated with it, Mr. Weisman. But one thing I would say too is that it would have drastically changed actually the strategy of the aircraft, because it would have been a very different aircraft than the MAX. If we would have had to change effectively the avionics backbone of the airplane,

it really would have been a very, very different airplane than a 737.

Q Right. And a different airplane would have imposed other costs. Is that right?

A Well, yeah, but it really would have been a strategic difference for the corporation, you know, because if we were going to make that dramatic a change, would we have done an all new airplane, for instance. So that is really why I -- cost is certainly an outcome of that, but it also would have been a broader strategic issue for the corporation.

Q Do you know how many total exemptions Boeing applied for on the MAX to the FAA?

A No, I don't, Mr. Weisman. That one certainly is one of the largest and the one that I'm aware of. But, no, I'm sorry, I don't.

Q Do you have a sense of if it was like more than a dozen, less than a dozen?

A Oh, it's less than a dozen, certainly.

Q Are you aware of the FAA denying any of the requests for exemptions on the MAX?

A You know, as I was speaking with Ms. Cooke, I don't recollect the details about which ones were and were not accepted. So I'm sorry, I can't speak to that, no.

Q So as vice president and general manager of the MAX program, is it fair to say that part of your responsibility was ensuring that the program stayed on schedule and on budget?

A Yes, certainly.

Q So as you may know, [REDACTED], who is a former senior production manager at Boeing 737 factory in Renton, Washington, testified before this committee in December, and he described enormous production pressure at the factory which he said



was, in his words, in chaos. He described -- he became so concerned about the level of mistakes he was seeing there in the spring and summer of 2018 that he spoke directly with vice president and general manager of the entire 737 fleet, Scott Campbell, and recommended shutting down the line temporarily to address critical safety issues. Production, in fact, was not slowed down but increased, and 3 months later, the Lion Air flight crashed.

My question is, in June of 2018, were you still on the 737 MAX program?

A No. By that time, I had transitioned to my other position.

Q When specifically did you transition?

A April, April of 2018.

Q Okay. So [REDACTED] concerns came in the spring and summer of 2018.

But in any of that time or even after you transitioned, were you aware of [REDACTED] concerns?

A No, I was not.

Q When did you first become aware of his concerns?

A It was probably as a result of the media reports of it.

Q Okay. How often did you interact with Scott Campbell?

A Often, frequently.

Q So did he make you aware of any concerns that Boeing employees raised about safety issues and production pressures regarding the MAX?

A No, he did not. I didn't speak with him on that. I was aware of the challenges in the factory, and there were -- most of them had to do with parts shortages from our suppliers. So I was aware that there were challenges in the factory, but I was not aware of any employee concerns that had been raised to Mr. Campbell.

Q Okay. Do you think, given your position as -- prior to your leaving the

program when you were still vice president and general manager of the program, do you believe that those kinds of production issues are the type of concerns that should be -- that you should be made aware of?

A Well, again, at the time, I had transitioned off of the MAX program, so I wasn't aware. I believe that any concern by any team members about concerns about pressure, schedule pressure -- we discussed the survey about undue pressure -- I think those need to be taken seriously. I think we need to give them their due. I think we need to have those conversations. But in terms of my knowledge of that particular issue, having transitioned off the program, I'm sorry, I can't really speak to that.

Q Okay. Are you aware of any Boeing employee telling potential 737 MAX customers, prior to the FAA's preliminary approval of Level B training, that no simulator training would be required? And I know you answered a variation on that earlier and had spoken that Boeing had expressed its expectation that no training would be required; but separating that out, what I'm asking is, are you aware of any Boeing employee telling potential MAX customers, prior to the FAA's determination on Level B training, that no simulator training would be required, not just the expectation but just no simulator training would be required?

A No, I'm not aware of that, Mr. Weisman. Again, it would be imprudent, since the decision hadn't been made. I think it could only be communicated as our objective and expectation as opposed to a fact. So, no, I'm not aware.

Q Did you ever tell any MAX customers, prior to the FAA's determination about Level B training, that the MAX would not require simulator training?

A No.

Q Prior to the FAA's decision about accepting Level B nonsimulator training, did you personally ever have any discussions with any airlines about pilot training

requirements for the MAX?

A I don't have any specific recall, Mr. Weisman, but in most of our marketing materials where we would share with prospective airlines, we would talk about our intent of achieving commonality, which would result in Level B. So it was clear that it was our intent and our objective, but I don't recall any specific examples of having that conversation.

Q So earlier you said that you'd worked with the marketing group and had some hand in reviewing marketing material. So through the investigation, we saw at a hearing some marketing materials that said no simulator training would be required, but we also saw a press release from 2014 saying explicitly no simulator training would be required.

Like how -- I guess I'm curious to know, I mean, who's responsible, ultimately responsible for these marketing materials if there was a mistake in overstepping or maybe misstating, who's responsible for that? And, you know, is that something that comes across your desk or --

A Well, not all the marketing materials do, Mr. Weisman, but, look, we were aware that until the T-test had been flown, then we had to state that Level B training was an objective, it was an expectation; but, clearly, we were not going to be able to say that it was a fact, because it doesn't become a fact until the AEG declares it to be so.

Q Right. But Boeing did say that as a fact in a press release in 2014. Is that an error or is that part of a broader strategy?

A Well, I think if it wasn't properly caveated, then it was an error because, obviously, we couldn't say definitively that there would be anything -- you know, that we could say definitively there would be Level B until the FAA makes that determination.

Q But if you did, which it turns out you did, Boeing did, and it was an error,

what kind of accountability is there for -- does a correction go out for a press release or is the person who sent it out or approved it, do they get a talking to? What happens? It seems like it gets out there and -- you know, what else happens?

A Well, you know, Mr. Weisman, on that particular topic, I can't speak. It would obviously depend upon the level of the error, about whether we go out and we print a retraction or a correction. I don't know the nature of the press release that you're speaking of. So, suffice it to say, it's situational. But, obviously, we -- and it's clear and it was clear to everyone on the program that I think we could say that we will achieve type certification as well, but until type certification is reached, then we couldn't really say that definitively, nor could we say it about Level B.

Q Okay. I may circle back on that later.

Prior to the FAA's decision of accepting Level B nonsimulator training, did you personally ever have any discussions with FAA officials about pilot training requirements on the MAX?

A No.

Q Okay. You've mentioned that you've reviewed some Forkner emails previously. Did any airlines ever inform you that they wanted simulator training for their MAX pilots or did they ever ask you if they needed simulator training for their MAX pilots or otherwise sort of ask your opinion about whether they should offer MAX simulator training to their pilots?

A You know, the only airline that I recall having conversations regarding simulator training was with [REDACTED]

[REDACTED] That's the only airline. And it wasn't a deep conversation; it was a cursory conversation about how their intention was to -- as I recall, of how they were going to be training the pilots. So there were no other conversations.

Q When was that, approximately?

A Oh, I believe that was around 2015.

Q And do you recall what you told them?

A No, I don't, because, again, [REDACTED] was a unique situation because they were going to require simulator training [REDACTED]

[REDACTED].

Q Gotcha. So, recently, several emails came to light that showed Boeing employees sort of 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 or with Michael Teal 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 No, I was not aware.

Q When did you first learn that a Boeing employee had been attempting to talk airlines out of simulator training on the MAX?

A Yeah, it was as part of the prep for this conversation.

Q Did you ask or in any way encourage anyone at Boeing to discourage MAX customer airlines from requesting simulator training for their pilots?

A No.

Q To your knowledge, was anyone in Boeing management aware of its employees' efforts to talk airlines out of simulator training, prior to Mark Forkner's departure from Boeing in July of 2018?

A No, I'm not aware.

Q Based on the emails, it appears that an employee worked to discourage simulator training by Lion Air and some other airlines. Are you aware of who these other airlines are?

A Really, the one that I recall as part of this preparation was that series of emails around Lion Air. That's the only one that I can recall as part of this preparation.

Q And you never -- you didn't become aware of this through press reports or other nonattorney-client communications?

A No, sir. No, I wasn't.

Q Okay. So we probably don't even need to look at the document. We can, if necessary; but were you aware in June of 2017 that Lion Air might have needed or wanted simulator training for the MAX?

A Again, Mr. Weisman, only subsequent to the event and as part of the preparation for this conversation, that's the first time I had seen those emails.

Q Did you ever discuss Lion Air's desire for simulator training with Mark Forkner or anyone else at any time prior to the Lion Air crash in 2018?

A No, sir.

Q Are you aware of any analysis of what the financial impact would be on Boeing if Lion Air had opted for simulator training?

A No, sir. I am not aware of any analysis that have been done.

Q Are you aware of any analysis of what the financial impact would be on Lion Air if Lion Air had opted for simulator training?

A No, sir, not aware of that.

Q Are you aware of there ever being any concern at Boeing about establishing a precedent of MAX simulator training?

A No, sir.

Q So you're saying Boeing had no concerns about airlines requesting MAX simulator training whatsoever?

A No, I don't think so. Obviously, having achieved Level B approval in about

August or September timeframe, subsequent or conditionally upon type certification, we believed that that would be a benefit to the airlines since they would not be requiring simulator training. So we didn't run any -- I'm not aware of any analysis or cost-benefit analysis that had been done on behalf of any airlines for simulator training.

Q Right. So airlines could -- even if it wasn't a requirement to have simulator training for differences training for their pilots, obviously the airlines could have chosen to provide simulator training on a voluntary basis. And are you saying that Boeing was agnostic as to whether or not any of the airlines chose to voluntarily use simulator training?

A You know, Mr. Weisman, I would -- I'm not sure I would say agnostic. What I think our responsibility would be at that time would be to have the conversation with the airline about their belief and the necessity of doing simulator training. I'm not saying that we would argue one way or the other, but we would certainly want to be transparent about, you know, the journey that we had been on and to why we believe Level B was appropriate. But, ultimately, that is the airline's decision. But, certainly, we would want to equip them with all of the information necessary to make that decision.

Q Right. I mean, because what we've seen is in an email conversation a concern expressed about, you know, establishing a precedent in a particular region should an airline choose to opt for simulator training. Is it your testimony that that is not -- is that -- sorry.

A I have a personal opinion about that, and I disagree with the author of those words. I think airlines are going to make the decision specific to them. I don't believe that there would be a precedent set. I think airlines are going to make the decision specific to them.

Again, I want to reiterate, it's our responsibility to equip them with the information they need to make that decision.

Q Do you believe if PT Garuda had opted for simulator training, Lion Air might have been more likely to opt for simulator training?

A I don't know. I can't comment. Obviously, they're two very different airlines despite being in the same region. I don't -- I can't speak to that, Mr. Weisman.

Q If one or both of those airlines had opted for simulator training, what would Boeing's opinion of that be?

A I can't speak to Boeing's opinion, of course, but I would say --

Q Why not?

A Well, I'm an individual at Boeing; I can tell you what my opinion would be.

Q You're the head of the MAX program.

A Yeah, certainly. But, again, as I discussed earlier, pilot training is not my area of expertise. So I think that the work that we have done, had done on the program up until that point to achieve that level of commonality, I think that -- again, I will -- the airline is going to make a decision specific to their needs, and the best we can do is equip them with the proper information.

Mr. Weisman. Looks like Doug has a question.

Mr. Pasternak. Sure.

BY MR. PASTERNAK:

Q Yeah, just to follow up on that and to clarify, I think at the very beginning in our first hour, you had mentioned that you did frequently interact with airlines about the MAX. Is that accurate?

A Yes, it is.

Q And how many -- I know there are lots of airlines. Did you have discussions



or meetings with, you know, more than a dozen airlines? Was it several dozen?

A Yeah, I would say more than a dozen, Mr. Pasternak.

Q Okay. Would it be more than 2 dozen?

A Let's say somewhere between a dozen and 2 dozen. How about that?

Q But it wasn't 50?

A Right, right.

Q I'm just getting a sense.

A Yeah.

Q So in those conversations -- and I understand you just said you're not an expert, you know, on the training issues -- none of those airlines, you know, brought up the issue of Level B training, or did any of them say, you know, we're planning on having simulator training for our pilots? Was it ever a discussion? Did they ever raise it in any of your conversations? It seems to me an important point for airlines in terms of potential costs to them.

A Right. I would tell you that my conversations really were around what the airplane is, what the expected performance was, what the fuel burn benefits were. There was one airline, Mr. Pasternak, where I am aware that this came up, and it was [REDACTED]. And [REDACTED] was having internal discussions about the MAX 9, which at the time was our largest aircraft. I'm not involved in the details, but I do know that [REDACTED] specifically, [REDACTED] was having questions about what kind of training would be necessary.

So that's really the only one where I -- where the topic specifically came up to my awareness.

Mr. Pasternak. Okay. Thank you.

BY MR. WEISMAN:

Q Separate from the requirement of simulator training, did you ever have any discussions with airlines about voluntary simulator training?

A No. Again, the level of conversations that I was having were really around aspects of the airplane itself. And so I didn't delve into the training aspects of it too much, except to state what our intention and what our objective was.

Q Okay. So in January of this year, Boeing announced that it would now be recommending simulator training for the MAX. Did you agree with that decision?

A I'm not privy to that decision, so -- I know that there have been changes to the MAX, change to the flight control computers, change to the MCAS. So not being a part of the decision, it's difficult for me to --

Q This is a publicly announced decision. This has been reported widely across the press.

A Sure.

Q I mean, I'd assume that you're aware of it. Were you not aware of it until I just asked about it?

A No, no, no. I was clearly aware of it, but not being part of the conversation and what drove the training, I'm assuming that the training is necessary.

Q Okay. So I'll just ask again. Do you agree with the decision to recommend simulator training?

A Yeah. And I'll reiterate, Mr. Weisman, not being part of the change packages as part of the MAX as we unground the airplane, I can't comment on the necessity for training, other than our processes associated with what goes into training and training decisions have been followed. So not being aware of that decisionmaking process, I can't comment.

Q Well, two of the changes, at least two of the changes have been also publicly

announced by press release from Boeing and widely reported in the press that it's no longer going to rely on a single sensor, it's no longer going to -- MCAS is no longer going to rely on a single sensor, MCAS is no longer going to be allowed to activate repeatedly.

Knowing that, do you agree with the decision to recommend simulator training?

A Mr. Weisman, I respect those individuals that have been involved in the change and the decision and knowing that they came to the right decision associated with the change package is necessary. However, not being part of that, I'm sorry, I can't render an opinion.

Q But it is your belief that it was the right decision to not require simulator training when you were in charge of the MAX program?

A Yes, sir.

Q Okay. Were you -- so I believe you talked a little bit previously, in a previous hour, about the reaction time to pilots for MCAS activation, and there was an assumption about 4-second reaction time. Do you recall where that assumption came from?

A Again, not being an expert in this area, it's my understanding that it is an industry standard about how we expect pilots to respond to nonnormal situations.

Q Were you routinely provided with Boeing's coordination sheets?

A No, I was not.

Q Did you ever see Boeing's coordination sheets for MCAS?

A Not prior to preparation for this session.

Q Okay. So you weren't aware that as early as 2012, that Boeing had concluded that if a pilot did not respond to uncommanded MCAS activation within 10 seconds, that the results could be catastrophic?

A Again, I had not seen that coordination sheet prior to the preparation for

this session.

Q Okay. What was your reaction -- without revealing any attorney-client communications, what was your reaction when you did learn that?

A Mr. Weisman, I understand that there are conditions that if the pilot doesn't intervene, that it can result in catastrophic results. So I viewed that understanding as a condition that says that if the crew does nothing in a nonnormal condition associated with flight controls, that something catastrophic can occur. So it was not a surprise to me the statement that said if the crew does nothing, then a catastrophic event can occur.

Q Do you believe that this is information you should have been made aware of, prior to preparing for this interview?

A No, because, again, as I say, I believe that there are numerous nonnormal conditions associated with failures on aircraft or combinations of failures that can result in catastrophes if the crews don't act.

Q Do you believe that this information should have been shared with the FAA?

A I believe that the FAA has guidance and understanding of what crew reaction times need to be, so I don't know that that specific was necessary to be shared with the FAA.

Q And do you believe that it should have been shared with MAX customers?

A Again, no. I believe that the belief in the standard and the understanding of how pilots will react is understood and is universally accepted by the industry.

Mr. Weisman. I think Doug has a question.

Mr. Pasternak. Yeah, sure.

For followup on this regarding the 10-second reaction time. So you acknowledge that you reviewed that document as part of your preparation for the interview today, but I think you're misconstruing what that document says. It wasn't hypothetical that, you

know, if a pilot took 10 seconds to react, you would have catastrophic consequences. You know, clearly, there are time limits on a pilot's reaction.

What it says, and other, you know, records from Boeing indicate, is that a Boeing test pilot, not a foreign pilot, but a Boeing test pilot, in the simulator could not react in 4 seconds. It took them more than 10 seconds. And so in the simulator, the reaction was catastrophic.

So I just, you know, am trying to figure out -- you were speaking before about, you know, Boeing making some faulty assumptions. This isn't really a case of Boeing making a faulty assumption. Boeing had clear evidence that if a pilot reacted in more than 10 seconds, could be catastrophic, and Boeing chose not to share that information with the FAA or its customers.

So do you have any reaction to that?

Mr. Leverkuhn. No. Again, I believe that there are reaction times to nonnormal situations that are required, and given that the standard for those times keep it inside, in our understanding at the time, keep it inside the safe zone, if you will, then it's -- I don't know if there -- I don't think that's surprising to me, Mr. Pasternak. I wasn't involved in it, but certainly an understanding that what we expect a crew to react to, and if the crew does not react within that period of time to certain nonnormals, that they can be catastrophic. So I accept that as due diligence in understanding the operation of the aircraft.

Mr. Pasternak. I'll let Alex jump in; I think he wants to ask. But that's due diligence, but Boeing didn't do anything with that critical information. You basically decided to shield that information from the FAA, from your customers, and from MAX pilots.

It's just a statement, not a question. I'll let Alex ask what he wants to.

Mr. Burkett. Thanks, Doug.

BY MR. BURKETT:

Q And, yeah, Mr. Leverkuhn, to sort of drill down on this a little bit more, you stated earlier that you're not aware that Boeing analyzed whether pilots could respond to an erroneous MCAS activation within 4 seconds with all of the things going off in the cockpit. And let me walk through some of the -- you said you had reviewed, I believe you said the Lion Air report prior to your appearance here today. Is that correct?

A Yes.

Q And the Ethiopian 302 interim report as well. Is that correct?

A I have not read that in detail, Mr. Burkett.

Q Okay. Putting that aside and even with respect to the Lion Air 610 report, I would represent to you that the crew was confronted with a stick shaker. Were you aware of that?

A Yes.

Q With a feel differential pressure light illuminated on the overhead panel?

A Yes.

Q With a master caution?

A Yes.

Q With a speed trim fail light?

A I wasn't aware of that. I don't recall that.

Q Okay. With an IAS disagree flag on the PFD?

A Yes.

Q And so -- and at the same time, MCAS was firing to push the nose of the airplane down. Is that right?

A As I understand it, yes.

Q And to your knowledge, the crew had no knowledge that MCAS was on that airplane. Is that correct?

A That is my understanding.

Q Okay. Did Boeing ever consider whether, with all of that going on in the cockpit, all of those cautions and warnings, that maybe we should rethink whether it's possible for someone to correctly diagnose the problem within 4 seconds and apply remedial action?

A Yeah. Mr. Burkett, what I will say is that, again, we believed that the crews would rely on their training to deal with a stab trim runaway, and that that would require them to stabilize the airplane and disconnect the trim. That was the assumption that --

Q Okay. Let me ask you this, and I apologize for interrupting, but I want to be economical with time.

Stab trim runaway, does that -- you know, in the classic understanding of a stab trim runaway, does that involve a spurious stick shaker?

A I believe that there are conditions that can result in those two occurring at the same time; but I'm sorry, Mr. Burkett, I am not aware of all of the failure modes that can occur that can result in both things happening at the same time.

Q Okay. But do you have an opinion as to whether a runaway stabilizer would not present in the same way that an erroneous activation of MCAS as a result of an alpha vane failure would present to the flight crew?

A I'm sorry, Mr. Burkett, can you ask the question one more time? I apologize.

Q Sure. Do you have an opinion as to whether a runaway stabilizer would in all cases present to the flight crew in the same manner as an erroneous MCAS activation from the standpoint of the cautions and alerts?

A Yeah. I'm sorry, Mr. Burkett, as I said, I'm not familiar with all of the failure modes that can result in a stab trim runaway and what the attendants additional indications might be. I don't have that level of expertise.

Q Okay. In the previous hour, our Republican colleagues asked you about the international profile of Boeing's customers, and I want to be clear about one thing on that point. In your opinion, can you rule out the possibility that an American -- not American Airlines -- an American pilot in the United States flying for a U.S. air carrier, can you rule out the possibility that such a flight crew would have been able to, in all cases, salvage the airplanes, where the Lion Air and Ethiopian crews were not able to do so?

A Mr. Burkett, I cannot comment on that. I think that -- what I can say is we have one data point, one additional data point, and that was the flight prior to the accident flight where, in fact, a similar situation occurred, and they were able to remedy the situation with a safe landing. So that's two different flight crews presented with similar situation, and one recovered and one did not.

Q And on the preceding Lion Air flight, I'm glad you bring that up, because on that flight there was a jumpseat rider in the flight deck. Is that correct?

A As I understand it, yes.

Q And the jumpseat rider, in fact, was the third person and, in fact, increased the mental resources in that cockpit by 33 percent. The jumpseat rider was instrumental in recognizing and remedying the situation. Is that right?

A Well, it's hard to speculate what would have occurred had that jumpseat rider not been in the airplane, but all I know is that they were able to remedy the situation.

Q And do you know if they remedied the situation within 4 seconds of the initial onset of the MCAS activation?



A I don't know, Mr. Burkett. I believe that there were more than one nose-down inputs from MCAS prior to them remedying the situation.

Q Okay. So would it be safe then to assume that, given that fact, they did not recognize and respond to the situation within 4 seconds among the three of the crew members?

A Well, I think the remedy to the situation that was taken was to provide nose-up trim, which clearly they did. So that's the remedy that I'm speaking of, that to counteract the trim provided by MCAS, the crew counteracts with nose-up trim, which obviously in the accident flight, that did happen. It happened several times. So I would say that the crew did remedy the situation. However, they did not carry out the full procedure, which ultimately resulted in the accident.

Q Okay. So in all three cases, then, the Lion Air incident, the Lion Air accident, and the Ethiopian accident, none of those crews followed the procedure for runaway stabilizer trim successfully. Is that not correct?

A As I understand it, the incident crew did by deactivating stab trim after they had trimmed the aircraft out. It is my understanding that they did follow that procedure.

Q Right. But as you just stated, they attempted to correct the situation by applying nose-up electrical trim, is what I took you to mean, but feel free to correct me if I misconstrued that.

A No, that's correct. And I think that when we talk about remedying the situation, it is the arrest of the nose-down pitch, which can be accomplished by counteracting nose-up pitch -- nose-up trim. Now, ultimately, we would expect that the crews would then perform the procedure of stab cutout.

Q Gotcha. Mr. Leverkus, one more question. You know, and just so you

know, my perspective on this question is in no way intended to cast aspersions on yourself or your career in Boeing. But let me ask you this. How many -- do you have a rough estimate, you know, days, weeks, even hours, how much time did you invest in the 737 program?

A Well, on the MAX, it was 4 years, 5 years, 5 years.

Q Four years, five years. So that's 250 weeks, plus or minus, assuming some vacation time. And so having spent 250 weeks or so, 5 years on this program, knowing what you know now about the accidents and the assumptions that Boeing relied on, do you wish that Boeing had made some different assumptions along the way?

A You know, Mr. Burkett, the accidents certainly weigh heavily on me. I need to be candid about that. You know, the assumptions that were made at the time were correct based upon what we know, but what we now subsequently know is that those assumptions have been proven incorrect. And the dual tragedies of Lion Air and Ethiopia -- and it's deeply tragic given the loss of 346 lives -- we have to review those assumptions. We have to go back and we have to -- we can do nothing else but go back and say, where could we have done better. And I think that doing a more thorough job of understanding the capability of flight crews around the world, the training acumen throughout the world, as well as the human factors associated with the failure event, all would have benefited us. And certainly those are things that will now be in the vernacular of all of our designs, and of that there is no question.

So it's difficult to say, but certainly in hindsight, I wish that we would have challenged those assumptions. But given that they were industry standing and our best understanding at the time, that's what we used in crafting the design.

Mr. Burkett. Very good. Thank you, Mr. Leverkusen. I really appreciate your responses.

And I'll turn it back over to Matt. Thank you again.

Mr. Leverkuhn. Thank you, Mr. Burkett.

BY MR. WEISMAN:

Q Just moving on to a different topic. When did you first learn that the AOA disagree alert was not working on most 737 MAX aircraft?

A I only learned about it when it came out in the press.

Q Okay. Why were you not notified of it prior to then, as the head of the program?

A I think that the disposition of the situation was such that we knew that we could, in a subsequent software roll, remedy, and given the fact that it wasn't a flight critical indication, that we would fix that as part of a collection of things that over the course of time no doubt we would have to remedy as part of an upcoming software role.

Q Do you believe it was right for Boeing not to tell customers that their AOA disagree alert wasn't functioning?

A I think our communication with customers is highly situational, and I think that in this case, given the sensitivity of the indication itself and the prominent use of it for maintenance, it was okay to tell them when the situation was going to be fixed in a subsequent software role. So --

Q But that's not what happened. Boeing knew about it in August of 2017 and didn't tell the FAA or customers about it until after the Lion Air crash in October of 2018.

Do you believe it was right to -- knowing that -- not only knowing that it wasn't functioning on many MAX aircraft that had been delivered, but Boeing to continue to manufacture and deliver additional airplanes with AOA disagree alert not functioning and not bother telling any of the customers who are taking possession of the aircraft and not tell the FAA and only come forward with that information after there's been a crash?

A Well, again, I think that the two issues, I don't see a causal linkage or linkage at all. But to answer your original question, Mr. Weisman, there are -- over the course of time, there are discoveries that are made about the design, and we have to assess the criticality of the discoveries. First thing, is it a safety issue? Secondly, is it a compliance issue? And if both of those are determined to be -- you know, if it's a nonsafety issue, if it's a noncompliance issue or not a compliance issue, then we have to determine what is the impact of the airlines. And so --

Q I apologize for interrupting, but this was a compliance issue. The FAA has informed the committee that they believe that the functioning AOA disagree alert was mandatory on every single Boeing 737 MAX that was delivered. Yet Boeing knowingly manufactured and delivered MAX aircrafts that they knew did not have a functioning AOA disagree alert on them and hid that fact from customers and from the FAA.

Do you believe that that was correct, how Boeing handled that?

A Not being in on the details of that particular decision, what I do know is that there are issues that come up in discovery that raise to the level of needing to inform both the regulators and the airlines, and sometimes those issues are minor enough that we will inform them when the situation is remedied.

Mr. Weisman. Okay. I think Doug has a quick question.

BY MR. PASTERNAK:

Q Yeah. So I had a quick question on something else, and we've got about 10 minutes left.

Just on the AOA disagree alert, I understand it's Boeing's position that this was not a safety critical component. FAA agrees with that. But as Matt said, the FAA acting administrator informed the committee that Boeing was still required, that it was mandatory for Boeing to deliver every single 737 MAX with a functional AOA disagree

alert.

I want to ask you, I'm less concerned about your belief about what the regulations required. To me it's really a gut sort of ethical issue. You have a master's in business administration. I assume you probably took some classes at the time on business ethics. Don't you think Boeing had an ethical obligation to let its customers know they were knowingly delivering a component that wasn't functioning and planned to update it in 3 years? Do you have any response to that?

A Yes, Mr. Pasternak. I don't think I would put it in the realm of an ethical decision. I think that it is in the realm of an understanding of how customers operate the airplane, how they maintain the airplane, and whether or not that is information that is necessary for them to do that successfully. And given the fact that it is the estimation of those people in charge at the time that this was not necessary for them to understand, I don't believe that it creates an ethical dilemma as you suggest.

Q Okay. So just as a comment on that, so delivering something that a manufacturer knows is not working and your customer is paying for it seems to be okay.

I want to be move on to one other question quickly.

At the very beginning, you spoke about your responsibilities and that you often reviewed financial and cost-related issues. And I thought you had said that when certain things were proposed to be added to the MAX, that there was some sort of cost assessment that was done. Am I recollecting that correctly?

A Yes. Yes, you are.

Q So on the issue of synthetic air speed and also the EICAS system, were there any financial cost analysis that was done in terms of what that would cost to add that to the MAX?

A You know, Mr. Pasternak, largely by the time I arrived as the VP/GM of the

MAX, the question with respect to EICAS had already been -- we had applied for the exemption and that was working its way through. And as I said to Mr. Weisman, the addition of EICAS would certainly have changed the strategic intent of the airplane. So I can't comment on that.

On synthetic air speed, I was not involved in any of the conversations. I know that both the chief engineer of the 737 NG, [REDACTED], as well as the chief engineer on the MAX, Michael Teal, had -- I know that there had been discussions around synthetic air speed. And as in many trades, they have to discuss what the timeline would be for the incorporation, the benefit, the costs, all of those things are taken into consideration. And so while I can't speak to the specifics, I certainly understand, as a former chief engineer, that those trades need to be made with some frequency.

So I'm afraid that I can't speak directly to synthetic air speed.

Q Okay. And just to clarify, but cost is normally part of that consideration?

A Yes. For nonsafety issues, yes.

Q Okay. Thank you.

A If it is a safety issue, then clearly they just need to be remedied.

Mr. Pasternak. Thank you.

BY MR. WEISMAN:

Q Okay. Very quickly. So as vice president and general manager of the MAX program, you've led all the development activities of the MAX, to greater fuel efficiency and economics. In light of the two crashes and the fact that the MAX has been grounded for more than a year, would you consider the development of the MAX a success?

A Yes, I would.

Q Do you have any idea how much money Boeing has lost due to the crashes,

the grounding, the company's more than a year-long effort to change the plane to make it airworthy?

A I don't know the actual costs.

Q Is it in the millions?

A No.

Q Is it in the billions?

A Yes.

Q Okay. So in addition to redesigning MCAS, Boeing is now recommending simulator training, which goes against one of the key design objectives of the 737 MAX program. Given the reversal, how would you rate your achievement of that design objective?

A You know, Mr. Weisman, we have spoken about it at some length here regarding the assumptions that we made at the time based upon the information that we knew. Aircraft accidents are horrific events, and from those, the industry changes, and these accidents are no different. And as a result, there are design changes and training changes as a result of both of these accidents.

Q So in 2018, or a few months before the Lion Air crash -- more than a few months, you were promoted to vice president of the supply chain propulsion. So I guess what I'd like to know, if at all, is how, if at all, you've been held accountable for the development failings of the MAX program. Have you been demoted? Has your salary been reduced? Have you been asked to return any bonuses? I mean, you were the person in charge. This development clearly was lacking, to put it mildly. What kind of accountability has been brought to bear on you?

A First of all, a clarification, Mr. Weisman, I was not promoted after the MAX. That was a different position at the same level.

Q Did your salary increase?

A My salary increased as a matter of annual reviews and performance against those reviews.

Mr. Weisman, I do challenge the suggestion that the development was a failure. Again, I believe that there are things that we have learned, assumptions that have been challenged, and those assumptions will impact the entire industry as we go forward. And it's not just Boeing aircraft; I believe that this is something the industry is going to have to grapple with. And that the assumptions around flight crews and the human and machine interface are going to be implicated in all of our designs.

Q Very quickly, likewise, Mr. Teal was the chief program engineer and deputy program manager for the MAX program. In 2017, he was promoted to vice president and chief project engineer of the 777X program. He told us last week that he signed off on MCAS without knowing that it relied on a single AOA sensor, without knowing that it could activate repeatedly if a pilot didn't react to unintended activation within -- sorry. Let me strike that.

He told us last week that he signed off on MCAS without knowing that it relied on a single AOA sensor, that it could activate repeatedly, and that if a pilot didn't react to its unintended activation within 10 seconds, the results could be catastrophic. He was the chief project engineer on the MAX. These are issues you would expect him to be aware of.

He also told us that he had not read the flight crew operations manual bulletin Boeing put out after the Lion Air accident or the FAA's airworthiness directive following the Lion Air accident. Frankly, we're surprised at the complete lack of curiosity regarding a program that he was the chief project engineer on and suffered from a fatal tragic accident.



How has he been held accountable, if at all, for the MAX design failings that occurred on his watch?

A Again, Mr. Weisman, you continue to suggest that they're design failings, and what I am countering is that prior to the accidents, we -- the assumptions that were made were valid industry standards and guidance from the FAA. So --

Q Let me amend the question. Instead of characterizing it as design failings, he wasn't aware of the designs. Call it design ignorance. Where is the accountability for the fact that he was unaware of the design that likely had a big part in bringing down two aircraft?

A Like me, Mr. Teal is dependent upon experts, experts in flight controls, experts in systems analysis, experts in hazard analysis, pilots. I am dependent upon those experts and the processes that those experts follow. And knowing that the processes were followed and that the cognizant experts were involved and were involved in the decisionmaking, this is what we depend upon. This is what we depend upon in all aspects of the airplane is that those processes that define how we certify aircraft are followed.

Q And if it goes wrong, who is accountable? What happens? Nobody loses their job, nobody's pay is diminished, life goes on, and now the same person is in charge of the next 777X crowd. It just seems -- is this the kind of -- a person who experienced this on the last project, is this the person you want to be in charge of the next project?

A Accidents, as we know, and certainly you know from reading the accident reports, are the cause of usually multiple, multiple failings, not one single thing typically. They could be many. And every day at Boeing everybody is involved in design creation, is involved in determining how we make our products safer, how we make them more efficient. Michael Teal is no exception, nor is the newest engineer in the company. It

is their responsibility to take those lessons and assure that the new models, as well as existing models, do not suffer from the same issues that were contributors to the crashes.

So this is what we do every day is to assure that those learnings, as difficult and horrific as they are, that they don't occur again on any of our models. That's our responsibility.

Mr. Weisman. Thank you. I think Doug has a question.

Mr. Primis. Mr. Weisman -- sorry, Mr. Pasternak -- I just want to note we are at the end of the hour. I just wanted to see if you guys were starting to wrap up.

Mr. Pasternak. Yeah, just a 15-second comment.

You mentioned, Mr. Leverkuhn, you said you challenge the proposition that the MAX development was a failure, and I'm just curious. I mean, two planes crashed, 346 people died. What would you characterize as a failure? Would it have taken 10 planes crashing? I just don't understand your response to that question.

Mr. Leverkuhn. I'm sorry, Mr. Pasternak. Was there -- was that a question or --

Mr. Pasternak. You're saying that the development of the MAX you would not characterize as a failure. I guess the question is, what would you characterize as a failure?

Mr. Leverkuhn. I think that in each of those accidents, as you know, there are different circumstances associated with each of them and that the system on board the aircraft was a contributor to those accidents, but there were many factors. In the case of Lion Air, according to the report, there were nine different issues that contributed to the accident, which is why I don't consider the development of the airplane to be a failure. What, however, we have learned as a result of these horrific accidents will influence what we do going forward.

Mr. Pasternak. Okay. Thank you.

Mr. Weisman. Thank you. Okay.

Before we go off the record, just a purely administrative question from our introduction. I just wanted to clarify for the record who of your counsel here today is representing you in your individual capacity as opposed to representing Boeing. I think there was some confusion on that when we --

Mr. Leverkuhn. Yeah, Mr. Weisman, thank you for bringing it up. That is my confusion alone. I do not have personal counsel. Kirkland & Ellis, as well as our in-house counsel, are here representing Boeing, and I am not represented by any counsel here today.

Mr. Weisman. Okay. And that was your choice not to be represented by individual counsel. Is that --

Mr. Leverkuhn. Yes, that's correct. Both Kirkland & Ellis and our house counsel have helped me prepare for this conversation.

Mr. Weisman. Okay. Thank you very much.

With that, we can go off the record.

[Recess.]

[4:11 p.m.]

Ms. Cooke. We will go back on the record. I have that it's approximately 4:13.

BY MS. COOKE:

Q And we thank you again for your time. We know it's been a long day so far. And, again, I apologize if we say anything duplicative, but mostly, we do truly appreciate your time. We know it's a very hard time right now for everyone, and Washington State was one of the first States hit by the pandemic, so we appreciate you being here and doing all of this for us, truly.

So I just want to go back. In the last hour, some of our Democratic colleagues talked to you about some various things related to the assumption that Boeing and folks would have relied on in terms of MCAS. And so I just wanted to clarify some of what was said there.

To be clear, could you just, again, state what assumption those were, and then I believe that I heard you say that those were mistaken assumptions now looking back in hindsight, but I just wanted to clarify some of that chain.

A Well, yes, the assumption that we made was that an MCAS failure would present itself as a stab trim runaway for which flight crews are trained and adept at handling, because the end result is the stab trim doing something unexpected and the flight crews are trained to deal with that circumstance. That was the assumption, as well as their ability to keep the airplane in safe flight.

Because of two accidents that MCAS and stab trim are implicated, I come to [no]<sup>17</sup>

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<sup>17</sup> The original transcript said "Because of two accidents that MCAS and stab trim are implicated, I come to know the conclusion other than that assumption has been challenged, and that that assumption needs to be revisited, not only in terms of what changes need to happen to the airplane, but as well as our understanding about the human machine interface." Boeing suggested there was a transcription error regarding the words "... I come to know the conclusion other than...." Majority and Minority Committee staff agreed to change the sentence above for clarity and accuracy.

conclusion other than that assumption has been challenged, and that that assumption needs to be revisited, not only in terms of what changes need to happen to the airplane, but as well as our understanding about the human machine interface.

Q And to clarify, you were not working on any of those changes now, correct?

A That is correct.

Q But Boeing, as a company, has also publicly noted that these changes need to be made and that some of these assumptions were mistaken, so you stating this is -- is this your personal opinion? Is this you speaking on behalf of Boeing?

A To the extent that they agree, I'm speaking for Boeing, but really, this is my own, again, examination of, in going back and thinking what could have been done to avoid these accidents, I think that at its core, it is at that assumption. So it is my conclusion, but it should be no surprise that that conclusion is also that of other experts around the company.

Q And just in terms of that, and it's always very difficult to talk about these things, just to make sure, do you agree that this was a terrible tragedy that occurred with these two crashes?

A As I said, both of these accidents that occurred on a MAX, an airplane with which I have been involved for 5 years of my life, are extraordinarily horrific tragedies. And I would say that they're deeply personal to me, again, just because of the time that I spent, and also because of the knowledge of how hard the team worked to create what was and is a robust design, a robust airplane. So, yes, it is -- they're tremendous tragedies.

Q And in the last hour as well, you were asked about a press release. And to the best of your knowledge, were you shared that press release prior to being asked about it?

A It was not part of the conversation that we had in preparation for this meeting, so I'm not aware of the specific press release.

Q And was that document sent to you?

A I don't recall it being in the documents that we reviewed.

Q Okay. So the press release that was being addressed you hadn't specifically seen to be able to specifically answer the question?

A That is correct. I don't recall seeing it.

Q Okay. I think on our end -- let me just take a minute and see if anyone has any additional questions. Sorry for -- obviously in person it would be a little bit easier to check.

A Yeah.

Q But I think that we're going to be okay to wrap up. But mostly, really, we want to thank you for your time and for your willingness to do this, and I hope that you and your family and loved ones and friends and everyone are safe, and we do really appreciate your time today.

A Thank you, Ms. Cooke. And thank you for your diligence as well.

Ms. Cooke. All right. And we can go off the record.

[Discussion off the record.]

Mr. Weisman. Okay. Thank you very much for participating. We very much appreciate your time. I know this is not the most fun, not the best way to spend a day. And especially given everything that's going on, I know it definitely is an extra effort, so very much appreciate it. Thank you, Mr. Leverkusen.

Thank you, everybody else, for participating. I don't know if anyone else has anything so say before signing off?

Mr. Leverkuhn. No. Thank you, Mr. Weisman, and thank you for the

committee's diligence in understanding the facts surrounding these tragedies.

Mr. Weisman. Thank you, all.

[Whereupon, at 4:20 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 nomenclature 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



Flight Crew Operations Manual Bulletin  
for  
The Boeing Company

The Boeing Company  
Seattle, Washington 98124-2207



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.

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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.
- AOADISAGREE alert (if the AOA indicator option is installed)
- FEEL DIFF PRESS light.

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### 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.

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### 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/](http://www.faa.gov/aircraft/safety/alerts/)

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**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**

<b>Required by AD 2018-23-51</b>
<p><b><u>Runaway Stabilizer</u></b></p> <p>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.</p> <p>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.</p> <p>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.</p> <p>An erroneous AOA input can cause some or all of the following indications and effects:</p> <ul style="list-style-type: none"><li>• Continuous or intermittent stick shaker on the affected side only.</li><li>• Minimum speed bar (red and black) on the affected side only.</li><li>• Increasing nose down control forces.</li><li>• IAS DISAGREE alert.</li><li>• ALT DISAGREE alert.</li><li>• AOA DISAGREE alert (if the option is installed).</li><li>• FEEL DIFF PRESS light.</li><li>• Autopilot may disengage.</li><li>• Inability to engage autopilot.</li></ul> <p>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.</p>

**(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.