COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,

U.S. HOUSE OF REPRESENTATIVES,

WASHINGTON, D.C.

INTERVIEW OF: ALI BAHRAMI

Thursday, December 5, 2019

Washington, D.C.

The interview in the above matter was held in Room 2254, Rayburn House Office Building, commencing at 10:08 a.m.

Appearances:

For the COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE:

MATTHEW WEISMAN, COUNSEL, INVESTIGATIONS AND OVERSIGHT STAFF
DOUGLAS PASTERNAK, DIRECTOR, INVESTIGATIONS AND OVERSIGHT STAFF
ALEX BURKETT, STAFF DIRECTOR AND SPECIAL ADVISOR ON AVIATION SAFETY, SUBCOMMITTEE ON AVIATION
MICHAEL TIEN, SENIOR COUNSEL, SUBCOMMITTEE ON AVIATION
LAUREN R. DUDLEY, COUNSEL, INVESTIGATIONS AND OVERSIGHT STAFF
MIKE ARMES, GOVERNMENT ACCOUNTABILITY OFFICE (GAO) DETAILEE to INVESTIGATIONS AND OVERSIGHT STAFF
MOHSIN R. SYED, CHIEF COUNSEL
BRETT FULCER, LEGISLATIVE ASSISTANT, INVESTIGATIONS AND OVERSIGHT STAFF
HOLLY WOODRUFF LYONS, MINORITY SENIOR COUNSEL AND STAFF DIRECTOR, SUBCOMMITTEE ON AVIATION
T. HUNTER PRESTI, MINORITY PROFESSIONAL STAFF, SUBCOMMITTEE ON AVIATION
COREY COOKE, MINORITY DEPUTY GENERAL COUNSEL

For the U.S. DEPARTMENT OF TRANSPORTATION:

WILLIAM H.W. MCKENNA, ASSOCIATE GENERAL COUNSEL, OFFICE OF THE GENERAL COUNSEL

JESSICA M. CONRAD, SENIOR COUNSEL, OFFICE OF THE GENERAL COUNSEL

RUSSELL CHRISTENSEN, ASSISTANT CHIEF COUNSEL, FEDERAL AVIATION ADMINISTRATION

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 Committee on Transportation and Infrastructure.

This is a transcribed interview of Federal Aviation Administration Associate Administrator for Aviation Safety Ali Bahrami. This interview was requested by Chair DeFazio as part of the Transportation and Infrastructure Committee's ongoing investigation into FAA certification and oversight of the Boeing 737 MAX and related issues.

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

Mr. Bahrami. Okay. I am Ali Bahrami, A-l-i; last name is Bahrami, B-a-h-r-a-m-i.

Mr. Weisman. Thank you.

I will now ask everyone else in the room to please identify themselves for the record, starting to my left.

Mr. Pasternak. Doug Pasternak.

Mr. Burkett. Alex Burkett.

Mr. Tien. Michael Tien.

Ms. Dudley. Lauren Dudley.

Mr. Armes. Mike Armes.

Ms. Woodruff Lyons. Holly Woodruff Lyons.

Mr. Presti. Hunter Presti.

Ms. Cooke. Corey Cooke.

Mr. Christensen. Russell Christensen.

Ms. Conrad. Jessica Conrad.

Mr. McKenna. Liam McKenna.

Mr. Syed. Mohsin Syed.

Mr. Fulcer. Brett Fulcer.

Mr. Weisman. I will now describe how we will proceed.

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

For the most part, we expect one person at a time on each side to 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.

You are allowed to have an attorney present to represent you in your personal capacity. Do you have an attorney with you today?

Mr. McKenna. We are here on behalf of Mr. Bahrami.

Mr. Weisman. Okay.

I understand you have agency counsel here with you. And you understand that agency counsel represents the agency and not you personally, correct?

Mr. Bahrami. Yes, I do.

Mr. Weisman. And it was your choice to have agency counsel --

Mr. McKenna. Sir, you're getting into a matter that's advice that we have provided to him. I don't -- this is a little bit of an unusual question to ask him, about legal advice he's got and his legal entitlements. Do you represent him?

Mr. Weisman. I'm not asking about legal advice. I'm just trying to establish for the record whether or not he -- by whom he is represented.

Mr. McKenna. He is represented, as an FAA employee, by FAA and DOT counsel, which is the three of us.

Mr. Weisman. Right.

And that representation was at your request. Is that correct?

Mr. Bahrami. They -- yes, of course.

Mr. Weisman. Okay. Thank you.

We have a court reporter here today who will be transcribing the interview. To help with the reporter, I will ask you to please wait to respond to a question until the entire question has been asked. I will also ask that you please provide a verbal response to each question as opposed to a nod, head shake, or other physical gesture. Do --

Mr. Bahrami. I understand.

Mr. Weisman. Thank you.

If at any point you do not understand a question, please do not hesitate to let us know. We'll do our best to provide clarification or to rephrase the question.

Mr. Bahrami. Will do.

Mr. Weisman. If I ask you about conversations or events in the past that you are unable to recall 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. 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. Bahrami. Yes, I understand.

Mr. Weisman. 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'll plan to take a lunch break. But if you need additional breaks, please just let us know. If you would like to take a break and there is a question pending, we'll ask that you first answer the question before we take a break.

Mr. Bahrami. I understand.

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. These are spelled out in 18 U.S.C., section 1001. This also applies to questions posed by congressional staff at interviews such as this one.

Do you understand?

Mr. Bahrami. Yes.

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

Mr. Bahrami. Yes, I understand.

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

Mr. Bahrami. No.

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

Mr. Bahrami. No.

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

Mr. Bahrami. No, I --

Mr. McKenna. We don't have any questions, but, before we begin, I have a brief statement that I'd like to make for the record.

Mr. Weisman. Okay.

Mr. McKenna. Associate Administrator Bahrami is appearing voluntarily for this interview with the intent of answering the committee's questions about the design,

development, and certification of the Boeing 737 MAX and lightning protection on the 787 Dreamliner.

Associate Administrator Bahrami is prepared to discuss his personal knowledge of facts related to those topics in his official capacity as the Associate Administrator for Aviation Safety for FAA as well as in his previous roles at FAA. He does not intend to offer personal opinions or speculate about hypotheticals or discuss decisions that have yet to be made, such as the return to service of the MAX.

The FAA has engaged in an unprecedented level of transparency with the committee on this investigation. The FAA has now made six other FAA employees available for interviews, provided the committee with over 35,000 pages of internal documents and communications, provided dozens of briefings, and, as of next week, will have participated in two hearings on this subject.

As you know, the certification of the MAX began nearly 8 years ago and was completed in early 2017, before Associate Administrator Bahrami returned to FAA. In fact, he was not employed at the FAA for most of the time the FAA was working on the certification of the MAX.

Associate Administrator Bahrami's organization is currently in the midst of critical safety work, including the review of the 737 MAX prior to return to service. Nonetheless, in the interest of transparency with the committee, Administrator Dickson and Associate Administrator Bahrami agreed to Mr. Bahrami's participation in this day-long interview by committee staff.

Finally, I'd note that we previously requested the committee staff provide a detailed list of subjects and documents the committee staff intended to cover during this interview so that Mr. Bahrami could prepare and be best equipped to answer those questions, including about events that happened several years ago. We've not received

that specific information from the committee.

Mr. Bahrami is, of course, prepared to answer questions to the best of his recollection, but, for that reason, there may be situations in which Mr. Bahrami's personal knowledge or recollection of the documents or issues you raise is limited and his ability to answer some questions is similarly constrained or his answers may not be as precise or fulsome as they would've been had the committee provided more information for him to prepare.

Mr. Weisman. Are there any questions before we begin?

Okay. If there are no other questions, we will begin the first hour of questioning on behalf of the majority, and I will begin by asking some questions.

EXAMINATION

BY MR. WEISMAN:

Q Mr. Bahrami, you joined the FAA in 1989 after 10 years with Douglas Aircraft. Is that correct?

A That's correct.

Q And from 2004 to 2013 you served as manager of the FAA's Transport Airplane Directorate. Is that correct?

A That's correct.

Q And in 2013 you left FAA to become vice president of the Aerospace Industries Association?

A That's correct.

Q And the Aerospace Industries Association is known for short as "AIA"?

A That's correct.

Q Do you recall when in 2013 you made the switch?

A I think about June, end of June. June 29th was my last day, 2013.

Q Okay. And in July of 2017, you rejoined the FAA as Associate Administrator for Aviation Safety. Is that --

A That's right.

Q -- correct?

Okay. Before leaving the FAA in 2013, were you involved in any way or was your office involved in issues relating to the 737 MAX?

A That was the very early stages of the program. Application had come in. Discussion begin at the time with respect to the design, configuration. That's the best I can recall at that time.

Q Were you aware at that time that the 737 MAX would have new, larger engines?

A I don't remember at the time, because, again, that was some time ago, all the design configuration. But, yeah, in typically engine is one of those things that change for efficiency and improvement. So I don't recall the specifically -- the discussion was not focused on the engine at the time. It was very early in the program.

Q Was there a discussion at the time about creating a plane that would be more fuel-efficient?

A That's always the goal. And I think that those discussion comes out at the specialist and the program management level. Those are not the kinds of things as a directorate manager I get involved.

Q Were you aware that the plane's aerodynamics would change?

A No, I was not.

Q Were you at the time aware that Boeing was planning to add the Maneuvering Characteristics Augmentation System, also known as MCAS, M-C-A-S, to the plane?

A No.

Q When did you first learn about MCAS being added to the 737 MAX?

A I didn't know anything about MCAS until after the Lion Air accident.

Q And how did you learn about MCAS being added to the 737 after the Lion Air accident?

A I learn of MCAS being on the aircraft after Lion Air accident. Prior to that, I had no knowledge of MCAS. The way I found out was the flight data recorder from the accident aircraft was public, was made aware. And we used that information. And given that, my specialist told me that MCAS was an activated -- they showed me on the flight data recorder where MCAS was activated. That's how I find out.

Q And who was the "they"?

A Well, the accident investigation group in my organization. We are party to the accident investigation. We have representatives on the NTSB team. And they give briefing to their managers. At the time, Steve Gottlieb was the manager that was getting information to us. He is one of the executive directors that reports to me.

Q And he's an FAA employee?

A Yes, sir.

Q And at the time you learned that MCAS was on the plane, what was your understanding of why MCAS was on the plane?

A At the time, again, we had not gotten into the conversation, the specifics of MCAS, other than the fact that we have seen it was activated. And through the conversation and the exchange, follow-on activities, I got to learn more about it.

Q Boeing is a member of the AIA. Is that correct?

A That's correct.

Q While you were at AIA, did you do any work with anyone from Boeing?

Mr. McKenna. My impression was this interview was about his work at FAA. You've never discussed anything about an intent to discuss his work as a private citizen.

Mr. Weisman. He's at liberty to answer or not answer, but we'd like to know about his relationship. He has a relationship in the public sector and the private sector and then again in the public sector and --

Mr. McKenna. Well, I think if you want to talk about his relationships with companies, that's fine. But it's a little odd to be asking about work he did at AIA without asking AIA, mentioning this to AIA, or mentioning this to us, since we don't represent him in his capacity at AIA.

Mr. Weisman. So we will be getting into questions about his current relationship with AIA in his capacity at the Federal Aviation Administration. So what these questions go to is laying a foundation for his relationship, his current relationship, with AIA in his current role.

Mr. McKenna. So the question is what he did at AIA?

Mr. Weisman. We are asking about -- correct. So at AIA I imagine he had some interaction with the Federal Aviation Administration. We'd like to probe that.

Mr. McKenna. I guess to the extent you're comfortable answering that.

I don't think we're going to be comfortable at all with you discussing details of his work at AIA, since we are here as his counsel at FAA, in his capacity as an FAA employee. And that was not something that anyone raised when we asked several times before the topics you'd like to cover. The topics you mentioned were 737 MAX, rudder cable design, lightning protection, and ODA.

Mr. Weisman. We would like to probe the extent of his knowledge on the 737 MAX. We assume that his knowledge of the 737 MAX did not begin when he came back to the FAA in July of 2017. He may have acquired knowledge while he was not at the

FAA but when he was in between his stints at FAA. We feel we have the right and the ability and the necessity to probe his knowledge of the 737 MAX.

Mr. McKenna. Could you give us a moment?

Mr. Weisman. Sure.

[Discussion held off the record.]

Mr. Weisman. Are you ready to go back on the record?

Mr. McKenna. Yep. So, just briefly, we think this is a pretty extraordinary thing to ask him about what he did in his role as a private citizen, with no notice to him or to FAA, when you know very well that he's appearing in his official capacity as an FAA employee.

That said, we're willing to indulge some limited inquiry into what he did at AIA. But I think this is a pretty unusual thing and completely outside the scope of what we had discussed. But if you want to ask him about AIA, I would say go ahead and we'll indulge you on some limited basis here.

Mr. Weisman. Appreciated.

BY MR. WEISMAN:

Q Why don't I frame it this way? Prior to your return to FAA in July of 2017, did you work with anyone from Boeing?

A AIA had 340 members. And if those members have the civil aviation interest, I worked with all of them, and Boeing was one of them.

Q In your work with Boeing, did that include any work relating to the 737 MAX?

A To my recollection, none at all.

Q Do you recall having conversations with anyone from Boeing about the 737 MAX prior to your return to FAA in July of 2017?

A During the time that I was at AIA are you referring to? Or prior to the 2013, before leaving the agency?

Q Why don't we take each in turn?

A Okay.

Q Prior to your departure from FAA in 2013, did you have conversations with Boeing about the 737 MAX?

A At the senior leadership, when they have a program, they often come in and explain what their programs are, what they plan to do, including existing projects, plus the follow-on activities. They do it at a very high level, senior level. I have had meetings and discussions about that with the company. When I left -- before -- you know, this was prior to June of 2013.

Q And who was the point person at Boeing at that point with whom you were dealing when you were at FAA?

A There are so many different people, frankly, at the senior level. Sometimes with the vice president of engineering. Sometimes general managers for a program. Sometimes directors and VPs of certification divisions. There are so many different group. One of them that -- John Hamilton was one of them that -- you know, if he was there. And when you're 40 years in this business, you meet a lot of people.

Q But specifically with regard to the 737 MAX, prior to your departure to the FAA, when Boeing came in to brief the FAA on the 737 MAX, who led that briefing?

A I don't recall.

Q Okay. And after you left the FAA, do you recall any conversations with Boeing about the 737 MAX?

A No. No conversations.

Mr. McKenna. You mean before he came back to FAA?

Mr. Weisman. Correct.

Mr. Bahrami. No. While I was AIA, no, I -- and just to be very clear, at AIA we don't work with companies on a specific projects. It's more a policy level, at higher level, that is of interest to the broader membership, not the specifics. Actually, because of the fact that we do not want to be favoring one group versus another or one company versus another, we stay away from the specifics of projects.

Q When you applied to return to FAA, did anyone at Boeing serve as a reference for you or make any calls or send any emails on your behalf?

Mr. McKenna. So, Matt, can I interrupt? You've assumed that he had a process. Could you ask him how he came to be employed at the FAA instead?

Mr. Weisman. We can ask that first.

Mr. Bahrami. So what's the question?

BY MR. WEISMAN:

Q The question is, how did you come to return to the FAA in 2017?

A I was at the Wright Brothers Memorial Dinner. Michael Huerta pulled me aside. At the time, he was the Administrator of the FAA. He said, "Would you consider coming back? We'd like you to come back to the agency."

I was shocked, because I figured, like, after having gone for 4 years, there was absolutely no chance for me to come back. I specifically asked, "What can I do when I come back?" And he said, Peggy Gilligan, who's my predecessor, is leaving, retiring. You know, he says that everyone in the agency thinks that you will be the right person for the position and would like you to consider it.

Q So, again, when you return -- as part of your return to the FAA, I imagine there's some paperwork involved. You have to fill out some kinds of forms, correct?

A Once -- good question. Right after that, I had a 45-minute meeting in

Michael Huerta's office over the holidays, because he asked me to come in during the Christmas break. I came in. And then, after that, they put out the announcement. I went ahead and applied for if it, went through the interview process, and I was told that I was selected.

I initially rejected the offer. I didn't want to come back because of personal reasons. But then I decided to come back because, you know, in my view, I had spent a lot of time in this agency, I love the agency, I love the people, I love the mission, I love aviation, and I wanted to come back and leave a legacy in terms of the kinds of things that I believe the agency can improve upon.

Q When you were interviewing to return to the FAA, did anyone at Boeing serve as a reference for you or make any calls or send any emails on your behalf?

A I do not know if anybody sent any email. And the application, when I apply, I may have to have references, and I don't recall who I put down. So that's the only thing I would say.

Q Do you recall if anyone who had formerly worked at Boeing served as a reference for you or made any calls or sent any emails on your behalf?

A I do not know of any of that.

Q In your time at FAA since July of 2017, has anyone from Boeing asked you if you would be interested in working for Boeing or approached you in any way about potential employment at Boeing?

A No. No, no.

Q What was your role in the preparation and approval of the FAA's November 7th, 2018, emergency airworthiness directive that followed the crash of the Lion Air Flight 610?

A Okay. Repeat the question.

Q Sure. I'm going to ask you a series of questions now about the emergency airworthiness directive that the FAA issued following the crash of Lion Air 610.

A Okay.

Q So the first question is, what role did you have in the preparation and approval of that emergency airworthiness directive?

A Very, very little, because when you have an organization of 7,000, you have processes, you have directives and orders that we put in place. And in this particular case, the office responsible for continu[ed] operational safety,[1] they followed their processes, and they came back with the recommendation to go forward with the emergency AD. And between a technical specialist and the attorneys that they normally review it, they review it, and that AD was released.

Q Did you review a draft of it before it was released?

A Frankly, I don't even recall I even did that. We had a conversation about it and what we were trying to do in terms of the directions --

Q With whom did you have that conversation?

A With Director -- at the time, I believe it was -- I think Dorenda Baker was still there. That's the Executive Director at the time. She was the one that was briefing me on the actions that we need to take.

Q Did you approve the emergency airworthiness directive?

A Again, when you say "approve," that goes through a process. And was I one of the ones that signed off on it? Yes.

Q And at the time that you were having conversations about the airworthiness

[1] The original transcript said “And in this particular case, the office responsible for continual operational safety”. FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

directive prior to it being issued, did you offer advice as to its contents?

A No, not at all.

Mr. Syed. If I can just clarify, when you said you signed off on the airworthiness directive, can you explain your process for reviewing it?

Mr. Bahrami. So just -- thank you for clarifying. Because when I say signed off, it's that I agree with it going forward. I didn't sign off on any [inaudible] or anything because it doesn't even come to my level. Thank you for asking that.

BY MR. WEISMAN:

Q So the purpose of the directive was to warn pilots that an erroneously high single angle-of-attack sensor could cause MCAS to send repeated nose-down trim commands to the horizontal stabilizer and remind pilots of the steps to take to address that situation. Is that correct?

A So part of the continu[ed] operational safety[2], we always have a two-step approach. One is interim approach; one is a long-term fix.

Interim, in this case, was to highlight to the pilots that when they are experiencing a runaway trim behavior on the aircraft, they need to follow appropriate procedure. And that's what they did it.

Q And the runaway trim situation was brought on by an angle-of-attack sensor providing information to the MCAS system, which then moved the horizontal stabilizer. Is that correct?

A That is correct. It was the -- in that particular case was due to erroneous information from angle of attack to the MCAS system, which activated the MCAS

[2] The original transcript said “So part of the continual operational safety”. FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

and -- repeatedly. But that particular activation manifest itself in form of the runaway trim.

Q So we have a first exhibit. I'm now going to show you a document that we're going to mark as exhibit 1.

[Bahrami Exhibit No. 1
Was marked for identification.]

BY MR. WEISMAN:

Q This is a copy of FAA's November 7th, 2018, emergency airworthiness directive, correct?

A Correct.

Q Neither the acronym MCAS or it's full name, Maneuvering Characteristics Augmentation System, appears anywhere in this document, does it?

A I understand from earlier review that, you know, it did not have MCAS reference.

Q Rather, it talks about an erroneously high single angle-of-attack sensor input being, quote, "received by the flight control system," end quote. Is that correct?

A Yes.

Q Okay. Was there any discussion between the FAA and Boeing about whether MCAS should be included in this directive?

A I have no recollection, or I was not involved in any of that conversation.

Q Did Boeing advise the FAA or make a request that MCAS not be mentioned in this document?

A I do not know that.

Q Who at the FAA would've worked with Boeing on the contents of this document before it was issued?

A This is -- the ADs are done by Seattle ACO. And I presume that it would be the technical specialist in the Systems and Equipment Branch, and the office manager, which is -- you know, [redacted] is the office manager there. And probably the technical specialist would be the branch manager over there, which was, I believe, [redacted]. Those are some of the people that could have been involved. And I'm not saying I know they -- I do not know that. They could have been involved.

Q And would those communications between the FAA and Boeing about the contents of the emergency airworthiness directive have been in writing? Would that have been over email or letter correspondence, do you know?

A I really don't know that.

Q If they were --

A When you are working an emergency situation, there are meetings, there are phone calls, there are things. So I can't tell you that there was a specific document or when it -- that should be coming from them.

Q If they were in writing, is that something you would produce to the committee?

Mr. McKenna. We can certainly get back to you on that, if we haven't already produced them.

BY MR. WEISMAN:

Q Are you aware of any drafts of the emergency worthiness directive that originally included references to MCAS?

A No, I am not.

Q And, again, do you know who the primary author of the emergency airworthiness directive was?

A I wouldn't know that.

Mr. Pasternak. Can I just ask --

Mr. Weisman. Sure.

BY MR. PASTERNAK:

Q In the preparation of the emergency AD, can you just walk us through your specific role? You know, was there a conversation at first about what should be in it? And did individuals get back to you with the drafts, saying, is this, you know, what you're looking for? Just how that process worked in more detail, specifically with your involvement.

A So we -- our continu[ed] operational safety[3] process is documented in one of our directives, which I don't recall right now the number of it. But the process when you have any kind of an issue, it is highlighted to the office, and the office, they will -- then engineers evaluate it, work with the appropriate companies involved, and at same time bring it to Corrective Action Review Board.

The Corrective Action Review Board, which are the specialists and the appropriate branch managers and the office level -- again, this is still all at the Seattle ACO level -- and they will all discuss it. And then they come back with a solution, an alternative. They say, here is what the corrective action should be.

Once they agree to that, typically they go forward with a draft of the AD, and then coordination takes place at the local level. And the office eventually signs the AD. As you can see, the AD in this particular case was signed by [redacted], who happened to be Acting for Jeff Duven, who was then directorate -- was the executive in charge.

[3] The original transcript said "So we – our continual operational safety". FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

So, when we get involved, it is typically that once they have done all of that work, they come and brief myself and other senior leaders as to, here is what we decided to do, here's our action. And often we simply concur with it, because we, you know -- and they are the experts, and we rely on their input.

So when we were talking about before it was released, because we issue a notification to foreign authorities, at that time we had conversation about what actions will be taken in the AD, what will be mandated in the AD. There were discussions with it by myself and the directors and also the senior folks that I work with. Dan Elwell was Acting.

So we were going through all that. But, at that time, we are were simply concurring with the action.

Q So, when you went through this process, you had no specific recommendations or edits --

A Absolutely not.

Q -- or suggestions?

A Absolutely not. Frankly, I'm not technically competent --

Q Okay.

A -- enough to be able to give that kind of a direction to the group of professionals.

BY MR. WEISMAN:

Q Do you know if anyone at the FAA recommended including MCAS in the airworthiness directive?

A I don't really know that.

Q Do you know if anyone at the FAA objected to not including MCAS in the airworthiness directive?

A I'm not aware of that.

Q So The New York Times reported that, at the last minute, an FAA manager told agency engineers to remove the only mention of MCAS, according to internal agency documents. Do you know if this report is accurate?

A No. It was -- I do not know that.

Q Do you know who that FAA manager would be?

A Again, I presume it would be at the local level because it was not something that elevated to my level or headquarters level.

Q Do you know if that manager would've been acting in response to a request from Boeing?

Mr. McKenna. This is getting way into a hypothetical. He's already said several times --

Mr. Bahrami. I do not know.

Mr. McKenna. -- he doesn't know anything about this.

Mr. Weisman. Understood. We want to establish a record of what he does and doesn't know. If he doesn't know, he's welcome to say he doesn't know. We understand.

Do you know if the FAA was acting in response to a request from Boeing to remove a mention of MCAS?

Mr. McKenna. He has not said that that occurred.

Mr. Bahrami. I did not know that.

Mr. Weisman. He's welcome to answer the question in any way that he sees fit.

Mr. McKenna. But you're making presumptions in your questions that he has not stated.

Mr. Weisman. No, I'm -- I'll rephrase the question.

Do you know if FAA was acting in a response to a request from Boeing to remove a mention of MCAS?

Mr. Bahrami. As I said, I do not know that. I'm not aware of any dialogue between the company with respect to removal of MCAS.

Mr. Burkett. Can I ask a --

Mr. Weisman. Sure.

BY MR. BURKETT:

Q So, Mr. Bahrami, I wanted just to circle back to the preparation process for the emergency AD. You stated that the continued operational safety team worked to prepare the emergency AD. Where in the aviation safety organization does the continued operational safety team reside, from an organizational standpoint?

A They are part of the aircraft certification system, you know, and in -- it's our certification service. And under aircraft certification service, we got ACOs. And the ACOs are responsible for continu[ed] operational safety[4] of the certificates that they have.

In case of Boeing, the Seattle ACO, and part of the chain of command, it used to be -- we went to all the organization, but it used to be through the directorate manager. I used to be the Seattle ACO manager back in the late 1990s, and, at the time, I had the directorate. And then it will go to the service director and then eventually to Associate Administrator, several level below that directorate manager.

Q Okay.

Do you know if the continued operational safety team worked with the Office of

[4] The original transcript said "And the ACOs are responsible for continual operational safety". FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

Accident Investigation and Prevention in preparing the emergency airworthiness directive?

A Yeah, because we -- this AD was prepared based on the information we got from the accident investigation side. And the very first group of people that have access to this information, which is very closely held early stages of an investigation, is through the AVP. The AVP is our accident investigation group.

So we have people on site. When they see -- you know, there are two roles we have. NTSB is in charge of investigating the accident. We are responsible for continued operational safety of the fleet. So, at the earliest stages of any accident, we work very closely to make sure that, if there is a safety issue that exists in the type of aircraft, we need to take action. NTSB doesn't. We do. It's our responsibility.

So, during that time, we work very closely. So the moment that flight data recorder information is available and people begin to see things that looks abnormal and they need to further review, it immediately is sent to the appropriate engineers in Seattle ACO.

In this case, they all looked at it, they looked at the flight data recorder, and they just said, "We need to do something quickly." That's how this whole thing came about.

Thank you.

Q And you stated earlier that you first became aware of MCAS through a conversation with Steve Gottlieb?

A That's the part that we were talking about, the flight data recorder. As they were going through, they were showing to me what was happening. And they told me that this was where the MCAS fired. And I said, okay, that's the time I -- the first time I heard MCAS and what it was doing was then, because prior to that I have no knowledge of what's on the aircraft.

Q And that conversation took place prior to the issuance of the emergency airworthiness directive?

A It happens when we started looking at the flight data recorders, which was prior to that.

Q Okay.

As I recall, your background is in aerodynamic loads and structures --

A That's correct.

Q -- correct? As an engineer, would you have expected the emergency airworthiness directive to have mentioned MCAS, given your understanding that MCAS was involved in the accident sequence from an aerodynamics perspective?

A No. And I'll tell you why. This information is directed to flight crews. At the time, there were no reference in the flight crew's documentation, outcomes, AFM, anything on MCAS. And for that reason, what we were trying to do, focus the flight crews on what they already know about the aircraft and how it behaves, what they need to be doing.

And I could see -- I don't know why they did what they did. I don't know why they didn't include or did include it. But as an engineer and having done this for 40 years, introducing a new terminology in an AD that no pilot has seen before, it's confusing. So what they tried to do is manifest -- focus it on the aircraft behavior and what is the appropriate action to take if you experience that particular maneuver.

Q Okay.

One last question, just referencing your conversation with Steve Gottlieb regarding the flight data recorder readout after the Lion Air accident. Do you recall generally when that conversation would have occurred?

A You know, at the end of -- anytime we have a major, you know, tragic

accident like this, our conversations are daily. The moment people are dispatched and they are at the site meeting and they have daily meetings, we get briefings -- they get briefings. They comes in, they say what they're doing, what they're able to do.

I would say that this was about 2 or 3 days after the accident. Because that's how long it took for Australians and the Singaporeans to read the flight data recorder. And it takes 2, 3 days, typically.

And, you know, in some cases, we can't get the flight data recorder. But we were fortunate enough -- we didn't have the voice recorder. Voice recorder, CVR, was not discovered until much later. But the flight data recorder, we were lucky enough to find it earlier.

[10:54 a.m.]

BY MR. BURKETT:

Q Okay.

And I'm sorry, Matt. Just one more question.

To your knowledge, did Boeing provide any technical advisors to the NTSB in the course of the NTSB's participation in the accident investigation?

A They are party to the investigation, and they do send people to the site to support the investigation, yes.

Q Okay.

A They do.

Q And would Steve Gottlieb have had conversations with Boeing employees, to your knowledge, in the course of --

A Steve would not have, but our accident investigation team members, you know, that -- they are on site. They do work very closely. And they work with the Boeing representatives on site as well. Yeah, they are part of a team that are investigating. Exchange of the, you know, communication, views is always a very normal part of the work.

Q Thank you.

Thank you, Matt.

Mr. Weisman. I'm now going to show you a document we're going to mark as exhibit 2.

[Bahrami Exhibit No. 2
Was marked for identification.]

BY MR. WEISMAN:

Q Have you seen this document before?

A No, I have not. But it's an FCOM, flight crew operations manual.

Q So, reading from the document, it says, "Flight Crew Operations Manual Bulletin for The Boeing Company." There's a date on it that says November 6, 2018.

A Right.

Q You don't recall seeing this prior to today?

A No.

Mr. Pasternak. Can I just ask --

Mr. Weisman. Sure.

Mr. Pasternak. Even without seeing that, were you aware that Boeing had issued this document? Did you ever discuss this?

Mr. Bahrami. No, I did not discuss this. Again, this is -- the discussions with respect to the service action and what goes out is between Seattle ACO and The Boeing Company, not me. Because, like I said, this is, like, four level below me. I don't get involved in that because I'm not a technical specialist to the point to discuss this.

BY MR. WEISMAN:

Q So part of your briefing from other parts of FAA would not have included the issuance of a manual bulletin by Boeing following a major accident?

A It would -- it is the normal practice, because manufacturers have the capability to communicate with their operators much faster than any other organization. They got people on site. So when there is a service instruction that they put out, that's always normal practice. That goes out first, and then the regulatory actions takes place.

This is one of the -- to me, it's a safeguard, because that information gets to people that they need it immediately, until we put the AD on, which becomes mandatory.

Q So this document is dated November 6th. Exhibit 1, which was the emergency airworthiness --

A It's the day before, yeah.

Q -- directive, is dated November 7th.

A That's correct.

Q That doesn't seem to be a lot of turnaround time between the Boeing action and the agency action.

A When you are working subsequent to a major accident, you are working around the clock. And there is no time to sit around and wait and discuss, so things are moving really fast. And I say that from the time that I was engineer and I worked on those types of issues. When those things happen, you are working like mad.

Q So, just to be clear, in November of 2018, you were not told that Boeing had issued a bulletin to its flight crew operations manual?

A Not true. I was told that Boeing was going to issue a document to their operators and we were going to also mandate that. It took a lot of debate and discussion takes place between the office with respect to the content, but we were told that Boeing is going to issue their FCOM.

Q But you weren't given a copy of this?

A No. No, I wasn't, because, again, it gets into the details, which I don't get involved in.

Q Do you know if the same individuals that put together the emergency airworthiness directive were aware of the contents of this flight crew operations manual bulletin?

A I don't know that, but I assume they would be involved, they would've known, yes. Because, like I said, the discussions are taking place real-time. I assume they have been involved, yes. Because I was not personally involved, but at the working level, the people who were working it, they have regular conversation.

Mr. Pasternak. And can I just clarify?

Mr. Weisman. Sure.

Mr. Pasternak. You said -- so you were aware of this; you just had not seen it.

Mr. Bahrami. That's right.

Mr. Pasternak. And how were you made aware of it? Were these conversations between you and the ACO?

Mr. Bahrami. No. I don't -- I don't -- I work through my director. So they were telling me that this is part of the briefing, that Boeing was going to issue their FCOM, we were going to follow suit with our own AD.

BY MR. WEISMAN:

Q When you were briefed about the work that was going on while the emergency airworthiness directive was in the process of being produced, were you provided written briefing materials, or were these just phone calls?

A You know, it's -- I will say it's typically both, but if you ask me what is first, what is next, these things -- when something like this happens, this is an urgent safety issue. There is a lot of discussions, a lot of meetings that may be taking place. But, again, it's between the directors and the people that in headquarters work with me. And I can't tell you specifically, when I found out about this document, was it on a phone call with the Executive Director? I do not know that.

Q More broadly, after the Lion Air crash, as you were getting briefed by individuals who were telling you what was going on out in Seattle or in Indonesia, were you given documents and written materials to bring you up to speed on the work that they were doing, or was this just phone calls?

A We typically put out accident bulletins, kind of daily updates, what's taking place at the site. Those papers are shared with senior executives, including myself.

Those are the ones that include what's happening during the day at the site right after the accident, when the team got there, what they did on that day, what are some of the challenges they're facing, what they're doing, and things of that nature.

Q But, in particular, with preparation of the emergency airworthiness directive, as you are briefed on the preparation of that, is that briefing in writing, or is that verbal?

A It could be both, frankly. I don't know specifically. It could be both. I don't know.

Q Okay.

Now I'd like to ask you some questions about the AOA, angle of attack, AOA, disagree alert.

Mr. Burkett. Matt, before we get there --

Mr. Weisman. Sure.

Mr. Burkett. -- one question. Sorry.

Mr. Bahrami, to your knowledge, did anyone in the FAA advocate for action with respect to the 737 MAX in addition to the airworthiness directive or in lieu of the airworthiness directive?

Let me rephrase that. Did anyone, to your knowledge, in the FAA advocate that the 737 MAX should be grounded after the Lion Air accident?

Mr. Bahrami. I'm not aware of that.

Mr. Burkett. Okay.

BY MR. WEISMAN:

Q So just a quick recap of the AOA disagree alert, what we know so far.

Boeing has admitted that in August of 2017, just a few months after it started delivering 737 MAX airplanes to customers, that it discovered that the AOA disagree alert that was supposed to be standard on all the 737 MAX aircraft were only working on a

fraction of the MAX airplanes, that the AOA disagree alert was only working on planes that contained an optional AOA indicator.

Boeing produced and delivered MAX planes with this known defect to its customers and never informed them about the defect until after the Lion Air crash, more than a year later. Boeing has also admitted that it did not inform the FAA about this defect until more than a year later, after the Lion Air crash.

Boeing also admitted that they initially planned to wait to fix the defect until 2020 but began expediting their plans to fix the defect after the Lion Air crash occurred in October of 2018.

Boeing also continued to produce and deliver more MAX planes with the same defect for more than a year and only stopped doing so after the Lion Air crash.

So, setting aside for a moment whether this defect was a safety issue, once Boeing made the AOA disagree alert a standard feature on the MAX and then FAA certified that design, that AOA disagree alert was required to be installed and functional on all 737 MAX airplanes that Boeing produced. Is that correct?

A Yeah. That becomes part of their design.

Q Okay. Has FAA penalized Boeing in any for its noncompliance?

Mr. McKenna. Keeping it to things that have already occurred with enforcement action.

Obviously, you're not asking about enforcement actions that may come?

Mr. Weisman. Correct. I'm asking, to date, has FAA penalized Boeing in any way for its noncompliance?

Mr. Bahrami. So let's go back to that issue and how it came about.

This was a software glitch. And it was discovered by Boeing Company, one of the people who was testing it. My understanding is that it happened earlier in the year,

which at the time I was not there, but once Boeing disclosed this, we're trying to understand what had happened.

In the software problems, typically what they do is they wait until appropriate time to roll over to the next level of software. And there could be a number of things that they have to take place.

Now, in terms of in this particular case, it was decided by -- first of all, they didn't know this was happening, as they acknowledged themselves, until somebody discovered it. And then they disclosed it. And as part of the disclosure, it's being investigated. And it turns out that, up to that point, they were following the process as was established for software in our orders and directives. So they knew that.[5]

[5] Please see September 4, 2020 letter from FAA clarifying this statement and related statements. (Attachment 1).

[11:08 a.m.]

BY MR. PASTERNAK:

Q Can I ask you, you said "they" disclosed it?

A Boeing did.

Q Boeing disclosed it to whom?

A To FAA, which basically said that they -- after the Lion Air accident, they came in and they said that was not operational.

Q When did you learn that the AOA disagree alert that there was a software problem that wasn't --

Mr. McKenna. Just to make sure, you mean him personally or --

BY MR. PASTERNAK:

Q Yes, you personally.

A Oh, my -- again, from my perspective, I found out after the fact. It wasn't prior to that. After the fact that it was in an -- I think it was some sort of an article, I don't recall exactly, which we tried to figure out what was going on. It was definitely after the accident.

Q Okay. And I understand what you're saying is that normally software updates, you know, may not happen right away, but what we're interested in, in this case, Boeing was aware that this component on the planes they were delivering were not working, they were not functioning, and they knew this for more than a year, and they didn't tell FAA or the customers. For you personally, does that concern you?

A It is concerning. I would have liked to know that. But one of the things that we do, just to let you know, any time, not just in this case, in manufacturing, any time there is escape or -- this is typically referred to as escape or manufacturing defect -- that information is then reviewed to see if it is a safety concern, is a safety issue.

If it's a safety issue, then stop. It's not -- the aircraft is not going anywhere. If it is not a safety issue, then it will continue up the --

Q But is FAA normally involved in that evaluation?

A When we are aware of those, we typically also have to get involved to understand what's going on.

Mr. Weisman. How could you determine whether or not it was a safety issue, if you weren't informed about it?

Mr. Bahrami. Well, see, this is what I was saying. Typically, I said, is this concerning, that we would have liked to know earlier, you know, in this particular case. Once it was disclosed to us, that's the time that they had to look at it to see whether it's a safety concern or not. At that time.

Not -- should I have known earlier? Yes, I already said that.

Mr. Weisman. So as you've told us, once it was part of the type design that was required to be present and functional on all planes that were produced, Boeing has admitted that that was not the case. Why has the FAA not penalized Boeing for its failure to comply with that requirement?

Mr. Bahrami. Again, that's part of the ongoing conversation that's part of this. Look, there's a lot of reviews that are going on. There's a lot of things that are happening. At this point, I can't get into those specifics going forward.

BY MR. PASTERNAK:

Q Can you tell us, were you involved in any -- once you learned of this after Lion Air, did you personally have any discussions with anyone at FAA or at Boeing about why FAA was not informed about this earlier?

A I did have conversation with -- with the executive director.

Q Can you clarify who?

A Yeah. It was Earl Lawrence, was the executive director. I had conversation with that. And I think that there may have been others involved, like people like at the directorate, people like -- well, we don't have directorates anymore. I keep getting to deal with that. Like Jeff Duven and those guys that are responsible for the oversight.

Q And did those discussions include actions that FAA should take against Boeing?

Boeing concealed this from FAA and its customers for more than a year. You know, I understand that FAA doesn't believe it's a critical safety issue. It's still, to me, a pretty big issue, when a manufacturer intentionally conceals information from FAA.

A When they, as you know, when they disclose the information, puts that issue in a different category as something that we find on our own. When disclose it, we have to still review all the facts, and I don't know where we are with respect to the actions.

Q But that's not my question. My question is, when you had discussions with Earl Lawrence or Jeff Duven or anyone else at FAA, did anyone say, here are some actions we should take against Boeing?

A Most of our conversation was trying to understand what went wrong, as opposed to try to figure out what actions to take. You can't take actions unless you know how things develop, whether this is something --

Q Right.

A -- a violation of rule or regulations or established process.

Q You just said it was part of the type design and so it was supposed to be required on every 737 MAX aircraft that was produced, and it was a --

A It should be part -- it should have been part of the type design, I said, yes.

Q One last question. Are you aware of any communication, formal letters,

that went to Boeing from FAA about the AOA disagree alert, voicing FAA's concern?

A I don't know. I don't know of that.

Q Okay.

Mr. Weisman. So --

Mr. Burkett. One follow-up on that, if I may.

Mr. Weisman. Time's really short, so --

Mr. Burkett. Okay, yeah.

Mr. Weisman. -- just keep it brief.

Mr. Burkett. Would you agree that if a manufacturer delivers a transport category airplane in nonconformance with its type design, that that would be a violation of some Federal aviation regulation or an FAA order or all of the above?

Mr. Bahrami. Well, yeah, it's a non -- it's a -- the issue of -- because the requirement for airworthiness standards there weren't in conformance to type design and in condition for safe operation. That's what a requirement of the law is, yes.

Mr. Burkett. Right. And that's the definition of airworthiness. Is that correct?

Mr. Bahrami. That's right.

BY MR. WEISMAN:

Q So real quickly, Boeing has also admitted that when it discovered the AOA disagree alert was not functioning on many of its MAX airplanes, that it alerted a Boeing employee that had been assigned to perform FAA-delegated responsibilities under the organizational -- organization delegation authorization, ODA, program. Yet this individual apparently did not notify the FAA about the defective AOA disagree alert.

When a Boeing employee participating in the ODA program becomes aware of a defect, aren't they supposed to alert the FAA?

A There are established processes that Boeing must follow to report that, and I'm not sure if those processes require them to -- an individual to report it or an organization within Boeing to report it. I can't talk to that.

See, part of the issue is that I would like you to understand is, in terms of these communication, there are established processes as part of the procedures manual, as part of the established manufacturing part. Those processes are the ones that govern. That's why it's not easy to go back and say, you must take an action.

First you have to understand what process was in place and what processes were followed. Until you know that, you should not be talking about taking action.

Q I understand. We're now more than a year past Lion Air. Does the FAA not have an assessment yet of what happened with the AOA disagree alert a year later?

A Here is the issue. We have -- everything that we do is based on priorities and safety work that we do. In my view, given where we are today and trying to understand what transpired in two accidents, trying to be responsive to number of investigations that are ongoing, frankly, I'm not trying to understand what happened with this particular issue when there are bigger, important issues that I have to pay attention

to, and this is what we're doing.

Q So do you know if that individual, who was the ODA representative at Boeing who was informed about this alert, that didn't inform the FAA, is still authorized by the FAA to perform ODA work?

Mr. McKenna. So this is all just --

Mr. Bahrami. I don't know.

Mr. McKenna. -- in a news report --

Mr. Bahrami. I do not know.

Mr. Weisman. No, this is a Boeing admission.

Mr. McKenna. Okay. But that's not something that we provide --

Mr. Bahrami. Again -- again --

BY MR. WEISMAN:

Q I'm asking about the ODA program and the participant in the program and whether this person is still -- who failed to inform the FAA -- is still working in that capacity.

A I don't know that. But, again, maybe it was not his role to report the FAA. It is another organization.

You have to understand the process to be able to figure out where the process broke down. This may not have been the person to communicate those kinds of stuff. So I would say I can't comment on that because I don't know those details.

Q Okay. And you don't know who the name of that person is?

A I really don't.

Q Okay. So going to a question we started earlier, FAA chose not to ground the MAX following the Lion Air crash in 2018, but then ultimately grounded the MAX after the Ethiopian Air crash in March of 2019.

Other than the fact that there had now been a second MAX crash, what information did the FAA have about the safety risk posed by the 737 MAX in March of 2019 that it did not already have in the wake of the Lion Air crash in 2018?

Mr. McKenna. Do you understand the question?

Mr. Bahrami. So -- no, just repeat it again.

BY MR. WEISMAN:

Q Sure, happy to repeat.

A I don't -- are you comparing what I knew before March 29 and if I knew -- is that what you --

Q Something along those lines. So what I'm trying to understand is, FAA made a decision not to ground the MAX after Lion Air. After Ethiopian Air, FAA made a decision to ground the MAX.

Obviously, there was new information after the Ethiopian crash. The fact of the crash was new information, there had been a second crash. Back in October of 2018, there had only been one crash. Setting that aside is the one fact.

What additional information did the FAA have in March of 2019 when they decided to ground the MAX that they didn't already have in November of 2018 when it decided to let the plane fly, but just issue the airworthiness directive?

A Okay, I got it.

After the second accident -- after the first accident, Lion Air, we have couple of data point information. First was the flight data recorder that was -- resulted in the issuance of the AD and the details of what we knew right away to take interim action.

At that time, we did two things. We issued the AD based on what we saw, which had a heavy influence on the pilot interaction and what they did, what the crew did.

At the same time, we focused on doing the software changes to correct what we saw the MCAS issue on the flight data recorder.

So those -- that work, both of those works were in progress.

When the Lion Air accident happened, the question was, you know, obviously initially what you want to know is what happened. Because although you have two

accidents, the two accidents could be completely different, different circumstances, and we go through different processes.

So at the time, we had no connectivity connections, similarities, between the two accidents. We did not have that. So let me tell you, let me finish up, then you can ask questions.

So at that time that accident happened, we didn't have any information, we didn't have any flight data recorder, nothing other than we were getting foreign authorities letting us know that they were grounding the fleet.

Q Sorry, I think you're maybe misunderstanding the question. Maybe it would help if I broke it down into component parts.

So in November of 2018 FAA was already aware that a faulty AOA sensor could cause MCAS to repeatedly trigger nose-down trim. Is that correct? After Lion Air?

A That's correct.

Q Okay. Also in November of 2018, FAA was already aware that Boeing had modified MCAS to enable it to activate at lower speeds and that it was capable of moving the horizontal stabilizer up to 2.5 degrees in approximately 10 seconds. Is that correct?

A That's right.

Q Okay. Also in November of 2018, FAA was already aware that multiple alerts could be going off in the cockpit while the MAX crew was trying to figure out how to deal with MCAS activation triggered by a faulty AOA sensor. Is that correct?

A No, that's not correct.

Q You did not know after Lion Air that there were multiple alerts?

A We know there are multiple alerts, but again to assess the human factors, how the pilots react to it, I could not talk to that.

Q I'm not asking about the pilot's reaction. I'm asking, was FAA aware that

multiple alerts were going off?

A Well, based on the flight data recorder, you'll see that, yes.

Q Okay. And in November of 2018, was FAA aware of Boeing's assessment that if a pilot took more than 10 seconds to respond to an unanticipated MCAS activation that the result could be catastrophic?

A I don't know whether, you know, if you don't take any actions in 10 seconds based on what we saw on the flight data recorder -- again, it was based on the flight data recorder, yes.

Q Sure, okay.

Ms. Cooke. Matt, I just want to know --

Mr. Weisman. Sure.

Ms. Cooke. -- I think you guys are at time for the hour.

Mr. Weisman. I think we have about a minute left if that's -- that's what our clock --

Ms. Cooke. Okay. Our time --

Mr. Weisman. I think --

Mr. Pasternak. We can finish up and circle back.

Ms. Cooke. We did -- I did do the same for --

Mr. Weisman. Yeah, that's what we were trying to --

Ms. Cooke. -- but it was at time.

Mr. Weisman. All right. We can continue in our next hour. Okay, we'll stop.

[Recess.]

Ms. Cooke. So we're going to start, we're going to try this. It's 11:33.

So just by way of background, I'm Corey Cooke. I'm with the Republican staff.

Ms. Lyons. And I'm Holly Woodruff Lyons.

Mr. Presti. Hunter Presti with the Republican staff.

EXAMINATION

BY MS. COOKE:

Q So in our round of questioning, we apologize in advance if we are asking repetitive things, trying to make the record straight, and we appreciate your cooperation with us during that. And again if there's anything that you don't know or can't answer, please clarify for us.

And in terms of names, especially for the benefit of the court reporter -- and I, myself, have to work on, I talk really fast -- if there are names that you can know how to spell out and can help just so that we can get those accurately, that will speed the process. Or when you're using a title, if there is a name associated that you know that you can put together, that would help us as well.

So we're going to go back and just start and get for the record, what is your current job and when did you begin that position?

A I am the associate administrator for aviation safety with the FAA. I report directly to Steve Dickson, the administrator. I started this job July 10th, 2017.

Q Great. And how did you come to get this position?

A Well, if I have to say some of my background, I came to this country in 1973, on my own, to continue my education by myself. Started at the University of Michigan, got my master's degree in aerospace. Started working at Douglas Aircraft Company for 10 years. I was an FAA designee, the last 3 years I was there, I was a DER, and my specialty was aerodynamic loads work. And I know what it is to be a designee. I know what it is to work in a big company. I had that experience.

My branch manager, who was responsible for oversight of my work, contacted me when I was at Douglas Aircraft Company and asked me if I would consider coming to the

FAA. They need someone with my specialty. So I joined the FAA as a GS-13 engineer. And then --

Q And that was in?

A That was in 1989. It was in September of 1989. And within about 2 years, 3 years, they recognized my talent and expertise, I became a section supervisor. And throughout my career, I have pretty much done every job there is in aircraft certification, from low-level engineers to program managers to section supervisors, branch managers, office managers, both on the policy side and certification side.

And then in 1996, then the directorate manager asked me to go to Seattle, take a position as a manager, and then it just -- everything just happened, boom, boom, boom, I was up to the directorate manager. And then after that, in 2004, I became the directorate manager for large transports for FAA.

In 2013, I was approached by Marion Blakey, who was at the time president and CEO of AIA. She contacted me and asked me, she would like to have me on her staff as the vice president civil aviation. She said: Your reputation and your experience is something that we need in order to promote a civil side of the AIA.

They gave me pretty darn good offer at the time. I decided to go ahead and go do that job.

I did that job for 4 years. Then I was approached by Michael Huerta. Michael Huerta asked me to come back to the FAA.

Q And to clarify, what was Michael Huerta's position?

A Michael Huerta was the FAA Administrator at the time. And he asked me if I would like to come back to the FAA. I said at the time, I just said: To do what? Because I didn't know what he had in mind. He said: I would like you to take Peggy's position. Peggy was the associate administrator.

Q What is her --

A Peggy Gilligan. Peggy Gilligan.

And he told me that Peggy would retire in April, coming April. This was -- when we talked, this was in December.

Q December 20- --

A 2016, that Peggy will do that. And then after that -- and then he asked me if you're interested, come and see me, let's talk.

I went to his office, had a 45-minute conversation, talked about plans, what I wanted to do, what I would like to be able to do, and he asked me to come in and join his team. And I applied for the job and I got it -- and to the dismay of my wife, of course, because she thought I was crazy, but I loved the job and I said: Yes, I'll take it on.

Q Okay. And how many FAA administrators have you worked under?

A In this position or in -- when I was at the FAA?

Q Well, start with this position, and then if you can give a --

A Yeah. I worked with -- sure. I worked with -- I work, of course, right now with Dickson, Acting Administrator Elwell, Michael Huerta, Bobby Sturgell, who was acting for a long period of time at the FAA, Marion Blakey. Before Marion, Jane Garvey, and before Jane Garvey, David Hinson, and going back to eventually -- I started at the time with Admiral Busey. But Admiral Busey was the administrator. So I've gone through a lot of administrators.

Q Going to switch slightly, and we're going to talk about the Boeing MAX, which is part of why you're here. And we do understand that you had left and there were various positions as you've described.

So are you aware of the [timeline] for testing and certification of the 737 MAX,

including the conditions involving MCAS activation?[6]

A I am -- I know now of the timeline when they applied for the project. That was when I was at the agency back -- it was 2012, I believe it was. And then I left in 2013, and certification, now I know that it was completed on March 2017.

Q But you were not at FAA during --

A No. From -- you know, okay, so the early part of the conversation, really not much is happening other than trying to understand what the configuration is, and what's involved, and what applies, what doesn't. But nothing really begins in terms of compliance, demonstration, testing. None of that stuff happens until later in the program, which by then I was gone.

Q And so given that you were not employed at FAA during that time, how have you come to acquire this knowledge?

A Since I been into this job, and again, once the accident happened and all of a sudden I needed to come up to speed about the background, what was going on, what's happening, and that's basically how I gained most of my experience and knowledge of the aircraft.

Q And can you provide the names of FAA senior leadership who oversaw the certification and the process prior to your returning to the FAA?

A Yeah. Peggy, of course, had my job.

Q I'm sorry?

A Peggy Gilligan. Sorry. Peggy Gilligan, Associate Administrator Peggy

[6] The original transcript said "So are you aware of the 39 for testing and certification of the 737 MAX, including the conditions involving MCAS Activation?" FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

Gilligan. Dorenda Baker was the executive director at the time. John Hickey was the deputy associate administrator at the time.

And when I left my job in Seattle, I think my replacement was Jeff Duven, who was the Transport Airplane Directorate manager. And then the BASOO at the time we had -- the person up there was [redacted], I don't know the spelling of the name frankly, but he was the BASOO manager who started the project. But -- and also [redacted] was the office manager in Seattle. And so these are the people that typically would be involved in that.

Q Great. So I likely will come back and ask more about that, but just again, be very clear, the Boeing 737 MAX, was that certified during your time at the FAA?

A No.

Q Okay. Were you involved in the final flight standardization board report for the 737 MAX?

A No.

Q You were not employed at FAA at the time. Is that correct?

A That's correct, I was not in the agency.

Q Similar to what I asked you before, are you aware of the FAA senior leadership who may have been there and involved at the time?

A At the time, again, in terms of the associate level, associate administrator, are still Peggy and John, but then -- and that responsibility for aircraft evaluation group is on the flight standards side. So that would be people like John Duncan, who is now retired.

And then after -- and then after John, of course, goes to the regional administrators, regional senior leaders in the flight standards, and eventually AEG group that was there. So I do not recall those names.

Ms. Lyons. All right. Just one clarification. Who did John -- what was -- John Duncan was -- did he work for Peggy Gilligan or where was he in the organization?

Mr. Bahrami. Yeah, he was working -- he was reporting to Peggy.

Ms. Lyons. Okay.

Mr. Bahrami. And then there were also -- and there may have been, because I don't know how long John was there, but John Allen may also have been a person there. But, again, I think it was primarily John -- John Duncan.

BY MS. COOKE:

Q Okay. And just -- this is a clarification -- your position is a career position, not a political one?

A That's correct, it is career, yes.

Q And just slightly going back, since you've mentioned a lot of the names, the structure of the organization, can you just briefly describe who currently, structurally, what offices report up to you? And then I know you mentioned you report directly to Steve Dickson.

A Yeah.

Q And then if possible, if you have any knowledge and are able to explain the structure prior, because our understanding is there have been some structural, organizational changes within the offices that you kind of see.

Mr. McKenna. Corey, would it be okay if we provided him and you a copy of the current org chart?

Ms. Cooke. Yes.

Mr. McKenna. I only have two copies, but you can have ours.

Ms. Cooke. And this has the names of folks?

Mr. McKenna. This has -- I think it has the date at the bottom. It's something

like 9/10 this year. It might have been cut off, but --

Ms. Cooke. So we can also consider this, if it's okay with everyone, we can make copies at our next break, and consider this exhibit 3 if that should be helpful. And we appreciate you having this prepared.

[Bahrami Exhibit No. 3
Was marked for identification.]

Mr. Bahrami. So do you still want me to talk about each one, or you just -- or you just needed this?

BY MS. COOKE:

Q If you very briefly can at least explain how this works in terms of both the certification process safety and the emergency AD directive process?

A Oh, okay, sure.

So, yeah, in my organization, there are eight lines of businesses, and they are responsible for what I consider to be aviation lifecycle. And lifecycle starts from standards, design, and development, certification, operations. When you talk to the operation, it becomes personnel, people, pilots, repair stations. And then eventually continue to operate -- and also schools, flight schools, repair -- repairmen schools and things of that nature. Those organizations have always been in place. That was the structure that we had.

At this level, these things have not changed for a long time, except that we also have now currently -- I've created when I went there, I created an international strategies division because of the global leadership objective that we have in the FAA. I thought I needed to have -- create an office and this is where you see this individual in that, which is AVS-5.

The work in terms of the products and the safety of air transportation and aviation, aircraft certification does design, production, and certification side. And flight standards does operational issues, pilot training, mechanics, repair stations, and things of that nature.

Under aircraft certification, really, there is the ACOs, the aircraft certification offices, and they are the ones that are responsible for continued operational safety. So what every ACO, what the ACOs do is they have responsible for continued operational safety of the product or the companies they oversee.

So, for example, in Seattle, Seattle ACO is responsible for continued operational safety of Boeing product, because they oversee Boeing certificate. At the same time, Seattle also responsible for production certificate. So everything is produced at Boeing facilities throughout the world, there are the manufacturing inspection limits there that they report to her.

In terms of the training and maintenance, MMEL and things of that nature, that all takes place with written flight standards, and the office that handles that is Aircraft Evaluation Group. And the Aircraft Evaluation Group on the western part of the U.S., which is Seattle office and then the Long Beach office, they oversee transport airplane. Those are any aircraft that is above 12,500 gross weight is handled by those offices.

There is a lot of interface and interaction between the two offices, because -- especially during the certification -- because what you do in design impacts what happens in training and vice versa, what you need to know about the mechanics, you know. So there is a lot of interaction that takes place, should take place, between those offices.

Q And during the certification of an amended type certificate like the 737 MAX was, understanding you were not there, but who -- in the process, how would it be escalated up, various issues, like, when it would get to, for example, your predecessor Peggy Gilligan, or would it typically stay lower? How does that --

A Yeah, thanks. So, yeah, the question -- basically very little of the decisions get elevated to someone like my level or Peggy's level. A lot of that, the way we -- the way we operate being we try to make decisionmaking at the appropriate level, people who have the technical knowledge, expertise, give them the authority, give them the resources and the funding to do their job.

So in terms of certification processes, ACOs, and if there is in the case of BASOO,

for example, Boeing Aviation Safety Oversight [Office], which oversees the ODA, those guys, all of that, is at the directorate level or at the manager level.[7]

As part of the certification process, we have put together long time ago, and they're still in place, is that in order to resolve conflict, occasionally, between the manufacturers and the certification offices, there is the issue resolution process. When there is an issue that the sides cannot agree at the lower level, they elevate it to the next level.

Not very many things get elevated to my level at all, because typically they're handled either at the directorate or office manager level, or at the director's level, and seldom comes to my level.

So most of my engagement is more of a strategy, resources, international activities, working with other authorities around the globe, mostly external relations with those authorities, and also supporting the Administrator whenever he needs support from me.

Ms. Lyons. And when you say things get elevated, they usually are resolved at the directorate level. Who would that have been?

Mr. Bahrami. At the time, would have been Jeff Duven.

Ms. Lyons. Jeff Duven?

Mr. Bahrami. Yes.

Ms. Cooke. So do you have any questions?

Mr. Presti. Can you give an example, understanding that you weren't in your present position during the certification of the MAX, can you give an example of the type

[7] The original transcript said "So in terms of certification processes, ACOs, and if there is in the case of BASOO, for example, Boeing Aviation Safety Oversight Organization, which oversees the ODA, those guys, all of that, is at the directorate level or at the manager level." After the interview, FAA requested a change to the sentence reflected in brackets for clarity. Majority and Minority committee staff agreed to this clarification.

of decision that, regarding the certification of an aircraft, that would be elevated to your level?

Mr. Bahrami. Well, let me point out, for example, these are typically the ones that get to my -- to my level, those are the really, really big issues and the policy decisions. I'll give you an example.

With one manufacturer, Gulfstream, for example, Gulfstream has a -- every Gulfstream airplane has a very unique feature. They have these elliptical windows, if you go look at them. And that's their trademark, that's really important to them.

One, there was a particular requirement that the overhead -- the exit -- emergency exits on the wing, on the side, there was -- a decision was made by the specialist that at the time they -- they did not -- they were told that they need to change the design of the door, which impact that trademark. And they have service history to show that this was not an issue. They were going to elevate it.

They elevate it. It got all the way to John Hickey and Peggy and those things. That I was the director at that time. Everything got elevated to that level because to them, that was absolutely critical that they keep that configuration and they thought they had a safe design.

So the discussion and the data was shared at the senior leadership, to that level, and the final decision was made. But this was, again, many, many years ago. It's very, very few item that gets to the level at that level.

BY MS. COOKE:

Q So we're going to shift to hopefully when you had assumed your role, which is following the first accident, the Lion Air crash on October 29th, 2018. What was your role in FAA's responses to that accident? And if you need to further elaborate with the org chart as to what office did what and how that function came together, please feel

free to do that.

A This is after the Lion Air?

Q Yes, sir.

A Okay. Typically when you have an accident of this magnitude, we get calls from operation center. They notify us immediately that an aircraft went down, here's the situation.

Subsequent to that, that information, it also is given to our accident investigation team, which is Steve Gottlieb's team. They have accident investigators. These guys then contact NTSB and figure out what is NTSB's plan, what do they want to do.

In this case of Lion Air, of course, the Indonesians were responsible for the accident investigation, and NTSB had a support role in this case. So at that time when we found out the accident occurred, Steve and his team members contacted NTSB, determined who's going to be on the go team, and whether they need FAA support. It was decided that they want FAA support, so we sent, I think, one or two of our investigators. I don't recall exactly whether we sent two, but we sent an investigator.

At the same time, when they go to the site, they immediately, based on the information that they have, everything that they have been able to collect, they figure out what type of expertise they need.

In that case, they may -- they decided that they need somebody from Seattle ACO, and they decided to, at the time, I believe, the project pilot, who was -- who flew during the certification, to go to the site. And he went and supported the investigation.

And there are times during the investigation we could have one person, or you could have more than one, two, three supporting the investigation. So I think in this particular case, I think we had at one point, we had as many as three or four people on site supporting the investigation throughout the whole process.

When that is happening, there is a clear coordination, first of all, at the senior level. We all know what's happening every day because we're getting daily briefing. At the same time, there is a lot of discussion between aircraft certification folks, flight standards folks, and Steve's team, because Steve has the ability to get us real-time information from accident site because of having representatives. And these guys with technical knowledge and so many people who are on site work for these folks. And they get together and they share the information.

And my role, again, is to support the administrator and to support these guys in terms of who they need to send, when they need to send, and what else we can provide them in terms of performing their functions and duties, things of that nature.

And this -- that's what -- that's how the communication takes place.

Now, in what -- in case of the AD, you said, how you get to that point is that once we got the flight data recorder, of course, then there was a lot of conversation between the aircraft cert folks and Steve, trying to understand where the data come from, how the information is, you know -- and then the specialist from flight test, and -- you know, what they look at the flight data recorder, traces of that.

And then based on what they see, they try to -- again, we don't have -- because the aircraft went into the water. So there is no way to have real access in terms of quick physical evidence. We didn't have any of that. It was only the flight data recorder at the time. And they use that information in order to determine what actions we have to take. And what followed was based on the data we got from [inaudible].

Q And just to be clear, to go back, based on your description and what I believe you told our colleagues in the first hour, there were not things that you were personally signing off on as they were going.

A No.

Q You, as you described, were having it with the lower --

A No, it was not -- no, it was not -- no involvement in that part, no.

Q And that is based on standard FAA process?

A Yes, it is.

Q Okay.

A It is based on the process.

Q So some things that have been raised following Lion Air, for example, are why the FAA did not ground the aircraft. I know you've gotten into it, but could you explain some of the facts, information, data that FAA knew at the time, to the best of your knowledge, understanding the levels, and on what basis the FAA made the determination that grounding was not appropriate?

A Okay. So as I said, we are in the business of managing risk. And we look -- we make that decision based on data and the information that we have.

At the time of issuance of the AD, we only had -- we had nothing other than the flight data recorder. And the flight data recorder had some evidence that flight crews were not doing what an airman with the, you know, average kind of knowledge, experience, would be able to do. So there are some things that people couldn't quite understand what was happening.

So that gave us an indication that there must have been a confusion what actions to take. And although we knew it was the MCAS was the triggering effect, there was nothing we could do in terms of going and taking action with respect to the changes to the MCAS. That's a longer-term process.

But the interim action was to make the crews aware of the fact that when you are experiencing an event like this, it is much like runaway trim, and under runaway trim, you follow those particular procedures that was in the AD, just to remind them of that.

And typically in an emergency, when you write an emergency AD, that is immediate, gets into the flight manual and instructions for the pilots to have with them when they're flying the aircraft so that if they experience, that that's the quickest way to make them aware that this is the type of corrective action if you are experiencing a runaway trim.

BY MS. LYONS:

Q How rare is it, or is it very typical, that FAA does an emergency AD?

A It's very, very rare, frankly, emergency AD of this nature because we -- in the media, they refer to immediately adopted rules, and we have different terminologies.

An emergency AD, typically in our vernacular that we use, anything that has corrective actions 7 days or less, it becomes into an emergency situation. There is no time for comment. There is no time for any of that. We just say, go do.

And there are few of those, but they are -- they do happen. I have done -- I've done many during my career in Transport Airplane Directorate, from what I recall. But it's typically -- we refer to this sometimes, we say telegraphically, because there is no, for the record, there is no -- it's not like -- we just say get it out there quickly. And that's what it is, and there are few.

Q So the emergency AD, I'm going to describe it as kind of an unusual, given the circumstances, you felt -- the agency felt --

A Urgent. Very urgent.

Q -- you had to do this. And it was directed towards the pilots and the operators.

A Yes.

Q Did FAA take any action directed towards the manufacturer following Lion Air?

A Well, what we did was the only thing we could have done, was to figure out what corrective actions we have to take based on what we have seen on the MCAS activation. So we knew that we need to change the software, we need to change the MCAS characteristic. We need to basically take care of that. That's why we started right off the bat, after issuance of the AD, almost at the same time, plans begin to take place to change the MCAS system software --

Q But what was FAA's action? I mean, I'm assuming, based on the last, however, almost a year, that Boeing is the one that was changing the MCAS system. What was FAA's action?

A FAA's action is that any system that Boeing wants to propose will have to go through evaluation. So the discussion starts immediately with the Boeing company, what changes they are trying to make, what kind of design changes they are considering, and then what's the process to get the certification plan that comes over it. That's how we get engaged, and then t[o] eventually get to a point where we have the system to actually go conduct the flight testing and do the work.[8]

Q Did FAA direct Boeing to make the changes?

A We would have done it, but in this case, everybody realize that this was -- this needed to take place.

Q So it was kind of a simultaneous realization that --

A Yeah. Everybody knew that something needs to change, yes. I mean, we knew -- this is always the routine. It's the interim action plus the following action. And in some cases, the design changes under 21.99, section 21.99[9], we have the authority to

[8] The original transcript said "That's how we get engaged, and then till eventually get to a point where we have the system to actually go conduct the flight testing to do the work." After the interview, FAA requested a change reflected in brackets for clarity. Majority and Minority staff agreed to this clarification.

[9] 14 CFR § 21.99.

mandate particular design. But we are not the experts of design. So we always talk to the company about, here's the problem, what needs to be done?

In this particular case, there is no reason to activate what are considered 21.99. 21.99 is adversarial. If the company doesn't want to do it, then you go back and say, you're required to do it, it is under 21.99. In this particular case, both FAA and Boeing acknowledge that this needs to take place and begin working together.

Mr. Presti. So to your knowledge, following the Lion Air crash, and contemporaneous with the issuance of the emergency AD, it sounds like -- and correct me if I'm wrong -- it sounds like there was never any pushback from Boeing that something needed to change with MCAS once it was learned that MCAS at the time may have played a contributing factor --

Mr. Bahrami. I am not aware of any pushback from Boeing. Not at all.

Ms. Cooke. All right. So we're going to move to the second accident, the Ethiopian Airlines crash in March 2019.

So what was your role in FAA's response to that accident? And of course if you can, please elaborate on the office's role in any actions that you may have been personally involved in or signed off on following that.

Mr. Bahrami. Right. So at that Monday -- accident happen on Sunday, which, of course, we all know what goes to lose someone who spent 40 years preventing accidents. Excuse me.

Ms. Lyons. Do you need a break?

Mr. Bahrami. No, I'm fine.

After overcoming disbelief and worries, we begin to look at what we can do, what we learn, what we have. And meanwhile, I was getting calls from my international colleagues telling me they're going in the field, and none of them told me what data they

had. None of them -- all the conversation was, Ali, I'm really sorry, minister asked us to ground the fleet, and we have to do it.

And I ask, what data, what information? Nothing was presented to us. So when I was asked what is my recommendation, I said I cannot make a decision to ground the fleet because I have no data.

BY MS. COOKE:

Q And who -- just to clarify -- who asked for --

A Well, it was my boss at the time, Dan Elwell, and they wanted to know what was going on, what it was -- because they were asking what we know from the site and what we -- and there was no data for us to make a decision to ground the fleet.

So until we got -- we got on that Monday afternoon, we got database traces from the ADS-B, which was from Aireon, satellite-based ADS-B, which we don't have agreement with Aireon. Other authorities may have. We don't have any of that. But I have to tell you that nobody ever came back and told me that we have data or anything like that.

We got that information -- since we didn't have the details of trying to transfer, understand what the database, what the ADS-B data was telling us, we turned that over to the NTSB.

And NTSB -- that was on a Tuesday -- NTSB got it from us, shared it with Boeing, and Boeing got with Aireon. And overnight they started evaluating the database, the traces, ADS-B traces, and figure out what was the flight profile that taking place. And then they took that flight profile, superimposed it on the Lion Air. And so they just begin to see similarities.

So they were still trying to get data and information. Then he came on Wednesday morning, and I was asked to be on a call, urgent call with Boeing, and I was

there. We were looking at --

Q Can you -- just to clarify -- who at Boeing was on the call with you?

A There were several people, but Beth Pasztor was one of them. [redacted] was the accident investigator on site. [redacted] was there. Beth Pasztor was on the call. And Beth basically said, Ali, we have some information that we need to share with you, and I said, fine.

And then I had -- I don't recall who I had in the room with me, but what they did, they put on the screen, they put the traces on the Lion Air and Ethiopian Airlines, they superimposed traces, and they explained their similarities and what is happening.

We still did not have flight data recorder. This was what we knew from Lion Air. No flight data recorder from Ethiopian Airlines yet.

So we use that, we put those together. And then they said that we have also found physical evidence from the accident site. The physical evidence they found was the flap actuator. Flap actuator was in a retract position. And MCAS gets activated when flaps are up.

So now we have data that says airplane -- the two scenarios, maneuvers, were the same, and we also have a flap actuator that is in a retract position.

I saw that and I said, thank you, anything else? And they said, well, what are you going to do? I said, we'll get back to you. And I walk out of my office, went to Dan's office, and I said, we need to ground the fleet.

And he said, what happened? I said, based on what I just saw, my recommendation to you is to ground the fleet.

BY MS. LYONS:

Q So in the first hour there were questions about what you knew after the first accident and what, you know, what you didn't -- I guess, what was new information

between the two. And you said comparison data.

A The, the -- yeah.

Q Okay. So you had the data from the first accident, and now you have the data from Aireon --

A Traces from Aireon.

Q -- from Aireon that you were able to make the comparison.

A Yeah.

Q And then you had the physical evidence.

A That's correct.

Q So that covers all of the new information --

A That's all I had at the time.

Q -- between the two that led to a different decision in terms of grounding.

A Right. Because the first -- the first accident could have been an isolated case. We didn't know that. But we know what we need to do as an interim action.

When the second one happened, when we saw those similarities, and the physical evidence that says the airplane was in the same configuration as the same one, we said that's enough, we need to move. And that's how I went forward. And I walked into Dan's office and I said, Dan, we need to ground the fleet.

And you know, any time you make the decision like that, it's hard decision, you know, for many different reasons. But it was time to do that. And I walked -- it wasn't even -- I would say that it wasn't even 5 minutes and I did that conversation because -- and then I immediately called Boeing and let them know, we're going to ground the fleet.

BY MS. COOKE:

Q So just to clarify, the date that you made that decision was?

A I believe it was March 13th.

Q And you personally made the recommendation to make the decision to ground the fleet?

A I am -- I am the -- you know, I always -- I never forget that I am the chief safety officer for the FAA. I make those decisions. I made that decision. And I told Dan, told him, and he acted upon it, and he said obviously we have to go through briefings and senior leadership and all that. I was not involved in any of that. But I was involved in making the decision, looking at data, making that call.

Mr. Presti. And what day was the MAX ultimately grounded by the FAA?

Mr. Bahrami. I think it was almost the same day. I don't know exactly because what we did was, we put out the order that was put out is grounded. And it was not an AD. It was a grounding order, which was almost -- we immediately worked with ATO and all the traffic centers is not permitting anything, and it was quite a disruption, because obviously any airplane at the gate wasn't going to go anywhere. People had to get deplaned and all that. So all of that happened really, really fast.

[12:15 p.m.]

Mr. Presti. But that order was issued the same day you made the recommendation?

Mr. Bahrami. I believe it was. I don't know exact dates, so don't --

Ms. Cooke. And for grounding of an aircraft, is that common?

Mr. Bahrami. No. No, we have had only two groundings.

Now, let me be careful, because some people use the DC-10 accident in 1979 as an FAA grounding. That was not an FAA grounding. That was a decision by the McDonnell Douglas company. FAA told them that you need to voluntarily ground or we will ground, and they voluntarily grounded.

But in terms of the FAA action, there has been only two. One was --

Ms. Lyons. Counting this one?

Mr. Bahrami. Counting MAX, this. Counting the MAX.

Ms. Lyons. So one other besides the MAX?

Mr. Bahrami. Yes. That was the 787, and I was involved with that one. That was my AD that grounded the 787 fleet. Yes.

Ms. Cooke. So, given that you apparently have been involved in both groundings --

Mr. Bahrami. Yes.

Ms. Cooke. -- what is the standard process for the grounding of aircraft by the FAA?

Mr. Bahrami. Standard practice is -- typically is issuance of airworthiness directive. But in case of an airworthiness directive, you have to have evidence of unsafe condition.

After Ethiopian Air accident, we still really didn't have any evidence to see whether there was an unsafe condition. Because we had thought our interim action would have mitigated the risk that we were experiencing.

So the only way to ground the fleet was through the grounding order, not an airworthiness directive. We typically do it with an airworthiness directive, but, in this case, we cannot issue an airworthiness directive, because you have to have an unsafe condition to do that, and we didn't.

Mr. Presti. Sorry. Can you elaborate on that a little further, with the lack of an unsafe condition? Is that because at the time of the grounding you had evidence to suggest that the Ethiopian Airlines crash was a result of -- a contributing factor to the crash was erroneous MCAS activation but you did not know that definitively?

Mr. Bahrami. Yeah, we did not know definitively. And, at the same time, typically when you have an AD, you will say, before further flight, to do certain action, take certain action. Okay? In this case, we had no idea what action to take. The only thing that we had, we had traces and we had the flap actuator. We did not know what other actions we could've taken to allow operation.

So, at the same time, when you write an AD, it's incumbent on the Administrator to say what is the unsafe condition. And we couldn't really find out what the unsafe condition was in this case. So we decided to basically go back and say, you know, ground them until we get more facts to figure out what we have to do and then eventually move forward.

Mr. Presti. So the ultimate effect of issuing the order or if you had had more knowledge would have been the same?

Mr. Bahrami. It would have been the same. It would have been grounding. And, in this case, since we did not know what would be the appropriate action, we just

decided to ground it, you know, until we figure out what needs to be done. And it's been almost a year now, so -- 9 months almost.

BY MS. LYONS:

Q So just, I guess, to review, after the first accident, FAA issues an emergency AD, which is a very rare --

A Yeah.

Q -- action by the agency.

A Correct.

Q After the second accident --

A We grounded.

Q -- you grounded it. It's the second time in the history of the agency that you've done that.

A That's right. Absolutely.

BY MS. COOKE:

Q And when you issued the grounding order, did you or someone else communicate that to Boeing? And who at Boeing was that communicated to?

A We told -- like I said, Beth Pasztor was the -- I think her title was vice president of safety. I'm not sure. But I told Beth -- Beth was the one that called for an urgent meeting. And that's when we got into there and we look at the traces and things.

I told her, okay, I understand, we'll get back to you. And I needed to immediately talk to my boss and tell him what my decision is. And he supported the decision, and we let Boeing know. And we do it typically through, first of all, through our chain of command, which is her and Jeff Duven and others. And then we let Boeing know that we're going to ground the fleet.

And I also have to point out that there was absolutely -- once I communicate that to Boeing, there was no pushback at all. Typically, when you are making these kinds of decisions, if they disagree with you, they will just fight it like crazy, because this is a huge deal. Grounding 387 aircraft is a big deal. And there was no pushback at all.

Q So we're going to switch. We have about 13, 12-1/2 minutes to go with. We're going to slightly switch and talk about some of the decision-making process and, again, based on what you know and your experience.

So, when folks are administrators, they obviously have great authority. So can you discuss what former Administrator Huerta's role was in FAA aviation safety oversight activities during his tenure that you're aware of, given you had some overlap?

A Well, I think that most of the -- you know, Peggy worked for Huerta. And this office that we just described, there are roughly 7,000 employees. They are responsible for oversight, safety standards, and all that. And the relationship that Peggy would have had with Michael Huerta would be very much similar to what I have with Steve Dickson. A lot of time, I'm left alone to make my decisions and then give my recommendations, and they would either concur or not concur, based on what it is.

But a lot of the issues on the aircraft projects and this-and-that details, it never gets to the level of Michael Huerta or the Administrator. These are things that happen at a much lower level. A lot of things about budget, overall strategies for the organization, goals and objectives are done at that level.

Q So, as you're mentioning, I guess, some of these lower levels, I believe you've mentioned the name Dorenda Baker. What was her role, and did you work with her? And is that the level that decisions would be made at?

A Actually, it will go even below that, because it goes down to the directorate level.

Under the old system, which -- by the way, when I came to the agency, I started on July 10th. Aircraft Certification reorganized on July 23rd completely, and Flight Standards got reorganized on August 20th. So the organization that I knew completely changed.

But --

Ms. Lyons. So that process was already underway --

Mr. Bahrami. It was already underway.

Ms. Lyons. -- when you came back?

Mr. Bahrami. When I came back, I came in knowing that those changes are taking place. And we are now, of course, moving forward with those changes to fully implement them.

But --

BY MS. COOKE:

Q Sorry. Just on those changes, so who -- since you said you came in, it was already underway. That organizational change was being made, then, under Peggy Gilligan? Or --

A Under Huerta, Peggy, Dorenda, and John Duncan.

Q Okay.

A Yeah.

Q So you came in. That was sort of already based, signed off, and --

A Oh, yeah. They basically told me that decision has been made, we're going forward with this reorganization.

And it's a good reorganization. The purpose was to shift the cultural change and create this cultural change, and the way we're doing business, more innovative, new ideas given the new entrants and things like that, and also standardization between the

offices and all that. This was all geared toward that. So I think it's a positive thing.

From my --

Ms. Lyons. But it was a Michael Huerta initiative?

Mr. Bahrami. It was a Peggy Gilligan and Dorenda Baker and John Duncan initiative, which Michael Huerta accepted and approved.

BY MS. COOKE:

Q Understanding you came in and it kind of was happening, are you aware of when that timeline for that decision process, I guess, started, when they proposed it and it was then signed off on?

A In case of -- I can speak on Aircraft Cert. I can't speak on the --

Q Okay.

A The discussion to transformation took place, actually, when I was still in the agency, back in 2013. We were thinking about how we reform the organization, how we move forward. I was involved in some of the conversations back then.

But when I left, then I didn't know what happened until they completed all the decisions and put certain people in place. But it was a decision to change the organization on the 23rd of July, 2017, for Aircraft Cert.

Q Okay.

So just going back, how long did you serve under Huerta? When did he, I guess, stop and others come in?

A Well, I think -- oh, I'm sorry. Randy Babbitt was the other Administrator that I missed to mention.

Anyway, Huerta -- after Randy left, Huerta was the Deputy. Then Michael Huerta become the Acting Administrator. And then that was for a long period of time. But then he became the Administrator. He was nominated and confirmed as Administrator.

So, during all his tenure, I was -- you know, in 2013 from the time he was Administrator until 2013 I left, he was the Administrator.

Q And then the second time, you came back. He was there until --

A I came -- yeah. And he was there until January 2018, when we had the new administration coming up, and then he left. And then Dan Elwell, who was the Deputy, took on the Administrator's responsibility.

Q And for Peggy Gilligan, again, just because I'm not as familiar -- so you said you had been asked to step or consider stepping into this role and applying, because she was retiring. Did you overlap with her at all during the retirement?

A Oh, no. No, actually, the process for bringing me on board took some time. And Peggy left, I think, in about April or May, and I didn't come on board until July of 2017. So there was a gap.

Mr. Presti. Who performed Peggy's duties during that gap?

Mr. Bahrami. I don't know. There were some actors. I mean, remember, John Hickey was still the Deputy there. He stayed in. So I think John Hickey was Acting at the time, because he just stepped up as a 2 to a 1, the Associate Administrator.

Ms. Lyons. Is John Hickey retired?

Mr. Bahrami. Yeah, he retired. Yes. He retired over a year ago.

Ms. Cooke. And in March 2017, when it was certified, you were not in place yet. Had Peggy retired, or did she not retire until April of 2017?

Mr. Bahrami. I think she was still there. I think she was still there. She was still there, Associate Administrator. But, again, it's now getting really close, so I may have to verify that.

Mr. Presti. Who was responsible for signing off or ultimately signing a type certificate, approving it?

Mr. Bahrami. Great question. Lowest level person is typically either at the ACO manager, ACO branch manager, or the directorate manager.

Sometimes a program -- for example, 787 was basically what I considered to be a great program for many respects, from new technology, you know, the extent of the design changes, the composite this, and all kinds of stuff on 787.

So the day that that TC and PC was signed, I signed the TC. And there was a certification celebration at Boeing Company when Randy Babbitt joined for that session. But I signed the TC, as the directorate manager.

But most often, it's done at the lowest -- at the ACO level on programs that are not, you know, as, I guess -- I don't know what the right word is -- high visibility. Let's put it this way.

BY MS. COOKE:

Q Along those lines, if it did need to be elevated, if there was disagreement, would that have been elevated from that ACO level? Who would've been elevated? If there was an issue paper, who would've been the next level elevated? And then, kind of --

A Yeah, it typically starts with the project team. And then when the issue is not resolved, it goes to the office level, basically ACO manager position.

But, remember, in cases like this now, now you need multiple people engagement. You need the policy offices involved. You need the certification offices involved. Under the old system, directorate manager was the next level up. So it used to come to the directorate level.

And if it's not resolved, then it goes to the Executive Director. And if the Executive Director cannot resolve the issue, it gets to the Associate Administrator. But that is very, very rare. It hardly really ever happens, but it is -- that's the process.

Q Are you aware, during the Boeing 737 MAX, understanding it sort of -- it sounds like you left and weren't there -- were there times where things were elevated up that chain dealing with the amended type certificate?

A I'm not aware. I can't speak to that.

Q And probably this is my last question since we're starting to run short on time.

When you came on -- obviously, it seems like you were recruited by Administrator Huerta -- what direction did you get regarding aviation safety, the certification oversight? Like, what was the direction you were given, sort of, for your mission and strategic role?

A With the change in organization, the focus was on cultural change. The focus was on efficiency, effectiveness, consistency in decision-making. The focus was on -- at the time, we had a compliance program. They started in 2015. Compliance program is basically a collaborative approach to safety. So, you know, under this, self-disclosure versus punitive approach to safety. They had already started a lot of those programs.

So when I came on board, the direction was they would like to see these programs succeed. And they thought that the workforce has begun to embrace these changes. And with these organizational changes, I should work with the team to make sure that we could actually execute the program.

And one of the things that you should also be aware of is that, before I was recruited to come to the FAA, I had planned to retire and go back, because my family lives on the West Coast. I was going to go back there. And I'd already started doing teaching in certain schools for certification.

And so I told Michael that, look, I already have other plans. And he said, "Ali, I just want you to do this for 2 years. Help me with this transition." And I said, "But if I

come in, this is not a 2-year job." And he says, "Well, all I ask, for 2 years for you to come and help me with this thing." So when I came on board, that's how I started, and that's what I did.

Ms. Cooke. Okay.

Well, I think that we are at time, so thank you for your cooperation.

Mr. Bahrami. Thank you.

[Recess.]

BY MR. WEISMAN:

Q Okay. When we left off after the first hour, we were talking about what the FAA was aware of after the Lion Air accident. So, just to recap a little bit, in November of 2018, the FAA was aware that a faulty AOA sensor could cause MCAS to repeatedly trigger nose-down trim. Is that correct?

A Yeah. That's what we talked about.

Q Great. Okay.

And then also in November of 2018, FAA was aware that Boeing had modified MCAS to allow it to move the horizontal stabilizer up to 2.5 degrees in approximately 10 seconds. Is that correct?

A Yeah.

Q Okay.

And also in November of 2018, FAA was aware that multiple alerts could be going off in the cockpit at the same time that MCAS was activating. Is that correct?

A That's what I said we saw on the flight data recorder.

Q Okay.

So I think when we timed out, I was asking about, was FAA aware that Boeing had done a functional hazard assessment in which they had determined that if it took more

than 10 seconds to respond to unanticipated MCAS activation the result could be catastrophic?

Mr. McKenna. You're asking if the FAA knows or if he knows?

Mr. Weisman. I'm asking, was FAA aware?

Mr. Bahrami. I was not aware that Boeing had done that, no.

BY MR. WEISMAN:

Q Okay. So, after Lion Air, FAA was not aware of Boeing's functional hazard assessment that found that if a pilot did not respond to unanticipated MCAS activation within 10 seconds the result could be catastrophic?

A As I said, I was not. You said FAA. I don't know if someone else within the FAA knew. I do not know that.

Q You did not know that. Okay.

A Yeah.

Q When did you first become aware of that hazard assessment?

A I found out about the hazard assessment once we tried to -- right after the accident, there was a quick review done to see whether there was noncompliance in terms of MCAS design. And I knew that that hazard assessment, our specialists were looking at it. I knew they were doing that. But I was not aware of this 10-second issue that you are talking about.

Q I see. Is this new? Am I bringing -- are you aware, presently, of the 10 seconds --

A I wasn't aware of an analysis that said if this continues for 10 seconds it will be catastrophic. That I did not know.

Q Understood. Did you come to know that at some point?

A Well, when you look at the traces that you see that continues on, that the

rate of MCAS activation and the reaction that we saw, we saw that if that continues on it could be catastrophic. Yeah, we saw that on the traces. But I did not know that there was a safety assessment done that says that is a catastrophic event. I'm basing that based on what we know from the traces.

Q Okay.

So, after the Lion Air crash, did anyone at FAA recommend grounding the plane?

A After Lion Air crash?

Q Yes.

A I'm not aware of it, no.

Q So no one at the FAA called you or sent you an email to suggest that keeping the 737 MAX aircraft flying was unsafe?

A I'm not aware.

Q Okay.

Did anyone at FAA object to or dissent from or recommend against the more limited actions that the FAA took in response to Lion Air? And by that, I'm referring to the decision to issue an airworthiness directive as opposed to grounding the plane.

A Again, I do not know that. But when you are having the CARB reviews and discussions that take place, a lot of different views are discussed within the group. I cannot tell you whether somebody did not agree with it or not. I cannot tell you that. I don't know.

Mr. Weisman. Did you want to ask your --

Mr. Pasternak. Sure.

BY MR. PASTERNAK:

Q So I just want to back up to clarify a couple of the questions that were asked in the last hour.

You said something to the effect that MCAS was the triggering effect on Lion Air, that you realized after Lion Air that MCAS was responsible for the conditions that led to the accident.

A Was a triggering effect. Basically, the way the aircraft behaved because of the AOA input, the MCAS was activated, yes.

Q And after Lion Air, you were also aware, I'm assuming from the questions Matt just said, that MCAS relied on a single sensor?

A Afterwards, I found out that that was the case.

Q Right. Okay.

A And prior to that, I had no reason to dig into that at all.

Q Right.

Did you also become aware that after the redesign of MCAS by Boeing in 2016 that they had not done a new risk assessment?

Mr. McKenna. Are you talking about a specific point in time?

BY MR. PASTERNAK:

Q In March of 2016. And I know you weren't there. I'm talking about, after the Lion Air crash, did you learn that Boeing had redesigned MCAS?

A So --

Q In 2016.

A So I was aware of increasing the authority, if that's what you mean.

Q Yes.

A That came up afterwards, after the Lion Air accident discussions, yes.

Q Okay. And you were also aware, from what you said, after Lion Air that the AOA disagree alert had not been functioning properly on a majority of --

A Well, that was, at the time, also something that was disclosed by Boeing,

yes.

Q Right. But after Lion Air?

A It was after that, yes.

Q Okay. So my question is, the emergency AD focused on the pilot's response, actions the pilot should take in case they saw another activation of that MCAS. Is that accurate?

A Repeat your question.

Q The emergency AD really focused on the pilot's response to how to react in a similar situation.

A It was directing the pilot on which procedures to use if you experience a runaway trim.

Q Okay.

It seems to me -- and I'm asking this question with all of the other things that FAA learned after Lion Air: that MCAS was reliant on a single sensor, that that had been redesigned, given more authority, that there had not been a specific risk assessment of that new authority, that the AOA disagree alert was not functioning in a majority of 737 planes.

On a personal level, did that raise serious red flags for you? It seems like, you know, those are serious issues that FAA had not been aware of.

A No, it did not, and let me tell you why. Because the basic -- the flight deck philosophy design was based on pilot intervention and action.

So, when the system safety assessment was done, the single failure aspect of it was known at the time, that you could have a single failure and you will have an MCAS reaction.

But it was the discussion that took place between the specialists and the experts

in the FAA and Boeing that they had discussed this, was that when that happens it becomes similar to a runaway trim. And runaway trim is considered a memory item. And every pilot that is out there knows that at that point you need to cut off the switch and take control.

That was what was assumed at the high level. So when you talk about these other things about it, again, the overarching design philosophy is that, for the flight deck philosophy.

Now, I also want to talk about the AOA disagree that you talked about. AOA disagree is not something that the pilots use to fly the aircraft. It is good as a matter of awareness but is not necessary for operating the aircraft because of the fact that there are other cues. They try to manage energy, speed, weight, and that's what they do. They do not look at the AOA disagree. There is an airspeed disagree. Those are other cues, other indications that typically pilots use.

Q I understand your argument on that. I guess my question is more, if you have all of these cases, you have the AOA disagree alert -- which Boeing did not disclose was not functioning to both FAA and its customers -- you know, you then find out that MCAS relies on a single sensor, that it --

A Well, we know that from design. From day one, the design architecture was known to the FAA, the single -- so that was not something that we found out after the accident.

Q It was certainly something that seems to have concerned lots of other folks within FAA. I understand FAA may have known of this at the time, but it seemed to be, you know, after Lion Air, and your fix now is correcting this, that it relied on a single sensor.

My point is, there were a multitude of problems on the design, not on the pilot

reaction, but on the design of the aircraft. And my question is, did any of that come up in terms of a decision not to ground the aircraft?

Did anyone say, look, we have all of these issues and we need to take a more thorough examination of the aircraft to make certain that Boeing complied with regulations and that the aircraft was safe?

A What we were working on was the MCAS redesign, which was, in essence, looking at the software. Looking at everything that you just highlighted would have been taken care of as part of the process that we were following. That's what we did. Interim action was to focus on the pilot action. The long-term action was to do the MCAS changes and any other changes necessary.

Q But you made a decision that those changes could wait --

A Yes, we did.

Q -- and still the plane could fly, and you were relying on the pilots to prevent a catastrophic failure.

A There are a lot of other scenarios out there that we -- again, it gets back to the cockpit design philosophy. Pilots are part of the system, and we rely on the pilots to do certain things.

Again, if you ask -- and I think that is -- to me, that's what we were focused on, and this is what we did while we were working on the MCAS redesign.

BY MR. WEISMAN:

Q So, earlier, you had mentioned during the second hour that after Ethiopian Air occurred you were aware of an unsafe condition. What was the unsafe condition that you were aware of?

A Okay. I didn't say we were aware of unsafe condition. I said, after Ethiopian Air, we saw similarities in the pattern in the aircraft behavior from Lion Air and

the Ethiopian based on the ADS-B data superimposed on actual flight data recorder and the physical evidence, which was the flap. And we saw similarities within the two accidents, and that was enough for us to ground the fleet.

Q Okay. So the decision was based on similarities --

A Yes.

Q -- after Ethiopian Air.

I guess what I'm trying to understand is, the conditions that were present on Ethiopian Air seem to be the similar conditions that were present on Lion Air. But after Lion Air, FAA decided not to ground but to suggest to pilots, this is what to do when you get into that situation. But then after Ethiopian Air, FAA decided not to advise the pilots but, instead, to ground the plane. It seems like the facts were very similar. What was the difference?

A So I would -- if you have ever reviewed accidents, any time an accident happen, we look at the information that we have at the time. Sometimes we want to know whether it is an isolated case or we want to know what the design situation is. There are a number of things that we go through our head based on the facts and the information.

It happened after -- so I'll give you an example. After TWA 800, when the fuel tank blew up, we didn't ground 747s. Because at the time we know there was a horrific accident, but we have no data to figure out what was the scenario, what caused it. We didn't ground any aircraft.

So, if you look at, after Swissair accident, when the MD-11 accident, you got the flight deck -- I mean, the insulation fire when the aircraft eventually came down in Nova Scotia, we didn't ground the MD-11 fleet. We basically wait for evidence and data to take action.

Now, let's look at the Lion Air. In the Lion Air case, we tried to look at data information. The information that we had, what we know what was going on, we think that the most logical interim action was to give instructions to the flight crews as to what you do when you experience runaway trim that could be manifested by triggered MCAS and AOA failure. That's what we focused on, and we took those actions.

When the second one happened, again, did I have additional data with respect to the aircraft system? No, I didn't. All I had was ADS-B data, which told me the aircraft is behaving similar to that, and the flaps, the actuator.

So when you start looking at those two again, did I know exactly what transpired on the Ethiopian Airlines at that time? I didn't. All I did was, there was enough similarity that I cannot take my normal time to do the process; I need to move fast. And the best thing to do was ground it, based on that.

Q So, if there is a pattern of crashes of a similar condition, FAA will ground a plane, but if there's just a single crash, FAA is not inclined to ground a plane?

A I would not try to come up with a generalized rule, because you are trying to -- what you're trying to do is trying to come up with generalized rules. Every decision we make is based on facts and numbers and information that we have.

In this particular case, after seeing the similarities in the aircraft performance, at least through traces and the ADS-B data, and that -- we said we've got to do it, and we decide to do it. And I made that decision in less than, God knows, not even 5 minutes.

Q But just to be clear, the only new information after the Ethiopian Air crash was the fact that there had been a second crash and that the circumstances of the crash seemed similar to that of Lion Air.

A Yes.

Q There wasn't a new or different condition that was discovered on the --

A No, there was not. The only thing -- even what really was [inaudible], which is the flap setting, the flap setting. That's also important, because when the flaps are up, MCAS kicks in. Well, okay, what else is going on? And we said, "Yeah, that's enough. We don't want to go any further. We need to ground them." And the rest is -- you know where we are.

BY MR. PASTERNAK:

Q So you also mentioned before that the DC-9 grounding was voluntary?

A DC-10.

Q Sorry, DC-10 grounding was voluntary.

A That was after the Chicago crash --

Q Right.

A -- when one of the engines fell off.

Q So in both the -- I guess I'll stick to this. In the Lion Air accident and the Ethiopian accident, did Boeing ever discuss with you -- were you aware of Boeing ever discussing voluntarily grounding the aircraft? Because you made it clear that --

A I'm not aware of that.

Q Okay.

A I'm not aware of that, no. We made the decision to ground.

Q And are you aware of any discussions with Boeing where, you know, they said, we're thinking about potentially grounding or --

A No. I'm not aware of anything like that, no.

Q Okay.

Just one more question for me.

You also had mentioned about Boeing not pushing back about fixing MCAS. You said there was no pushback at all from Boeing.

A Okay. What I said was -- two things I said. One was no pushback on the grounding, because we told them we're going to ground it. That's what I said.

Q Okay.

A The other thing I said was -- the question was, did you tell Boeing to redesign MCAS? And I said that the only way we could do it legally is what is referred to as 21.99[10]. If the manufacturers disagree with the design changes, then we invoke 21.99, which we direct them to do it.

In this particular case, obviously, they knew that they had to redesign. We knew that that redesign needs to be taken. So when we start working it, there was mutual agreement that design needed to be changed.

Q Okay.

And after Lion Air, as the head of safety at FAA, did you have any discussions with Boeing? I'm assuming you did with Boeing.

A After?

Q After the Lion Air crash, did you personally have discussions with Boeing?

Mr. McKenna. Do you mean immediately after or at any point from there to, like, today?

[10] 14 CFR § 21.99.

BY MR. PASTERNAK:

Q Between Lion Air and the Ethiopian accident, did you have discussions with Boeing, direct discussions?

A I really don't recall, honestly, because I relied on the team to do -- to do their work. Most of the information, even if I have a conversation, it would be through the director, through the other people. Those are the guys that know the details.

Q So they would report up?

A Yes, they would report up to me. I don't necessarily have the specific discussion about the accident with them.

Q So --

A From Boeing.

Q So from what you recall, you know, you never had discussions between Lion Air and Ethiopian Air with Boeing about the MAX?

A I don't recall a conversation about that between the two accidents.

Q Yeah.

A No.

Q Okay.

A I don't recall.

Q Do you recall at all anyone reporting up to you from the divisions you oversee, did they ever raise the issue of Boeing being concerned about potential grounding because of the economic impact --

A No.

Q -- it would have on the company?

A I don't recall anything like that.

Q So no one ever said, you know, if we ground the plane, there's going to be -- you know, have serious economic consequences?

A No. I have no recollection of that.

Q Okay.

BY MR. WEISMAN:

Q With regard to pilot training relating to MCAS, in January of -- in response to a request from FAA in December of 2018, in January of 2019, Boeing proposed level A training for pilots to learn about MCAS. Is that correct? Is that something --

A What was the timeline?

Q Okay. So I guess in December of 2018, FAA --

A December 2018?

Q December of 2018. So this would have been a couple months after Lion Air.

A The accident, yeah.

Q FAA asked Boeing to assess what kind of training might be necessary for MCAS. Is that correct? Are you familiar with that?

A No, I'm not. I don't recall. What I recall -- I don't recall us asking them to reevaluate that. I think it's -- there was a lot of focus on what pilots knew on MCAS, what MCAS is. Pilots didn't have the knowledge. But I don't recall us going to Boeing company and say reevaluate their training. I did not recall that.

Q Do you recall Boeing making recommendations to the FAA as to what kind of training would be necessary to inform flight crews about MCAS?

A No. They were -- at that time, they were working -- they were actually trying to handle most of the issues with the pilot community themselves.

Q So the Joint Authorities Technical Review, known for short as JATR -- that's

J-A-T-R -- found that MCAS should have been considered a novelty and, therefore, clearly highlighted to the FAA technical staff, and that the information provided the FAA about MCAS was so fragmented and delivered to disconnected groups within the process that it was difficult for the FAA to recognize the impacts and implications of the system.

I know you weren't at FAA when certification was taking place, but in the time since then, based on your knowledge of what you learned since returning to the FAA, do you agree with the JATR's assessment?

A You probably know that I chartered the JATR. I actually wanted that review to be done. And that was one of many reviews. So what we are doing right now, we are waiting for all the recommendations to come in for us to review to see what has transpired, what we know, and then come up with the recommendations. And the decision to whether something needs to be elevated to novel or new, I cannot speak to that.

Q So I'm not asking you to speak to what future recommendation you may have, but just do you have -- do you agree with JATR's assessment?

A I really can't make a comment on that, because it's a function of -- let me tell you what. It depends on the system safety assessment. It depends on what MCAS is doing or not doing. It depends on level of automation and intervention. For me to say it needs to be elevated to a novel feature, it is -- I cannot make that assessment, because all of those need to go into the discussion.

Q Is that because you aren't technically aware, or are you declining to answer because of a future decision that you may need to make?

A Mostly technical in that I'm not at the point to have all aspects of the design to be able to make that determination. But also going forward, we have to make decisions going forward. We have not yet made those decisions.

Mr. Pasternak. And just to be clear, I think Matt is asking about the original design of MCAS, that from the information you now have that you've seen, you still don't feel you could make a personal assessment as to whether or not MCAS should have been, in the past, should have been declared new and novel?

Mr. Bahrami. I can't make that assessment, honestly. From a technical perspective, I can't make that assessment.

BY MR. WEISMAN:

Q What about administratively, since the JATR was saying that it was presented to the FAA in such a fragmented way and to such disconnected groups within the FAA that it was difficult for the FAA to recognize the impacts and implications of the system. Do you agree with that assessment?

A Yes, I do, because the communication within the agency definitely needs improvement. And this is -- you're talking about engineering, talking about flight tests, and you're looking about inspectors who define the training requirement. If that team is not very well-connected, then you could have breakdown.

So I would say that that's something that we need to look into and we definitely need to improve.

Q So the JATR said that they also believe that had FAA technical staff been fully aware of the details of MCAS, it would have required an issue paper, because this was a new use for the stabilizer in that the stabilizer was not just being used to trim the aircraft but also to change the column force feel.

Do you agree with that assessment?

A I don't know whether it should have elevated to the issue paper. Again, that's up to the program management team deciding that. I can't comment to that.

Q So in addition, JATR found two other things. They found that key aspects of

MCAS function, such as its intended function description, its interface as an architecture, were not directly visible to the FAA in a straightforward manner through the certification deliverable document, and certification plans and some certification deliverables, an example the Preliminary Safety -- Preliminary System Safety Assessment, PSSA, were not updated to describe the expansion of the MCAS function for the low Mach portion of the flight envelope and for compliance with stall-related requirements.

Ms. Conrad. That was a pretty lengthy quote. Do you happen to have a copy of the JATR report that you could direct Mr. Bahrami's attention to?

Mr. Weisman. I do. Sure, happy to.

BY MR. WEISMAN:

Q This is on page 24 of the JATR report.

A This one here?

Q This paragraph here.

A Okay. (Reviewing.) Okay.

Q Do you agree with that assessment?

A I do know that they were not updated. That I know.

Q Okay.

BY MR. PASTERNAK:

Q You said, in talking about communications throughout FAA, that they do need to be improved.

A Yes.

Q Have you taken any steps so far to do that?

A Yes.

Q And can you tell us what they are?

A Yes. As a matter of fact, some of the -- some of the changes in the

organization that we are doing right now, which we talked about earlier, changing the organization, that will help.

At the same time, I changed the leadership of the Flight Standards organization. I have a Rick Domingo now there. Before, at the time this was happening, John Duncan was the executive in charge of flight standards, which is the AEG function responsibility.

At the same time, as part of the work we are doing, as a matter of fact, Administrator Dickson has also asked us to take a look at what else we may be able to do going forward, because in terms of these breakdowns, this happened in this case. And we need to figure out how we can get these program managers -- our program management team needs to be strengthened, in terms of the skill set, things of that nature, and we're trying to work that.

Q But were there -- you mentioned, you know, Rick Domingo replacing John Duncan. That's, you know, a personnel change. I'm talking about were there any new policies, guidance, directives in terms of sharing information?

A We already have guidance in place for that. If you look at 8110.4C[11], it tells you that. I think what we are typically not very good at is the implementation, and the implementation, we need to put focus on implementation.

Q Okay.

BY MR. WEISMAN:

Q So, again, understanding that you were not at FAA during certification, what I would like to ask you about is sort of what you've learned since returning to the FAA about what took place during certification.

Do you know if Boeing provided the AEG with any of its functional hazard

[11] FAA Order 8110.4C Type Certification.

assessments relating to MCAS before the AEG response -- let me strike that.

Let me start. Boeing made a request to the AEG to remove MCAS from the flight crew operations manual and from training materials, correct?

A I have since found out.

Q Correct. That was before you had returned to the FAA, but you are presently aware of that?

A Right.

Q Okay. So do you know if Boeing provided the AEG with any of its functional hazard assessments relating to MCAS?

Mr. McKenna. Isn't this a question more appropriate for the AEG? I mean, you've already interviewed several of the FSB members.

Mr. Weisman. Understood. What we'd like to know is what his awareness is of what the AEG knew or didn't know, not just --

Ms. Cooke. At the time that you said he wasn't at the agency.

Mr. Weisman. Correct. To the extent that, you know --

Mr. Syed. I mean, as the chief safely official for FAA, we'd like to know what he's learned since then.

Mr. Weisman. Right. Has AEG raised this issue with him? What has AEG possibly told him about this? What is his level of awareness about what AEG knew or didn't know? That's what we'd like to ask about.

Mr. McKenna. Do you want to repeat the question?

Mr. Weisman. Sure.

BY MR. WEISMAN:

Q Okay. So do you know if Boeing provided the AEG with any of its -- let me just say this. Do you know if Boeing provided the AEG with any of its functional hazard

assessments relating to MCAS?

A Functional hazards assessment review is an engineering function. It's not an AEG. AEG people would not be able to understand what the functional hazard assessment does.

So I think I would say that the functional hazard analysis was presented to the engineering at the office. They had known about it. They review it. It's not something that typically is given to AEGs.

Q So if, for example, a functional hazard assessment determined that if a pilot didn't react within 10 seconds to an MCAS activation the result could be catastrophic, that information would not be expected to go to the people who are determining what kind of training is --

Mr. McKenna. We've already talked, we're not going to engage in hypotheticals here. If you want to ask him about his factual knowledge.

I mean, as Mr. Bahrami has said, FAA bases its decisions on facts and data, and you're presenting him with a hypothetical right now. If you want to talk to him about what he knows and doesn't know, that's a different thing.

Mr. Weisman. I'd like to know about the administrative structure as to what information flows to where and why. And so what I'm trying to understand is, you've just told us that the functional hazard assessment would not go to the AEG. That would not be information that they would understand or need to understand. Is that fair to say? Or am I -- I don't want to give you a statement you --

A No, no, no. So let me -- let me see if I can -- I know where you're trying to get to. Should Boeing let the AEG know of the consequences of a malfunction? Yes, they should. But should they give them FHA in order for them to find out what the consequences is? The answer is no. FHA data is something that engineers look at, not

inspectors.

But if the consequences of -- if the consequences of a fault reanalysis is that there is a risk, then that should have been communicated to AEG. I think I answered your question.

Q Okay. So just to be clear, so Boeing had done an assessment whereby they found that if a pilot did not react within 10 seconds --

A Correction. I told you earlier I do not know whether Boeing has done the review of 10 seconds. I only told you what I knew from the flight data recorder. You think that's 10 seconds. I was not aware of it.

Mr. Pasternak. We understand that. He's stating this as information that --

BY MR. WEISMAN:

Q Sure.

A So it's a hypothetical scenario. If that's the case --

Q So let's take it out of the hypothetical. Did you -- you're aware that this committee held a hearing on October 30th at which Boeing testified. Is that correct?

A I watched some of it.

Q Okay. Did you -- at that hearing, a document was made public, a coordination sheet from Boeing on which -- which contained a functional hazard assessment --

A Okay.

Q -- a portion of which said if a pilot didn't react within 10 seconds the result could be catastrophic. That was information made public at the hearing. Were you --

A No, I was not aware of that.

Q You didn't watch it, weren't aware of it, so you're not aware?

A No, I didn't. You know, like I said, I was in Montreal at the Assembly, and I

just watched portions of the hearing. And I do not know about this document.[12]

Mr. Weisman. Okay. Can we stipulate to the existence of this document?

Mr. McKenna. Okay.

Mr. Bahrami. I have no reason why.

Mr. Weisman. Okay. Is that a piece of information that the AEG should have known when they were making a determination about what kind of training would be necessary?

Mr. Bahrami. Well, yes, they should have known that if there is that kind of information, yes. But the training, again, this was done after the Lion Air, right? This the 10 sec -- this -- I don't know when this analysis was done. I do not know that.

Mr. Pasternak. March of 2016.

Mr. Bahrami. Well, then they should have known. They should have told AEG, yes.

BY MR. WEISMAN:

Q Similarly, do you know if Boeing provided the AEG with any of its -- either the functional hazard assessments or information from the functional hazard assessments relating to MCAS before the Flight Standardizations Board made decisions about --

A I don't know. I do not know that.

Q Has anyone with the AEG discussed that matter with you?

A No, no.

Q No one has complained that they didn't have awareness?

A I do not know of -- I do not know of -- nobody come to me and tell me that they didn't give me this information, because we haven't discussed this.

[12] Please see September 4, 2020 letter from FAA clarifying this statement. (Attachment 1).

Q Okay. Moving on to a different topic, Boeing -- sure.

BY MR. BURKETT:

Q I'm going to ask a somewhat related question, a couple of questions, going back to the JATR report.

I assume that when you worked at McDonnell Douglas on the MD-11 program, you worked on the Longitudinal Stability Augmentation System?

A Yes. LSAS system.

Q LSAS, yes. So you're familiar with the concept of augmentation systems that address --

A Yes.

Q -- relaxed stability?

A Yes.

Q Do you have an opinion on whether the 737 MAX exhibits relaxed stability in the pitch axis?

A I can't speak to that.

Q Okay.

A I don't know.

Q With that, what is your view of the purpose of MCAS?

A MCAS was put together in order to meet the stick force per G requirement for the control column. So as you are pulling, you want to increase -- continue to increase forces on the control column, not to just have a situation where you are pulling and all of a sudden there is a give and then you get back to that. You don't want that. And that's -- the MCAS was designed to prevent that from occurring, that particular relaxation in the control column forces.

Ms. Cooke. Just to be clear, are you asking about his opinion on MCAS or the

information that he learned about MCAS?

Mr. Burkett. Well, I guess I would be asking about his opinion, based on information he learned about MCAS and his opinion.

Mr. Bahrami. This is factual information. It is not my opinion. This is what -- this is what the design was -- what MCAS was supposed to address.

BY MR. BURKETT:

Q Right. So, to your knowledge, it was never intended to be an anti-stall?

A Oh, no, it's not an anti-stall.

Q Okay.

[1:47 p.m.]

Mr. Syed. Really at a high level, when you first learned of MCAS after the Lion air crash as mentioned earlier, what was your reaction? Does it seem like this seemed unusual to you or was it something that, you know, you didn't think was --

Mr. Bahrami. No, I didn't think it's anything unusual. When you talk about automation and aircraft handling qualities, there are all kind of systems that are happening in the background, the yaw dampers and things like that. A low delegation systems, things like that. They are working and the pilot doesn't even know that is happening in a highly automated system.

The only thing that changes, it changes the reliability level that you have to have in order to have that system on board. That is the only thing. So it is very normal to have those types of system on aircraft.

BY MR. BURKETT:

Q What was the -- my memory is failing me -- what was the name of the centralized -- the EICAS equivalent of the MD-11?

A EICAS.

Q Did they call it EICAS or was it another --

A No, because I think -- I don't recall. At this time, I don't know.

Q Okay. But would it be fair to say that on the MD-11 there were alerts that would specifically indicate a failure of LSAS?

A I don't recall, I really don't.

Q Okay.

BY MR. WEISMAN:

Q Boeing relied on FAA guidance for its assumption that pilots would be able to properly react to an unanticipated MCAS activation within 3 seconds. However, the

JATR observed that no studies were found to substantiate the FAA guidance concerning pilot recognition and pilot reaction time. They weren't clear on what FAA's guidance was based, and perhaps 3 seconds was not a proper reaction time.

Do you agree with JATR's assessment?

A Let me basically point out that the guidance that they are referring to is AC, was AC 25-7. And AC 25-7 has been around for many, many years, and it is developed by what at one time was Flight Test Harmonization Working Group.

And not just FAA. It is Europeans and other parties that are a part of this. And it is based on years of experience by people who have been in aviation, that have been flying aircraft.

And those timelines over the air, some of them comes from the Air Force, some comes from other sources, NASA and others. All of that gets into -- rolled into the AC 25 -7.

So different sources, different groups. So to me, that was the standards that was used and that is the standard that we have on the books today.

Q Why does JATR think that it can't figure out what it was based on? Why would they be confused about it and you seem to be so clear about it?

A We need to find out where the basis are. That's what I said. A lot of these recommendations that are coming to us, we have to study them to figure out what is the background, what is going on.

So if you look at the JATR, for example, one of the things they have, they gave, if you recall in the JATR, they have a series of findings. And so we have to basically chase those findings to figure out where they got it, did they have the right information, was it accurate. That's the work that we have to do going forward.

Q Okay. Moving on to a different topic. Once you rejoined the FAA in

2017 -- actually let me start out with this.

On November 7th of this year, 2019, Chair DeFazio and Chair Larsen wrote a letter to the FAA about two issues, a rudder cable issue on the 737 MAX and a lightning protection issue on the 787. Are you familiar with that letter?

A I got -- yes, I saw the letter. Yes.

Q Okay. Great. So once you were back at the FAA in 2017, but prior to the letter that was sent from the two chairs on November 7th of this year, had you ever discussed within the FAA the 737 Max's rudder cable issue that was then cited in the letter?

A In my conversation with deputy executive director aircraft cert, I remember him mentioning to me of the SRP and they had on the rudder, but it was never involved in discussions any more than just, yeah, we had an SRP on the rudder. That was it, nothing detailed.

Q Just letting you know that --

A Just letting me -- again, that was after that issue was completely closed, because, you know, he brought it to my attention because -- and I tell you why.

I am in the process of developing a voluntary safety reporting system in my organization for all employees. And as I was doing this, he told me that we have an SRP. And I said, what is SRP? Because I didn't know when it came about. It wasn't when I -- that happened when I -- what it was.

He said SRP is when people working there, working there with our NATCA, you know, bargaining members. And he told me about it. And he said we have the SRP. And then he said and one of issues we recently worked on was the rudder.

That's how the context of it was. But I am now developing a safety reporting -- voluntary safety reporting system for the entire with four unions that we

have in order to collaboratively resolve our differences.

Mr. Pasternak. For the record, who -- you didn't mention his name. You said the deputy --

Mr. Bahrami. It was David Hempe.

BY MR. WEISMAN:

Q Okay. Do you know how the last name is spelled?

A H-e-m-p-e.

Q Great.

In your experiences just coming back to the FAA, is it unusual for a decision from the SRP panel to be different from what the ultimate FAA decision is? Is there usually more agreement or is it sometimes they disagree?

A You know, I don't know. It depends what the issues are. But, again, the decision's based on data sharing, information, facts, and risk. And decisions could go in any direction based on what was brought to the table for discussion. But the managers, eventually they have to move forward and make that decision.

Q In your experience, is it typical for as many as half a dozen technical specialists to object to an issue paper?

A I wouldn't say it is typical, but it does happen.

Mr. Pasternak. It happens with that many individual FAA employees?

Mr. Bahrami. Sometimes.

Mr. Pasternak. Can you give us examples? Are there any that come to mind?

Mr. Bahrami. There was back in -- let's see. For example, on the 787 that later on you are going to talk about lightning protection, the original certification on that aircraft, that was one of the controversial areas. And that was one of the areas that it was -- it was a tough issue to resolve, it took 2-1/2 years, and it was investigated by the

IG, GAO. And all that stuff happened. So it was -- it was a -- that was an example.

BY MR. WEISMAN:

Q Okay. So we will get to the lightning protection. But just to close out on the rudder cable, have you had any discussions with [redacted] about the rudder cable issue?

A No, not with [redacted].

Q Have you had any discussions about the rudder cable issue with Earl Lawrence?

A After I got the letter, I started to talk to the people like Jeff Duven and Earl, but --

Q But not before the letter?

A No. I did not, no.

Q And again, similarly, before the letter was drafted, had you discussed the rudder cable issue with Dan Elwell?

A No.

Q You mentioned the lightning protection issue. So as I understand it, the Boeing Aviation Safety Oversight Office, more commonly known as the BASOO, B-A-S-O-O, formally notified Boeing that a submission that it had made regarding the lightning protection on the 787 did not comply with FAA regulations. Is that correct?

A Since I got the letter I start looking to it, yes, that's what it was, yes.

Q Okay. So on February 22nd, 2019, the BASOO told Boeing that the design -- paperwork submission relating to the design change to the lightning protection system in their view did not comply. Is that correct?

A That is based on the information that was in the letter and my discussion with the team.

Q Okay. But this letter was sent to Boeing after Boeing had built approximately forty 787 planes. Is that correct?

A That's what I understand, yeah.

Q Okay. Are manufacturers allowed to produce airplanes before the FAA has determined that the design for the airplane is compliant?

A Manufacturers can produce anything they want. They cannot deliver. They cannot release certificates of airworthiness on it until it is -- meets their requirement.

Q As of February 22nd, 2019, had Boeing delivered any 787s?

A To my knowledge, no. Not with those design changes that you described.

Q They delivered a previous version?

A They could have -- okay. This is really important. I want to make it very clear so you don't misunderstand what I am saying.

There are a couple ways to produce an aircraft. One is under production certificate. Once you get production certificate, you can go ahead. For production certificate, you have to have a type certificate. You have type certification, you get production certificate, and then you can produce the aircraft. Okay?

Now, if you introduce a design, because of the lead time, you have to start putting parts into the aircraft, and it takes time to approve the design sometimes. Sometimes they start doing all that, doing design changes, but they cannot deliver it until the design is approved.

So during the production line, if a design change can take, say, a year or 2, and the production rate is so many, some of them with lead times -- for example, in the case of the wing, Mitsubishi Heavy Industries produces the wing in Japan.

For them to build something, they have to start a year and a half earlier before

they can actually get to that point. So sometimes they build it, but they can't deliver it until the design is approved. So if they are building something, I understand that, but they cannot deliver it until the design is approved.

Q So if Boeing produced 787s but had not yet delivered them, they really need the FAA to approve that design or they can't deliver the aircraft. Is that right?

A They can't deliver the aircraft until the design is approved.

Q Okay. So on February 22nd, 2019, the FAA notifies Boeing that the design change is not compliant, but Boeing then appealed that decision. Is that correct?

A That's what I find out through the office manager.

Q Okay. And then there was a meeting on February 27th, 2019, about the appeal. Were you at that meeting?

A No.

Q Okay.

A I was not at the meeting.

Q Okay. And then on March 1st, 2019, the FAA reversed its decision and found that Boeing's design was compliant. Is that correct?

A That's what you wrote and that's what was indicated.

Q Okay. So between February 22nd, 2019, when FAA said it was not compliant, and March 1st, which is just about a week later, when FAA said, oh, in fact, it is compliant, did you communicate with anyone at Boeing about the lightning protection on the 787?

A I don't recall any communication with Boeing on that.

Mr. Pasternak. Do you recall any communication with anyone at FAA?

Mr. Bahrami. No, I don't, because this is not something that was elevated to my level.

Mr. McKenna. You mean during that period?

Mr. Pasternak. During that period.

Mr. Bahrami. Nobody elevated this to me because it wasn't something that get elevated to my level.

Mr. Pasternak. Do you -- did you hear from anyone in your office that they were made aware of this lightning issue in that time period we are talking about, February, March?

Mr. Bahrami. No, if I may say so, because this is -- when I saw the letter I thought that this was -- they were talking about original certification, because I was involved in that one. So I just said -- my reaction was, are we talking about that again?

And then next thing someone said, no, no, no, this is zone 3. And I said, what is zone 3? That is the way -- that is the way I found. It was -- everything was done at the lower level. I had no knowledge that this was actually even being worked at the lower level.

Mr. Weisman. So we have been advised that at that February 27th meeting between the BASOO and Boeing, that Boeing mentioned that they had spoken with you about the lightning protection issue. Is that -- are you saying that that is false?

Mr. Bahrami. I have not talked to anyone on this to my recollection. And I tell you again, your letter was the way I found out about this issue.

Mr. Pasternak. And just to be clear, did anyone else at FAA mention to you that they had spoken with Boeing about this issue?

Mr. Bahrami. No, I don't recall anything like that.

BY MR. WEISMAN:

Q So after FAA notified Boeing on March 1st that its lightning protection design was compliant, do you know if Boeing went ahead and produced additional 787

airplanes?

A I do not know that.

Q Or do you have any awareness if they delivered 787s?

A I really don't know. Frankly, I don't know that. We can find out for you, but I don't know.

Q Are you aware of any concerns that the European [Union] Aviation Safety Agency, EASA, raised with Boeing and the FAA about Boeing's design changes relating to lightning protection features on the MAX?[13]

A No, I am not aware of--

Q Sorry on the MAX. Sorry.

A Oh, you went to MAX?

Q Yes. Sorry, sorry.

A Oh. No, I don't, because I wasn't here. I didn't know anything about it.

Q Okay. So going back to the 787 -- sorry, I apologize for jumping around between aircraft.

A No problem.

Q So on October 15th, 2019, the BASOO at FAA, seems like they changed course yet again and they asked Boeing to perform a numerical risk assessment of the overall fuel tank explosion risk from lightning-related ignition sources, which the FAA said that it plans to use to determine if corrective actions to reduce the risk of a field tank explosion should be required. Is that something you're familiar with?

A I saw again the letter that you are referring to. But prior to that, I had no

[13] The original transcript said "Are you aware of any concerns that the European Aviation Safety Agency, EASA, raised with Boeing and the FAA about Boeing's design changes relating to lightning protection features on the MAX?" Majority committee staff added the bracketed language for clarity and FAA and Minority committee staff agreed.

idea.

Q Okay. So I guess what I'm trying to understand is it seems to me that FAA approved the design in March, and then in October it's asking for a more detailed numerical risk assessment for the overall fuel tank explosion risk of a design that it had already been approved. It seems to me, like, wouldn't you want that risk analysis before you decide whether or not to approve the design?

A All right. Back in March, the discussion was around a single issue, which was removal of the copper mesh. What they were doing there was as part of the continued operational safety, because during the manufacturing there are a number of things that could happen, such as sealants not being in place or the fasteners maybe not tight enough. There are things that happen during the manufacturing.

When they asked that question, their focus was, tell us a numerical number on a cumulative risk. A cumulative risk means if there is a little bit of a gap between a fastener, if there is a sealant is missing at the back of it in the fuel tank, if there is something else, tell us, if those things happen, what is the risk?

Again, this is part of the continued operational safety and it was not specific to the design, more like trying to understand any other discrepancies that could happen what would the risk be, a cumulative risk.

Q Wasn't the concern back in late February, early March was, in addition to the design, it was the lack of a full safety assess -- full risk assessment and that was what they didn't comply with?

A I do not -- I do not know that, and I don't agree that they didn't comply with the regulation. Determination was made with the removal of the mesh and they decided that it complies with the special condition that was put in place for the lightning protection. And they consulted with our chief scientist to reach that decision. So I am

not going to second guess their decision based on this information.

Q Okay. We may circle back to that.

A Sure.

Q I know we are just about out of time.

A Thank you.

Mr. Pasternak. Thank you.

Mr. Burkett. Thirty seconds left. I guess one quick follow-up question.

Do you know what prompted the broader inquiry with respect to the fuel tank explosion risk? For example, looking at the fasteners and the sealants and that sort of thing. To your knowledge, what prompted the FAA to want to look at that?

Mr. Bahrami. Well, again, typically what happens is you get -- you, as part of the manufacturing, you may find out that maybe they forgot in some cases they did not put the sealant on the fasteners. And this does happens, and that gets reported to us.

They go fix it and correct it. But then what we want to do is we want to continually stay on top of those types of risks and to see whether we have sufficient mitigation to deal with those kinds of issues. I think that's what they are trying to do. At least that's my understanding.

[Recess.]

Ms. Cooke. So looks like it is 2:18. We are going back on record, the Republican side starting our hour.

So we are going to go back to some of the questions about the former FAA Administrator folks and decisionmaking and just some of your knowledge, what you may or may not know, given the overlap you had.

So when we ended we were sort of asking about when you started your role and came in, what FAA Administrator Huerta specifically said for his goals for you. So did he

give you any -- I know you mentioned the 2 years and this new office. Were there any specific missions that he said, coming in, here's the three things I want you to do for aviation safety?

Mr. Bahrami. Again, it was continuation of the cultural change and the compliance program shifting from collaborative -- from enforcement to collaborative approach, working with the certificate holders. And at the same time the follow-through with the organizational change, in fact it was organizational change. Global leadership is one of his objectives, so we also talked about that.

And then one last thing that I brought up was succession planning, because given the fact that I was going to be there for a short period of time, I needed to make sure that I worked with other executives in my organization and get them ready for whenever I decide to leave, then they can come in behind me. So succession planning was one of the areas that he was also focused on and he thought it was a good idea that I do that.

Mr. Presti. Can you expand a little bit on compliance program and compliance philosophy and what that means?

Mr. Bahrami. Yeah. Compliance philosophy, as you know, we have -- as part of our roles and responsibilities for many years we are in a mode of finding and fixing. And the finding and fixing was taking place through our audit program, through enforcement programs, and it is a punitive approach.

That philosophy has caused problems for us in the sense that people were not being truthful because they are worried about how the information they shared with us would be used against them. So what we decided to do is we decided to foster a working relationship based on sharing of information and enabling for the industry, in order to be able to take care of a high-risk situation on a timely fashion.

So there were voluntary disclosure programs that we have had for a long time and

we wanted to make sure that we get -- create an environment that they could put all the facts in front of us as opposed to only giving those things that is going to help them with their enforcement case.

And so we did that in 2015. We changed our order, the enforcement order, to include -- at the time we called it compliance philosophy.

And then we have been able to make tremendous difference in the way we are operating with the certificate holders, especially with the SMS in place now for the operators. It has been very, very effective because they tell us what the issues are. They also give us the mitigation plan, they give us the risk assessment, and then we work together to resolve the issues.

Now, having said that, doesn't mean that enforcement has gone away. No, it has not. If they are not -- they are not willing and able to bring whatever issues they have into compliance or correct the actions as they need -- as they ought to be doing per their agreement, then we can go ahead and take enforcement action.

But that would be one of the last resorts, but this philosophy has worked -- actually the latest -- the last number I had up to 23 -- the number I recall was 23,000 actions, compliance actions that we have taken and to fix things. Historically, we could never get to these kinds of numbers because we have to rely on our own audits and we never caught all the issues that we get.

Ms. Lyons. That 23 is in what period of time?

Mr. Bahrami. I think it was within -- I think it was 20 -- I don't recall exactly, but I would say that I think probably was from 2015 during that timeframe.

Mr. McKenna. We can get the specifics.

Mr. Bahrami. Yeah. We can get that. We can get that, the specifics.

Mr. Presti. When you say certificate holder, it is not just referring to an aircraft

manufacturer. You are looking at air carriers.

Mr. Bahrami. Yes, yes. Thank you, yes.

BY MS. LYONS:

Q And SMS is Safety Management System.

A Safety Management System, yes.

Q And this all started in 2015, prior to your return to the FAA?

A Yes.

Q How during your time back now that you are back, how has it been received across your organization?

A Initially it was difficult, frankly, for the people to make the transition. I think we have -- we have evolved. We are in a much better position in terms of acceptance in the organization. And people in their offices have begin to see benefits of it because the corrective action plans is taking hold a lot quicker compared to the old system.

Q Those that were uncomfortable with it or maybe resistant to it, what were their concerns, as you understand it?

A Yeah. Their concerns basically is that they don't take things seriously unless you hammer.

Q "They" being --

A Old certificate holders would not keep -- unless you restrict or you bring punitive action against them, they may not get the message, and things of that nature.

Again, I believe we are transitioned, and we are well on our way. I think part of the issue that we have to be working on is follow-through with the actions in terms of the corrective actions, better oversight of mitigations that are put in place. And that's an area that we have to continue to improve.

BY MS. COOKE:

Q All right. So are you aware of during your time when you came back, or I guess even in 2013 but primarily when you came back, of any meetings between FAA Administrator Huerta and Boeing?

A Since I came back?

Q Yes, in 2017.

A I don't specifically recall, but --

Q What about was Dorenda Baker still there when you returned or had she already retired?

A No, no. She was there when I returned.

Q Okay. Are you aware of any meetings between Boeing and her?

A I -- they -- they met. They discussed things on a -- you know, now and then. But I am sure there were some meetings, but I don't know the specifics or things like that.

Q Are you aware of Administrator Huerta expressing concerns about FAA and Boeing's relationship?

A No, I am not.

Q What about Dorenda Baker?

A So whether Dorenda Baker concerned about the relationship?

Q Yes. If she expressed concerns about the relationship between FAA and Boeing?

A No, I don't know of any.

Q Have you ever heard concerns from folks, whether line level managers or directors, do you have experiences where anyone in FAA has come to you and said, "We have concerns about Boeing's relationship with FAA"?

Mr. McKenna. This means at any time?

Ms. Cooke. During your current position.

Mr. Bahrami. No, not -- not that I know of. I mean, look, when you work with the manufacturer and a company as large as Boeing or any other company like that, I think there are occasions, issues that you need to deal with and problems here and there on enforcement actions and things that we do. But can I just say generically is there concerns and stuff? I can't speak to that.

Q So you wouldn't characterize there to be a relationship, a culture at FAA where they may feel, particularly the line level, that line level employees' concerns may be dismissed by senior management due to a revolving or open door policy with Boeing?

A Well, there are some people, to be honestly, there are always certain people that do not appreciate the relationship that we have with the entities that we oversee. It is -- it does happen. And when I was in Transport Airplane Directorate there were a number of complaints and people talked to my about some of that stuff. And there were a number of IG -- I got a number of visits by IG, they were doing investigations. But at the bottom of it, when they got to it, there was nothing there. But there were a lot of concerns by people, yes.

Q You have mentioned that you have had a lot of time with various administrators and roles. And I know, I specifically asked about Huerta and Dorenda Baker, et cetera. Broadly speaking, even not Boeing, other manufacturers, is it pretty typical for folks to meet with various senior levels and come in and have those discussions?

A Oh, yeah. I mean that is just normal business. That is normal. This happens all the time. Do you have to -- you know, this is -- we are -- we are providing a public service. And these people any time they want to meet with us, talk to us, we meet.

That doesn't mean that we have to do what they ask us to do. We do listen, we look at the stuff, we gather information. And that will all help us with whatever decisions we are going to end up to take on various issues that may be before us.

Q And, for example, with some of these issues, are you aware of former Administrator Huerta, the person who is in your role previously, or any other senior folks overturning or overruling, deciding differently, however you'd like to characterize that phrase, the recommendations of FAA line employees sort of as was previously mentioned in the last hour about things related to lightning or the rudder? Are you aware of other instances of that happening and when they would have happened on that issue?

A I -- yes, I am aware of a couple, I was subject to that myself. I know some cases. The decisions at the senior level, at Peggy's and John Hickey's level, they decided against my decision and in favor of the applicants. But, again, that's just part of the process.

Mr. Presti. And to be clear -- sorry -- that's when you --

Mr. Bahrami. When I was the Transport Airplane Directorate manager.

Mr. Presti. That overruling occurred when you were previously at FAA and not in your current possession?

Mr. Bahrami. That's correct, that's correct. That's what I was saying in the past. I'm not talking about since I came. Since I came, I am -- nothing is elevated to my level. I am talking, have you ever known of any administrator? I would say, yes, I have.

BY MS. COOKE:

Q Could you just very briefly sort of elaborate on that timeline, what your role was then, quick synopsis of the issue and the overturning that occurred and by who, just so we can sort of get a scope of, hey, this has happened, as was mentioned in the last

hour recently happened?

A One was in early -- mid to early 2000, which was -- it has to do with the head injury criteria for seats. There is a requirement that, in case of Boeing, when you are sitting at a bulkhead there is a 16-G[14] requirement that head injury criteria you have to meet certain rules. Therefore, that means the seat in front of you would have to be padded so that you don't have that kind of -- that level of injury during a crash landing.

In the case of Boeing, there are certain airplanes that the bulkhead did not meet that requirement, and they have had it for many, many years, and they kept it that way. When we got to a new aircraft model we wanted to change that. And the decision by the company they use the service history in the rare event of a crash landing as the basis of not wanting to make that change. I took the position that we should -- they should change it, and then it got elevated through data and review. It was made -- the decision was made that they don't have to change that.

But since that time, that was long time ago, since that time we have inflatable lap belts. So if you ever sit in the bulkhead you see, you notice that you have a very [thick] belt, and that is an inflatable lap belt.[15] Now you have the technology to be able to inflate that quickly so you don't have the head injury criteria. But before we didn't have that. But they ruled against my decision and my staff at the time.

Q And who, the "they" were --

A John Hickey was the director at the time and that was the decision.

Q And just to reiterate, in your time since returning in July 2017, I know they

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[14] FAA Advisory Circular (AC) 120-16G.

[15] The original transcript said “So if you ever sit in the bulkead you see, you notice that you have a very think belt, and that is an inflatable lap belt.” FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

mentioned the rudder cable, which was before, and the lightning, which was during, are you aware of other FAA senior leadership decisions that have overturned lower level decisions or kept lower level?

A I am not aware of any.

BY MS. LYONS:

Q Over the course of your time working at FAA -- we are going to move now to the relationship between FAA and Boeing -- over the course of your time working at FAA would you describe the agency's working relationship -- how would you describe the working relationship between FAA and Boeing?

A It's -- over the years it has changed. Back in -- I have been working with the company since about -- I would say since about 1996 timeframe. And early on was very, very adversarial, and the approach basically was, you know, you give enough information to them, nothing more, just enough to satisfy the [A]ircraft [Certification].[16] That was the philosophy they had at that time.

Over the years things have changed and we moved to a lot more working together regularly because of the -- primarily because of the fact that they needed to demonstrate their performance and their capability in order to get to the higher level of authority in terms of delegation. And over the years that has changed.

Occasionally, we still have -- you know, there are disagreements, things of that nature. But they -- they are -- one of the things that maybe I am sure you are all aware of is that in terms of safety Boeing does tremendous work globally promoting safety

[16] The original transcript said “And Aireon was very, very adversarial, and the approach basically was, you know, you give enough information to them, nothing more, just enough to satisfy the aircraft.” FAA and Majority and Majority committee staff agree “Aireon” was likely a transcription error and corrected the text to “early on”. FAA requested the bracketed language to provide clarification. Majority and Minority committee staff agreed to this clarification.

around the world with what the work that they do, and they do the CAST, they do ASIAS, and those kinds of stuff.

So our relationship when it comes to an applicant in the FAA is one thing, collaboration on the global stage is a different issue. But in terms of certification, it initially was very, very I would say adversarial, but things have improved, but we still have occasions that we have to disagree on things.

Q And what about your personal working relationship with Boeing during -- in your current role? It has been kind of a difficult time for both the company as well as you and the FAA.

A I don't really have a personal relationship with Boeing Company. As a matter of fact, there used to be a few of the senior people, like people like Steve Atkins and others, that have now retired many years ago, but they were the people who I worked with when I was at Douglas Aircraft Company, but after the merger they all came up and become senior authorities. I know them, but I was never a friend, I never went to their house, I never befriended their family members. It was purely professional relationship.

Q So the major decisions on the 737 MAX certification were made under the Obama administration in the time period before you returned, between, as you mentioned, February of 2012 and March of 2017. Are you able to describe the working relationship between FAA and Boeing during that timeframe?

A I would say that what I just described, it was pretty much the same as we were going through this. There were occasions that we would really adversarial. There were times that we worked very well together.

Again, some of the issues on certification of course are challenging because the rules are subjective, you know. And for example, the whole issue of rotor burs. And

rotor burst 903 -- we never got into it – 903(d)[17]. I can tell you how many programs we have debate over this issue because the rule says minimize the risk. What does that mean? And minimizing to one engineer is different than minimizing on another engineer. And that kind of discussion is going on.

So in those cases we have those issues. We have had some controversial, difficult times, yes, back then and even now, and it goes on because it's just the nature of the work.

Mr. Presti. Do those discussions and those deliberations -- internal deliberations, occasionally involving dissensions, do you believe that that process creates better safety outcomes?

Mr. Bahrami. Absolutely. So when the disagreements start, you know, that is why we put those processes in place, especially after -- you know, I started my career when we did not have a bargaining unit in the organization. But then, after we went to performance-based, we got the unions.

So because of that we have even better processes in place to deal with the disagreements. And those processes are in place from issue paper process, all the way to SRP. All of the stuff that everybody talks about, those processes make the debate and discussions valuable and the final decision is a better decision.

BY MS. LYONS:

Q Are you aware of the FAA settlements with Boeing related to ODA and safety settlement agreements?

A I am aware of the settlement agreements, but it was started, I think, there was some during the time I was out that they had a settlement agreement that details of

[17] 14 CFR § 25.903(d).

it, I know how it came about after I came back into the agency.

And when I was in the agency, we, long time ago, we did some work, special technical audit. And at that time we used the same approach, settlement agreement, to actually resolve a lot of the corrective action issues that came up afterwards.

But in 2015 with ODA in place, I was out when some of that was decided.

Q Are there any other enforcement activities involving Boeing that occurred since your return to the FAA that you can discuss at this time?

A Right at top of my head I can't. There are some other things that I cannot speak to.

Q You can't speak to. Okay.

In discussions with FAA line employees there have been statements regarding the level of training and how Boeing would respond to that. Does your office interact with level pilot training standards, do you work on that?

A My office, the Office of Aviation Safety, is responsible for that, but that work is done at the very low level, the AEG, and the flight standards is not my office per se.

Q Okay. Since you said you are aware of it, not at your level but aware of it, are you aware of Boeing reaching out to senior leadership, including either yourself or the Administrator, to discuss concerns about overruling decisions?

A Boeing is approached?

Q Uh-huh.

A No, I am not aware of that.

Q Talk a little bit about certification and delegation. During you time at FAA what obstacles have you seen with the delegation process? And how have you sought to alleviate those challenges?

A What obstacles?

Q If any. Maybe there is none.

A Well, look, that delegation is nothing new, it has been going on for many, many years, since the 1940s, and then the organizational delegation came in 1955 timeframe, with DOA and SFAR 36.

And delegation, the challenges that we have had over the years has been not -- people not wanting to delegate, engineers not wanting to delegate because they like the technical work.

On the other hand, there was issues associated with oversight, that how well we oversee the delegation over the years. We have evolved significantly compared to the days before that. There were inefficiency, for example, individual designees versus organizational designees. There are different benefits and things of that nature that have evolved over the years.

But I don't necessarily say challenges or what word did you use --

Q Challenges.

A Yeah, challenges. I don't. Again, it is just part of the process, we use it all the time. It is a great tool. It works.

I was a designee. And I have to tell you that when you become a designee, it is the highlight of your career because it gives you a lot of authority in the company. People want to know your opinion.

I was commenting that I remember a specific case on the MD-11 where we recognized that under certain condition in clear air turbulence the engine mount could not handle some of the G loadings, lateral G loadings. And the company wanted to go do a flight test. And I was the designee, and they said, sign this, it is okay, we are never going to had have that kind of a condition in flight. I said, no way, because how could you see clear turbulence in a flight? You don't know that. Stopped it.

So the delegation works. I have seen it. And I know how people take this very seriously when they are given that kind of authority. And, yeah, I don't have any issues with it.

Q Can we talk a little bit about organization designation authority or ODA?

A Sure.

Q Do you know how many entities currently have ODA?

A I believe there are about 76, but we can confirm that.

Q Okay. And can you talk about the process for an organization to be granted ODA?

A It's very, very challenging because they have to put the infrastructure to be able to become an ODA. What it will take -- first of all, they have to demonstrate a need, because we just don't give it away when somebody says, I want to become ODA. No, they have to put the structure in place. They have to have competent, capable people in place. They have to have a lead administrator that has proven record to be able to represent the agency and on tough decisions in the company.

And when you talk about ODA you should be thinking about it. They are not, although they are part -- work for the company, they are independent entity. They are basically doing work on behalf of the FAA.

So you always look at the ODA administrator, and you also then look at as -- you look at the applicant. In case of Boeing Company, Boeing 737 MAX program is just part of the company, whereas the ODA is completely separate.

And that relationship is really important. And they have to do training, they have to keep upkeep with their unit members. They have to build an infrastructure that has ODA, UM counselors or overseers, because --

Q UM?

A UM, unit members.

Q Okay.

A Let me put it this way. When I was Seattle ACO, I was responsible, with the Los Angeles ACO and Seattle ACO, I was responsible for 1,400 DERs and designees. Every year we had to go back and look at supervision records, look at what they did, look at their reviews, do recurrence. We do a lot of administrating work that was taking away from us doing valuable technical work that we need to be doing for continu[ed] operational safety.[18]

Under ODA, all of that responsibility is now on the company, and they will have to do that caring and feeding and training of their staff. And so a company will not want to be an ODA if they don't want to invest that kind of resources to be able to do the work that is expected. So it takes a lot to become an ODA.

Q Would you say all ODAs are the same? Are they all kind of -- have a unique culture and their unique personality depending on the company and who they interact with at FAA and --

A The ODA order [defines] interact[ions].[19] The expectations are the same for all of them. What changes is the level of authority and the level of delegation.

In some cases, the case of Boeing being such a large company, and they are -- they have multiple elements of responsibility on their ODA and delegation of their ODA. You will find that a smaller company may not have -- they don't need all of that, and they only

[18] The original transcript said "We do a lot of administrating work that was taking away from us doing valuable technical work that we need to be doing for continual operational safety". FAA and Majority and Minority committee staff agree this was likely a transcription error, and the bracketed language has been added for clarity.

[19] The original transcript said "The ODA orders interactives." FAA requested a clarification to the transcript noted in brackets. Majority and Minority committee staff agreed to this clarification.

want STC ODA, would only be doing STCs, nothing more than that.

Q STC?

A STC, supplemental type certificate.

Q How does -- can you explain the concept of retaining authority in the context of ODA?

A Yeah, retaining authority. So at the beginning of a program the first step is their familiarization, what the design is, what is going on, what the issues are. And based on the design and you are moving to the certification basis, once the certification basis are defined -- the certification basis are nothing more than standards applicable to that particular aircraft that is under development. And then after that, you have the certification plans.

Based on the criticality of the design, then the engineers and inspectors decide what -- which parts can be delegated to the company, and the company can make findings of compliance on behalf of the FAA, versus those that FAA engineers will withhold and want to keep it and review it and make the final decision.

That is what the retention is referred to. The retention is that.

And then what basically happens, that what we try to do is based on novel or new design features, based on past experiences with the issues that we have, based on continued operational safety, if they have reissued airworthiness directive on a particular subject or not. Those are the types of decisions -- those kind of issues get into the decision that either you retain or you don't retain compliance finding.

Q And just so I'm clear, so the actual decision is by the FAA, by FAA --

A Is by the engineers --

Q The engineers.

A -- the level people, lower levels are dealing with the issue.

Q Okay. Can you give a few examples just really quickly of authorities, approvals, actions that FAA would normally retain and then that they would normally delegate?

A Yeah. A lot of the areas that -- for example, we just talked about lightning protection. Lightning protection was an area that we find that -- we retained the compliance finding in the original 787 program.

And there are other areas associated with, for example, on the 787, again, was the reason I bring that program up, because there's a lot of novel new features on that aircraft. Composite fuselage was another area. And you have post-crash fires, what happens, fuel fed fires, those kinds of things. Those we retain. Those are all retained.

But when you get to an issue, something that is conventional metallic structure, has been around forever, stress analysis that we do, those are routine. Galley manufacturers, how you prove the stress analysis on the galley, or how you do flammability testing on the material, you burn, you know, hundreds of pieces of material in order to see.

Those are routine. You don't have it. There is a distinction between what is important and what is not, what is criticality, from the criticality perspective, that gets into consideration.

[2:51 p.m.]

BY MS. LYONS:

Q And you've mentioned new and novel. Who makes the determination about whether a technology is new and novel?

A It depends on whether we have precedent on harnessing a particular design that we are seeing. If we haven't seen that design -- I'll give you an example: Synthetic vision. Synthetic vision, when the very first time around, that design was introduced on Gulfstream aircraft, because typically those updated technology gets on the business aircraft first before they get into the -- so on a business aircraft, synthetic vision is very new. So the idea came from NASA, and it took us a long time to figure out how you evaluate that.

So that's a novel design feature. That's something we haven't seen before. And we may see one of them; we issue a special condition. We see the next one. Based on the last one, we actually improve the standards because now we have service experience. And it becomes yet another. You do that two, three times, you eventually say, this is now routine, we don't need to have a special condition or retain it anymore because they know how to do it. And that's what that is.

Q So is there a process by which FAA can retain something or, as some call it, claw something back that they've delegated previously?

A Yes. So delegation, unlike certificate, is -- delegation is a privilege. At any time, FAA has the authority to pull it back.

So you do it for a number of reasons. You do it based on poor performance. You do it based on possibly the training purposes in some cases. We actually want our engineers to also learn how to do certain things. We want them to review. I think that

would be another area. We sometimes do it because of continued operational safety. We have an event happening on another aircraft and would like to see, hey, if this system is happening here, how do we make sure that it's not happening in this area? We retain that kind of information.

And that's very common, to go ahead and give something to the company, say, as part of the procedures manual, this is what is given to you, but then when you get to a particular program, you says, no, I'd like to withhold that one. And you do it during the cert plan review. You actually make that up front. You go through it, you look at each item and say, "Okay, these are delegated. These three, four items we'd like to retain."

Q Okay.

BY MR. PRESTI:

Q I want to jump back to the JATR. I think you said earlier that you were the person who either chartered it or requested that it be created?

A I chartered it, yes. I thought it was a good thing to do, in light of what I was hearing from our international partners. I thought it was absolutely clear to be transparent.

Q Can you talk about what the JATR process looked like and how their work was developed?

A So I have to tell you that I went to the -- the whole idea behind it was this. In this particular issue, we wanted to be very transparent, we wanted to be inclusive, and we wanted to be communicative. And the best way to do it is to get those people who have worked with us over the years, that have relationship with us, to come and join us to see what we've done and that we are willing to take criticism and work the issues as we move forward and improve things.

So when we went and got these authorities, we invited Indonesia, we invited

Ethiopia, in addition to these authorities. Indonesians joined us. Ethiopians decided not to join us.

So when we went to move on this process, I definitely did not want an FAA person to lead it, because I wanted to have somebody independent from the FAA. And Chris Hart, former Chair of NTSB, was gracious enough to agree to do that.

And I went to the first meeting. I was there. I talked to them about what the charter was. I stood in front of them; I answered questions they had. And I basically then told them that, you know, anything they need, they need to let me know, because I was the sponsoring executive on there.

And they met about three, four times in Seattle because that's where the data information was. They met over there. And then they also did some work when they were all in their countries. And then they come together, put their report together.

The commitment that I had to them was that we'll develop an action plan based on the recommendation that we have. We will share with them what we're going to do. And that's what we're going to do when we get all the recommendations from all the sources that are doing the investigation and reviews that are ongoing right now, including what the Secretary's committee is doing also.

And one of the other things that we made very clear, if they're identifying something that needs to be addressed prior to return of the aircraft to service, that would also get done. So we don't want to be in a situation that they identify something that is -- rather than to the return to service. And we wanted to make sure we addressed that as well. So we made that commitment.

So, as we go forward, we have identified, if there are anything in that area, we'll include it.

Q Did the JATR specifically identify any items that they believed needed to be

addressed prior to return of service?

A I think one of the issue was their workload, the pilot workload, and the confusion that was discussed earlier. I think Matt was asking that, about the human factors aspect of it. That was one of the areas. And we are moving forward. We're actually making evaluations to assess the workload and things that we need to be doing going forward.

Q Do you know if the JATR was a consensus-based group, meaning that if a finding was included in their final report, that that finding was either adopted unanimously by the members or they had come to some sort of consensus about it?

A It was not a consensus. It was not.

Q So what does that --

A What that means is that, generally speaking, in a lot of the ideas -- that is why we have to evaluate every one of those recommendations separately. If we had to go and ask consensus, then we would have been subject to FACA and other kinds of information that we did not want to do. We wanted to give freedom to the team to get together and express their views, what they see and recommended.

My understanding is there are certain things in there that was only coming from one authority. And they had to do a lot of discussions. There were some things -- I don't recall which ones -- there were a number of things that people wanted in there. And the chairman -- former Chairman Hart had to work through those. But there are some that are not consensus. That's all I wanted to -- but I will say, majority of them are. There are some that are not.

Q So when you say that you had to work through them, it's because a single authority could have either suggested or insisted that a finding be included --

A Right.

Q -- even though the other authorities might not have --

A Absolutely.

Q -- agreed with that?

A Thank you. Yes. That's correct.

And what we need to do when we are analyzing, we need to get the facts. We need to make sure, where is this coming from, do we understand the basis for it, is it a valid basis for this decision or this recommendation, before you take action.

Q Can you talk about the difference between the -- this is jumping back to the certification process -- the difference between the safety review panel process and the issue paper process?

A Issue paper process is the normal process that we are going through for every certification program. When you have an issue paper, it's highlighted -- well, the basis for an issue paper is this: Is there equivalent safety finding?

Equivalent safety finding is that, when they cannot literally meet the requirement of the rule, they come up with an alternative proposal. And in order to make sure that that proposal is acceptable, then we put an issue paper and share broadly with the policy group, cert group, so everybody understand what happened and agree to it. And once they sign it, that becomes the way to go forward.

You have issue paper for exemptions; you have issue paper for special conditions. Because those are all precedent-setting things that we are doing together, and we want broad engagement from the experts in this area.

The safety review panel is when one individual disagrees with the final decision that is established through the issue paper. And then that is the process that I was telling you he put in place before I come on board. It was done during my absence from the agency, between those two frames.

And what that is put together was as a way to have people who have safety concerns to bring it up, even though the decision may have been already made through the issue paper. So this is yet another way to address a concern that was expressed and actually discussed once through the issue paper.

Q So a single individual can see what happened with an issue paper and say, "I disagree, I feel strongly about this" --

A Yes.

Q -- and that will move it through a process to --

A They can elevate it. Yes, they can. Yes.

Q And now I want to go back to airworthiness directives. You know, about how many airworthiness directives are issued in a given year?

A Wow. I can tell you the record for me when I was a directorate manager. Just in Transport Airplane Directorate, one year I hit 749.

Q So the issuance of an AD is a daily occurrence.

A It's a regular occurrence because we got issues happening in the service. Globally, when you have a fleet of roughly 20,000 aircraft to oversee, those things do happen. And that's why we have to do a risk-based. That's why you have to use data-driven decision-making. That's why you know where you spend your resources and put things in place.

And, remember, there are different level of urgency. Of course, there are the telegraphic. Boom, they're going through, no issues whatsoever. But then there are some, there's NPRM. So when I say 749 or some number, that is AD actions. Some are final rule, some are NPRMs and others. But they're all -- those are actions that -- one year, that was the record for me during the 10 years that I was up there.

Q So, just given the inherent nature of an AD, it's designed to address

something on an aircraft that is potentially unsafe or is unsafe. Is that correct?

A Yeah, that's right. Actually, you cannot issue an AD unless you have a way to also -- incumbent on the agency to determine that there is an unsafe condition.

Q Okay. And then, just to remind us, that is done by your continued operational safety group?

A Yes. It is the ACO office, Aircraft Certification Office, that have that responsibility. And they have the Corrective Action Review Board. Those people decide appropriate action in light of the data and information that they have gathered.

Q And that whole process is designed to find unsafe conditions that either were unknown at the time of manufacture or have developed over the course of an aircraft's life, or unknown, you know, condition -- you don't know what can happen to an aircraft over its life and how it's going to behave.

A It is a tool to deal with anything that is going to be viewed as a hazard to continued operational safety of that particular aircraft.

One of the things that, if you just look at the preamble of the AD, it says that, you know, we have discovered this situation and we believe this condition exists in the type of aircraft that are out there.

And then you basically write and make sure that the same condition you observed in this one aircraft is not happening in others. That's what the AD does. Sometimes inspection, sometimes system changes, sometimes software changes. I mean, you can go on, depending on the nature of the challenge.

Q And then an emergency AD would be something that would be issued immediately. No public comment. It just happens.

A Yeah. The moment you know something of that magnitude, I tell you, we work around the clock. I remember nights that we stayed till 3:00 a.m., 4:00 a.m., until

we get the AD out the next morning. Yes.

Q And I believe you said before that that's a pretty unusual occurrence, in terms of issuing emergency --

A Yes, it is. It is. It is unusual. You find that there aren't too many of emergency AD. Because, for the most part, we only use them when there is absolutely serious situation that we're dealing with.

They're very disruptive. When I say "disruptive," they're disruptive to the entire air transportation system globally. Because the moment you get that, whatever you're doing, you know, you stop. I mean, you basically give them -- typically you give them -- if it is in terms of a grounding, of course, that was different than the AD. When there's an unsafe condition, you typically give them maybe even a day or so just to move the aircraft to the bases and the places that they can fix it. But they can't carry -- you know, that is that urgent. It's a really urgent situation.

Q But earlier you seemed to caution about trying to create a sort of generalized rule for when to decide to ground an aircraft. I believe our colleagues had been asking about the difference between what you knew in the aftermath of the Lion Air crash and then the aftermath of the Ethiopian Airlines crash.

It seems to me, based on what you said, that in the aftermath of the Lion Air crash, based on the data and the information that was available to the FAA at the time, that the interim action that you took, which was the issuance of the emergency AD -- and I believe we heard something similar from the TARAM group or the CARB group -- that the interim action would be sufficient until a permanent action could be put into effect.

And so, then, after the Ethiopian Airlines crash, you know, it might be only that you have that one additional data point of the fact that a second accident occurred, but it means that that interim action was not sufficient to prevent a crash before a permanent

solution.

A So I don't -- okay. I guess I didn't understand your question. So we knew that interim action was just that, an interim action.

Q Correct.

A It would not resolve -- the fundamental issue was the redesign of the MCAS system, which going to happen via software change, which immediately started right after the first accident. And we begin to work, including during the appropriation lapse. We told our guys to continue to work on that, don't stop. They had the direction to work through all of that stuff.

So we did that, yes. And, all along, we knew that that was just an interim action, nothing more than that.

Q It was never going to be the final --

A Oh, no. Oh, absolutely not. Yes. Yes.

Ms. Lyons. Let's look and see if we have any others.

BY MS. COOKE:

Q I think the -- just a couple very quick clarifying points, just on your professional background. I just wanted to make sure that we clarify.

Are you a licensed pilot?

A No, I'm not.

Q Do you hold any professional certificates?

A No, I don't.

Q And what was your degree in again?

A Aerospace engineering. My B.S. and master's are aerospace from Michigan.

Ms. Cooke. We're good. We can go off the record. Thank you.

[Recess.]

Mr. Burkett. All right. We're ready to go back on the record. It's 3:16 p.m.

BY MR. BURKETT:

Q Mr. Bahrami, I'd like to revisit first a matter that my colleague was asking you about with respect to just delegation in general. And most of my questions are going to be philosophical questions. All of us share a passion for aviation safety, and so my questions are being asked now in that spirit.

Would you agree that as part of an effective delegation program that that program is built on trust between the FAA and the ODA holder?

A Yeah, I do. Because, as a matter of fact, if you look at delegation, the way it's put together, going back to 1940s -- and, as you can see, starting in 2003 until now, we have had a number of legislation including us to explore other alternatives such as certificated design [production] organization, CDPO,[20] and things of that nature. But all of that is based on performance, trust, and being able to achieve to that level of performance and maturity. And everything that we have put in place with individual designees, to Partnership for Safety Plan on a CPI document, ODA, is geared to eventually build to that -- SMS -- all of it is based on trust. Yes, I agree with that.

Q And if you were asked today, as the head of the aviation safety organization, whether what you know now with respect to the 737 MAX certification process has affected your level of trust in commercial airplanes, what would you say?

A I would still like to wait and see all the investigation and documentation to

[20] The original transcript said Because, as a matter of fact, if you look at delegation, the way it's put together, going back to 1940s and, as you can see, starting in 2003 until now, we have had a number of legislation including us to explore other alternatives such as certificated design organization, CDPO, and things of that nature." FAA requested the addition of the language in brackets to clarify the acronym meaning for "CDPO". This was agreed to by Majority and Minority committee staff.

be completed. But based on everything that I have read in the media, based on everything that we have looked at, I would certainly wish that we had better communication between the two organizations.

But I honestly believe that these reviews and recommendations that have come from various groups -- and eventually the IG is conducting a review. All of that will help to figure out what really took place in this particular case.

Q Right.

For now, we do have some information in the public record with respect to statements and positions taken by Boeing employees and, admittedly, not during your tenure as the Associate Administrator. But, for example, Captain Mark Forkner sent a series of emails and instant messages during the certification process. Are you familiar with those emails and instant messages?

A Yeah, I saw those instant messages. I think it was a paper published it first. I don't know which one. But, yeah, I've seen them.

Q And you're familiar with the contents of those communications?

A I don't remember exactly, but, yeah, I know what they were.

Q Do you remember that he said that -- and recognizing that Mr. Forkner, to my knowledge, was not an authorized representative pursuant to the ODA. But, generally speaking, do you remember that he told his colleague that he was engaging in Jedi mind-tricking of the FAA and other civil aviation groups?

A I read that, but, frankly, I don't understand what that means. I guess I'm not a "Star Trek" guy or whatever it comes from. I don't know what that means. Yeah, okay, I heard that.

Q Well, if you interpret that to mean he was tricking regulators, is that behavior that you would expect from an ODA holder with the authorities that Boeing

had?

A I don't know what he meant at the time he said that, frankly. Like I said, I don't know what that means. But, obviously, I do not expect that kind of a behavior. If they said they wanted to trick the authority, that's unacceptable.

Q Right.

He also said that he had unwittingly lied to the FAA with respect to certain characteristics regarding MCAS. Do you think that that statement reflects an acceptable attitude on the part of a certificate holder's employee?

A I don't think [--] anybody who is in a position of responsibility to oversee a company does not want to see anything like that.[21]

Q Okay.

Were you involved in the order and subsequent -- I believe it was a final rule, the regulatory action to establish the ODA program in 2005?

A [Nonverbal response.]

Q And what was your involvement -- was that a "yes" for the court reporter?

A Yeah, I'm aware of that 2005 rule. Yes.

Q Okay.

A My involvement in that was almost none. Because that rulemaking was done by, at that time, our Aircraft Engineering Division, AIR-100, which is the designation of the -- they were doing the rulemaking because they are responsible for that.

Q Okay. And your role, you said, was limited. Did you have any role in the

[21] The original transcript said “I don’t think anybody who is in a position of responsibility to oversee a company does not want to the see anything like that.” After the interview, FAA requested a change to the sentence reflected in brackets for clarity. Majority and Minority committee staff agreed to this clarification.

process of the design or implementation of the ODA rule?

Mr. McKenna. Are you talking about the rule from 14 years ago?

BY MR. BURKETT:

Q Correct. It was 2005.

A So there is a rule, and there is the guidance that goes along with it and things like that. I was not involved in that.

But when it came to organizational delegation, especially, at one point, with the company, there was a time that, as Boeing was trying to get ready to decide whether they want to become an ODA or not, I had some interaction with them. Because, at the time, I was asked by then -- this goes way back when -- to start helping answering questions, to see what the organization would look like, what the procedures would look like, giving them help in terms of guidance and material. That was back in late 1990s, early 2000 timeframe, as they were trying to anticipate what the eventual rule would be.

And the other issue that is important is that DOA, which is the delegation option authorization, first came to being in 1995 -- I mean, I'm sorry, '55, 1955. DOA was put in place for Part 23 companies like, you know, Cessnas and Beeches and those things. That rule allowed for exemptions for other companies. They could apply exemptions that -- to apply, have delegated organization in place.

And at one point, Boeing, before the ODA rule was going to go into place, they were contemplating whether they want to exercise that exemption in order to become a DOA. And they pursue that. And at that time, I was trying to work with them to help understand what those requirements were.

Q Okay. Okay.

So I want to turn now to what was known after the Lion Air accident. And I will give you a document from the Corrective Action Review Board.

Which exhibit number are we on?

Mr. Christensen. Four.

Mr. Burkett. Four. Very good.

[Bahrami Exhibit No. 4
Was marked for identification.]

BY MR. BURKETT:

Q So, Mr. Bahrami, have you seen this particular document before, exhibit 4?

A No, I have not.

Q Okay. Are you familiar in general with what this document is and what its purpose is?

A As I mentioned, the CARB process, as part of the documentation, they document their decisions and deliberations and their final recommendations. That's part of the process that they follow.

Q Okay.

And just to establish for the record -- and you can correct me if I'm wrong in any of this, but just for purposes of the transcript, this is a document that was prepared, according to page 1, on December 11th, 2018. And the title is "Maneuver Characteristics Augmentation System (MCAS) response to Angle of Attack (AOA) failed high."

Do you agree with that?

Mr. McKenna. I think the document speaks for itself.

Mr. Bahrami. Where are you reading from? Just curious.

Mr. McKenna. Page 1. This is the date.

Mr. Bahrami. Okay. Up there. Okay, the title. Sorry. Sorry. I didn't understand. Okay.

BY MR. BURKETT:

Q So could I direct your attention to page 3 of this document?

A Okay.

Q Which is under the heading of "Quantitative Risk Assessment." Are you familiar with this -- this is a transport airplane risk analysis. Are you familiar with this document generally?

A I know what TARAM is, but I'm not familiar with the details of it.

Q Okay. Are you familiar with -- for example, if you were asked about the significance of one of the numbers in any of the given cells in this document, are you familiar with what that number signifies?

A I will be the wrong person to talk about that. I do not know.

Q Okay.

I can tell you that we were briefed by employees of AVS with counsel present, the same attorneys who are present here today, we were briefed yesterday on the contents of this document. And the document, as they explained it, reflects the conclusion that without corrective action beyond the airworthiness directive issued immediately after the Lion Air accident that 15 catastrophic accidents would occur to the worldwide fleet of 737 MAX airplanes over their lifetime.

A Over the lifetime?

Q The lifetime of the fleet.

A Of the fleet? Okay. Okay. All right, thanks.

Q Does that --

Mr. McKenna. Can I just clarify, that's also including aircraft that had not been manufactured or delivered at the time, I believe.

Mr. Burkett. Correct. That's right. It's all 4,800 airplanes that were on order

or delivered at the time of the analysis.

BY MR. BURKETT:

Q So do you have any basis to doubt your employees' explanation that this document reflects that conclusion, that 15 catastrophic accidents would occur?

A So let me talk about TARAM, if you don't mind.

Earlier, when I was asked how many airworthiness directives you do in a year, I responded that in one year alone I did 750 actions. When I was in Transport Airplane Directorate -- and I use those days because those are the numbers that we had -- in a given time, we were working on up to 150 to 200 airworthiness directives that we needed -- service difficulties that we needed to review. The never-ending debate was which one to tackle. Because from one manufacturer, they will say, "We need to do this now. It's taking you a long time to do it." Another manufacturer will say, "No, don't do this. This is not an urgent issue." And we were always debating those issues with the manufacturers.

What we decided to do is develop a tool that helps us with that decision-making. Because we were becoming a data-driven, risk-based decision-making organization. This document, when it was together, it is not an exact science. That's number one. It is an estimate in order to be able to figure out, if you have 150 separate issues to deal with, how much time you statistically have in order to deal with that issue. And then you bring those issues to the top and work them. So I want to make sure that this is very -- this is not an exact science.

And so, from that perspective, with this background, I have no doubt -- I have no question about what my guys have done. This is the numbers, this is the work they did based on the directives and the policy that we had.

And, by the way, when we published this, we published this for comments from

industry, because we wanted every company, before they come to us, run through this exercise and come and tell us what is their assessment of it. And then we will then verify through our own analysis to see if we are in the ballpark or not.

But we wanted to have a standard approach to addressing safety issues based on real urgency. Just want to point that out.

So I have no question. Do I think that my guys are coming with the wrong number? No, I don't. I think they used the process the right way.

Q Okay. When you say you published this, to whom was it published?

A Well, okay. So in the Transport Airplane Directorate, when I was the manager there, the nature of the business is such that you impact a lot of people when you take an action -- the airlines industry, things like that nature. Therefore, when you come out with a policy, you want to make sure they all know about it.

So, when we come up with a TARAM analysis, we published it, let everybody know this is what we want to do. We got a lot of comments about it, and we corrected, we improved it. We want everybody to know how we do this. And we went through that process. We got comments.

As a matter of fact, a lot of people in industry -- some big companies were against it. They actually tried to stop it by appealing with my predecessor and wanting to know why Ali is doing this and why is he pushing this stuff. I believe that if you want to be a safety organization, you have to be able to make the right decision based on the right reasons. And we went forward. Eventually, we succeeded to go forward with this policy and we did it.

Q Okay.

A That's what I meant, published in the -- we typically put a notice of availability, and then people go to the website, get it, and provide comments to us based

on that.

Q I see. So you're --

Mr. Pasternak. And just to clarify for the record, you're talking about the TARAM tool --

Mr. Bahrami. TARAM tool, not this --

Mr. Pasternak. -- not this specific document?

Mr. Bahrami. Oh, yeah, please. Yes, thank you for clarifying. Yes, absolutely, the TARAM tool. Not the specific of this, no.

BY MR. BURKETT:

Q I'm going to come back to this specific document in a moment, but are you aware of any other instances of an angle-of-attack vane failing high among 737 MAXes in service up to the grounding?

A On the 737 MAXes?

Q Correct.

A I am not. No, I'm not.

Q Have you received or has your office received any information from any air carriers, whether in the U.S. or abroad, specifically confirming whether an alpha vane or an AOA sensor has failed high -- had failed high up to the date of the grounding?

A On MAX again?

Q On the MAX.

A No, I'm not aware of that, yeah.

Q Okay.

A I do not know of any.

Q Okay.

So let me refer you back to this document, exhibit 4. If you look in the

worksheet, in the field about halfway down, "CP3" in the left-most column. And in the right-most column, the description is that the "probability that the event causes an unsafe outcome, given that the airplane is in a susceptible condition."

Your employees described this us to as essentially the percentage of -- or the number of flight crews per a certain number who would not adequately respond to the procedure outlined in the emergency airworthiness directive. And they explained that the figure that you see there in green of .01 means that, out of 100 flight crews, only 1 of those flight crews would collectively not respond appropriately to the emergency airworthiness directive.

Months after this, 3 months after this, almost to the day, Ethiopian Airlines Flight 302 crashed. Does that affect your view of the reasonableness of the assumption that 99 out of 100 flight crews would respond appropriately to an erroneous MCAS activation?

A I cannot speak to that, first of all, because, you know, this is a guess. It is very difficult to guess a human reaction, especially flight crews.

When we were looking at the data in the U.S. -- we had 57,000 operations both in the U.S. and in Canada, and we got information. We had no indication whatsoever that -- you know, to come up with this kind of a number, that's a guesstimate. They wanted to take this conservative approach. They could have taken 100,000. They could've taken -- I don't know what the number is.

So this is why I said this is primarily -- what it is is a tool. And, to me, when they did this, it may be from their perspective. I just don't know where that number comes from. I'm not going to be able to tell you whether I disagree. I just tell you that it's a very difficult thing, to quantify a flight crew reaction based on their experience, their knowledge, to be able to quantify it.

Q Given that we -- in the public domain, the only instances of alpha vanes

failing erroneously high on 737 MAX airplanes and resulting in MCAS activation, given that that scenario occurred only three times -- the flight preceding Lion Air 610 or the accident airplane, Lion Air 610, and then Ethiopian 302 -- and in two out of those three occasions, the flight crews were not able to recover the airplane, what does that say to you about the ability of the flight crews to recover from an erroneous MCAS activation in a 737 MAX?

A I would say that you also have to take a look at the experience of those flight crews. I'll just leave it at that. If somebody has only 34 hours on a 737 MAX, it's not equal to somebody who has got 1,500 hours of 737 MAX. So how do you -- I'm just pointing out that you have to look at the holistic approach in this particular case.

And I would say that, from my perspective, obviously, we are revisiting the human factors aspect, the workload situation. We are doing that. But to be able to guesstimate and draw conclusions, based on these two set of flight crews, across the board, I think that would not be something that I would be able to give you good numbers or estimates or quantify.

Q Okay.

With respect to the flight crew experience, I will represent to you that the Lion Air Flight 610 captain had 6,028 hours of total flight time, and his first officer had 5,174 hours. This is according to the Indonesian authorities' report. And the captain of Ethiopian Airlines Flight 302 had 8,122 total hours, and his first officer had 361 hours.

Does that affect your assessment of the flight crews' experience, given that, with one exception, three of the four pilots were extremely well-experienced airmen?

A Again, I can't -- what I cannot -- I can tell you this, that how much experience

they have in a 737 and how much time they have in MAX -- and the NG[22], that also matters. I don't know that. I don't know how much time they have on those.

But, again, does it impact my views? We already acknowledge that we're going to have to revisit on the workload. And during the MCAS, the redesign, this completely eliminates the risk that these folks experienced. We are already doing what we need to be doing.

And given where we are, I will tell you that we are already moving forward with the changes that need to take place, and we're looking forward to putting in place those changes and appropriate training for those flight crews. That's all I can tell you.

Q Okay.

Jumping ahead to your conversation with then-Acting Administrator Elwell regarding the grounding, I think you stated earlier that you, after reviewing the space-based ADS-B data from Ethiopian 302, you immediately recommended grounding the fleet, and then you immediately communicated that to then-Acting Administrator Elwell.

A Can I correct you?

Q Sure. Please.

A Okay. I said, after seeing the traces of the two profiles, which -- one was based on ADS-B, and the other one was based on the flight data recorder. Lion Air was based on flight data recorder, the Ethiopian based on the ADS-B. After seeing that, I went and did that. Because I saw the ADS-B traces earlier on the Monday, but we didn't have all the parameters to make sense or to see what it was telling us.

I just wanted to make sure --

[22] The transcribed text included a phonetic reference to “AG (ph).” The FAA requested a change to the text to “NG” to provide clarity, which was agreed to by Majority and Minority committee staff.

Q Sure.

A -- it wasn't the -- it was the profile that we superimposed on another.

Q Right. Sure. Yeah. Understood.

When you had that conversation with Mr. Elwell, what was his response to your recommendation initially?

A He wanted to know how I quickly come up with this reaction, why did I say what I said. And it so happened that, as I was going to Dan's office, I also come across Carl Burleson. Carl was the Deputy at the time, Acting Deputy. So, as we both walk into Dan's office, and Carl and I both said, "Here is the reason." Because on the way to Dan's office, I was talking to Carl about what we just saw and what was going on in there.

And when we walk in there, told Dan, and he didn't have any pushback or anything like that at all. He basically said, okay, so let's figure out what we have to do to move forward to do it.

Q And, to your knowledge, what happened after he made that determination?

A I think we begin to get the team together, including chief counsel and others who have to help us with the grounding. We got air traffic people involved to make sure what we need to be doing. So we went through all of those processes to see what we need to do to execute the grounding.

Q Okay. So would it be fair to say that the procedures to implement the grounding were begun immediately after you spoke to Mr. Elwell?

A Absolutely. Yeah, we start moving really fast. And we just moved. Yeah.

Q Okay.

Were you aware of the President's comments about the 737 MAX around this time, public statements regarding the safety of the airplane?

A The only thing I remember, which was on the media, on the news, and that's what I saw on the media. I think I recall that there was either a Cabinet meeting or something where he made a comment that that aircraft may get grounded or something to that -- I don't remember exact --

Q Okay.

A But I don't remember the specifics, to be honest with you.

Q Okay.

A Whatever you guys saw on TV, I saw the same thing.

Q Right. Right.

Did anyone from the White House or anyone outside the FAA contact you or, to your knowledge, anyone else within the agency expressing an opinion on whether or not to ground the airplane?

A No. Not at all.

Q Not to your knowledge? Or, no, they didn't contact?

A Not to me. They didn't talk to me.

Q Okay.

A I mean, I'm only talking about my engagement. I was not involved in anything. Once I explained it to Dan and people start working it, I was out of the picture, and I was just focusing on what we have to do to execute our plan.

Q Okay. Very good.

And just one more question. Knowing what we know now, would you agree that the 737 MAX, before the grounding, was not an airworthy airplane?

A Before grounding, it was not an airworthy airplane? No, I cannot make that statement.

Q If someone were to tell you that an airplane is safe, what do you take "safe"

to mean?

A Well, basically, we say the safe operation, basically they can go from point A to point B uneventfully and you get there. That's what it means.

Because even when we -- despite what constitutes safety, we say it's in compliance with Part 25[23]. And also, not only that, we also say that it is in condition for continued flight and landing. So safety -- that's just based on the standards that we've developed over time.

Q Do you believe the 737 MAX was safe as of the date it was grounded?

A Again, I did not have any information at the time to say that there was definitely an unsafe condition. I did not have that information.

That is the reason we went with the grounding order and not an AD. If there was something that we know we considered an unsafe condition, we wouldn't do the grounding -- we would have to do something that nobody around the world has seen. When you see a grounding order, they have never seen a grounding order. Because that requires [inaudible] kinds of different things. We would do something that is routine.

But, first, we have to know what is the unsafe condition. And we didn't know what the unsafe condition was. We didn't have enough evidence to figure out what really constitutes an unsafe condition.

Q Right. Very good. Thank you.

Mr. Burkett. I don't have any further questions. I'll defer to my colleagues.

BY MR. PASTERNAK:

Q I'll just be very quick. Just to follow up on your last response, you said you didn't know the "onset" condition?

[23] 14 CFR Part 25.

A Unsafe condition.

Q Unsafe condition.

A Unsafe condition.

Q Okay.

A Because if you issued the AD, you have to have an unsafe condition. Okay? And you have to be able to say, we have seen this and this and this. I can't write an AD based on similarity.

Q But you knew --

A But I could ground them based on the similarity that I saw in the profile.

Q But you knew it was related to MCAS.

A I knew it was based on the airplane performance, and the traces was very similar to what we saw on there. Now, was that the MCAS, or was it some sort of other malfunction that manifests itself like another profile like that? I did not know that.

As a matter of fact, any time you have an accident, when something like this happen, you have to look at -- you can't just immediately focus on -- you have to look at all possibilities. Okay? And, in some cases, actually some people thought was this an engine failure, initially. People were actually speculating it may have been an engine failure. Somebody even thought, could it be a terrorist activity given what was going on.

I mean, all of that stuff was up there. But what we were seeing in here and what we saw on the traces was insufficient for us to ground the fleet until we know what's going on.

Q Okay. And just to clarify, though, I thought you had said previously that after Lion Air you still knew enough to know that it was related to MCAS.

A We knew that MCAS activated and caused the aircraft behavior --

Q Okay.

A -- the way it was. Yes, we knew that.

Q Okay.

I'll be very quick, and then I think Matt has a followup. Just to clarify from what we're asking about on the lightning issue --

A Yes.

Q -- I think Matt asked a question about whether or not you were aware if EASA raised any questions on the MAX. I think --

A On the MAX?

Q Yeah.

A Okay.

Q The question is, are you aware whether EASA has raised any issues about lightning protection on the 787 Dreamliner?

A I'm not aware of that.

Q That you're not aware of.

A No, I'm not aware of that.

Q Okay. Okay.

And, secondly, just as head of safety at the FAA, you've been head of safety there since July of 2017?

A Right.

Q Have you ever had a time when a manufacturer has called you directly that had concerns about FAA's decisions on a technical issue or safety issue, where they said, "You guys are getting it wrong," you know, "I want to speak to you directly"?

A I'm thinking really hard. No, not to my recollection, no. Since I've been there, no.

Q Okay.

And I think asked this before. And even after Lion Air, you -- between Lion Air and Ethiopian Airlines crash, you did not have direct conversations with Boeing officials?

A Nobody called me --

[3:53 p.m.]

Mr. McKenna. About the topic or --

BY MR. PASTERNAK:

Q About the 737 MAX.

A As I said, once the accident happened and we began to talk about -- remember, we were shut down to begin. But right after about December timeframe, once the AD was issued, we were working the corrective action, and people were working it with Boeing. There was no need for us, any more engagement on this issue. So I do not recall any conversation with anyone from Boeing directly related to the Lion Air accident.

Q Okay.

And one last question, just in terms of -- not getting into specifics of the fixes to MCAS or the 737 MAX, clearly, what's been reported, what's been out there, what Boeing has also said in terms of MCAS will now rely on two sensors, these are things that a lot of people look at and say should have been done the first time.

As Matt mentioned, in the hearing, we also revealed communications within Boeing raising the issue of two sensors.

Do you think any of this points to a system from FAA that just didn't work properly?

A So let me point out that a system is never perfect. That's number one.

Second, our job is not to design aircraft. That's not my job either. My job is to make sure a design that presented to the FAA meets its applicable rules and regulations. So when a company comes in and puts one AOA system and they come up with the data and assumptions, and we make those assumptions and agree that, yes, it complies with

the rules, that is a decision we made, that it complies with the rule based on what we saw. Our guys looked at the information again, and they said it complies.

Now, should the design be something different or more robust? That's a decision that Boeing will have to make, to make those decisions. And my job is to find compliance to the applicable regulations, and I believe that our guys did that.

Knowing what we know today in terms of the assumptions and do we need to validate those assumptions, do we need to do the system safety assessment differently, those are the kinds of things that we are waiting for these reviews to be done and then incorporate those changes in our system as appropriate.

Q Okay.

A Thank you.

BY MR. WEISMAN:

Q Just on a different topic, just to find out what your processes or the FAA's processes, as you've observed -- like, since you've been there, have you ever had a Freedom of Information Act request come out or a DOT IG or even a congressional oversight request, where you've either had your email searched or you've been requested to search your emails?

A Yes.

Q Is that a process that you've ever --

A Oh, yeah, they did it -- they did it -- I went through that when I was in Transport Airplane Directorate. They came in and took 2 years of my emails to investigate it.

Q To understand how the process works, so is that something where you're told, "We're coming in and searching your emails," or are you told --

A No.

Q -- "Please go look at your emails and select these things"?

A No, no, no.

Mr. McKenna. If you want to talk about the process of production in response to the committee's document request, that would be more appropriately handled through other individuals than AVS.

Mr. Weisman. I want to know what his personal experience has been with that process.

Mr. Bahrami. I can tell you what happens. I can tell you what happens very quickly.

They come in. "Hello, sir. Can you please step out of your office for 2 hours?" And I said, "Why?" "We need to copy your emails." "Okay." "Thank you." I leave, they copy, they leave. That's what I know.

And, now, what happens before that, how they get engaged, that's not my involvement. The only thing I do, I give them access to my computer to get to them.

Mr. Weisman. Has that happened since April 1st of 2019?

Mr. McKenna. You mean in regard to your investigation --

Mr. Weisman. Yes.

Mr. McKenna. -- or someone else's investigation?

Mr. Weisman. In regards to the committee's investigation.

Mr. Bahrami. They are doing that, yes.

Mr. Pasternak. And can you tell us when that began?

Mr. McKenna. These questions are --

Mr. Pasternak. I'm not asking about your advice. I'm asking about when he was told his computer was being searched in response to the chairman's request from April 1st.

Mr. McKenna. We don't necessarily tell everyone when their computers are searched, first of all.

Mr. Pasternak. Well, that's what we are trying to ask him, if he was aware.

Mr. McKenna. I think if you want to talk about the process of document production, we will discuss that with you in a different setting than this one.

Mr. Weisman. He's a fact witness to what he's observed at the FAA.

BY MR. PASTERNAK:

Q Let me restate the question. Are you aware that the FAA has searched your computer for emails responsive to the committee's request?

A I was told, probably when I got back from Dubai, which was the week -- and I went on vacation. I was out of the office. They said, "We have a FOIA to look at your calendar and your email, and we're going to do that." And I was gone, and they -- I don't know whether that happened or not.

Q So that's a FOIA request. Were you told that was in response to the committee?

A No. They just said there was a FOIA request.

Q And when was that?

A I don't -- like I said, it was some time ago. Maybe 2 weeks ago.

Q Well, you said your trip to Dubai.

A After I came back from Dubai, which was -- I don't know when I went to Dubai. It was -- okay, I remember. It was about --

Q I'm just asking approximately.

A -- November -- I know. Well, I'm trying to give you the date, because I was only in the office, like, maybe 1 day before I left for Thanksgiving holidays. So it was around probably the 21st or 22nd of November.

Mr. Weisman. Of this year?

Mr. Bahrami. Yeah. It was just recently that I was told there was a FOIA.

Mr. Pasternak. And, just to clarify, so you've not been told specifically that your emails were searched in response to the chairman's letter?

Mr. Bahrami. No, not at all. None of that. Actually, there was also -- there was multiple FOIAs there, including some from news media. So there was all kinds of stuff going on.

Mr. Pasternak. Okay. Thank you.

Mr. Bahrami. Thank you. I don't know specific to anything.

BY MR. WEISMAN:

Q Have you ever been instructed not to put something in writing or not to communicate over email about anything related to the MAX?

A No. No, not at all.

Q Have you ever chosen, without being instructed to do so, not to put something in writing or not to communicate over email about anything related to the MAX?

A No. No.

Q While an employee of the FAA, have you ever used your personal cell phone or personal email address to communicate with anyone about the 737 MAX?

A No, not on 737 MAX. No.

Mr. Weisman. I think that's about it, unless you have --

Mr. Burkett. Just a couple more.

BY MR. BURKETT:

Q In reference to the 787 lightning protection issues that we were talking about earlier, you observed that Boeing can produce airplanes really to the extent that it

can and wants but can't deliver them to an airline customer until they have an airworthiness certificate.

A Until the designs are approved and -- yeah.

Q Right. If a backlog of produced airplanes exists, pending approval of the design, in your view, does that put any pressure on FAA employees to essentially get to "yes" and approve the design?

A No.

Q Okay.

A No, it doesn't.

Q And why doesn't it?

A Because throughout the process, as we discuss this, we always remind them that anything they are doing is risk-based. They're taking a risk on their own to produce something that needs to be modified, may have to be modified because of the design. So, if they know that, there is no concern for me, because they've been warned, they've been made aware of it.

Q Okay.

A What you don't want to do is the surprises. Nobody likes surprises. So what you try to do to avoid that, you says, "You realize you're doing this at risk." And they continue to do that. That's their choice.

Q Their choice? The airline's choice or --

A No, no, no. This is the manufacturer's choice to build at risk --

Q I see.

A -- as opposed to waiting for it to be completed and then, 2 years later, produce it because of the lead time.

Q Right.

A Those are business decisions, not certification. Those are not certification decisions.

Q Right. Okay.

Have you ever received any complaints or, to your knowledge, has anyone in your reporting structure in AVS received any complaints about pressure from Boeing employees to FAA employees with respect to approvals?

A Yes, I have. I mean, the reality is, sometimes when you get into -- when you begin a project, there are milestones, there are timelines that you have to follow. And those processes is not necessarily because Boeing is pressuring us. Anybody who has a project with us, whether it is even an STC holder on a galley, they do pressure because they have commitments they need to deliver. Do they pressure us for certain things? Yes, they do. And if I tell you that that's not happening, that is not true. We do have those situations.

But, at the end of the day, the job that we do is this compliance and making sure the product is safe. And until that is done, that's not going to change anything, and we have to go and get that done. That's very clear.

And what we have been doing over the years -- I think you know that very well -- through activities that started going back to early 1990s, with the CPI and Partnership for Safety Plan and the agreements that we put in place, we put all those safeguards in place to avoid those types of situations, that they don't pressure our employees and they're free to do their work, at the same time, their own unit members.

Q Sure.

A couple more specific questions regarding the MAX and this situation. We've got, what, 12 minutes left or so? And I see Mr. Syed needs to ask questions as well.

Mr. Pasternak. Just to follow up very quickly. On this 787 lightning issue, just

to clarify, you said, when you got the letter from the committee, that was the first you were aware of that issue?

Mr. Bahrami. This particular issue.

Mr. Pasternak. This particular issue --

Mr. Bahrami. Yeah. Yes.

Mr. Pasternak. -- in terms of the -- okay.

Mr. Bahrami. Yes, that's correct.

BY MR. BURKETT:

Q I think it's fair to say that you are an expert in the field of aviation safety and engineering by virtue of your experience and qualifications.

Boeing considered -- it's now undisputed that Boeing considered the pilots to be the redundancy to an erroneous MCAS activation. Do you believe that that was a reasonable assumption on Boeing's part, knowing what you know now?

A You know, this is a never-ending debate, and it's been around forever: Airbus design versus Boeing design. Airbus heavily relies on automation. And Boeing, on the other hand, ultimate decision-maker is the pilot, not the system. And so those are the design philosophies that the companies have.

Our job is to make sure that that airplane operates safely. So, in our reviews, all of that gets into consideration. And training becomes an important piece of it. And design of the system, the alerting is a big issue. That's what you all have been talking about, the alerting. All of that stuff becomes part of the consideration at the time.

And, going forward, based on what we know today, and if there is anything that we have to learn from this experience, is to take a look at the specific issues that occurred, in terms of system safety assessment and things of that nature, to see what we could do better in terms of engagement, involvement, and delegation.

Q Right.

Boeing received an exception from -- I believe it's 14 CFR section 25.1399 on flight-crew-alerting/caution alerting warning systems.

A Uh-huh.

Q To your knowledge, is it not correct that the 737 is the only transport category airplane in production without a centralized caution and alerting system?

A I don't know if that's the only aircraft, but I do understand that the architecture is the old system, and it's not -- they took an exception to this particular rule.

Q Right. Do you have a view on whether, when presented with a similar application in the future, if it arises, that you or your successor should grant such an exception in the future, knowing what we know now about the --

Mr. McKenna. I don't think we want to get into hypotheticals. That's not an appropriate role for a regulator to speculate on what it might or might not do in response to future design submissions.

BY MR. BURKETT:

Q Let me ask you this. Do you believe that that was a reasonable decision, to grant that exception?

A Here's what I would say. Let's not forget thousands of thousands, millions of hours of operation with that particular architecture. So the question becomes, if that is the case and it's been operating with over 200 million of operation, does it make sense to change it on the next type aircraft, to introduce yet another -- a different system on this new aircraft?

That's a decision that we have to make based on data. So I would say, is it reasonable to do the same thing in the future? I say, it depends. It depends on data. It depends on information.

The safety record of the 737 aircraft, I mean, it's one of the most popular aircraft around the globe. You know that. The numbers are there. God knows, close to 10,000 of them operating, 737s. Close. I think that's around the number.

So does it make sense to change the system that has been working? It depends, and people have to take the facts and just make that decision.

Q Okay.

Last question, again, getting into the human factors issues, and we've talked about this several times in different contexts.

Reading from page 4 of the emergency airworthiness directive -- and while you're locating that, this is the "Airplane Flight Manual Revision: Operating Procedures." The description here -- and I'll read from about midway down, the text in the box.

A Uh-huh.

Q "An erroneous AOA input can cause some or all of the following indications and effects: stick shaker; minimum speed bar (red and black); increasing nose-down control forces; IAS DISAGREE; ALTITUDE DISAGREE; ANGLE OF ATTACK DISAGREE (if the option is installed); FEEL DIFFERENTIAL PRESSURE light; autopilot may disengage. Initially, higher control forces may be needed to overcome any stabilizer nose-down trim already applied."

Was there ever any discussion about the collection of cautions and alerts facing the pilots in an erroneous MCAS activation situation and whether it was reasonable to expect them to always diagnose and respond to the issue within 3 seconds in the preparation process for this emergency airworthiness directive?

A I don't recall that conversation --

Q Okay.

A -- at our level -- at my level.

Q Okay.

A I don't know whether that took place at the lower level. For me, it didn't happen.

Q As an engineer -- and you're a dynamics engineer -- and as a safety expert, do you think that that conversation -- do you have a view on whether such a conversation should've taken place?

A I expect the people who are in that discussion and the experts to have that conversation and make decisions on that. Yeah, I would think that's reasonable to think that they would.

Q Okay.

A Thank you.

Mr. Pasternak. Thank you.

Do you guys have --

Ms. Cooke. We don't want to move. We have one question. Can you hear us?

Mr. Bahrami. Yes, I can.

Ms. Cooke. Okay. So we're going to go -- I guess they went off the record. We're going on the record for the minority side. It is 4:12.

BY MR. PRESTI:

Q Just to finish the AD that Alex was just reading, it says, at the bottom, after listing some of the indications and effects that erroneous AOA input can result in, "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."

Mr. Bahrami, to your knowledge, did the Ethiopian Airlines flight crew use the

electric stabilizer trim to neutralize control column pitch forces prior to moving the stab trim cutout switches to cutout?

A I'm going based on my memory, and they tried to use it, but they did not hold it sufficiently long enough for it to get to overcome the MCAS. But if they would have kept it, it would have been different outcome.

Q So, by not holding it sufficiently --

A Yeah.

Q -- they did not neutralize control column pitch forces?

A That's correct. That's what I said, yes.

Q Thank you.

BY MS. COOKE:

Q I think the final -- this is the final. Just to clarify, the prior hour, the Democratic colleagues mentioned the AOA sensors and the 1 degree. Just to clarify, you were not at the FAA during the time that decision was made.

A That is correct, I was not.

Q Okay.

A For original design.

Q Yes.

A That's correct; I was not.

Ms. Cooke. All right. That is all we have. Thank you.

Off the record for us.

Mr. Pasternak. Thank you very much.

[Whereupon, at 4:14 p.m., the interview was concluded.]

Exhibit 1

FAA
Aviation Safety

EMERGENCY AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/

DATE: November 7, 2018
AD #: 2018-23-51

Emergency Airworthiness Directive (AD) 2018-23-51 is sent to owners and operators of The Boeing Company Model 737-8 and -9 airplanes.

Background

This emergency AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. This condition, if not addressed, could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

FAA's Determination

We are issuing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design. Due to the need to correct an urgent safety of flight situation, good cause exists to make this AD effective in less than 30 days.

AD Requirements

This AD requires revising certificate limitations and operating procedures of the airplane flight manual (AFM) to provide the flight crew with runaway horizontal stabilizer trim procedures to follow under certain conditions.

Interim Action

We consider this AD interim action. If final action is later identified, we might consider further rulemaking then.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

This AD is issued in accordance with authority delegated by the Executive Director, Aircraft Certification Service, as authorized by FAA Order 8000.51C. In accordance with that order, issuance of ADs is normally a function of the Compliance and Airworthiness Division, but during this transition period, the Executive Director has delegated the authority to issue ADs applicable to transport category airplanes and associated appliances to the Director of the System Oversight Division.

Presentation of the Actual AD

We are issuing this AD under 49 U.S.C. Section 44701 according to the authority delegated to me by the Administrator.

2018-23-51 The Boeing Company: Product Identifier 2018-NM-151-AD.

(a) Effective Date

This Emergency AD is effective upon receipt.

(b) Affected ADs

None.

(c) Applicability

This AD applies to all The Boeing Company Model 737-8 and -9 airplanes, certificated in any category.

(d) Subject

Air Transport Association (ATA) of America Code 27, Flight controls.

(e) Unsafe Condition

This AD was prompted by analysis performed by the manufacturer showing that if an erroneously high single angle of attack (AOA) sensor input is received by the flight control system, there is a potential for repeated nose-down trim commands of the horizontal stabilizer. We are issuing this AD to address this potential resulting nose-down trim, which could cause the flight crew to have difficulty controlling the airplane, and lead to excessive nose-down attitude, significant altitude loss, and possible impact with terrain.

(f) Compliance

Comply with this AD within the compliance times specified, unless already done.

(g) Revision of Airplane Flight Manual (AFM): Certificate Limitations

Within 3 days after receipt of this AD, revise the Certificate Limitations chapter of the applicable AFM to include the information in figure 1 to paragraph (g) of this AD.

Figure 1 to paragraph (g) of this AD – *Certificate Limitations*

Required by AD 2018-23-51

Runaway Stabilizer

In the event of an uncommanded horizontal stabilizer trim movement, combined with any of the following potential effects or indications resulting from an erroneous Angle of Attack (AOA) input, the flight crew must comply with the Runaway Stabilizer procedure in the Operating Procedures chapter of this manual:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

(h) AFM Revision: Operating Procedures

Within 3 days after receipt of this AD, revise the Operating Procedures chapter of the applicable AFM to include the information in figure 2 to paragraph (h) of this AD.

Figure 2 to paragraph (h) of this AD – *Operating Procedures*

Required by AD 2018-23-51

Runaway Stabilizer

Disengage autopilot and control airplane pitch attitude with control column and main electric trim as required. If relaxing the column causes the trim to move, set stabilizer trim switches to CUTOUT. If runaway continues, hold the stabilizer trim wheel against rotation and trim the airplane manually.

Note: The 737-8/-9 uses a Flight Control Computer command of pitch trim to improve longitudinal handling characteristics. In the event of erroneous Angle of Attack (AOA) input, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds.

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8/-9, in conjunction with one or more of the indications or effects listed below, do the existing AFM Runaway Stabilizer procedure above, ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

An erroneous AOA input can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the option is installed).
- FEEL DIFF PRESS light.
- Autopilot may disengage.
- Inability to engage autopilot.

Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used before and after the STAB TRIM CUTOUT switches are moved to CUTOUT.

(i) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Seattle ACO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j) of this AD. Information may be emailed to: 9-ANM-Seattle-ACO-AMOC-Requests@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(j) Related Information

For further information about this AD, contact Douglas Tsuji, Senior Aerospace Engineer, Systems and Equipment Section, FAA, Seattle ACO Branch, 2200 South 216th St., Des Moines, WA 98198; phone and fax: 206-231-3548; email: Douglas.Tsuji@faa.gov.

Issued in Des Moines, Washington, on November 7, 2018.

Original signed by
Chris Spangenberg,
Acting Director,
System Oversight Division,
Aircraft Certification Service.

Exhibit 2

5.11 Boeing Flight Crew Operations Manual Bulletin number TBC-19

BOEING

Flight Crew Operations Manual Bulletin
for
The Boeing Company

The Boeing Company
Seattle, Washington 98124-2207

737

Number: TBC-19

IssueDate: November 6, 2018

Airplane Effectivity: 737-8 / -9

Subject: Uncommanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason: To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Information in this bulletin is recommended by The Boeing Company, but may not be FAA approved at the time of writing. In the event of conflict with the FAA approved Airplane Flight Manual (AFM), the AFM shall supersede. The Boeing Company regards the information or procedures described herein as having a direct or indirect bearing on the safe operation of this model airplane.

THE FOLLOWING PROCEDURE AND/OR INFORMATION IS EFFECTIVE UPON RECEIPT

Background Information

The Indonesian National Transportation Safety Committee has indicated that Lion Air flight 610 experienced erroneous AOA data. Boeing would like to call attention to an AOA failure condition that can occur **during manual flight only.** This bulletin directs flight crews to existing procedures to address this condition.

In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- Inability to engage autopilot.
- Automatic disengagement of autopilot.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the AOA indicator option is installed)
- FEEL DIFF PRESS light.

Operating Instructions

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8 /-9, in conjunction with one or more of the above indications or effects, do the Runaway Stabilizer NNC ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

Note: Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used after the STAB TRIM CUTOUT switches are moved to CUTOUT.

Administrative Information

Insert this bulletin behind the Bulletin Record page in Volume 1 of your Flight Crew Operations Manual (FCOM). Amend the FCOM Bulletin Record page to show bulletin TBC-19 "In Effect" (IE).

This Bulletin remains in effect until Boeing provides additional information on system updates that may allow this Bulletin to be canceled.

Please send all correspondence regarding Flight Crew Operations Manual Bulletin status, to the 737 Manager, Flight Technical Data, through the Service Requests Application (SR App) on the MyBoeingFleet home page.

Exhibit 3

Federal Aviation Administration

AVIATION SAFETY (AVS) SERVICES AND OFFICES

AAM
Office of Aerospace Medicine

AAM-100
Program Management Division

AAM-200
Medical Specialties Division

AAM-800
Drug Abatement Division

CAMI -
Civil Aerospace Medical Institute

- **AAM-300** Aerospace Medical Certification Division
- **AAM-400** Aerospace Medical Education Division
- **AAM-500** Aerospace Human Factors Research Division
- **AAM-600** Aersopace Medical Research Division
- **AAM-700** Occupational Health Division

9 Regional Divisions

FS
Flight Standards Service

Air Carrier Safety Assurance
AFC-1
AFC-2A
AFC-2B

6 Divisions

General Aviation Safey Assurance
AFG-1
AFG-2A
AFG-2B

8 Divisions

Safety Standards
AFS-1
AFS-2A
AFS-2B

8 Divisions

Foundational Business
AFB-1
AFB-2A
AFB-2B

6 Divisions

28 Divisions

AIR
Aircraft Certification Service

AIR-010
Executive Support Staff

AIR-040
International Office

AIR-300
Organizational Performance Division

AIR-600
Policy & Innovation Division

AIR-700
Compliance & Airworthiness Division

AIR-800
Systems Oversight Division

AIR-900
Enterprise Operations Division

AOV
Air Traffic Safety Oversight Service

AOV-20
Planning and Program Management Staff

AOV-30
International Integration Staff

AOV-100
Air Traffic Safety Standards Oversight Division

AOV-200
Air Traffic Safety Operations Oversight Division

3 Field Offices

AQS
Office of Quality, Integration & Executive Services

AQS-100
Quality, Integration & Process Division

AQS-300
Planning & Performance Division

AQS-400
Finance & Budget Division

AQS-500
Management & Business Services Division

ARM
Office of Rulemaking

ARM-100
Airmen & Airspace Rules Division

ARM-200
Aircraft, Commercial Space & Airports Rules Division

AUS
Unmanned Aircraft Systems Integration Office

AUS-10
Executive Office

AUS-100
Business & Planning Division

AUS-200
International Division

AUS-300
Research Division

AUS-400
Safey & Integration Division

AVP
Office of Accident Investigation and Prevention

AVP-100
Accident Investigation Division

AVP-200
Safety Analytical Services Division

AVP-300
Safety Management & Research Planning Division

AVP-400
Management Services & Recommendations Division

Regional Locations

AAL (Alaska)
ACE (Central)
AEA (Eastern)
AGL (Great Lakes)
ANE (New England)
ANM (Northwest Mtn)
ASO (Southern)
ASW (Southwest)
AWP (Western Pacific)

AVS
International Strategies

AVS-5
Director

AVS EXECUTIVE LEADERS

AVS-1
Ali Bahrami
Associate
Administrator

AVS-2
Lirio Liu
Acting Deputy
Associate Administrator

AAM Office of Aerospace Medicine

AAM-1
Michael Berry, MD
Federal Air Surgeon

AAM-2
Stephen Goodman, MD
Deputy Federal
Air Surgeon

AAM-3
Melchor Antuñano, MD
Director Civil Aerospace
Medical Institute

FS Flight Standards Service

AFX-1
Rick Domingo
Executive Director

AFX-2A
Lawrence Fields
Deputy Executive
Director

AFX-2B
Rico Carty
Deputy Executive
Director

AIR Aircraft Certification Service

AIR-1
Earl Lawrence
Executive Director

AIR-2
David Hempe
Deputy Exec. Director
Regulatory Operations

AIR-3
Chris Carter
Deputy Exec. Director
Strategic Initiatives

AVS International Strategies

AVS-5
Tricia Stacey
Director

ARM Office of Rulemaking

ARM-1
Brandon Roberts
Acting Executive
Director

ARM-2
Forest Rawls
Acting Deputy
Executive Director

AQS Office of Quality, Integration & Executive Services

AQS-1
Sunny Lee-Fanning
Executive Director

AQS-2
Heather Danner
Deputy Executive
Director

AOV Air Traffic Safety Oversight Service

AOV-1
Michael O'Donnell
Executive Director

AOV-2
Alex McDowell
Deputy Executive
Director

AUS Unmanned Aircraft Systems Integration Office

AUS-1
Jay Merkle
Executive Director

AUS-2
Bill Crozier
Deputy Executive
Director

AVP Office of Accident Investigation & Prevention

AVP-1
Steven Gottlieb
Executive Director

AVP-2
Warren Randolph
Deputy Executive
Director

AAM Office of Aerospace Medicine

Staff of
300+ employees

AAM-1
Federal Air Surgeon

AAM-2
Deputy Federal Air Surgeon

CAMI
Director Civil Aerospace Medical Institute

AAM-100
Program Management Division

AAM-200
Medical Specialties Division

AAM-800
Drug Abatement Division

AAM-300
Aerospace Medical Certification Division

AAM-400
Aerospace Medical Education Division

AAM-500
Aerospace Human Factors Research Division

AAM-600
Aerospace Medical Research Division

AAM-700
Occupational Health Division

Regional Divisions

- AAL-300 (Alaska)
- ACE-300 (Central)
- AEA-300 (Eastern)
- AGL-300 (Great Lakes)
- ANE-300 (New England)
- ANM-300 (Northwest Mountain)
- ASO-300 (Southern)
- ASW-300 (Southwest)
- AWP-300 (Western Pacific)

AAM-840
Central Compliance & Enforcement Center (Dallas, TX)

AAM-850
Western Compliance & Enforcement Center (Los Angeles, CA)

AAM-860
Eastern Compliance & Enforcement Center (Miami, FL)

FS Flight Standards Service

Staff of 5,200+ employees

AFX-1
Executive Director

AFX-2A
Executive Deputy Director

Air Carrier Safety Assurance
AFC-1

AFC-2A | AFC-2B

- **Air Carrier A** AFC-100
- **Air Carrier B** AFC-200
- **Air Carrier C** AFC-300
- **Air Carrier D** AFC-400
- **Air Carrier E** AFC-500
- **Air Carrier F** AFC-600

General Aviation Safety Assurance
AFG-1

AFG-2A | AFG-2B

- **General Aviation A** 135 10 or more AFG-100
- **General Aviation B** 135 9 or less AFG-200
- **General Aviation C** 135 9 or less AFG-300
- **General Aviation D** 135 9 or less AFG-400
- **General Aviation E** 135 9 or less AFG-500
- **General Aviation F** Air Agency AFG-600
- **General Aviation G** Air Agency AFG-700
- **General Aviation H** Air Agency AFG-800

Safety Standards
AFS-1

AFS-2A | AFS-2B

- **International Program** AFS-50
- **Aircraft Evaluation** AFS-100
- **AIR Transportation** AFS-200
- **Aircraft Maintenance** AFS-300
- **Flight Technologies** AFS-400
- **Regulatory Support** AFS-600
- **GA and Commercial** AFS-800
- **Safety Analysis & Promotion** AFS-900

AFX-2B
Executive Deputy Director

Foundational Business
AFB-1

AFB-2A | AFB-2B

- **Missions Services** AFB-100
- **Strategic Planning and Financial Services** AFB-200
- **Workforce Services** AFB-300
- **Safety Risk Management** AFB-400
- **Workforce Development** AFB-500
- **Civil Aviation Registry** AFB-700

AIR

Aircraft Certification Service

Staff of
1,300+ employees

AOV
Air Traffic Safety Oversight Service

Staff of 130+ employees

AOV-1
Executive Director

AOV-1A

AOV-1B

AOV-2
Deputy Executive Director

AOV-20
Mission Support Staff

AOV-30
International Integration Staff

AOV-100
Air Traffic Safety Standards Oversight Division

AOV-200
Air Traffic Safety Operations Oversight Division

AOV-210 Western Area Operations Branch (SEA)
AOV-220 Central Area Operations Branch (DFW)
AOV-230 Eastern Area Operations Branch (ATL)

AQS

Office of Quality, Integration and Executive Services

Staff of
80+ employees

AQS-1
Executive Director

AQS-2
Deputy Executive Director

AQS-100
Quality,
Integration & Process
Division

AQS-110
AVS Centralized
Internal Audit
Branch

AQS-120
QMS Planning
& Performance
Branch

AQS-300
Planning
& Performance
Division

AQS-400
Finance
& Budget
Division

AQS-500
Management
& Business Services
Division

AQS-510
Human
Capital
Branch

AQS-520
Training
Solutions
Branch

AQS-530
Business Services
Branch

ARM

Office of Rulemaking

Staff of
30 employees

ARM-1
Executive Director

ARM-2
Deputy Executive Director

ARM-100
Airmen
& Airspace Rules Division

ARM-200
Aircraft, Commercial Space
& Airport Rules Division

AUS

Unmanned Aircraft Systems Integration Office

Staff of
60+ employees

AUS-1
Executive Director

AUS-2
Deputy Executive Director

Executive Support
Staff

AUS-100
Business
& Planning
Division

AUS-200
International
Division

AUS-300
Research
Division

AUS-400
Safety
& Integration
Division

AVP

Office of Accident Investigation and Prevention

Staff of 65+ employees

AVP-1
Executive Director

AVP-2
Deputy Executive Director

Executive Support Staff

AVP-100
Accident Investigation Division

AVP-200
Safety Analytical Services Division

AVP-300
Safety Management & Research Planning Division

AVP-400
Management Services & Recommendations Division

Geographic Locations of the AVS Workforce

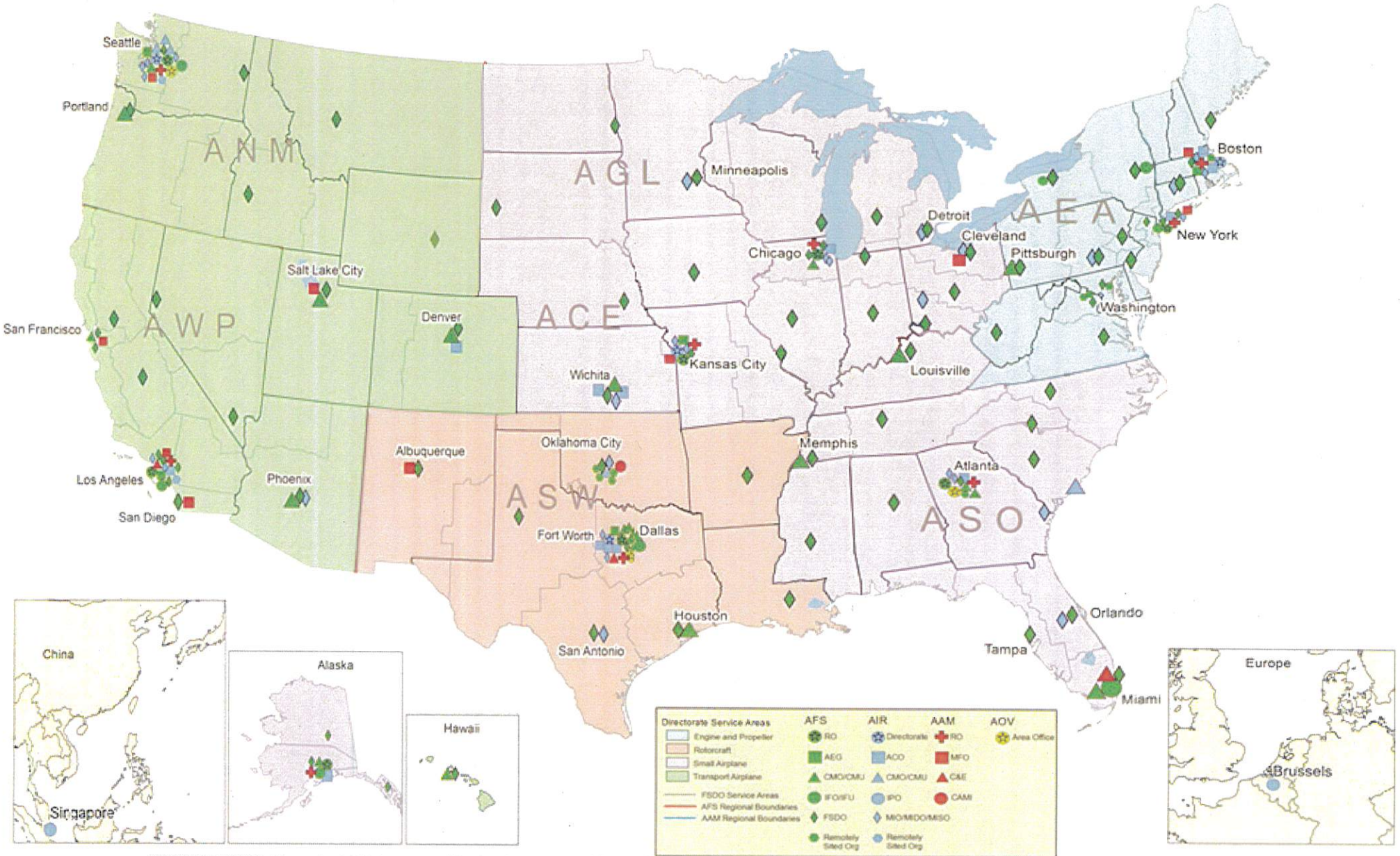

Exhibit 4

FAA
Aircraft Certification Service
Transport Airplane Directorate (TAD)

18-PAD-0048

TAD Corrective Action Review Board (CARB) Presentation Form

CARB 1 – Unsafe Condition Determination

OEM COSP (21.3 Report) #	2018-1922
SACO Safety Investigation (SI) #	78-SI-0093
Monitor Safety / Analyze Data (MSAD) Event #	11876439
MSAD Safety Investigation #	
Noncompliance Notification Number (NCN) *(if applicable, or N/A)*	

Title: Maneuver Characteristics Augmentation System (MCAS) response to Angle of Attack (AOA) failed high

Engineer: [redacted]		**Branch:** AIR-783		**Date:**	12/11/2018
Branch Safety Position:	**Safety:** X			**Non safety:**	
Branch Mgr. Approval: [redacted]		**COS PM Review:** [redacted] 12/13/2018			

Model(s)/Appliance Affected:	737-8/-9 (MAX)		
Number of Affected Airplanes in Current Fleet	**US:** 45	**Total:**	246
Does this issue affect current production?	**Yes** X	**No**	
Does this issue affect out-of-production models (e.g., 727, 737CL, 757) ?		**No**	
Yes *(provide LAACO contact)*		**No** ☒	

Description of Service Difficulty or Issue:

On October 29, 2018 a 737-8 (MAX) crashed shortly after takeoff. Flight Data Recorder (FDR) data from the accident investigation suggests there was valid erroneous AOA sensor data associated with the captain's AOA vane. The bias in the high angle of attack direction resulted in activation of the MCAS function when the Flaps were retracted. The combination of the airplane nose down MCAS activation commands and airplane nose up pilot stab trim commands via the manual thumb trim switches resulted in excessive airplane nose-down attitude. The accident is still being investigated.

AD 2018-23-51 (November 7, 2018) required revising the Airplane Flight Manual (AFM). That AD identifies appropriate crew actions to mitigate the effects of a single AOA sensor. That AD was identified as interim action.

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Unsafe Condition or Consequences of No Action:

Repeated MCAS airplane nose down stabilizer trim commands resulting from a single erroneous valid high AOA sensor input, can, without appropriate intervention, can 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.

Manufacturer's Position:

Boeing has determined this to be Safety. • Boeing issued a Flight Crew Operations Manual Bulletin to support AD 2018-23-51 • Boeing is developing design changes to the MCAS system	
Date of Meeting / Telecon with Manufacturer:	11/6/2018, Boeing SRB
Name of Manufacturer's Focal for this Issue:	[redacted]

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1. Quantitative Risk Assessment

Random Transport Airplane Risk Analysis (R-TARA) Version 2.4.2 10/20/2016

COS Item Number(s)	2016-xxxx	Airplane Model	737 MAX
COS SI Number	16-SI-xx	Branch	AIR-780
MSAD Event Number		Engineer	[redacted]
MSAD SI Number		Analysis Date	12/3/2018

CONDITION UNDER STUDY
Lion Air 737-8 (MAX) crashed about 10 minutes after takeoff from Jakarta, Indonesia, October 29, 2018.

SUSCEPTIBLE CONDITION (CP_1 and CP_2)
Describe any particular configuration that puts the airplane at risk.
If all airplanes are affected, all the time, then $CP_1 = CP_2 = 1$.
CP_1 represents the probability of a latent failure, and is calculated below (see Cell F42).
CP_2 represents the probability of flying in a critical condition (including cargo loading, passenger configurations, fuel load, etc. but excluding latent failures).

INITIATING EVENT (F)
One accident to date in approximately 135,980 cycles and 372,754 flight hours flown.

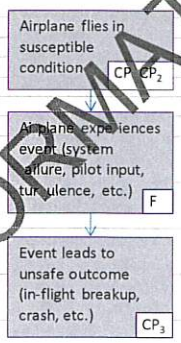
CAUSAL CHAIN (CP_3)
Describe how the event leads to the unsafe outcome. CP_3 is the probability t at the e ent will lead to he unsafe outcome, for airplanes that are flying in the susceptible condition.

UNSAFE OUTCOME
Uncontrolled Crash, IR = 1.05

Adding not-yet-delivered airplanes 250 airplanes now, 900 aver ge over the contro program.

Per Flight Global database as of 11/25/18, Boeing ha de er d 264 Max irplanes, and orders for 4554, total of 4818. Rounding off to 4800 airplanes.

This page assumes interim action reduces the risk by a factor of 100. We still need HP NPRM or IAR.



ANALYSIS IS IN: Flight Hours

TARAM Handbook Variables	Total Uncorrected Fleet Risk	Uncorrected Individual Risk	Control Program fleet risk	Control Program Individual Risk	90-day Fleet Risk	Description
F	2.683E-06	2.68E-06	2.68E-06	2.68273E-06	2.68E-06	Frequency of Occurrence (per flight hour)
U*T	113697.5					Remaining life (flight hours, per airplane)
Sigma	4800		300		250	Number of airplanes in affected fleet (average over fleet life)
CP_1	1	1	1	1	1	Probability of latent failure
CP_2	1	1	1	1	1	Probability of flying with critical cargo loading / passengers / fuel / etc.
CP_3	0.01	0.01	0.01	0.01	0.01	Probability that event causes unsafe outcome, given that airplane is in susceptible condition
IR	1.05	1.05	1.05	1.05	1.05	Injury ratio
EC			190		190	Exposed occupants
U (FH)			8.9		8.9	Utilization (flight hours/day)
U (FC)			4.5		4.5	Utilization (flight cycles/day)
CAD			112			Corrective Action Development (days)
RT			14			Rulemaking Time (days)
CT			30		90	Compliance time (days)

Risk Measures	Guidance Value	Calculated Value	Recommendation
Total Uncorrected Fleet Risk	0.02	15.373	Issue an AD
Total Uncorrected Fatal Events	N/A	14.6	
Total Uncorrected Fatalities	3	2920.9	Issue an AD under new guidance
Uncorrected Individual Risk	1.00E-07	2.82E-08	
Control Program Fleet Risk	3	2.01	
CPFR (Weighted Events)	0.02	0.01	
Control Program Indiv. Risk	10^{-5}, 10^{-6}	2.82E-08	
90-day Fleet Risk	N/A	1.07E+00	
NPRM Prioritization Rating	N/A	19.2	High Priority

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2. Qualitative Unsafe Condition Assessment Summary

Respond "YES" or "no" to each line item:

1.	**Airplane Safety:**		YES/no
	a.	The condition was likely a significant contributing factor in a catastrophic event (including relevant events on other airplane models).	Yes
	b.	The condition is **an approved design configuration**, or an escape of the production system, that could result in a catastrophic event.	No
o	**c.**	The condition is a foreseeable single failure, cascading failure sequence, or common cause failure scenario that could result in a catastrophic event.	Yes
	d.	The condition is known or anticipated to occur in the life of the affected fleet and could result in: 1) Inability of a Principal Structural Element to sustain limit load, or 2) Any other structural failure that could result in a catastrophic event	No
	e.	The condition is anticipated to occur in the life of the affected fleet, is not likely to be detected by flight/cabin/ground crew, and brings the airplane within one foreseeable failure of a catastrophic event.	Yes
	f.	For multiple failure scenarios, a catastrophic event due to the scenario cannot be shown to be extremely improbable. *("Extremely Improbable" implies probability of the order 10^{-9} or less, per AC 25.1309-1A.)*	Yes
2.	**Compromise of Required Safety Features:** The condition is a design shortfall, manufacturing escape, or failure that excessively reduces the availability or performance of a prescriptively required safety-related system or function.		No
3.	**Personal Unsafe Condition Determination:** The condition could result in serious injury or death to person(s) (including person(s) other than crew or passengers), and cannot be shown to be extremely remote.		No
4.	**Other (specify and provide rationale):**		

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Are the parts rotable?	Yes ☒	No
Rationale for rotability decision: Flight Control Computer (FCC) software is resident in the FCC. If an FCC is moved to another airplane, the Software can be moved to another airplane with the FCC.		

Note:
ADs that involve rotable parts require special handling, to ensure that the unsafe condition does not get rotated onto an airplane outside the applicability of the AD.
Components / parts that have the same form, fit, and function and can be removed from one airplane and installed on another airplane are considered ROTABLE. Structural components installed with a permanent fastener are not considered rotable. Points to consider:

- *Is the part physically capable of being installed on an airplane outside of the affected airplanes?*
- *Is this a part that could be removed from the airplane, modified or repaired, and reinstalled on another airplane?*
- *Is it reasonable to expect that the operators may have a need to move the part to another airplane?*

Is this related to an Airworthiness Noncompliance?	Yes	No ☒
Noncompliance Notification Number (NCN):		
Associated regulations (14 CFR):		

Note:
Airworthiness noncompliance means the type design does not meet the requirements of one or more applicable Airworthiness Regulations (e.g., 14 CFR 25.571 or 25.1309). Boeing reports each noncompliance as a COS item with a description beginning with "NCN."

Is this related to a Manufacturing Nonconformity?	Yes	No ☒
Comments:		

Note:
Manufacturing nonconformity means the as-produced airplane does not conform to its type design, i.e., there has been a quality escape from the production system If the nonconformity is explained in the "Description of Service Difficulty or Issue" on page 1, then it is not necessary to repeat that information here.

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Proposed FAA Action:	☐ Emergency AD (Complete short term safety determination) ☒ Immediately Adopted Rule (IAR) (Complete short term safety determination) ☐ High Priority Notice of Proposed Rule Making (NPRM) ☐ No Notice Final Rule (NFR) ☐ NPRM ☐ Supplemental NPRM **(see below)** ☐ Supersedure (NPRM/IAR/NFR) **(see below)** ☐ Special Airworthiness Information Bulletin (SAIB) ☐ No action required

Supplemental NPRM / Supersedure:	**Identify rationale for appropriate action:** ☐ **Effectivity error** *(change in affected airplanes, line #s, etc., should have been determined during SB development)* ☐ **Engineering error** *(Incorrect part numbers, dimensions, processes, procedures, materials, and figures/illustrations)* ☐ **Unavoidable expanded scope based on fleet findings – new discovery outside scope of SB** *(Additional airplanes affected and or areas affected based on the increase in scope due to fleet findings)* ☐ **New/current info changes FAA approach** *(FAA concurred with corrective action approach ... later decided on different approach. i.e., inspection approach to now requiring mod (i.e., suction feed))* ☐ **Other** *(Any other issue that doesn't fall into the above categories)*

Short term safety determination (complete this section for emergency or IAR AD):

Per the TARAM analysis, the Control Program fleet risk is sufficiently low to allow continued growth of the fleet and operations until the changes to the system are retrofitted via Service Bulletin

Comments:

AD equivalent MCAS design change will be basic on the 737-7 at the time of Amended Type Certificate (ATC) issuance.

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End-to-End Airworthiness Directive Schedule Agreement

For Boeing issues, insert or attach:

(1) Boeing's draft End-to-End form, if they have provided one.

(2) A draft End-to-End form for CARB approval, that states the Risk Outer Marker Times (ROM-T) and Joint Preliminary Agreed Times (JPAT), as determined from the final risk analysis that you have coordinated with Boeing.

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APPENDIX 1 – Boeing Problem Solving Method (BPSM)

Planned AD Number:	*(to be filled in after CARB 1)*
Title:	737-8 (MAX) Lion Air Accident
Affected Airplane Model(s):	737-8/-9 (MAX)
Boeing COSP (21.3 Report) Number(s):	**2018-1922**
Noncompliance Notice (NCN):	*(if applicable, or N/A)*

FAA point of contact:

Name/Branch:	[redacted]
Phone number:	[redacted]
E-mail address:	[redacted]@faa.gov

Is Boeing required to submit a BPSM analysis document for this issue?

[X] Yes [ ] No

The FAA requests a BPSM analysis document for most safety issues, but it is not always necessary. In general, the focus of the BPSM will be on the causes that led or contributed to the unsafe condition. However, BPSM for supersedures and follow-on ADs should focus on the cause of the supersedure, and not the direct, technical cause that led to the unsafe condition. In other cases, the focus of the BPSM may be procedural issues.

What should be the focus of the BPSM?

[X] **Underlying causes or factors related to the unsafe condition**
Example: Three independent aircraft components all go "off-line" simultaneously due to a software counter overflow error.
Focus Areas: Are the specifications insufficient in this, and possibly other systems? Do they protect future designs from being subject to a similar failure mode? Is a cross-model, cross-system review needed?
Comments: BPSM is required, however the BPSM associated with AD 2018-23-51 is for the same issue. Two BPSMs are not necessary – the two planned ADs can be combined into a single submittal.

[ ] **Effectivity error**
Example: Change in affected airplanes (line #s, etc.), should have been determined during original service bulletin (SB) development.
Focus Areas: How were these airplanes missed the first time around? What measures are in place to capture the correct effectivity for future issues?
Comments:

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☐ **Engineering error**

Examples: Incorrect part numbers, dimensions, processes, procedures, materials, and figures/illustrations.

Focus Areas: What led to the errors in the service information? Why weren't the errors identified and corrected during the review/approval process before the service information was released?

Comments:

☐ **Unavoidable expanded scope based on fleet findings – new discovery outside scope of SB**

Example: Additional airplanes affected and or areas affected based on the increase in scope due to fleet findings

Focus Areas: Additional airplanes: Were relevant changes to production and their implementation points (affected line numbers) correctly identified? Did the production fix cut-in point match the effectivity of the SB? Was the production fix ineffective in correcting the problem?
Additional areas: How was the original scope of the problem determined? Was the originally-determined root cause complete and correct?

Comments:

☐ **New/current information changes FAA approach**

Example: FAA concurred with corrective action approach … later decided on different approach, i.e., inspection approach to now requiring mod (i.e., suction feed)

Focus Areas: What caused the original approach to be ineffective? Was the originally-determined root cause complete and correct? Why didn't the original BPSM (or equivalent method in place at the time) identify an effective solution?

Comments:

Note: BPSM may not be required for terminating actions (e.g., when an AD that mandates inspections as an interim corrective action is superseded by an AD that mandates a terminating modification).

☐ **Process, procedure, or other issues**

Example: Any other issue that doesn't fall into the above categories

Focus Areas: *Describe in detail the areas of interest for this issue.*

Comments:

Attachment 1

U.S. Department
of Transportation
**Federal Aviation
Administration**

Office of the Chief Counsel

800 Independence Avenue, SW
Washington, DC 20591

September 4, 2020

The Honorable Peter DeFazio
Chairman, Committee on Transportation & Infrastructure
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Chairman:

On December 5, 2019, Federal Aviation Administration (FAA) Associate Administrator for Aviation Safety Ali Bahrami sat for a voluntary interview with staff for the House Committee on Transportation and Infrastructure. In anticipation of future public release of the transcript, the Committee provided FAA a copy of the transcript, asking FAA to review the transcript for any information not suitable for release and offering FAA the opportunity to memorialize clarifications to the transcript that the FAA previously provided via email. This letter memorializes those two clarifications of Mr. Bahrami's answers and imparts context regarding the interview. The FAA appreciates the Committee's offer to append this letter with any public release of the transcript that the Committee might elect to make.

Subsequent to the December 2019 voluntary interview, Mr. Bahrami, through Agency counsel, provided two clarifications of his answers to the Committee: The first concerns a discussion beginning on page 39 of the transcript regarding the circumstances in which a manufacturer is required to disclose software problems on an airplane, like the non-functioning Angle of Attack (AOA) disagree message on the Boeing 737 MAX. The second concerns Mr. Bahrami's whereabouts at the time of a Committee hearing, discussed on page 115. In the interests of clarity and accuracy, I am memorializing those clarifications here to accompany any public release of the interview transcript. The two clarifications are reproduced below as they were shared with Committee staff shortly after the interview last year:

1. Having consulted with Mr. Bahrami and the Aviation Safety Organization, we would like to provide the following clarification regarding the non-functioning AOA disagree message: Software problems, like the non-functioning AOA disagree message, must be addressed by the manufacturer. RTCA DO-178B is an FAA approved method of developing software on many aircraft and covers software problems. DO-178B is used to identify software problems and works in combination with 14 CFR 21.3 and FAA Order 8110-107A (MSAD) to require a manufacturer who discovers a software problem to document the problem in a software problem report and classify the software problem report with respect to severity and safety significance. The manufacturer is obligated to report safety related problems to FAA, which the FAA analyzes in accordance with MSAD Order 8110-107A. If the software problem is not determined to be safety related or significant it is not required

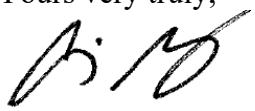
to be reported or corrected immediately, and instead can be corrected with the next software update.[1]

2. Mr. Bahrami has refreshed his recollection regarding the date of the Boeing hearing and he was in Seattle at Infoshare at the time of the hearing, not in Montreal at the Assembly.[2]

Given the potential for this transcript to be reviewed by outside parties, it is also important to clarify the conditions of the interview, which differ from the circumstances of a traditional civil deposition. As underscored by Mr. Bahrami's diligence in clarifying his answers, Mr. Bahrami cooperated voluntarily in this interview and answered questions to the best of his ability, despite some disadvantages that the congressional interview format placed on him. For example, Mr. Bahrami was not provided a detailed list of subjects and documents that the interview would cover, which hindered his best efforts to prepare to discuss specific matters of interest to the Committee, some of which dated back several years. During the interview, Mr. Bahrami responded to questions from several different Committee investigators and attorneys, sometimes with abrupt changes in topics or multiple questioners examining him at the same time. Some questions focused on matters about which Mr. Bahrami stated he had no personal knowledge or involvement, such as FAA actions that occurred when he was not employed by the FAA. The questions also covered documents Mr. Bahrami had not previously seen, was not familiar with, and, in some instances, was not shown or given an opportunity to review during the interview. In addition, under the terms for the interview, Agency counsel had no allotted time to ask follow-up questions during the interview to enable Mr. Bahrami to clarify a response or area of inquiry for the record.

I appreciate the Committee's cooperation in providing appropriate clarification regarding the interview transcript. If you need more information or have any questions, please do not hesitate to contact me or the Department of Transportation's oversight staff at (202) 366-4072.

Yours very truly,



Arjun Garg
Chief Counsel

[1] Email from Agency Counsel to Committee Counsel (Dec. 10, 2019, 7:22 PM).
[2] Email from Agency Counsel to Committee Counsel (Dec. 12, 2019, 6:46 PM).