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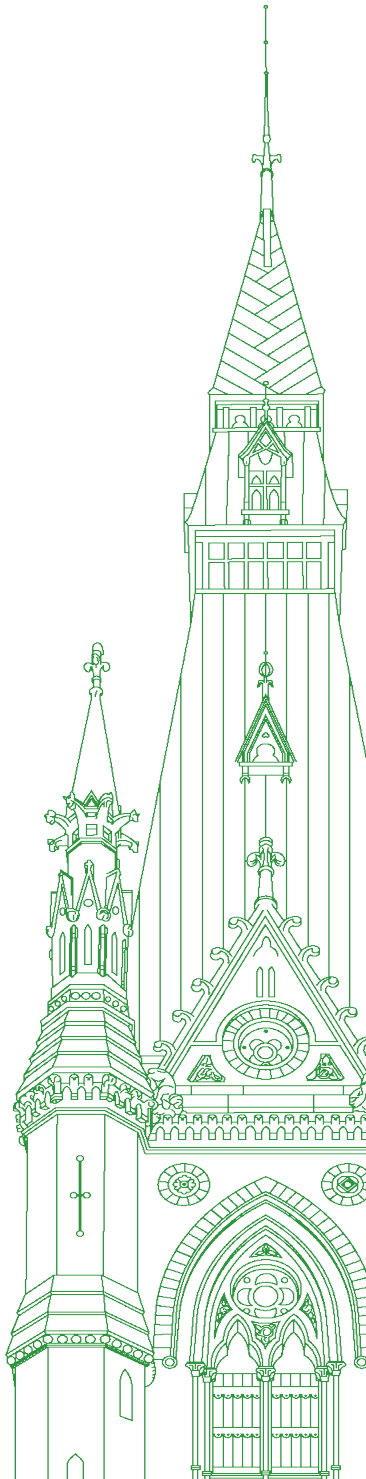

Chair: Mr. Vance Badawey

Standing Committee on Transport, Infrastructure and Communities

Tuesday, March 10, 2020

● (1530)

[*English*]

The Chair (Mr. Vance Badawey (Niagara Centre, Lib.)): Good afternoon, ladies and gentlemen. I would like to call this meeting of the Standing Committee on Transport, Infrastructure and Communities to order.

Before we get on with our agenda, I would like to take this opportunity to have a minute of silence. As many members recognize, today is the first anniversary of the Ethiopian flight 302 tragedy.

[*A moment of silence observed*]

Thank you.

Mr. Doherty.

Mr. Todd Doherty (Cariboo—Prince George, CPC): Mr. Chair, in the notice of meeting from the clerk regarding our meeting on Thursday, I noted that this study would take place from 3:30 to 5:00, and then from 5:00 to 5:30 we would do committee business.

Given the seriousness of the issue and the number of witnesses we have, I offer that we extend the committee meeting and do committee business from 5:30 to 6:00. This gives all parliamentarians an opportunity to hear from the witnesses and provide questions to them.

The Chair: Thank you, Mr. Doherty.

I'll take that as a motion.

Are there any questions or comments, members?

Mr. Sidhu.

Mr. Maninder Sidhu (Brampton East, Lib.): Mr. Chair, I have a prior commitment. I thought the meeting would be until 5:30. At 5:45, I have someone coming to my office. I could cancel that meeting, if you need me to.

The Chair: Are there any other questions or comments from members?

Mr. Doherty.

Mr. Todd Doherty: Mr. Chair, it's not normal practice during a study that we arbitrarily assign 30 minutes or a portion of that time immediately after having witnesses. The purpose of the witnesses' appearing is that we can ask pertinent questions of those witnesses regarding their testimony and the topic at hand. It would be out of the ordinary to hear from witnesses and not have an opportunity to put questions to them.

Again, I put it forward as a motion that I hope the committee will adopt.

The Chair: Thank you, Mr. Doherty.

Just for clarification, this is not in fact out of the ordinary; it is practice at times, when appropriate. Having said that, however, I will take the motion and ask members whether they have any further questions on the motion.

Mr. Berthold.

[*Translation*]

Mr. Luc Berthold (Mégantic—L'Érable, CPC): I want to add to what my colleague just said. There are three witnesses and we have 30 minutes. The witnesses will therefore come here only to make their presentations. We will not have any time to question them. According to the schedule, there will not even be a single round of questioning. I think it is perfectly legitimate for us to be able to question the witnesses and get clarifications on their presentation.

[*English*]

The Chair: Thank you, Mr. Berthold.

Are there any further questions or comments on the motion?

Mr. Bittle.

Mr. Chris Bittle (St. Catharines, Lib.): This is my attempt to compromise and find some middle ground on this, because I know members may have other commitments, such as flights home, and there's a cost to re-booking, not just in terms of money but of family. I'm here Friday, so it's not an issue for me, but it may be an issue for other members.

Perhaps we can cut the committee business in half and move forward based on that. That would give more opportunity for questions and allow for members who have to travel. I know some members of this committee have long distances to travel.

That's my attempt at a compromise, if it's acceptable to the opposition.

● (1535)

The Chair: Thank you, Mr. Bittle.

Are there further questions or comments?

Mr. Todd Doherty: Again, given the seriousness of the topic at hand and that witnesses have travelled great lengths to come before us, it's important that we not rush their testimony and give ample time for questions.

The Chair: Thank you, Mr. Doherty.

Are there further questions or comments? I will call the question on Mr. Bittle's amendment.

(Amendment negatived)

The Chair: Now we go to Mr. Doherty's motion.

(Motion agreed to [*See Minutes of Proceedings*])

The Chair: Thank you, Mr. Doherty.

Now we will get on with the business outlined in the agenda. We have the aircraft certification process.

We are privileged to have witnesses today. Between 3:30 and 4:30, as individuals we have Sylvain Alarie and Gilles Primeau, both professional engineers, to start us off. As well, from the Canadian Transportation Accident Investigation and Safety Board, we have Kathleen Fox, who is the chair, and Natacha Van Themsche, director of air investigations.

To all, welcome. It's a privilege and honour to have you here.

Of course, we'll start with a presentation by you. You have 10 minutes each. That will be followed by questions from members of the committee.

I'm not sure who wants to start.

Ms. Fox, the floor is yours.

Ms. Kathleen Fox (Chair, Canadian Transportation Accident Investigation and Safety Board): Good afternoon. I'd like to thank the committee for inviting the Transportation Safety Board of Canada, the TSB, to discuss the topic of aircraft certification.

[*Translation*]

Today I am joined by my colleague, Natacha Van Themsche, director of investigations in the air branch. She brings a wealth of experience and has a background as an aerospace engineer with over 20 years in the Canadian Forces.

[*English*]

As there are some new members on this committee, I'd like to take a very brief moment to tell you who we are at the TSB and what we do.

The TSB was created in 1990 by the Canadian Transportation Accident Investigation and Safety Board Act. Our mandate and our sole purpose is to advance transportation safety in the air, marine, rail and pipeline modes of transportation that are under federal jurisdiction.

We do that by conducting independent investigations, identifying safety deficiencies, causes and contributing factors, making recommendations and publishing reports. Put more simply, when something goes wrong, we investigate to find out not just what happened but why, and then we make public what we've learned so that those best placed to take action—the regulator and industry—can do so.

The TSB is independent and operates at arm's length from other government departments and agencies. We report to Parliament through the President of the Queen's Privy Council for Canada. This lets us be impartial, free from any real or perceived external influence.

[*Translation*]

lt is also important to clarify what the TSB does not do. We are neither regulator nor court; we do not assign fault, nor do we determine civil or criminal liability. We do not conduct inspections or audits. Those functions are left to the regulators and other organizations.

[*English*]

As for today's topic, aircraft certification, that is something that, generally speaking, falls outside of TSB's mandate as defined in the CTAISB Act. We cannot certify aircraft or aviation equipment. That is part of Transport Canada's role. The TSB would only be involved in such a matter if, during the course of our investigations, aircraft certification were identified as a safety-significant issue. Although such a scenario is not common, it has happened on a number of occasions. Allow me to provide two high-profile examples to give you a sense of when and how this works.

On September 2, 1998, Swissair flight 111 departed New York on a scheduled flight to Geneva. About 53 minutes after departure, the flight crew smelled an abnormal odour in the cockpit. A fire was spreading above the ceiling in the front area of the aircraft. This led to a rapid succession of aircraft systems-related failures. The flight crew declared an emergency, but several minutes later the aircraft crashed southwest of Peggy's Cove, Nova Scotia, killing all 229 people on board.

TSB's complex and exhaustive investigation made many findings. Two of them were both causal to the accident and specifically mentioned the issue of certification. First, the TSB found that the aircraft certification standards for material flammability were inadequate, in that they allowed the use of insulating materials that could be ignited and could sustain and propagate a fire. Second, we found that there was no requirement to consider a fire-induced failure when completing the system safety analysis required for certification.

The second example is from March 12, 2009, when a Cougar Helicopters Sikorsky S-92A experienced a sudden loss of oil from the main gearbox. Shortly thereafter, the helicopter crashed into the Atlantic, approximately 35 nautical miles from St. John's, Newfoundland and Labrador, killing 17 of the 18 people on board.

TSB's subsequent investigation found issues with the certification process for the main gearbox, specifically that the certification standards did not require the helicopter to be able to continue flight for 30 minutes following a loss of lubricant from the oil filter bowl, as happened in this occurrence.

● (1540)

[*Translation*]

Since then, other TSB investigations have made findings on topics including the design and certification of emergency locator transmitters, or ELTs, and the design of emergency exits and whether they are adequate in cases of emergency egress.

[*English*]

Over the years, the TSB has issued safety communications related to certification, such as safety advisory letters and board recommendations, and the subjects of these have included such issues as the recording capacity of cockpit voice recorders or CVRs, the aforementioned flammability standards for insulation materials, aircraft performance in icing conditions and the installation of stall warning systems.

In each case, once a recommendation is issued, we assess the minister's response and conduct an annual reassessment of the updated responses received. We evaluate progress made toward reducing or eliminating the identified safety deficiency and then report publicly on what remains to be done.

Again, I need to stress that the TSB is not itself involved in the actual certification process. As I said earlier, we are not the regulator. Our sole objective is to advance transportation safety by identifying safety deficiencies and reporting publicly on what needs to be done to reduce or eliminate the risks.

Thank you, and in due course I will be pleased to take your questions.

The Chair: Thank you, Ms. Fox.

Who is next?

Mr. Alarie, welcome.

[*Translation*]

Mr. Sylvain Alarie (Professional Engineer, As an Individual): Good afternoon.

Thank you. It is an honour to be here.

[*English*]

I'm an aerospace engineer. I've been working in the aerospace field for 30 years, since graduating. I started out as a draftsman and worked my way up as a designer, structural analyst, project engineer and system engineer. Until recently, I was chief engineer on large fly-by-wire flight control systems, and today I work as an engineering consultant specializing in the development of critical systems, such as flight controls, fuel systems and hydraulic systems.

My approach to the certification process is mainly from the point of view of the system supplier. I want to highlight that a little bit to you to help steer some of your questions.

Since the late 1990s, a process has grown whereby the airframe manufacturers who apply for the type certificate will flow down certification requirements by contract to the system suppliers. These system suppliers, depending on their system, will negotiate which of the Transport Canada regulations are applicable to their system, and, through the whole development process, they will be working with the airframe manufacturer and by extension Transport Canada to design a system that complies with the regulations. They will also prepare all the plans and the familiarization and verification artifacts needed for the certification of the system on the airframe and the type certification itself.

My role as chief engineer was to oversee the design, but I was also responsible for the certification and responsible for costs, schedule and risk on the programs, which creates an interesting dichotomy whereby you have to manage these different priorities.

As I said, when I look at the certification process, it's more from a bottom-up perspective: How do systems comply? How do we apply the changed product rule when we make changes to our system? How do we flow to the airframer that the system change is coming? How do we deal with the change with Transport Canada?

I look forward to answering your questions. Thank you.

● (1545)

The Chair: Thank you, Mr. Alarie.

Mr. Primeau.

Mr. Gilles Primeau (Professional Engineer, As an Individual): Good afternoon, Mr. Chair, vice-chairs and committee members.

[*Translation*]

My name is Gilles Primeau, and I want to thank the committee for inviting me to appear today as an individual, professional engineer and private pilot.

[*English*]

Flight controls problems are the dominant factor in the Lion Air and Ethiopian Airlines 737 Max crashes. This is where my expertise and experience reside. Early on, I simulated them and spent hundreds of hours, notably in 737-300 level D full-flight simulators. Later, I worked for several aircraft types on the design, testing and certification of actual flight controls and on the horizontal stabilizer trim system, HSTS, in particular.

This is probably the most important of all aircraft systems. If its actuator breaks, or if its controller acts abnormally and the situation cannot be contained, you lose the aircraft. This happened before the 737 Max crashes. Alaska Airlines flight 261 crashed in 2001 because of the system's actuator, and in 2011 a Falcon 7X was almost lost because of the system's controller.

One year ago today, the second 737 Max crash took place. On that day, I started my independent, neutral and voluntary study into what caused those crashes. Contributing to the prevention of similar tragedies in the future became for me a professional and moral obligation and the best way I could ensure that the 346 victims have not perished in vain.

To prepare for today, I read the transcript from the February 25 hearing with Transport Canada certification leadership, and I can agree with their assessment of the high quality of regulatory oversight and the enviable safety record in Canada. I also agree with the spearheading by Canada of the need for high-quality simulation training, especially regarding MCAS. My experience as a pilot from three separate flights with specific difficulties encountered, one of them being during my first solo flight, has me absolutely convinced that in front of the unexpected, good training is your best ally.

I also agree that the level of international harmonization of regulations should be improved. The changed product rule, CPR, is a good example. This may also apply to regulation 25.1309, the most important regarding aircraft systems.

I now wonder whether there might be merit in having every national certification authority that oversees airframers in its own country dispatch permanently some of its own representatives to each of the other countries in the same situation. If everyone acts in good faith, new developments could be made more robust from the contribution of all stakeholders.

Also relative to the aircraft certification process, almost nine months ago I concluded that there exists the potential to introduce the following two new regulations.

First, regarding the CPR and the associated so-called “grandfather clause”, no grandfathering privilege should be granted if anything is interfaced, new or modified, to a previously certified critical system. The latter then needs to be recertified. With this rule, the introduction of MCAS would have forced the modernization of the HSTS.

Second, regarding testing—and this ties to a key recommendation from the JATR, the Joint Authorities Technical Review—testing for any critical system should be forced, maybe under regulation 25.1309, to be performed integrated with all its interfacing systems. Some call this aircraft-level testing. In other words, testing of critical systems individually or in silos is insufficient. With this rule, the simple test of a faulty AOA sensor would have easily uncovered its multiple effects, forcing architecture changes upon the 737 Max.

The MCAS software changes will make the 737 Max safer; however, the HSTS will then have become the next weakest link in the chain, and no chain is stronger than its weakest link. I have identified nine technical reasons to justify the need to modernize the 737 Max HSTS.

● (1550)

Another key finding was that a faulty AOA sensor, in addition to causing erroneous MCAS activation, has also caused a large increase of the control column forces due to the erroneous stall detection. High column forces, along with high manual trim wheel forces, a long-known problem, made it extremely difficult for the ET302 flight crew in particular to raise the nose of the aircraft, to trade airspeed for gaining altitude, which they had to do to avoid colliding with local peaks. Google Earth near Addis Ababa reveals why the ET302 crew requested from air traffic control a 14,000-foot altitude. That's what they were struggling to achieve.

The conclusions of my study have been compiled in a 44-page document, which was recently sent to Boeing. It notably contains 24 main technical questions, makes suggestions for rebuilding trust in Boeing and gives a synopsis of what likely occurred in each accident flight, based on the findings from my study. Because of the ties to regulations and the pre-cited incentive to harmonize internationally, the FAA and Transport Canada were also put in distribution of this document.

[*Translation*]

Thank you for your attention, and I am now prepared to answer your questions.

[*English*]

The Chair: Thank you, Mr. Primeau.

Thank you, all, for your presentations.

We will start off with Mr. Doherty.

Mr. Todd Doherty: First, I want to thank the witnesses for being here today.

Mr. Primeau, would you be willing to table your findings with the committee as well?

Mr. Gilles Primeau: Yes, I'm willing to do so, but confidentially, because I want to give Boeing a fair chance of answering. Some of the questions are pretty steep, and I want to give them a fair chance to answer them before this goes public.

Mr. Todd Doherty: Mr. Primeau, does it seem odd to you that even the flight control manuals did not mention MCAS, except in the definitions? With more than 1,000 pages in the flight control manuals, it did not even put the information in.

Mr. Gilles Primeau: Given the capabilities of MCAS, that it can take control of the stab trim actuator, yes, that's unacceptable. I think it was only found in the glossary later on.

Mr. Todd Doherty: With your background, do you believe, given the size of fuselage and the capacity—38% longer and 52% greater size, and thrust of engines 100% greater—that the 737-800 should have been classified as a new aircraft or just certified as a new model?

Mr. Gilles Primeau: I would certainly have thought that the stab trim system had to be revised. One of the questions I'm asking Boeing is whether they instrumented one of their test aircraft, instrumented the actuator itself to confirm whether the load-bearing capability was appropriate for the aircraft.

Mr. Todd Doherty: Thank you, Mr. Primeau.

Ms. Fox, has your organization, the NTSB, been involved, either prior to the crashes or after the crashes, in any investigation regarding the certification of the 737 Max?

Ms. Kathleen Fox: For clarity, not to confuse matters, we're the TSB of Canada—

Mr. Todd Doherty: Yes. I'm sorry.

Ms. Kathleen Fox: —not to be confused with the NTSB, which has done—

Mr. Todd Doherty: I know what it is. I'm sorry.

Ms. Kathleen Fox: No, we have not conducted any investigations ourselves into the Max. Prior to its grounding, we didn't have any occurrences involving the Max of a similar nature that would have compelled us to conduct an investigation at that time.

Mr. Todd Doherty: So after the first incident, you weren't compelled to do a review of the certification of the 737 Max.

Ms. Kathleen Fox: If we're talking about Lion Air, the Lion Air accident was under investigation, and like any other accident investigation agency, we were obviously very interested in the outcome.

Mr. Todd Doherty: Okay.

Ms. Kathleen Fox: When the Ethiopian Airlines plane crashed, our role was very limited by the fact that the aircraft wasn't Canadian-built, Canadian-manufactured, Canadian-operated or Canadian-registered, so our role was the same as in the Iranian accident—limited status.

Mr. Todd Doherty: Thank you. I'll turn it over to my—

The Chair: Thank you, Mr. Doherty.

Mr. Baldinelli.

Mr. Tony Baldinelli (Niagara Falls, CPC): Thank you to the witnesses.

Ms. Fox, just as a follow-up on that, in terms of annex 13 of the Convention on International Civil Aviation, if an accident includes nationals from Canada among the deaths in a tragic incident, experts can be appointed by our country to investigate and look into these matters. Are you saying the Canadian Transportation Accident Investigation and Safety Board was not involved in the Ethiopian Airlines incident?

● (1555)

Ms. Kathleen Fox: Because in that particular accident the interest was due to the Canadian fatalities, our status under ICAO annex 13 was limited to "expert". We immediately, following that accident, tried to become involved. We contacted the Ethiopian investigation agency and worked closely with central agencies in our own government and with diplomats, but unfortunately we were never able to.... We even sent an investigator to Paris to attend the download of the recorders, which we were never allowed to participate in because of our limited status under annex 13. But we tried.

Mr. Tony Baldinelli: Just to follow up, does the Transportation Accident Investigation and Safety Board routinely request that their foreign counterparts allow them to participate in investigations?

Ms. Kathleen Fox: It depends upon the involvement. Certainly, if it is a Canadian-manufactured product, has a Canadian operator or a Canadian registration, or if the occurrence happens in Canada, then we have full rights, if not to lead the investigation, then to participate as an accredited representative.

In the case of the Ethiopian Airlines crash, we were unable to go beyond the "expert" status, notwithstanding that we tried through multiple attempts and multiple agencies. In the end, we were limited to receiving factual information released by the Ethiopian investigation agency on the progress of the investigation.

Mr. Tony Baldinelli: You also mentioned that you are not the regulator and that they look after the certification process, but that you would look to play a role on the safety and accident side in providing recommendations, should an accident occur. Has that happened with regard to the Max 8 aircraft at all?

Ms. Kathleen Fox: Again, other agencies.... For example, the National Transportation Safety Board in the U.S. has conducted an investigation and has made recommendations. We don't have any formal role to play, but we are following the developments very closely.

Mr. Tony Baldinelli: The House Committee on Transportation and Infrastructure in the U.S. just released a preliminary report. Was your office contacted to participate in it or to provide any input or comments on it?

Ms. Kathleen Fox: No.

The Chair: Thank you, Mr. Baldinelli.

Thank you, Ms. Fox.

Mr. El-Khoury.

[*Translation*]

Mr. Fayçal El-Khoury (Laval—Les Îles, Lib.): Thank you for being here and for the insight you bring to our committee.

My question is for Mr. Alarie and Mr. Primeau: did you meet with the Minister of Transport, Marc Garneau, and Transport Canada to share your expertise and your point of view?

If your answer is yes, what were the main recommendations you made?

Mr. Sylvain Alarie: As Mr. Primeau has indicated, he has begun to prepare a stand-alone brief. At some point, questions regarding flight controls and actuators arose and he called me. There was also talk of a review of his work. I participated in that activity with him. My role was to support Mr. Primeau. I think we're in complete agreement on the case. Then Mr. Primeau spoke to Minister Garneau.

I'll give him the floor.

Mr. Gilles Primeau: I asked to meet with Minister Garneau. I don't remember the exact date. I was granted a 30-minute hearing and it was held on Friday, May 3, I believe. At the end of the 30 minutes, I apologized because I had not finished yet, but the minister said:

[*English*]

"Please continue."

[*Translation*]

I stayed there for about 50 minutes, and Mr. Garneau asked me if I was willing to go and present what I had found so far to his experts at Transport Canada in Ottawa, which I agreed to do.

It took place on June 18. I made a presentation of about 65 slides, about 40 of which were active. It lasted two hours. It was very well explained to me that I couldn't get any feedback. That is normal. I want to fully respect the investigation process. However, I was still led to believe that I was on the right track in some respects.

● (1600)

Mr. Fayçal El-Khoury: Was it understood that Transport Canada would follow up on your recommendations?

Mr. Gilles Primeau: I forgot to answer the second part of your question.

I have made the recommendations I mentioned in my presentation. I made some suggestions, but I wasn't sure whether Transport Canada had the authority to do certain things, such as requesting the inspection of certain parts.

With respect to what Ms. Fox just said, I don't think there was much power in that connection, but I made recommendations for new regulations, the one I told you about.

[*English*]

Mr. Fayçal El-Khoury: We have understood that the observations of Mr. Primeau and Mr. Alarie have not yet been noted in any investigation.

[*Translation*]

Even with respect to the questions and recommendations you sent to Boeing, you did not get a response. I think that here in Canada, when our experts send a report outside, it must be respected.

Can you explain to the committee why you didn't get a response?

[*English*]

Is there any hidden reason behind the scenes that did not allow Boeing to answer your questions?

Mr. Gilles Primeau: The questions were posed directly to Boeing by email last Thursday, followed by a paper copy that was sent by registered mail. The last time I checked, it still hadn't been taken in at the headquarters in Chicago. The mail process could still take a couple of days. The FAA, however, did receive it.

Mr. Fayçal El-Khoury: Do you believe you are going to have answers to those questions and those recommendations?

Mr. Gilles Primeau: I cannot know what has been done with my input. I respect that, because I respect the process of investigation. I wouldn't want to be blamed for having tried to interfere with something. All I have is my knowledge of physics. Even if we don't understand and apply physics properly, unfortunately, the laws of physics are always right. We will have to deal with the laws of humans in courts of law later, and I'm not good at that.

[*Translation*]

Mr. Fayçal El-Khoury: The opinions provided by experts on these subjects are contradictory. You are very experienced engineers.

How are we going to evaluate such complicated aeronautical engineering issues in such a case?

Mr. Gilles Primeau: If Mr. Alarie and I made certain statements about certain systems on November 10, on *Découverte*, a Radio-Canada program, it's because we were certain of what we had discovered.

The CBC team also demanded to be able to corroborate our statements before broadcasting anything. So we brought in an engineer by the name of Peter Lemme, who worked for Boeing and with whom I was in contact. Let's just say that some of my findings surprised him. He told me:

[*English*]

"I'm still pondering them."

[*Translation*]

However, we are going in the same direction.

[*English*]

The Chair: Thank you.

Mr. Barsalou-Duval.

[*Translation*]

Mr. Xavier Barsalou-Duval (Pierre-Boucher—Les Patriotes—Verchères, BQ): Thank you very much, Mr. Chair.

My first questions will be for the Transportation Safety Board representatives.

Earlier I had a question, and I got the answer when one of my colleagues was told that the Transportation Safety Board had not investigated the two accidents involving a Boeing 737 MAX because it had not been allowed to go to the site of the accidents to obtain evidence.

I would like to know what the usual procedure is in such cases, because, on the one hand, a total of 18 Canadian citizens were affected by this accident, and on the other hand, there are also Boeing 737 MAX aircraft in the air here. So we are very affected by these accidents.

Ms. Natacha Van Themsche (Director, Air Investigations, Canadian Transportation Accident Investigation and Safety Board): I'll answer that question.

First, I will put annex 13 to the Convention on International Civil Aviation of the International Civil Aviation Organization, or ICAO, into context. It is this annex that governs international investigations of aviation accidents and incidents. It includes very clear roles and responsibilities.

For example, in theory, the country where the accident takes place should be responsible for the investigation. Second, the countries that make up the investigation team, i.e. those that will actively conduct the accident investigation, are the State of Registry or State of the Operator of the aircraft, the state where the aircraft was designed and built, and the state where the engines were designed and built. These countries play a very active role in the investigation.

In the case of the Lion Air accident, Canada does not meet any of these criteria. The case of the Ethiopian Airlines flight is different. The annex I was talking about states that when citizens of a country are on board an aircraft involved in an accident, that country has expert status. However, this status is very limited. In fact, it allows them to visit the scene of the accident, to receive factual information that is ready to be publicly disclosed by the state responsible for the investigation, and finally, to receive a copy of the final report of the investigation. This is what annex 13 allows in such cases.

So, in the case of Lion Air, we have no status, and in the case of Ethiopian Airlines, we have expert status. That being said—

● (1605)

Mr. Xavier Barsalou-Duval: Thank you. That answers my question.

Basically, the expert status doesn't give us much more than the average person has. You get on a plane, you go and see the scene after the accident and you get the same documents, which are public. I understand that it doesn't give you much to go on.

However, could the Transportation Safety Board, for its part, have undertaken investigations into the 737 MAX here after the two accidents that occurred? We know we have some here.

Can you carry out such investigations? If so, why don't you do it?

Ms. Kathleen Fox: First, our mandate is to investigate events, and accidents are events. Following the Ethiopian Airlines accident, there was a worldwide flight ban. Also, investigations by Ethiopian Airlines and by the United States were ongoing. In reality, we had no formal role to play. As I told you, we are closely monitoring the turn of events.

Mr. Xavier Barsalou-Duval: You had confidence in the process, given that these two accidents were being taken seriously and that other countries were going to check it out. So you're going to follow that.

Ms. Kathleen Fox: Yes.

Mr. Xavier Barsalou-Duval: I understand. Thank you for the answers you gave to my questions.

I have some questions for Mr. Alarie and Mr. Primeau.

I'm trying to understand what happens when you design such a device and add systems, as has been the case. They didn't indicate in the manual that there was a new collision avoidance system, the MCAS, and they didn't train the pilots to use it. In fact, there's a one-hour general training on the aircraft that's done on an iPad, and the system is not even mentioned.

When we have a new system like this, is it common not to put it in the manual and not train the pilots in its use?

Mr. Sylvain Alarie: On board the aircraft, they would have applied the changed product rule.

When they built the new plane, they had to take an inventory of everything new on board. When they added the MCAS, they had to establish the criticality of the system. This would have been classified as minor.

This means that, if the failures were major and the system was faulty, they would have slightly increased the pilots' workload.

In my opinion, that's where the mistake was made; it was misclassified. They took it for granted, like the trim system in general—

Mr. Xavier Barsalou-Duval: I'm interrupting because I'm running out of time.

If it was misclassified, do you think it was intentional on Boeing's part to limit the analyses or was it just a common mistake?

Mr. Gilles Primeau: If this had been classified as risky or riskier, they would have been forced to do simulator training. Boeing, which even had an agreement with Southwest Airlines, did not want to do it. If there was a need for simulator training, there would be a $1-million rebate per aircraft.

● (1610)

[*English*]

The Chair: Thank you, Mr. Primeau.

Mr. Bachrach.

Mr. Taylor Bachrach (Skeena—Bulkley Valley, NDP): Thank you, Mr. Chair.

I'd like to begin by acknowledging the one-year anniversary of the flight 302 disaster and express my condolences to the families and everyone who's been affected.

I'd also like to thank our witnesses for being here today.

My first question is for Mr. Primeau. It has to do with harmonization of the certification processes between our country and other countries. At a previous committee meeting, we had a chance to ask questions of Transport Canada officials about the validation improvement road map, one of the goals of which is to limit the technical study by validators in that process and to fully harmonize the validation and certification processes.

How would you describe the certification process between Canada and the U.S.? In light of the two crashes we've been discussing, are there questions about whether we should be moving towards common certification and the pursuit of harmonization?

Mr. Gilles Primeau: I'm going to go back to the transcript from the February 25 meeting and repeat that I was in agreement with what was said by the Transport Canada people. This is also why this was a late addition in my preparation.

I had the idea of perhaps going towards a common certification. That would be a big bite to swallow. An intermediate step might be to dispatch experts to other national certification authorities and try to have a common understanding before the project starts. That's just an idea I had.

Mr. Taylor Bachrach: Thank you for that answer.

You also spoke a little bit about the grandfathering that occurs currently for systems that are interfaced with previously certified critical systems. Could you speak to how common this is in our current certification process, how frequently it occurs?

Mr. Gilles Primeau: My last job was in Seattle, on the Mitsubishi regional jet, the MRJ. There was a big team whose only task was to try to contain suppliers trying to apply similarities so that their system could be installed on the aircraft without any change. Sometimes I joked, “Are you calling similarity against the Wright Flyer?” It's amazing.

The technical rules should lead. By that I mean, you need to qualify, you need to test, and if you've made a change for this new aircraft that is significant, that's where the CPR comes in—minor versus major changes, or non-significant versus significant changes. You just bite the bullet and go and test it. It's amazing, the endless discussions I have seen in my career. They might as well turn around and test it; it would have taken less time and fewer resources.

Mr. Taylor Bachrach: Thank you.

Going back to your suggestion that for every national certification every other country could dispatch its own regulators to participate, could you walk us through, in a little more detail, how that would have worked in this scenario around the Max 8, and how it would have caught the deficiencies and potentially prevented disaster?

Mr. Gilles Primeau: The two recommendations I am making are separate from having an international team of experts. In this case, though, to try to answer your question directly, it would be the excellent reputation of Canadians in aerospace that might have been helpful.

Of the two recommendations for new regulations, the first one, which says “no grandfathering”, should have automatically caused the HSTS to be recertified.

Mr. Taylor Bachrach: Thank you, Mr. Chair.

The Chair: You have two more minutes.

Mr. Taylor Bachrach: I have a question for Ms. Fox.

You mentioned two other incidents, the Swissair crash and the incident involving the Sikorsky. You mentioned that subsequent to that, the TSB issued communications that related to the certification process. Were those communications integrated into the future certification of those types of aircraft?

Ms. Kathleen Fox: With respect to the Swissair accident, a little less than half of the 23 recommendations related to certification and the flammability standards. Most of those were adopted by industry, not only in the U.S. and in Canada but also in Europe. The material that was in use in that aircraft is no longer permitted. Many of those recommendations, then, were implemented.

With respect to the certification processes used for the Sikorsky 92A, unfortunately the action that the board wanted has not yet been taken, and so that helicopter, for example, cannot fly for at least 30 minutes in the event of a loss of lubricant from the main gear.

● (1615)

Mr. Taylor Bachrach: Is it fair to say, then, that your concerns in that regard are outstanding?

Ms. Kathleen Fox: Yes, in the case of those particular recommendations, they remain outstanding and active.

Mr. Taylor Bachrach: Thank you, Mr. Chair.

The Chair: Thank you, Mr. Bachrach and Ms. Fox.

I'll go to Mr. Davidson now.

The floor is yours.

Mr. Scot Davidson (York—Simcoe, CPC): Thank you, witnesses, for appearing.

Again, my condolences to the families.

I'm going to look at the airplane itself first. I'll ask the engineers this question. Would you say the 737 Max is a stable or unstable airplane? That's a big question.

Mr. Gilles Primeau: Are you referring to the location of the engines and how they can pull it up?

Mr. Scot Davidson: Yes. There have been significant changes compared with the NG model.

Mr. Gilles Primeau: Oh, my gosh. When they found they needed to expand the envelope of protection from the MCAS at low speed, that's when everyone should have stopped and said, “Wait a minute.”

Fly-by-wire aircraft can control elevators to control the pitch of the aircraft with finesse. They can gradually, through the control laws, keep the airplane stable. If you don't have a fly-by-wire aircraft like the 737, and the only pitch control surface you can control electrically is the horizontal stabilizer, and you have this actuator that moves it to, say, a quarter-degree per second, that's all you have to work with.

Mr. Scot Davidson: Yes.

Mr. Gilles Primeau: You need to be extremely careful when you're going to use such a high-gain surface to do the same type of finesse that you'd do if you had a fly-by-wire bird.

Mr. Scot Davidson: There have been some wiring issues that have come to light. Given what you've been studying and looking at, I wonder if you could comment on whether the wiring should be bundled or split, or if you've looked at that.

Mr. Gilles Primeau: Yes, well, that's part of the HSTS modernization that would have to happen.

Typically, we do what's called a particular risk analysis—engine rotor burst, APU rotor burst on the tail of the aircraft in this case—and we say, "Well, you have a blade from that rotor that's going to go and snap through your harness." That's why you need to separate some signals to make sure that you're not going to take out all the redundancies when there are.... On the HSTS for the 737 Max, there's only one motor to actuate that actuator, so they probably wanted to separate some wires on the connector to make sure that if you had chafing, you wouldn't be shorting two wires that could command it to go full nose-down or full nose-up.

Mr. Scot Davidson: How about lightning protection? Is that something they're looking at, do you know, on the engine mount, on the APU?

Mr. Gilles Primeau: That's typically done. That should be done by default. You may be referring to the 787.

Mr. Scot Davidson: There are a lot of things that should be done by default, but I don't think some things were done here. Is that the case?

Mr. Gilles Primeau: Well, on the 787, for instance, it came out. Well, it's a composite wing. You don't do lightning protection on fuel tanks the same way when they're built out of composites. There's a different rule. I worked on that on the MRJ in Seattle, peripherally, and on the Global 7500.

You know, some managers sometimes can overrule the engineer who's out in the trench and saying, "We need to do this." If the manager hasn't evolved and hasn't followed the technology that's been evolving, he's going to overrule someone, and you're going to end up with systems in the field that don't comply, necessarily, to the latest regulations.

Mr. Scot Davidson: Right.

Obviously, given the scrutiny, let's say, of this aircraft, if it is approved to fly again, do you feel that for pilots this should be a separate type rating on their licences to instill that confidence, given the changes from the NG model? Some would argue that these aren't significant enough to warrant that, but in this case, for the public to have trust, would pilots have a separate type rating for this aircraft given those changes, because it does act slightly differently?

● (1620)

Mr. Gilles Primeau: It would be a huge uphill battle. I would fight for making sure that they get excellent simulator training. If you want to achieve something, maybe that's what we should be aiming at.

Mr. Sylvain Alarie: It goes with the type rating.

Mr. Gilles Primeau: Yes, on the type rating, the airlines try to maintain that common type rating as much as they can.

Mr. Scot Davidson: Right.

Mr. Gilles Primeau: For the handling of this aircraft, in normal flight nobody should get near a stall in a 737 Max, until something unexpected happens.

Mr. Scot Davidson: That's right.

The Chair: Thank you, Mr. Primeau and Mr. Davidson.

We'll move over to Ms. Jaczek.

Ms. Helena Jaczek (Markham—Stouffville, Lib.): Thank you, Chair.

My question is for Ms. Fox.

This committee is tasked with studying the aircraft certification process here in Canada, so it's our duty, really, to ensure that all our Canadian institutions have the opportunity to comment appropriately when there is an aircraft certified in Canada that Canadians are going to be using, so that in fact every institution that touches this process has the opportunity to properly comment.

You have told us that within your mandate you were able to have only "expert" status, which was very limited as it related to the Ethiopian crash. Obviously, it's a terrible tragedy. Canadians died. What would you see? Would you like to have a larger role?

If you would like a larger role in terms of commentary and the ability to see what went wrong, how would we ensure that the TSB is actually able to play a larger role? Who decides those rules in terms of who gets to be at the site, etc.? Would you recommend that in some way we ensure the TSB has that role in the future?

Ms. Kathleen Fox: If we're talking about being part of a foreign investigation because of an accident that happened on foreign soil but in which Canada has a direct interest, the body that sets those standards and recommended practices is the International Civil Aviation Organization.

If we use the parallel with the Iranian PS752 accident, where again Canada has only "expert" status, in accordance with ICAO annex 13, in that case the TSB has actually received more access to the site, the wreckage and the investigating agency—even though it's being led by Iran—than we're entitled to as experts, even in the same situation.

It would really be up to ICAO to make the changes so that when a country like Canada, or another state, has a significant number of fatalities, as well as recognized expertise to contribute, we should be able to play a more active role in the investigation.

Ms. Helena Jaczek: Thank you.

In this case, though you had this limited role, will the TSB be issuing any type of report at all in terms of commentary when you do see what has been done?

Ms. Kathleen Fox: We would not normally comment on an investigation report by another country. Talking about the Ethiopian Airlines, we're certainly watching very carefully to see what the FAA, Transport Canada and other regulators are going to do before they put that aircraft back into service.

Again, we don't, in our mandate, really have a role to play. Certainly in any subsequent occurrences involving that aircraft or others, we would look to see if actions taken were sufficient or if more needs to be done.

Ms. Helena Jaczek: You mentioned your response to the Swissair and Sikorsky situations. Have there been other reports that you've issued over the last many years? If there have been, Transport Canada presumably has looked at your recommendations. Could you comment on the type of response you got?

Further to that, if you as an organization are not satisfied with Transport Canada, do you have the opportunity to issue another report, or is there anybody who is able to do that?

Ms. Kathleen Fox: The way we do it, yes, we've issued multiple recommendations over the years relating to certification issues on a variety of aircraft. We were talking about the Sikorsky S-92, and just to clarify, they are making improvements to that aircraft to allow it to fly 30 minutes without oil. They have responded to us.

We annually reassess the responses. When we find responses fully satisfactory, we say so. When there's more that needs to be done, we can rate it as satisfactory in part, or even unsatisfactory. Our ultimate tool is our recommendations, or even our watch list, if we find that there's a specific safety issue that isn't being addressed.

● (1625)

Ms. Helena Jaczek: Your commentary is publicly reported.

Ms. Kathleen Fox: Yes. All of our reports, recommendations, assessments and our watch list are publicly reported.

Ms. Helena Jaczek: I have one question for you, Monsieur Primeau, and I hope you won't think it's impertinent. You have given us a huge amount of information. I think we all appreciate it, and we understand where you're coming from.

Are you doing this out of public interest? You're a consultant. Has this report been sponsored by anyone?

Mr. Gilles Primeau: No.

Ms. Helena Jaczek: It's entirely...?

Mr. Gilles Primeau: Yes, it's entirely voluntary.

Ms. Helena Jaczek: I commend you. That's excellent.

The Chair: Thank you, Mr. Primeau and Ms. Jaczek.

Mr. Doherty.

Mr. Todd Doherty: Mr. Primeau, are you aware of how Boeing classifies any 737 Max 8 major design changes?

Mr. Gilles Primeau: That's the key question on the CPR: How do you determine if it's a minor or a major change?

Mr. Todd Doherty: Is it L-1?

Mr. Gilles Primeau: Oh, on the nomenclature, I wouldn't know about the nomenclature.

Mr. Todd Doherty: You don't know what those changes would be in terms of what a minor change is and what a major change is.

Mr. Gilles Primeau: Normally—and Sylvain will be able to correct me if I'm wrong—if something turns out to be a major change, it should appear on the type certificate.

Is that correct?

Mr. Sylvain Alarie: Yes.

Mr. Gilles Primeau: Okay. Sylvain has gone through the type certificate.

Go ahead, Sylvain.

Mr. Sylvain Alarie: I went through the type certificates with the whole history, multiple pages, and I couldn't find anything related to the pitch trim or the—

Mr. Gilles Primeau: Stab trim system....

Mr. Sylvain Alarie: They didn't categorize it at all—

Mr. Todd Doherty: Are you aware now or were you aware at the time of certification of the 737 Max...? You're in the industry. You know that this is a new aircraft. I'm a former aviation guy. I followed it along as well. Were you aware of any concerns at the time of the manufacture and the certification? Would it concern you now to learn that perhaps there were some indicators and that perhaps there was some concern regarding the stall indicators or stall identification?

Mr. Sylvain Alarie: Personally.... Boeing is Boeing, and they've certified a lot of airplanes. There are very clear rules in Canada and in the U.S., and they are very well harmonized. You would think they would have done the classification properly, and that it would be adequate and appropriate, and so the certification carried on that way. It was only after the fact, unfortunately, that we found out that some of the due diligence wasn't done.

Mr. Gilles Primeau: There was one engineer who said, “Are we going to allow the system to be controlled by a single sensor, which can cause catastrophic events?” I'd like to know who that guy is; he should be put in charge.

Mr. Todd Doherty: I really appreciate your testimony here today.

As many have mentioned, it is the one-year anniversary.

We also have family members present here. We have family members who are probably paying attention. The reason we're doing this is to get answers for those family members, not only of the Canadians but of those 346 lost because of the two crashes.

In your opinion, were all the checks and balances met?

Mr. Sylvain Alarie: The process works only as well as it is applied.

Mr. Todd Doherty: Right.

We've also heard that there are Boeing employees who said there were monkeys guarding the bananas. I think that was the quote. We're also hearing about “Jedi mind tricks”, which is very frustrating, obviously.

To all of our colleagues here, I would be interested, as we move through this.... I would ask, Mr. Chair—I will do this at a later date, and we've already discussed this....

Mr. Primeau and Mr. Alarie, I think your testimony today has been very in depth. As we are getting close to the end of this session, would you make yourselves available for this committee if we invite you back?

● (1630)

Mr. Sylvain Alarie: Sure. It would be a pleasure.

Mr. Gilles Primeau: Yes.

The Chair: Thank you, Mr. Doherty.

We'll now move on to Mr. Bittle.

Mr. Todd Doherty: Good.

Thank you.

Mr. Chris Bittle: Thank you very much, Mr. Chair.

Since there aren't too many aviation experts in the room, apart from those up front—and perhaps this isn't a fair question to the Transportation Safety Board—for me, as an individual who studied not the laws of physics but the laws of man in law school, could you comment on what has been testified to by Mr. Alarie and Monsieur Primeau?

Ms. Kathleen Fox: No.

Mr. Chris Bittle: Without commenting on their conclusion, do you see any flaws in the process they've explained regarding how they would get to their conclusion?

Ms. Kathleen Fox: They're experts in their fields.

I think it would be totally inappropriate for me to comment on their testimony or on the reports issued by other agencies, other than to say that we are paying attention and keeping a watchful eye on it.

Mr. Chris Bittle: Thank you so much.

Mr. Primeau, did you mention that you simulated some of the issues on a B737-300 simulator? Was that what I had heard?

Mr. Gilles Primeau: At the beginning of my career, I was flight controls engineer and I would simulate the 737 flight controls in the simulator. That included getting all the logic and all the performance, and testing it to verify. It was my work there that allowed me to predict what the forces are on the column.

Mr. Chris Bittle: I appreciate it. Again, thank you very much for being here.

Is there an ability to have Canadian expertise or Transport Canada involved as an observer in terms of all certifications that are happening around the world, just in terms of the sheer volume that is going on?

Mr. Sylvain Alarie: I've worked with certifications in Canada and in the U.S.

In my experience, obviously the country where the airplane is being designed is the lead in certifying the airplane. I don't know exactly what the laws are, but usually the FAA and EASA are involved if it's in Canada.

There are periodic familiarizations. Those usually happen at a very high level, and Transport Canada will explain where they are in the process, what the airplane is like and so on. I think at that point they do have an opportunity to say that they've had issues with something, they're concerned about a regulation, and they want to dive into that.

That would have to be verified, but I'm pretty certain they do have an opportunity to do that. It's just not done very often because there's a really good reciprocity agreement.

Mr. Gilles Primeau: It's informal, I would say, rather than formal. We should formalize it, perhaps.

Mr. Chris Bittle: Fair enough.

I'll go back to the Transportation Safety Board.

You mentioned our inability to be involved in terms of the Ethiopian air tragedy with respect to treaty, and I appreciate that. If there were a similar tragedy in Canada, would the TSB refuse other foreign agencies in a similar manner? How would the TSB go about making that determination?

Ms. Kathleen Fox: The Transportation Safety Board applies the conventions under annex 13 of the International Convention on Civil Aviation. We would lead the investigation. We would involve all the other states that have a role that is formally outlined.

If another state were in our position, we'd have to look at what they could bring to the investigation team, but certainly we thrive on transparency and openness, and as long as they respect the rules of confidentiality.... We'd have to look at it on a case-by-case basis.

Mr. Chris Bittle: This is a question that I've asked of other officials. For Canadians who are watching today, is it safe to fly in Canada?

Ms. Kathleen Fox: We have a very good safety record in Canada in aviation.

We're about to release—tomorrow—our statistics for 2019. It was a very challenging year for some sectors of aviation, notably general aviation, but the safety rate in commercial aviation, the type of aircraft that most people board—talking about the large carriers—is quite safe. When we look at segments like air taxi, we have some real concerns in that area, and we've published a special study on that.

Mr. Chris Bittle: Do you think the minister acted responsibly in grounding the Max 8 fleet?

● (1635)

Ms. Kathleen Fox: The action was taken, and it obviously has been demonstrated to be the right thing to do, given the ongoing work and the fact that the aircraft is still undergoing testing. Plans are still being made as to when, how and what additional requirements will be put in. I think it was the right thing, if only from a public confidence perspective.

Mr. Chris Bittle: Thank you.

The Chair: Thank you, Ms. Fox and Mr. Bittle.

To all of you, Mr. Primeau, Mr. Alarie, Ms. Fox and Ms. Van Themsche, I thank you for your time today. As Mr. Doherty mentioned earlier, possibly you will get a phone call in the future to participate once again.

I will suspend for a moment.

● (1635)

_____(Pause)_____

● (1640)

The Chair: The committee will reconvene.

First, I want to take this opportunity to welcome our witnesses for this session between now and the end of the meeting.

We have Jodi Diamant, chief engineer, airworthiness and certification, Pratt & Whitney Canada. We have Jim Quick, president and chief executive officer of the Aerospace Industries Association of Canada. We have Michael Deer, airworthiness specialist at Bell Textron Canada Limited.

From Viking Air Limited, we have David Curtis, president and chief executive officer; and Steven Bruce, director of design and certification. From De Havilland Aircraft of Canada Limited, we have David Joseph Watson, manager, airworthiness and air safety.

With that, we'll start with presentations for members.

Mr. Quick, you had your hand up, so I'm assuming you want to go first.

Mr. Jim Quick (President and Chief Executive Officer, Aerospace Industries Association of Canada): I'll volunteer; how is that?

The Chair: The floor is all yours.

Welcome.

Mr. Jim Quick: Thank you, Mr. Chairman, and good afternoon.

On behalf of the members of the Aerospace Industries Association of Canada, thank you for including us in your study on the aircraft certification process.

Aerospace stands as one of our country's proudest achievements, providing 215,000 jobs and $25.5 billion annually to the Canadian economy.

It is also a sector that is facing increasingly fierce global competition. Frankly, Canada is falling behind from a competitiveness standpoint. That's why our association launched vision 2025, a pan-Canadian, industry-led initiative, just over a year and a half ago. We travelled across the country, engaging our members, federal and provincial governments and our 215,000 employees. The process resulted in a comprehensive report that outlines the industry's concerns. We have also provided recommendations.

One of the key priorities identified involved Transport Canada's certification process and ensuring its status as a world-class regulator.

I'd like to say right off the top that AIAC has full confidence in TCCA's work to certify Canadian aircraft. However, we have some recommendations from an organizational and resource perspective.

I'll start with the organizational structure of TCCA. My remarks today are not intended to criticize; in fact, we feel that TCCA has an unparalleled commitment to safety. However, opportunities exist to improve efficiencies in its interaction with industry.

Currently, TCCA is the only major civil aviation regulator that is structured within a government department. This isn't the case with our major trading partners. The U.S.A.'s Federal Aviation Administration, the FAA, and the European Union Aviation Safety Agency, EASA, are different. TCCA is hampered by a structure that places it in competition within a multimodal Transport Canada and with a complicated internal reporting structure.

AIAC's civil aviation technical committee, comprised of industry representatives and subject matter experts, has reviewed that structure and made the following recommendations: TCCA should be structured within Transport Canada as a stand-alone branch, with proper autonomy, authority and accountability. A senior-level official with relevant aviation experience—an ADM or higher, in our view—should be appointed with overall responsibility for civil aviation matters in Canada. A strong and clear mission statement for civil aviation should be issued. Finally, we recommend to work with us at AIAC to re-establish and invigorate the Canadian Aviation Regulation Advisory Council, CARAC, to ensure industry is working with government to assess and recommend potential regulatory changes through co-operative rule-making.

That brings me to the investment side. Our industry is growing at a rate of 5% a year, yet investments at TCCA are not keeping pace. Our most important trading partner, the United States, funds the FAA in a very proactive and transparent manner. It's a matter of public record. AIAC's civil aviation technical committee recommends that the Government of Canada create a high-level stakeholder team—industry stakeholders as well as Transport Canada—tasked with the following: identifying the staffing and funding requirements by the TCCA, and identifying fair and practical methods of achieving the staffing and funding. The team should be mandated to provide their findings and recommendations within a short, defined timeline, and this should occur in parallel with improving the efficiency of the organizational structure of TCCA.

I'll wrap up by reiterating that it's imperative that TCCA's reputation as a leading civil aviation regulator be protected and enhanced. These recommended changes, we feel, will ensure that.

Thank you, Mr. Chairman.

● (1645)

The Chair: Thank you.

Ms. Diamant, you are next.

Ms. Jodi Diamant (Chief Engineer, Airworthiness & Certification, Pratt & Whitney Canada, As an Individual): Good day, Mr. Chair, vice-chairs and members of the TRAN committee.

I would like to thank the committee for undertaking this important review of Transport Canada's aircraft certification process and extend my sincere condolences to those who have lost loved ones in the tragic events that have led to this study.

Let me introduce myself. My name is Jodi Diamant—Joanne to some. I am a professional engineer with a specialty in aircraft certification. I spent 18 years at Transport Canada Civil Aviation, and for the past 14 years I've been the chief engineer for airworthiness and certification at Pratt & Whitney Canada. I've been extensively involved in the development and application of design standards, the aircraft certification, validation and delegation processes, and implementation of safety management systems. I am here today in an individual capacity, because I've been involved in this process for over 30 years and I'm well qualified to explain how it works and how it can be improved.

As Mr. Quick indicated here, Canadian industry is a world leader in design and production of aircraft, helicopters and gas turbine engine products, and Transport Canada is recognized as having one of the most robust type certification processes in the world, resulting in an exceptional level of product safety.

As state of design under ICAO, Transport Canada is now responsible for the type certification and continued airworthiness of over 18,000 aircraft and helicopters today and over 60,000 Pratt & Whitney Canada engines currently flying in the world, including in Canada.

The type certification of aircraft and engines—which is exceptionally complex, as the Transport Canada representatives explained in February—is just the starting point of aviation safety, before the products enter service. It's very critical, though. It's a partnership in which there are very defined roles, obligations and accountabilities of the parties involved in the certification process. I'm going to go through it very quickly.

There are the regulators: ICAO, which you heard about from Ms. Fox; Transport Canada; and FAA. There's the applicant, which is us in the industry represented here, and delegates.

I have to stress that however it's been characterized, the system is not self-certification and it's not regulation at all. Very simply, starting at the top, ICAO—which Ms. Fox talked about—is an international body. It's a special agency of the UN that has been in place since 1944. Canada is a main signatory, and obviously ICAO is headquartered here. It defines the high-level responsibilities, requirements and processes that are used by countries, regulators and the industry to design and certify a safe product. It drives bilaterals and harmonization. Note that this approach is unique to the aviation sector. There is no other industry that has the same model of international regulation governance and oversight.

Transport Canada, based on the ICAO requirements, defines the design standards and processes to establish the product level of safety and the acceptable methods to demonstrate compliance with these requirements, and how to prove it.

Industry, the companies that design the products—we're called "the applicant"—have to design them using many suppliers and our own expertise. We have to design them to meet those design standards. That can take years. Then we have to prove to ourselves but, more importantly, to Transport Canada that a product complies with or meets all of those design standards that are set by Transport Canada and that the product is safe.

For an aircraft, there are over 1,200 requirements. For an engine, there are at least 100. We have to prove that each and every one of those meets those requirements.

Transport Canada will only approve that aircraft or engine once the company—the industry—has proven that each and every one of those requirements has been demonstrated. They have to have confidence in that.

At the beginning of the certification process, and throughout, there is constant communication between Transport Canada and the applicant. It's not just at the beginning and then we'll see you at the end. It's all the way through.

● (1650)

Transport Canada uses a risk-based approach to determine its involvement during the compliance demonstration phase of the process. They focus on safety-critical aspects, new and novel processes, and design and compliance methodologies. They witness tests. They read reports. They're in there constantly.

Post-certification, the type certificate holder—because we now hold the design approval—has the obligation to monitor the products in the field, identify and analyze issues that could lead to unsafe conditions, work with Transport Canada to introduce required corrective actions and apply lessons learned for design and certification of new products. It's a continuous improvement cycle.

The Transport Canada aircraft certification process is fundamentally robust. It results in an exceptional level of product safety. However, as we know, in the current environment of increasing product complexity and integration, evolving technologies and commercial pressures, the process can be further improved. My recommendations on industry require organizations involved in product type certification and production to have safety management systems.

Let me explain safety management systems, or SMS. Canada was a world leader and recognized in rolling out SMS in the early 2000s on our large CAR 705 operators. It has taken a bit of a hiatus. Many of the committee members may appreciate the journey it has been on.

For certification, let me say that SMS does not replace the certification process or requirements at all. They exist as they have been and will be. It complements and reinforces that by requiring an organization's management system to identify and manage product safety risks associated with the business processes and decisions. It requires executive accountability for product safety and the development of an organizational safety culture.

ICAO has recognized the importance of SMS, not just for operations, but also for our sector of industry, and has introduced the requirement into ICAO annex 19. Transport Canada should put the processes and resources in place to evaluate and recognize those organizations that would like to have SMS or should have SMS on a voluntary basis in advance of or in place of rule-making.

They need to mandate SMS. For Transport Canada, to echo Mr. Quick's comments, it is very important for the Canadian public as well as the industries sitting here at the table. They have to maintain their certification competency through the retention and development of sufficient qualified experts involved in key steps of the certification and continued airworthiness process.

That includes everything from standards development, bilaterals, involvement in the actual product certification processes and oversight of company processes for certification, as well as SMS. In addition, Transport needs to ensure that the appropriate organizational structure is aligned with main bilateral partners.

With the above suggestions, the current robust Transport Canada certification process and product safety record will be further enhanced.

I would like to thank you for your attention. I'd be pleased to respond to questions at the appropriate time on certification, delegation, validation and SMS.

Thank you.

● (1655)

The Chair: Thank you.

Mr. Curtis.

Mr. David Curtis (President and Chief Executive Officer, Viking Air Limited, Longview Aviation Capital Corp.): Mr. Chair and members of the committee, thank you for inviting me here today.

As a clarification, I am CEO of Viking. I am also the executive chair of Longview Aviation Capital, which owns Viking and a number of other aviation entities in Canada, including De Havilland Canada.

Longview, through its subsidiary companies De Havilland Canada and Viking Air, based in Victoria, Calgary and Toronto, designs, certifies, manufactures and modifies commercial turboprop aircraft, including the class-leading Dash 8 series 400 regional turboprop, the world-renowned DHC-6 Twin Otter aircraft and the highly specialized Canadair CL-415 water bomber.

The Longview group of companies employ nearly 2,000 directly and 4,000 indirectly within the Canadian aerospace supply chain, and we account today for over $1 billion in sales, of which 95% is exported. With Bombardier's exit from commercial aviation, Longview is now the largest commercial OEM of turboprop-powered aircraft in North America. We own over 23 different aircraft designs, 21 of which were designed and built in Canada over the last many decades.

Why is this notable? Certifying new clean-sheet aircraft designs is incredibly capital-intensive. We only have to look at the recent development of the Bombardier C Series, now the Airbus A220, to better understand this. Our entire business model is focused on developing second or third product life cycles from robust and proven designs.

The Twin Otter, for instance, was first certified in 1965 and in production until 1988. It was out of production for 22 years. Viking restarted production in 2010. It went through a robust CPR process with Transport Canada and has since delivered another 150 of those new variants. The same is true for the Dash 8. It was first introduced in 1983, and derivatives were developed and have extended the production life of the Dash 8 aircraft over 37 years.

The aircraft certification process and how CPR—the changed product rule—is applied is incredibly important to Longview and our subsidiary companies. The CPR process allows a robust evaluation of the design change with respect to maintaining an acceptable level of safety. The evaluation of newly proposed changes and the proven in-service performance of the aircraft is a fundamental key to identifying the certification basis and ensuring that the appropriate means and method of compliance are completed.

The early involvement of TC—Transport Canada—in the examination of the design change and the certification aspects enables evidence- and risk-based decisions regarding TC involvement throughout the entire certification process. TC's continual engagement with the applicant as the certification progresses allows for the monitoring and adjustments of their involvement as any risk factors change and the appropriate oversight requirements are maintained. Through this oversight and an established system of delegation, TC can rely on the delegated organization to complete the compliance findings with confidence.

Both Viking and De Havilland, through working experience with Canadian airworthiness and operational requirements, have established that we have the necessary knowledge and capabilities as organizations to enable authorized persons within our teams to make findings of compliance on behalf of the minister, not as an employee of the OEM.

TC is a worldwide and respected leader in aircraft certification. Once the aircraft is certified, as we sell globally, TC becomes a partner in achieving certification in other jurisdictions. They become our advocate. The acknowledgement of the role of TC as a certifying authority from the state of design through strong bilateral agreements with other foreign regulators is critical for our business and to sustain our business.

● (1700)

The Twin Otter and the Dash 8 are validated worldwide. This activity would not have been possible without TC maintaining its status as an industry-leading regulator.

Thank you.

The Chair: Thank you, Mr. Curtis.

Mr. Bruce.

Mr. Steven Bruce (Director, Design and Certification, Viking Air Limited, Longview Aviation Capital Corp.): Actually, I'm here with David.

The Chair: Mr. Deer.

Mr. Michael Deer (Airworthiness Specialist, Bell Textron Canada Limited): I would like to thank the committee for the opportunity to discuss the Canadian certification process. Bell has been developing and manufacturing helicopters at our Mirabel facility for more than 30 years now. To support the certification of our products, we built a strong relationship with Transport Canada and have held the Transport Canada designation of design approval organization based on the Transport Canada delegation system for over 28 years.

In my role at Bell, I'm responsible for the management and certification process for Bell Canada and for validation of our products globally. As such, I have had the opportunity to observe how Transport Canada compares to and is viewed by other authorities.

I can say that Transport Canada Civil Aviation has a strong reputation around the world as one of the premier certification authorities. Due to Transport Canada's reputation and strong bilateral partnerships, other countries recognize Transport Canada's competence and have trust in the Canadian certification process, which ensures that aeronautical products like ours, developed and certified in Canada, meet the safety standards that have been established by the world's leading authorities.

As mentioned before, Transport Canada uses a risk-based approach to certification. The Transport Canada certification process with its system of delegation is effective and robust. Transport Canada's oversight, known as level of involvement, is based on assessment of risk to determine where and when they are involved in certification projects so their attention can be focused on areas that are the most important and have the greatest impact on safety.

Bell has developed safe products through an open relationship with Transport Canada. The certification process is structured to initiate communication with Transport Canada early in the product development life cycle. The Canadian delegation system is mature and is based on trust. It includes Transport Canada level of involvement to ensure product safety. Early and open communication between Transport Canada specialists and Bell specialists is encouraged to ensure engagement and common understanding of our design and compliance with the applicable standards.

A strong delegation system is necessary to maximize the efficiency of the certification process and to ensure that Transport Canada resources focus on areas that have the greatest impact on safety. There are finite authority resources to provide oversight of the certification process, so delegation and a strong partnership with Transport Canada are necessary for the success of the Canadian industry. Early collaboration, trust, and continued delegation and reliance on the OEM's expertise are needed to continue to develop safe products.

Strong bilateral partnerships with other major authorities are also essential. If there is trust in Transport Canada's certification process, foreign authorities can focus their attention on areas of greatest risk as well.

We appreciate our partnership with Transport Canada. It's important to Bell that Transport Canada be properly resourced and have predictable and stable funding to retain a strong international and domestic voice.

I would also echo the recommendation from Ms. Diamant about the safety management systems. Bell has already started the process to voluntarily adopt safety management systems within our organization. We have already adopted it in several other facilities and are in the process of adopting a voluntary safety management system here in Canada as well.

Thank you.

● (1705)

The Chair: Thank you, Mr. Deer.

Are there any other comments?

Mr. Watson?

Mr. David Joseph Watson (Manager, Airworthiness and Air Safety, De Havilland Aircraft of Canada Limited, Longview Aviation Capital Corp.): I have no further comments.

The Chair: Okay. We will start with the questions.

Mr. Doherty.

Mr. Todd Doherty: Thank you to our guests here today.

Mr. Curtis, you said that certifying new is a very capital-intensive process. You mentioned the recertification of the Twin Otter and Dash 8 that your company has gone through. How much change to the airframe was done in the new certification of both aircraft?

Mr. David Curtis: I can speak for Viking on the Twin Otter program.

Mr. Todd Doherty: Yes, go ahead.

Mr. David Curtis: Essentially, in order to meet the changed product rule and update the certification basis, a number of things related to passenger safety had to be addressed. New regulatory requirements around passenger safety, improved avionics systems, situational awareness, lightning strike...all these kinds of things went into it.

However, structurally, with regard to a new Twin Otter compared to a legacy Twin Otter, you wouldn't be able to tell the difference.

Mr. Todd Doherty: Great, thank you.

So if we had an aircraft that had changed an airframe—38% longer, 52% greater capacity, the size and thrust of the engine 100% greater than previously, the wingspan 27% wider, the aerodynamics, stable or unstable under certain conditions, questionable.... In your opinion, should this have been a new type certification?

Mr. David Curtis: Jodi, if you want to talk about the Dash 8.... I mean, you've seen an aircraft that's evolved from a 37-passenger aircraft—

Mr. Todd Doherty: Specifically with the 737 Max, should that have been—

Mr. David Curtis: I'm not qualified to understand the technical differences in the 737.

Mr. Todd Doherty: Okay.

Ms. Diamant, I'll ask you the same question.

Ms. Jodi Diamant: You asked it differently before, I would say, but that's fine.

The evaluation of changed product rule means that every area of change would have to be evaluated for the impact at the product level. When people talk about certifying the whole aircraft, in essence, those 1,200 requirements have to be looked at and a decision made about the extent of the change—38%, different engines, different performance—and the airframer has to reconfirm compliance with the requirements.

Mr. Todd Doherty: Given your background with the TCCA, would that be something, given the new specs of the aircraft coming out, that would be questioned by the TCCA?

Ms. Jodi Diamant: Every time we do a change, we have to evaluate—and you heard this already—whether it's significant or not significant. So you look at the extent of change.

We, as an applicant, have to go to our regulator and say, this is what it is. It's either significant or not significant. Even if it's not significant, we still have to demonstrate compliance with every single requirement. None are left out; it's a product-level evaluation.

Changed product rule requires you to look at later safety requirements in the certification basis. Part of the evaluation will be to look at the extent of the change and determine if there's sufficient change to warrant going to later certification requirements. Certification, no matter what the change, always requires you to look at all the changes and re-evaluate against the certification basis.

● (1710)

Mr. Todd Doherty: Great.

Mr. Deer, it's the same question.

Mr. Michael Deer: I can't specifically talk about the 737 Max, but from a CPR standpoint, we've gone through changes on our products. Every time we go through a change on our product, we have the same process we have to follow. We need to look at the amount of change we're making on the aircraft in accordance with the guidance material that is available from Transport Canada and make an assessment in terms of whether or not that is a significant or non-significant change.

We make that recommendation to Transport Canada, but at the end of the day, it's Transport Canada's decision in terms of whether or not a change to an aircraft is significant or not significant. They have the final say in terms of the certification basis.

I know that Transport Canada also asks the same questions of foreign applicants as well. When they are looking at a foreign product, they are asking the same questions in terms of the certification basis and how that basis was established.

Mr. Todd Doherty: Thank you.

The Chair: Thank you, Mr. Deer.

Thank you, Mr. Doherty.

Mr. Davidson.

Mr. Scot Davidson: Thank you, Mr. Chair.

Thank you for appearing here today. We'll always support great Canadian aviation, for sure.

With regard to our focus, we're trying to stay around the 737 Max. We owe it to the families. There was definitely a red flag that came up when the first one crashed. I think things were missed.

We're not trying to complicate things or make it tougher for Canadian aviation. We're trying to get answers, answers for the families, and to make sure that what has happened never happens again.

To pick up where Mr. Doherty left off, when the 737 Max was certified to fly, there were over 71 design changes provided by the FAA and Boeing engineers. That's a substantial list compared to the NG model.

The Chair: Mr. Davidson, could you get to the question?

Mr. Scot Davidson: Okay. Anyway, do you have any comment on all those design changes that took place?

I'll take this to you, Mr. Curtis.

The Chair: Give a short answer, Mr. Curtis, please.

Mr. David Curtis: Again, I have no information on how the 737 Max was certified. The only equivalency that I would mention is that at De Havilland Canada we had a product like the Dash 8 that evolved from a 37-seat aircraft to a 90-seat configuration today, which involved fuselage stretches and all these things. But they went through an incredibly robust process where new and current certification requirements would have to be applied to the aircraft. That aircraft has been in production for 20 years with nearly 700 built, so the process works.

I don't know about the 737, honestly.

The Chair: Thank you, Mr. Curtis.

Thank you, Mr. Davidson.

Go ahead, Mr. Rogers.

Mr. Churence Rogers (Bonavista—Burin—Trinity, Lib.): Thank you, Mr. Chair.

Welcome to our witnesses.

Again, condolences to the family members as we discuss this very important topic.

Today we saw a CBC report commenting on two reports. One was from the Ethiopian investigation team, which clearly points a finger at Boeing. The other was from the U.S. House of Representatives, which I find somewhat disturbing, when we think about the comments they make in the report about the tremendous financial pressure to get things done, the culture of concealment, hiding flaws with the MCAS system from 737 Max pilots and failure to identify key safety problems. They're questioning the certification process of the FAA, obviously. I found that somewhat concerning.

Given the comments about the FAA and the failure, the shortcomings in what they did and how they collaborated with Boeing on some of these certification processes, why should we continue to trust the certification process? I guess the question is this. How would you expect other countries to react if we withdrew from the international system and stopped recognizing their certification process? What might some of the implications be for Canadian companies if other countries no longer recognized Canadian certification?

I'll ask Ms. Diamant to comment on that, and maybe Mr. Curtis.

● (1715)

Ms. Jodi Diamant: If I understand your question, just repeating back what you said, you would like to understand what the impact would be if we withdrew—

Mr. Churence Rogers: Yes, how would you expect other countries to react if we withdrew from the international system and stopped recognizing the certification process? What might the implications be for Canadian companies?

Ms. Jodi Diamant: Basically, what would happen is that we would have every country recertifying our aircraft and our engines with in-depth reviews. They would not be trusting Transport Canada, presumably, and that's an exceptionally difficult and challenging process. It would be very difficult for us to produce products and deliver them to customers around the world, because they would have to recertify them themselves.

Mr. Churence Rogers: Mr. Curtis.

Mr. David Curtis: I think it would bring our industry to a grinding halt. I'll give an illustration of a situation where some countries have competing products. In the instance of the Twin Otter, when we were selling to China, we needed Transport Canada to work with the equivalent Chinese airworthiness authorities to stand behind how Transport Canada had certified the aircraft. There were a whole bunch of political issues that were preventing the entry of our product into China. Without Transport Canada defending the basis of certification, we wouldn't have aircraft in the country.

Mr. Churence Rogers: Thank you.

Mr. Deer, how does Transport Canada assist you with certification? How lengthy or rigorous is the process?

Mr. Michael Deer: When we start a new certification program, we engage with Transport Canada right away. The delegation system we have is based on the relationships we have with Transport Canada. We're in constant communication using the relationships we have with Transport Canada to make sure they understand the configuration of our product and the complexity in certain areas, and then they can make a risk-based decision in terms of where they will get involved in the certification process.

Transport Canada will familiarize themselves with our product through the interaction with us. They will make an assessment of risk and which areas would have the most influence on product safety, and they will target those areas in terms of their level of involvement and where they get involved in the product.

At the end of the day, our delegates are the ones who are making the findings of compliance, but the product will never get approved unless Transport Canada involvement has been completed and they are satisfied that the product is safe.

Mr. Churence Rogers: Do you feel that the Canadian certification process in recent years has made advancements that have led to improved safety?

Mr. Michael Deer: I think the Transport Canada certification process is a very mature process, and because it's a very mature process, there are good working relationships between Transport Canada and their applicants. At the end of the day, safe products are the result.

Mr. Churence Rogers: What, if anything, sets apart the Canadian certification process from other global certifying entities?

Mr. Michael Deer: My simple answer is that the delegation system that Transport Canada has is a trust-based relationship. You don't become a delegate in the Canadian delegation system without trust from Transport Canada. That trust requires a relationship. There is a standard that has been set where there needs to be at least a one-year working relationship with Transport Canada to become a delegate. History has shown that it takes longer than that to be able to get the level of trust that's required. I think that's one of the key elements in the Canadian system that is different from some of the other systems, the element of trust.

The Chair: Thank you, Mr. Deer.

Thank you, Mr. Rogers.

We'll now move over to Mr. Barsalou-Duval.

● (1720)

[*Translation*]

Mr. Xavier Barsalou-Duval: Thank you very much, Mr. Chair.

My first question is for Mr. Deer of Bell Textron Canada Limited, but other witnesses may answer as well.

The pilots had not been informed that MCAS, this new system, had been installed in the Boeing 737 MAX aircraft. It was also not included in the manual that was provided and was not part of the training.

If you had incorporated a new system like that or a major system into helicopters built by Bell Textron Canada, would that have been in the manual? Would there have been training on this?

[*English*]

Mr. Michael Deer: I can't specifically talk about the 737 Max, but when we make changes to our products that are significant in nature, there is an assessment of the training that's required and whether there are adjustments required in our training courses.

[*Translation*]

Mr. Xavier Barsalou-Duval: Does Viking Air, for example, do the same thing?

[*English*]

Mr. David Curtis: I'm sorry, I didn't get the whole question.

[*Translation*]

Mr. Xavier Barsalou-Duval: If a system such as MCAS or a system that changes the way the aircraft is flown and stabilized is installed, would Viking Air, for example, mention it in its manual? Would training be provided to pilots?

[*English*]

Mr. David Curtis: I think it would really depend on the change to the aircraft system and whether that was considered a major or minor modification. Any time you get into changes to the control systems of the aircraft, typically they become major modifications and get a much higher level of oversight.

[*Translation*]

Mr. Xavier Barsalou-Duval: My second question is also for Mr. Deer and the representatives of Viking Air.

If you were installing a new system, and you didn't consider it important when it would be fairly important, and wanted to avoid disclosing that fact as part of the certification process, would you be able to hide that change from Transport Canada or the Air Transport Association of Canada, ATAC? Would the Canadian certifying body detect it?

[*English*]

Mr. Michael Deer: In the Canadian certification system, I would say no. As I said before, the whole relationship that we have with Transport Canada is based on open and honest communication and trust.

Mr. David Curtis: I can't imagine not relying on that trust relationship with the certifying authority.

[*Translation*]

Mr. Xavier Barsalou-Duval: How do you explain that such a situation occurred in the United States, in the case of Boeing?

[*English*]

Mr. David Curtis: I have no idea.

[*Translation*]

Mr. Xavier Barsalou-Duval: All right. I have one more question for you.

Do you think a situation like this undermines public confidence in the aircraft certification process?

[*English*]

Mr. David Curtis: I would say most certainly, and I think that's why we're here today, to support the fact that Transport Canada's certification process is robust and recognized around the world as one of the best in class.

[*Translation*]

Mr. Xavier Barsalou-Duval: I think it's been proven by a lot of people that our protection system is solid, and I'm glad that's the case. Having said that, I'm wondering whether we should take steps to ensure that other countries' certification process is as robust as ours.

A slightly automatic acceptance system is coming. A change adopted in Europe or the United States would be automatically considered accepted here. This system could be interesting in the sense that it would simplify things, make our work faster and be profitable.

How can we be sure that we can trust the certification systems used in other countries?

● (1725)

[*English*]

Mr. Jim Quick: I mentioned in my comments that we had done an exercise called vision 2025. We very strategically, intentionally, made recommendations around Transport Canada. We fully believe that the folks at Transport Canada are some of the best in the world. As Mike mentioned, our system is different from other systems, and I think that difference also makes it the best system in the world.

What I mentioned in my comments was that, while we have the best people, we don't have enough of them, so how would we, from a global competitiveness standpoint, move forward? We need to make sure that TCCA has the proper structure and the proper resourcing, financial and human, in order to keep up with us. I mentioned that we grow 5% a year. Their budget hasn't grown for the last seven to eight years.

The Chair: Thank you, Mr. Quick and Mr. Barsalou-Duval.

Mr. Bachrach.

Mr. Taylor Bachrach: Thank you, Mr. Chair.

Thank you to all of our witnesses.

My first question is for Ms. Diamant.

You offered a very strong defence of Canada's certification system in your opening remarks. In the situation this committee is studying, we're seeing more and more that there were major issues in the U.S. certification of the 737 Max 8, yet Canada verified that certification. What went wrong? In your opinion, how do we fix it so that we can ensure the safety of the Canadian flying public?

Ms. Jodi Diamant: I can only speak to what's been published factually so far. I'm not going to speculate on anything other than that. The official investigation report hasn't been finalized.

What I can talk about, which seems obvious based on the testimony from the Transport Canada team, is that they were not aware of the changes when they validated the aircraft. In fact, it seems that the FAA may not have been aware of that. It's very difficult for a validating authority to be able to identify an area as a risk area for validation review if the certifying authority and the airframer don't do that initially. They would have been trying to find a needle in a haystack, and there's limited time to do that.

Mr. Taylor Bachrach: We heard earlier about the delegation process and the role of trust. Would you say that perhaps the situation was one in which the FAA trusted Boeing to identify issues?

Ms. Jodi Diamant: I'll go to obligations and accountability. It's the responsibility of the organization that has the delegation or authorization to do a correct assessment and then notify the regulator when it's of a certain risk. It seems that they did not make an appropriate assessment, so it wasn't flagged to the regulator.

Mr. Taylor Bachrach: Thank you.

Mr. Deer, you spoke extensively about delegation and the role of trust. In the case involving Boeing and the FAA, Boeing was under extreme financial pressure and under pressure by its competitors to get this product to market. I'm wondering if you can comment, from within a company that bears that delegated responsibility, on how you avoid the financial goals and objectives of the corporation conflicting with the goal of delivering a safe product to market.

Mr. Michael Deer: I'll talk specifically about the Canadian delegation system.

Within the Canadian delegation system, there is a requirement essentially that there be no commercial pressures induced on the people with the delegated authority, so the highest level in our company, the head of our DAO, needs to sign a commitment stating that the delegates are free to operate on their own cognizance without commercial pressures.

Mr. Taylor Bachrach: This is a question for Mr. Quick.

Mr. Quick, you spoke extensively about competitiveness and the importance of the changes you've recommended to make our industry more competitive globally. I think the committee's prime concern in discussing the issue before us is safety, and I'm wondering if you could comment on the contribution that the recommendations your organization has put forward would make toward the safety of our industry and the safety of air travel in Canada in general.

● (1730)

Mr. Jim Quick: Both Transport Canada and the Canadian industry always put safety first.

The recommendations we have made fit very well with making sure that safety remains first and foremost in all we do. As I mentioned in a previous answer, the innovation that we develop is very disruptive, and it happens at a very quick pace. One of the things we need to ensure is that, from a safety perspective as we are developing that technology, Transport Canada and TCCA are able to keep pace with us.

The recommendation we have made is basically to change your structure and support it properly, and that way we can guarantee safety.

Mr. Taylor Bachrach: Thank you, Mr. Chair.

The Chair: Thank you, Mr. Bachrach.

Members of the panel, thank you as well: Mr. Watson, Mr. Bruce, Mr. Curtis, Mr. Quick, Ms. Diamant and Mr. Deer. Thank you for your time today.

As well, members of the committee, I want to thank you not only for the great questions today and the great answers we received from both panels, but also for taking the time to recognize the 157 men, women and children who were lost in the Ethiopian Airlines flight 302 tragedy. I encourage you, as we leave here today, to keep those folks in mind and, of course, their families as well.

With that, I adjourn.