



JHUMUNC

THE JOHNS HOPKINS MODEL UNITED NATIONS CONFERENCE

EXECUTIVE DIRECTORATE OF BOEING

Chaired by Jane Scinta

Session XXIII

Executive Directorate of Boeing

Topic A: Planning the Repair and Maintenance of Commissioned Aircraft

Topic B: Increasing Transparency to Improve Public Image

Committee Overview

Founded in 1916, the Boeing Company builds airplanes, rockets, missiles, and satellites for governments and multinational institutions. With a \$101B operating income (2018) and over 150,000 employees worldwide, Boeing tops the list of aircraft manufacturers, in addition to being the largest private exporter from the United States.¹

The range of aerospace products produced by Boeing is quite extensive, ranging from commercial jet transports to military aircraft, helicopters, space vehicles, and missiles. The Boeing Company is divided into three divisions: Commercial Airplanes designs, which produces and sells aircraft to commercial airline companies across the globe; Defense, Space, and Security, which takes government contracts for military systems and aircraft of many varieties (28% of Boeing's revenue comes from the US military²); and Global Services, which provides valuable services to their customers, including supply chain management, data analytics, and training.³

Boeing is currently located in Chicago, IL, although it was formerly headquartered in Seattle, WA. It assembles commercial aircraft in two facilities: Renton (located in Washington) and Everett (located in California). The Renton facility is home to

the production of the narrow-body Boeing 737. The Everett facility produces the wide-body Boeing 767 and 777.

In the military context, Boeing contributes to the design, manufacture, and support of fighter aircraft, bombers, transports, helicopters, and missiles. The F-15 Eagle and F/A-18 Hornet fighters, C-17 Globemaster III airlifter, AH-64 Apache attack helicopters, and Airborne Warning and Control System aircraft are all a part of Boeing's operations. Meanwhile, the Boeing Company's space and communications sector include launch vehicles, in-space solid-rocket boosters, and rocket engines. Boeing's current workforce includes well over 150,000 individuals and involves operations in 65 countries and 27 US states.

Parliamentary Procedure

The Executive Directorate of Boeing is a small specialized committee at JHUMUNC. The nature of the committee allows delegates to be more engaged with the debate and decision-making process. While we will follow the typical parliamentary procedure for discussion, the committee and individuals will pass directives and press releases instead of working papers and resolutions. Each delegate also has specific portfolio powers, granting them their own actions to be taken

¹ CNN Business. Company Description: Boeing Company. CNN: 2019.

² Rich Duprey. 6 Companies That Are the Most Reliant On Government Contracts. USA Today: 2017.

³ Figures taken from Boeing website, 2019.

without other delegate's voting approval. The committee's goal is to discuss and implement the steps Boeing must take to restore its brand image and ensure public safety in the future while dealing with interactive crises as they arise. The Executive Directorate of Boeing will include important leaders within Boeing and managers of the 737-MAX's production line. Because of Dennis Muilenburg's important role and influence as president, chairman, and chief executive, the chair will be portraying this individual. The simulation will begin on March 14, 2019, and extend throughout the following months.



Case Studies

Lion Air Flight 610

Lion Air flight 610 left Jakarta, Indonesia at 6:20 on the morning of October 29, 2018. Its destination was Pangkal Pinang, off of Sumatra. On the flight were 189 people, including 178 adult passengers, a child, two babies, two pilots, and six flight attendants. Flight 610 crashed into the sea only moments after taking off and is thought to have sunk in the waters of West Java. The Lion Air flight lost contact with the airline after only twelve minutes. Before it lost contact, the aircraft requested to return to base but never had the chance as a result of communication problems. Additionally, issues with the pilot's displays prevented the pilot from determining the correct airspeed and altitude.⁴

The problem with the 737 planes being flown was likely the maneuvering characteristics augmentation system (MCAS) anti-stall program that was built into the 737 Max's software and provided an automated response in the event of a stalling aircraft. In this case, the jet incorrectly alerted pilots that it was in a stall and responded by bringing the nose of the aircraft down, even as the captain fought to make the plane climb in altitude.⁵ The incorrect diagnosis by the MCAS system was likely due to the angle of attack sensors on the plane's exterior, which falsely

indicated that the plane's nose was pointed too high. The flight data recorder suggests that pilots fought the downward tilt of the plane more than two dozen times before crashing the plane into the Java Sea at 450 miles per hour.

Ultimately, the major issues identified with the crash were the MCAS system, faulty sensors, and the airline's maintenance and training procedures. The problems with training procedures are especially critical given that sources have suggested the pilots were unaware of what the problem even was at the time. CBS reported that US airline pilots were only given 56 minutes of training on an iPad to inform them about the modifications made to the Boeing 737 Max planes. At this time, it is unclear whether the pilots incorrectly carried out the emergency procedures or whether the procedures themselves were flawed. It appears that either the pilots were either not properly trained or that the problem with the plane's operations was more severe than Boeing anticipated.⁶

Ethiopian Air Flight 302

Ethiopian Airlines Flight 302 crashed on March 10, 2019, killing all 157 passengers and crew onboard the Boeing 737 Max jet. The plane crashed only forty miles away from its takeoff location, Addis Ababa,

⁴ Gröndahl, Mika, Allison Mccann, James Glanz, Umi Syam, and Blacki Migliozzi. "In 12 Minutes, Everything Went Wrong." The New York Times. The New York Times, December 26, 2018.

⁵ Petchenik, Ian, Ian Petchenik, Ian Petchenik, Ian, and Ian Petchenik. "Indonesian Investigators Release Final Lion Air 610 Crash Report." Flightradar24 Blog, October 28, 2019.

<https://www.flightradar24.com/blog/indonesian-investigators-release-final-lion-air-610-crash-report/>.

⁶ "Boeing." MediaRoom. Accessed November 17, 2019. <https://boeing.mediaroom.com/2019-10-25-Boeing-Statement-On-Lion-Air-Flight-610-Investigation-Final-Report>.

Ethiopia, (near Bishoftu) and many miles from its final destination, Nairobi. The crash appears to have been highly similar to the Lion Air disaster five months earlier.

According to the Ethiopian authorities, the jet's crew correctly adhered to emergency procedures but was unable to regain control of the jet.⁷ These authorities suggest that the blame primarily falls on the manufacturer, Boeing. Just like in the Lion Air flight, it has been proposed that the MCAS system of the Boeing 737 Max is part of the problem. It is believed that one of the plane's external sensors sent erroneous information and triggered the MCAS system. One of the key factors contributing

to the pilot's inability to keep the plane level was the two-wheel system in the cockpit that control the angle of the 737's nose. The motor that adjusted this angle was shut off by the MCAS system, causing the pilots to be unable to keep the plane level.⁸

The essential question to be answered is whether the inability of the Ethiopian Airlines pilots to control the plane's angle was the result of their own actions or Boeing's safety designs. A major criticism of Boeing's MCAS is that it can be triggered by the failure of only one of two pitch sensors and that Boeing may or may not have sufficiently explained the system to pilots flying the new 737 Max planes.

⁷ Reals, Tucker. "Ethiopian Airlines Flight 302 Crash: Preliminary Report Says Pilots Followed Boeing's Guidance." CBS News. CBS Interactive, April 4, 2019. <https://www.cbsnews.com/live-news/ethiopian-airlines-flight-302-crash-preliminary-report-today-live-updates-04-04-2019/>.

⁸ Topham, Gwyn. "Ethiopian Flight 302: Second New Boeing 737 to Crash in Four Months." The Guardian. Guardian News and Media, March 10, 2019. <https://www.theguardian.com/world/2019/mar/10/ethiopian-flight-302-second-new-boeing-737-max-8-to-crash-in-four-months>.



Delegate Biographies:

Corporate Leadership:

Greg Smith

Chief Financial Officer

After serving as Vice President of Finance, Greg Smith assumed the CFO position in 2011. However, he is also involved in many other aspects of The Boeing Company. As well as being in charge of the entire company's financial strategy and long-term growth plan, Smith oversees the corporate management team and has authority over Boeing Capital Corporation.⁹

Heidi B. Capozzi

Human Resources

Having previously worked in human resources in both Boeing's Commercial Airlines and Defense divisions, Heidi Capozzi knows all about Boeing's workforce. As the current Senior Vice President of HR, she oversees company-wide talent acquisition, labor relations, and employee training.¹⁰

Ted Colbert

Chief Information Officer

Ted Colbert manages most of Boeing's internal technology, networks, and information. Previously working in the information field, both within Boeing and at other companies, Colbert helps Boeing optimize for growth with his broad range of skills. He also oversees the important role of ensuring data security.¹¹

Brett C. Gerry

General Counsel

Previously working for Boeing in several of its divisions around the world, though starting his career in Washington, he is well qualified to lead Boeing's legal endeavors. Overseeing Boeing's international team of attorneys and paralegals, Gerry has influence over Boeing's relations with numerous governments.¹²

Greg Hyslop

Chief Technology Officer

Leader of 56,000 engineers worldwide, Greg Hyslop oversees the actual design, manufacture, and testing of Boeing's products across all divisions. Hyslop would be responsible for major company changes in the production of products in response to the crashes.¹³

Timothy Keating

Government Operations

Timothy Keating leads Boeing's interactions with the relevant governmental bodies and defines its relationship with all aspects of government: local, state, federal, and international.¹⁴

⁹ "Executive Biography of Greg Smith." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/greg-smith.page>.

¹⁰ "Executive Biography of Heidi B. Capozzi." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/heidi-b-capozzi.page>.

¹¹ "Executive Biography of Ted Colbert." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/ted-colbert.page>.

¹² "Executive Biography of Brett Gerry." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/brett-gerry.page>.

¹³ "Executive Biography of Greg Hyslop, D.Sc." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/greg-hyslop.page>.

¹⁴ "Executive Biography of Timothy Keating." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/timothy-keating.page>.

J. Michael Luttig

Counselor and Senior Advisor

Although he is considered a top advisor to the executive council and Dennis Muilenburg, J. Michael Luttig currently spends all his time overseeing the legal reaction to the 737-MAX crashes. Luttig previously recently finished his position as Boeing's General Counsel.¹⁵

Jenette E. Ramos

Manufacturing, Supply Chain, & Operations

Head of the supply chain of the largest airplane manufacturer in the world, Jenette Ramos currently has a lot to manage. She must consider all aspects from between receiving plane parts to final shipment, including environmental, economic, personnel, facilities, and inventory factors.¹⁶

Diana Sands

Internal Governance and Administration

Working closely with the other executive council members and business divisions, Diana Sands must ensure that all employees of Boeing are receiving proper training and adhering to internal policies.¹⁷

Anne Toulouse

Communications

Previously working on the brand strategy team, Anne Toulouse now drives the business forward with marketing, sponsorships, and media appearances. Toulouse must focus heavily on how to repair Boeing's public image after both crashes.¹⁸

¹⁵ "Executive Biography of J. Michael Luttig." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/j-michael-luttig.page>.

¹⁶ "Executive Biography of Jenette E. Ramos." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/jenette-ramos.page>.

¹⁷ "Executive Biography of Diana Sands." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/diana-sands.page>.

¹⁸ "Executive Biography of Anne Toulouse." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/anne-toulouse.page>.

Division Leaders:

Michael Arthur

Boeing International President

In addition to being Boeing Executive Council's first non-US citizen, Michael Arthur's role includes forming alliances with foreign businesses and initiatives to promote international growth. Arthur has worked his entire life in positions that require global communication and thought.¹⁹

Leanne Caret

Defense, Space, & Security President and CEO

Leanne Caret is the head of Boeing's Defense, Space & Security (BDS) division, overseeing and the \$26 billion per year international organization. She has also been ranked as one of the most powerful women in the world by Fortune and Bloomberg.²⁰

Stanley A. Deal

Boeing Global Services President and CEO

As head of Boeing Global Service since its creation in 2016, Stanley Deal pioneered the supply chain, engineering and maintenance, analytics, and training that the division offers Boeing's clients. He works with all other areas of the company.²¹

Kevin McAllister

Commercial Airplanes President and CEO

President of Boeing's Commercial Airplanes division, Kevin McAllister is the link between the Executive Board and the proper implementation of future changes as a result of the 737-MAX crashes.²²

¹⁹ "Executive Biography of Michael Arthur." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/key-orgs/boeing-international/sir-michael-arthur.page>.

²⁰ "Executive Biography of Leanne Caret." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/leanne-caret.page>.

²¹ "Executive Biography of Stanley (Stan) A. Deal." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/stanley-a-deal.page>.

²² Gates, Dominic, and Steve Miletich. "Kevin McAllister Ousted as Boss of Boeing Commercial Airplanes as 737 MAX Crisis Continues." The Seattle Times. The Seattle Times Company, October 22, 2019.

Commercial Airlines

Division:

John Hamilton

Chief Engineer

Tasked with ensuring the Commercial Airplanes division has the proper materials, tools, and skills to complete each project, John Hamilton is responsible for the on-time completion of every plane at Boeing's factory.²³

Lynne Hopper

Vice President of Engineering

Lead engineer in the Commercial Airplanes division, Lynne Hopper oversees and is accountable for the design process, manufacturing, and testing of Boeing's airplanes. She should be prepared to answer to the Executive Board as to why the planes crashed.²⁴

Eric Lindblad

General Manager, 737 Program

Similar to Lynne Hopper, Eric Lindblad is responsible for the 737 programs as a whole, in addition to Boeing's Renton site. He should also be prepared to detail the 737's specifications and mishaps to the Executive Board.²⁵

Linda Mills

Communications

Linda Mills oversees and manages ways to share Boeing Commercial Airplanes division's innovations and products. She will work closely with Anne Toulouse in order to deal with the press and fix the company's public image.²⁶

Walt Odisho

Manufacturing, Safety, & Quality

Overseeing production and manufacturing, Walk Odisho has the important job of coordinating all actions within Boeing's airplane factories. He must make sure the process is as streamlined and safe as possible.²⁷

Sheila Remes

Vice President of Strategy

It is vital that Sheila Remes thinks long term in her position as Vice President of Strategy for Boeing's Commercial Airplanes division. She should be deciding how to best pivot off of the 737 crashes and create positive change in the division as a whole.²⁸

Kim Smith

Fabrication General Manager

As Manager of Boeing Fabrication, Kim Smith oversees 16,000 employees who manufacture the parts for Boeing's other divisions, including parts that went into the 737-Max plane.²⁹

<https://www.seattletimes.com/business/boeing-aerospace/kevin-mcallister-ousted-as-boss-of-boeing-commercial-airplanes-as-737-max-crisis-continues/>.

²³ "Executive Biography of John Hamilton." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/john-hamilton.page>.

²⁴ "Executive Biography of Lynne Hopper." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/lynne-hopper.page>.

²⁵ "Executive Biography of Eric Lindblad." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/eric-lindblad.page>.

²⁶ "Executive Biography of Linda Mills." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/linda-mills.page>.

²⁷ "Executive Biography of Walt Odisho." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/walt-odisho.page>.

²⁸ "Executive Biography of Sheila Remes." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/sheila-remes.page>.

²⁹ "Executive Biography of Kimberly (Kim) Smith." Boeing. Accessed November 17, 2019.

<https://www.boeing.com/company/bios/kim-smith.page>.



Topic A:

Planning the Repair and Maintenance of Commissioned Aircraft

Introduction

Recent events have been immensely detrimental to Boeing on all fronts, and in order to address these issues, Boeing must take a close look at its own internal practices, policies, and errors that caused these crashes to happen. The logical first step to regaining the public trust and reclaiming lost market share is to discern the cause of the crashes and fix the grounded 737s.

To successfully address these issues, we must first gain a deeper understanding of the process of airplane design, construction, and certification, while also examining the design error that led to these deadly crashes, and elucidating Boeing's intricate relationship with the federal regulators of the airplane industry.

The 737 MAX Aircraft

Today, the Boeing 737 is known as the best-selling airliner of all time. Over 15,000 orders have been taken for the plane so far, and the new 737 MAX has become the fastest-selling airplane in Boeing history. Development of the 737 began in 1964 with the construction of 50-60 seat narrow-body airliners designed for trips between 50 and 1,000 miles. Then, in 1981, Boeing launched its second-generation 737, whose high-bypass turbofan engines made it simultaneously more quiet, efficient, and powerful.

The 737's competitor, Airbus' A320, was introduced in the mid-1980s. The A320 family of narrow-body airliners threw Boeing's dominance of the industry into question. This caused Boeing to launch its third generation in 1993. Over the years, the 737's affordability and reliability have made it very popular and well-suited for many different airlines and types of flights. The 737 has become extremely popular with American Airlines, United, Delta, Alaska, Lion Air, Qantas, Virgin Australia, WestJet, Air China, Fly Dubai, AeroMexico, and Icelandair, with its most reliable purchasers being Southwest and Ryanair.³⁰

Boeing's fourth-generation 737, the 737 MAX, was launched in 2011. It is equipped with turbofan engines, new wings, and avionics, and capacities ranging from 172 to 230 seats. The 737 MAX is the fastest-selling Boeing plane of all time. Boeing Commercial Airplanes produced 806 commercial aircraft in 2018, 256 of which were the brand new 737-MAX. The models were highly successful when introduced, receiving over 5,000 orders from airlines across the world.³¹ The plane most relevant to this committee is the 737-MAX 8, which seats up to 210 passengers, has a range of 3550 nautical miles, is 130 ft long and 118 ft wide, and contains a LEAP-1B engine from CFM International, costing about \$121 million.³²

³⁰ Boeing. Accessed November 17, 2019.

<https://www.boeing.com/commercial/737max/>.

³¹ Woodyard, Chris. "Boeing Clings to Hope That the 737 Max Will Fly Again This Year after Two Crashes." USA Today. Gannett Satellite Information Network, October 23, 2019.

<https://www.usatoday.com/story/news/nation/2019/10/23/w-hen-will-boeing-737-max-fly-again-crashes/4069180002/>.

³² Source: Boeing webpage, entitled Commercial: 737 Max, accessed October 2019.

Boeing's Aircraft Production

Design Process

The design phase of producing an airplane is a long, multistep process, in which a plane is designed to suit a particular purpose. Designers also take into account federal regulations on wingspan and plane size, environmental impact, and of course, safety.³³ An especially important aspect of safety considerations is a plane's "crashworthiness," in other words, its ability to minimize the extent of injury to passengers should a plane crash occur.³⁴ All aspects of the plane, including wing design and landing gear, are tested. After simulations, the design is finalized and the manufacturer decides whether to go forward with production.

Production Timeline

A Boeing 737-Max takes 10 days to construct.³⁵ A fuselage from Kansas, wings from Mitsubishi, Japan, and engines from Derby, UK, or Evendale, OH, all arrive at Boeing's Renton factory. The first few days of production are marked by "systems installation," where the plane is fitted with its internal systems and wirings.³⁶ Following this, the planes are pieced together in an assembly line, starting with the wings and body and ending with the engines, before being rolled out for flight testing.

When new aircraft are built, the first few planes coming out of production are loaded with sensors and tested in a variety of weathers, temperatures, and take-off conditions. Every other plane that is manufactured after those first few planes

must also be tested before it goes to airlines. After the plane satisfies the test pilots and test flight engineers and is certified by the FAA, it is officially ready for use by commercial airliners.³⁷

The 737's Design Flaw

737 MAX 8's inherent design problem is most likely the cause of the two recent crashes. Problems began when Airbus, Boeing's major European rival, upgraded its most popular model with an improved engine. This engine greatly improved fuel efficiency, enabling airlines to drastically reduce costs. Moreover, the plane's operating mechanics were not affected much, so pilots could fly this new plane with little additional training.³⁸ Consequently, Boeing decided to upgrade their airplanes with the new engine as well.

However, while Airbus's airplanes were tall enough to place these engines right under the wing, Boeing's planes were lower to the ground, creating an issue. Boeing altered its original plans, moving the engine higher up on the wing so that part of the engine was above the wing. Following in Airbus's footsteps, Boeing maintained that its redesigned plane would be so similar to the old one that pilots would not need additional training to operate it. This fateful decision would cost the crew and passengers on Lion Air flight 610 and Ethiopian Air flight 302 their lives. Because the engine was higher up on the wing, when the 737-MAX was in full thrust, its nose would point too far up, putting the plane in danger of stalling. To counteract this, Boeing fitted the planes with sensors and a computer system called the Maneuvering

³³Yuvraj Domun. Aircraft Design Process Overview. EngineeringClicks: 2018.

³⁴Matthew Lynberg. Crashworthiness. National Highway Traffic Safety Administration: 2018.

³⁵Kate McKenna. Boeing Factory Tour Seattle: How Planes Are Made. Escape: 2017.

³⁶Sam Chui. Boeing 737 MAX - How Boeing Builds Their Best Selling Plane. YouTube: 2018.

³⁷MinutePhysics. How Airplanes Are Made. YouTube: 2014.

³⁸Vox. The Real Reason Boeing's New Plane Crashed Twice. YouTube: 2019.

Characteristics Augmentation System (MCAS) that would automatically push the nose of the plane down when the pilot directed the plane at too steep an angle.³⁹

Given that Boeing marketed the plane as essentially the same as the old model, pilots received only a two-hour iPad training course from Boeing and with training materials that did not mention the new software.⁴⁰ Because Boeing was in such a hurry to finish the plane, the data used for simulations didn't become available until about when the planes were ready to take flight. When United Airlines was set to receive the 737 MAX in 2017, the group of pilots putting together the relevant training materials had never flown the aircraft or a used full simulation of it.

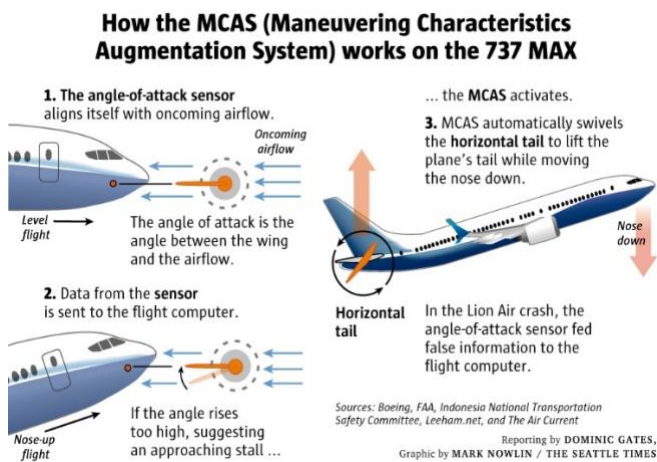


Fig. 1: Maneuvering Characteristics Augmentation System on the Boeing 737 MAX.⁴¹

Impact of the Erroneous Design

As the 737 MAX remained in service, certain pilots issued complaints to a federal database that the nose of the plane was inexplicably turning down at times. The in-flight data from the Lion Air 610 crash showed that while the plane was in full-

thrust during take-off, the nose kept lurching down, greatly confusing the pilot and first officer. They referenced the plane's handbook where they could not find an answer and continued to struggle against the MCAS. It is thought that the sensors on the 737 MAX were feeding the MCAS incorrect data. Minutes later, the plane crashed. A similar situation happened with Ethiopian Air flight 302, and while the pilots were able to shut off the MCAS system before the plane crashed, it was too late, and the plane crashed, killing all 157 people on board.

Following the crash, a discrepancy arose between Ethiopian officials' statements and Boeing's stated procedures. Ethiopian officials assert that the crew followed Boeing's instructions regarding the MCAS system. However, Boeing claims not to have recommended switching the MCAS system back on after an error, which is what the Flight 302 crew did. More information is still needed about what directions Boeing made clear to pilots and whether these guidelines are in need of further revision.

Initial Response to the Crash Press Statement and New Priorities

Boeing's statement following the crash suggested that it recognized the flawed angle of attack sensor (and the resulting MCAS functioning) as the main cause of the two crashes. Some have speculated that Boeing will now attempt to develop a software update for MCAS to ensure that unintended MCAS activation will not occur again. It is also possible that pairing this measure with an associated comprehensive training program specifically for the 737 Max would resolve

³⁹ BBC News. Boeing 737 Max: What Went Wrong? 2019.

⁴⁰ Natalie Kitroeff, David Gelles, Jack Nicas, Thomas Kaplan, and Maggie Haberman. After 2 Crashes of New Boeing Jet, Pilot Training Now a Focus. The New York Times: 2019.

⁴¹ Sources: Boeing, FAA, Indonesia National Transportation Safety Committee. Obtained from The Seattle Times by Mark Nowlin.

the issues with 737 Max planes. Experts have suggested that Boeing's goal should be to add additional layers of protection so that erroneous data will not cause erroneous MCAS activation in the future, while also ensuring that flight crews are able to override any problematic MCAS controls. Meanwhile, the US Federal Aviation Administration (FAA) has said that, alongside the US National Transportation Safety Board, it is working toward understanding all aspects of the incident.⁴²

Subsequent Events

Following these crashes, almost all 737 MAX aircraft have been grounded across the world. Boeing and the FAA are facing tremendous backlash. One way for Boeing to respond would be to issue a software update to dampen MCAS's control over the plane, making it less aggressive, easier to control, and to improve pilot training.

For all Boeing 737 MAX planes to be put back into service, the FAA needs to approve the new updates.⁴³ Unfortunately, however, this could take months, further damaging Boeing's financial situation. There is an extreme amount of pressure on both Boeing (to find a fix to the software problems) and the FAA (to validate Boeing's solution as quickly as possible). The resulting hastiness could potentially become problematic, given that Boeing's rush to catch up to Airbus contributed to the problems with the original MCAS system.

⁴² Chicago Tribune. "Timeline: Boeing 737 Max Jetliner Crashes and Aftermath." [chicagotribune.com](https://www.chicagotribune.com/business/ct-biz-viz-boeing-737-max-crash-timeline-04022019-story.html), October 14, 2019. <https://www.chicagotribune.com/business/ct-biz-viz-boeing-737-max-crash-timeline-04022019-story.html>.

⁴³ Leslie Josephs. "Costs Pile up for Airlines as Boeing 737 Max Grounding Enters Eighth Month." CNBC. CNBC, October 13, 2019. <https://www.cnbc.com/2019/10/13/boeing-737-max-grounding-enters-eighth-month-driving-up-airline-costs.html>.

Questions to Consider

1. *What has Boeing done in the past when there have been aircraft malfunction?*

In finding methods for solving Boeing's crisis, it will help to reference past solutions. Examine what other airlines have done in the past to improve their production processes and implement new safety practices and features.

2. *Who or what is truly at fault for the crashes?*

It is imperative that the committee determine what exactly is at fault in these accidents. MCAS has been clearly linked to the problem, but there may be other factors at play. All aspects of the production process should be examined, including the training and preparation of the pilots themselves.

3. *Who should have ultimate control of the plane - the pilot or the computer system?*

If the MCAS is truly a leading cause of the crashes, doubts will be increasing about the safety of automatic mechanisms on airplanes. As a committee, you will have the influence to push the industry and Boeing as a company towards or away from increased automaticity.

4. *What is the future of Boeing's competition with Airbus?*

It is likely that one of the reasons Boeing overlooked safety concerns with the MCAS is that it was competing to get the 737-Max on the market so that the Airbus models would have less control over the market. However, given this intense competition, is it time for Boeing to focus on other fields such as military aircraft?

5. *Is it time for leadership change?*

Are there specific leaders or department heads who bear responsibility for Boeing's current plight? It may be the case that new leaders are needed to take the 737-Max's production in a new direction. If so, what positions should be targeted and how will you decide on replacements?

Conclusion

Ultimately, these two tragic crashes of Boeing's 737 MAX airplanes were the culmination of many issues that range from Boeing's intense competition with Airbus in the airplane market, the lust for profit and streamlining, disingenuous business practices, the complicated relationship between Boeing and the FAA, the role of computers and automation, and of course, inherent design and engineering flaws. However, while these issues are indeed factors that caused the crash, you as a committee must decide if these aspects are all equally at fault or is the blame heavier in some places than others?

Your answers to some of these problems have major ramifications for the

future of the airline industry as a whole. For example, consider the following: If the pilots did not fight against the MCAS, would the plane still have crashed? If there was no MCAS altogether, would the plane still have crashed? As technology continues to progress, the airplane industry has an important decision to make: should the lives of passengers be placed in the hands of increasingly intelligent computers or the instincts of experienced pilots?

Should Boeing hope to survive the coming storm, the executive directorate of Boeing must resolve these nuanced, multi-faceted and important issues with innovative and comprehensive plans while considering how their decisions will impact the future of aviation and travel.



Topic B:

Increasing Transparency to Improve Public Image

Introduction

The Lion Air and Ethiopian Airlines crashes have proved highly detrimental to Boeing's public image and its relationships with consumers, clients, and the FAA. These crashes raised several concerns about Boeing's operating procedures and the actions it has taken to improve the safety of its aircraft.

Stakeholders are looking to see Boeing will make concrete changes to the design of its airplanes, the training it gives its pilots and the regulatory processes that certify its aircraft.⁴⁴ It is in Boeing's best interest financially to reassure consumers about the safety of Boeing's 737 MAX planes and the procedures Boeing uses to certify its planes and train its pilots. Boeing's stock values declined dramatically in the wake of these flights, indicating that declining public confidence will create a major business problem for Boeing, potentially impacting the future of the company as a whole. As a committee, it will be your job to effectively assuage public concerns about the safety of Boeing's planes and general practices.

The Aftermath of the Crashes

The day after the crash, March 11, Ethiopian Airlines was the first to ground the aircraft model. Many other governments and airlines followed over the next few days: China, Indonesia, and Mongolia on March 11; Singapore, India, Turkey, South Korea, Europe, Australia, and Malaysia on March 12; Canada, United States, Honk Kong, Panama, Vietnam, New Zealand, Mexico, Brazil, Colombia, and Chile on March 13; Taiwan and Japan on March 14.⁴⁵

The incident has proven detrimental for Boeing in terms of both its finances and public image. The United States Federal Aviation Administration (FAA), the aircraft's certifying authority, opened an investigation and obtained a subpoena to view documents relating to the 737-MAX's development.⁴⁶ Many of the aircraft around the globe were not allowed to leave the airports at which they landed. Additionally, many airlines canceled their existing orders. Boeing estimated it would cost them \$1 billion in grounding and aircraft alteration costs.⁴⁷ However, the largest hit to the company came in the form of its stock price. By the end of March, Boeing's stock decreased in value by 18%, representing \$40 billion in market shares.⁴⁸ The major news coverage of the event was a public relations

⁴⁴ Chicago Tribune. Timeline: Boeing 737 Max Jetliner Crashes and Aftermath. ChicagoTribune.com: 2019.

⁴⁵ Chicago Tribune. Timeline: Boeing 737 Max Jetliner Crashes and Aftermath. ChicagoTribune.com: 2019.

⁴⁶ Andrew Tangel with Andy Pasztor and Robert Wall. Prosecutors, Transportation Department Scrutinize Boeing's Development of 737-Max. The Wall Street Journal: 2019.

⁴⁷ Gates, Dominic and Miletich, Steve. Kevin McAllister Ousted as Boss of Boeing Commercial Airplanes as 737 Max Crisis Continues. The Seattle Times: 2019.

⁴⁸ Wattles, Jackie. Boeing Has Plunged In Market Values Since Ethiopia Crash. CNN Business: 2019.

disaster, surrounding the aircraft model and the entire company in bad press.

Boeing's Public Relations Problem

Concerns Arising From the Crash

The combination of the many deaths involved in the crash and the shocking similarities between the two accidents is causing the public to lose confidence in the Boeing Company. It is critical that this committee addresses the public's doubts in order to ensure the economic stability of the company. As more information is discovered about the specific causes of the two crashes, several major concerns have arisen about the practices Boeing uses.⁴⁹



Fig 2. Boeing share values from March 8 to March 22, 2019.⁵⁰

One of the questions asked in the wake of the crash is the level of training that the Lion Air crew had. Pilots in the US have suggested that the manufacturer, Boeing, did not highlight modifications to the plane's behavior that would have made it different from the previous 737 models. Boeing, however, said that existing safety procedures would have allowed pilots to

override the plane's computer. This discrepancy between Boeing's statement and the concerns of US pilots have cast doubt upon the training programs Boeing has implemented.⁵¹ In order for the general public to regain confidence in flying with Boeing, these doubts will need to be resolved.

A critical part of resolving public relations issues will be Boeing's efforts to increase transparency. It is critical that Boeing advertises its new policies and safety procedures to ensure a rise in public confidence and inform consumers about the changes Boeing is making.

Initial Response

Boeing's Commercial Airplanes President Kevin McAllister has said that Boeing will carefully review all reports of the two crashes and take any steps necessary to enhance safety.⁵² The FAA has also come under intense scrutiny, especially because it has a close relationship with Boeing and has been previously accused of loosening the certification process for new planes, thereby putting Boeing's commercial interests above public safety. Ultimately, however, the real criticism falls on Boeing. Many stakeholders believe that Boeing should have provided more comprehensive guidance to pilots or possibly even fundamentally altered the MCAS system.⁵³

Ethiopian Airlines, in particular, blames Boeing rather than the pilots operating the 737 MAX planes. Officials from Ethiopian Airlines have consistently upheld that their pilots following the instructions and procedures handed down by Boeing and that all of their actions were

⁴⁹ Topham, Gwyn. Ethiopian Flight 302: Second New Boeing 737 to Crash In Four Months. The Guardian: 2019.

⁵⁰ Wattles, Jackie. Boeing Has Plunged In Market Values Since Ethiopia Crash. CNN Business: 2019.

⁵¹ Kitroeff, Natalie. After 2 Crashes of New Boeing Jet, Pilot Training Now a Focus. The New York Times: 2019.

⁵² Gates, Dominic and Miletich, Steve. Kevin McAllister Ousted as Boss of Boeing Commercial Airplanes as 737 Max Crisis Continues. The Seattle Times: 2019.

⁵³ Chicago Tribune. Timeline: Boeing 737 Max Jetliner Crashes and Aftermath. ChicagoTribune.com: 2019.

consistent with the standard procedures for operating the 737 Max aircraft.

At this time, Boeing is considering reallocating its engineering resources within its commercial airplane division and creating a new executive position focusing specifically on the crash investigations.⁵⁴ Boeing should now be prioritizing the ongoing accident investigations to both fix its safety problems and convince the public that it is taking concrete action. As a committee, it will be your role to continue taking steps to reassure the public.

Increasing Transparency

Benefits of Transparency

Given that consumers are becoming more distrusting of Boeing and its practices, increasing the transparency of Boeing's operations is a much-needed first step. There are many contexts in which increased public awareness of Boeing's actions can be beneficial. For instance, it will almost certainly help Boeing's image if the changes it makes to resolve issues with the 737 MAX and the related training are widely publicized.⁵⁵ As a committee, working towards transparency will prove beneficial because it will enable you to regain public trust.

Methods

One important facet of transparency in sharing information relating to performance, revenue, internal processes, sources, and business values. Communicating Boeing's commitment to safety and best practices will encourage consumers to once again feel comfortable flying on Boeing planes.⁵⁶ Especially in the

Information Age, when consumers are likely to uncover details about Boeing's internal operations on their own, it is critical for Boeing executives to create a narrative that facilitates increased consumer trust.⁵⁷

However, there can also be situations of too much transparency. It is imperative that important proprietary information or trade and industry secrets remain out of the public eye. Ensuring that competitors don't use information about Boeing's operations to benefit their own productivity is an important part of creating the right level of transparency. Ultimately, the committee is most likely to benefit from solidifying Boeing's core values, sharing information with its employees, and being candid about its past successes, while being careful not to overshare specific industrial practices.

Certification Process Reform

The crash has also brought up the question of whether Boeing has been too closely involved in the US government's certification process for the aircraft. This concern has led the Transportation Department to launch an investigation into the Federal Aviation Administration's process of certifying the Boeing 737 MAX jets.⁵⁸ It has been suggested that the government certification process bent over too much to corporate interests and did not prioritize public safety. In fact, the current system allows manufacturers to self-certify large aircraft and their safety systems in many cases.

Having been in intense competition with its European rival, Airbus, while developing the 737 Max jet, it is possible that Boeing rushed to get its new model on the market and overlooked potential safety

⁵⁴ Chicago Tribune. Timeline: Boeing 737 Max Jetliner Crashes and Aftermath. ChicagoTribune.com: 2019.

⁵⁵ Zhang, Benjamin. The Amazing History of the Boeing 737, The Best-Selling Airliner of All Time. Business Insider: 2018.

⁵⁶ Petchenik, Ian. Indonesian Investigators Release Final Lion Air 601 Crash Report. Flightradar Blog: 2019.

⁵⁷ BBC News. Boeing 737 Max: What Went Wrong? BBC: 2019.

⁵⁸ CBS News. Indonesia's Lion Air Flight JT-610 Crashes Into the Sea With 189 On Board, Officials Say. CBS: 2018.

concerns.⁵⁹ A former Boeing engineer revealed that “there wasn’t a complete and proper review of the documents” the first time around, likely because of the impending release of the Airbus 320 Neo. It was most likely these delegated, rushed safety checks that allowed the flawed MCAS to be certified.⁶⁰

On March 16, 2019, Boeing released a statement saying, “the FAA considered the final configuration and operating parameters of MCAS during MAX certification, and concluded that it met all certification and regulatory requirements.”⁶¹ While this is true, the FAA may not have been in a position where it could conclude the opposite: that the 737 did not meet regulatory requirements. With its limited budget, the FAA has increasingly delegated much of the certification and safety checking processes to the airplane manufacturers themselves.

In recent years, experts have begun to criticize the close relationship between the FAA and major airplane manufacturers. One of the major issues with the certification process of new software is that with the technology on modern passenger jets advancing so quickly, the FAA needs to work alongside manufacturers in order to stay current.⁶² The FAA relies on manufacturers to self-police because it lacks the resources to certify the aircraft completely independently. At this point in time, the certification staff is falling behind the industry when it comes to technical competency.

Clearly, reforming the approval process for Boeing’s new aircraft will not be easy, but it is imperative that the public have confidence in the certification process. Without a widespread belief that the certification process is strict enough to keep passengers safe, Boeing will not be able to attract business from major airlines and its financial problems will continue to grow.

⁵⁹ Weiss, Stanley and Amir, Amir. Boeing Company. Britannica: 2019.

⁶⁰ Dominic Gates. Flawed Analysis, Failed Oversight: How the Boeing, FAA Certified the Suspect 737 Max Flight Control System. Seattle Times: 2019.

⁶¹ Petchenik, Ian. Indonesian Investigators Release Final Lion Air 601 Crash Report. Flightradar Blog: 2019.

⁶² Levin, Alan. Fight For Survival on Doomed Jet Came Down to Two Cockpit Wheels. Bloomberg: 2019.

Questions to Consider

1. *What can Boeing do to increase transparency and restore public trust?*

What types of measures will be most effective at re-establishing Boeing's values and encouraging public confidence in Boeing's safety practices? Is there a limit to what kinds of practices can be implemented?

2. *Are there particular trade practices which cannot be divulged?*

With Boeing trying to compete with other airliner manufacturers, what kinds of information and details should not be shared with the public? How can Boeing's corporate leadership protect privileged information?

3. *How can Boeing protect its company image?*

How should Boeing seek to brand itself after the two crashes? What sorts of actions can Boeing take to proliferate new views of the company? Should special actions be taken to reassure investors versus the general public?

4. *What types of measures can Boeing take to reassure passengers on future flights?*

In the interest of easing the concerns of passengers on future Boeing flights, what can Boeing do to ensure the safety of its other plane models? How can Boeing then assure the public that other planes are safe, including future iterations of the MAX?

5. *What actions might competitors take in the light of the crashes?*

Given the crashes, Boeing's competitor might take advantage of the company's precarious public standing and plummeting stocks. What might other companies do, and what actions can the Board take to mitigate these actions early? How might rebranding, or a restoration of the company brand, cause competitors to respond? Finally, how might competitors work to reduce public confidence in Boeing technology in the future?

Conclusion

As Boeing tries to continue business in the wake of the crashes, it is critical that the assembled executives arrive at useful strategies to encourage public trust and confidence in Boeing's practices. By sharing certain strategies and new policies Boeing is implementing, Boeing can radically alter the public's perception of the company. Boeing can also revise its training standards and certification process in order to resolve consumer fears about Boeing's 737 Max planes being unsafe

Boeing executives are now at a critical crossroads where they need to ensure that Boeing's consumers have confidence in its values, policies, and reformative efforts. As a committee, you should enact measures to increase transparency and make the necessary adjustments within Boeing's operations so that the public will feel comfortable flying on Boeing jets and Boeing can continue selling its airplanes on a large, international scale.

Bibliography

- Aerotime Team. *History of Boeing: Pioneering Aviation For 100 Years*. Aerotime Hub. July 11, 2016.
- BBC News. *Boeing 737 Max: What Went Wrong?* April 05, 2019.
- CBS News. *Indonesia's Lion Air Flight JT-610 Crashes Into the Sea With 189 On Board, Officials Say*. October 29, 2018.
- Chicago Tribune. "Timeline: Boeing 737 Max Jetliner Crashes and Aftermath." [chicagotribune.com](https://www.chicagotribune.com/business/ct-biz-viz-boeing-737-max-crash-timeline-04022019-story.html), October 14, 2019. <https://www.chicagotribune.com/business/ct-biz-viz-boeing-737-max-crash-timeline-04022019-story.html>.
- Chui, Sam. *Boeing 737 Max- How Boeing Builds Their Best-Selling Plane*. YouTube. September 11, 2018.
- Engineering Clicks. *Aircraft Design Process Overview*. June 26, 2019.
- "Executive Biography of Anne Toulouse." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/anne-toulouse.page>.
- "Executive Biography of Brett Gerry." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/brett-gerry.page>.
- "Executive Biography of Dennis A. Muilenburg." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/dennis-a-muilenburg.page>.
- "Executive Biography of Diana Sands." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/diana-sands.page>.
- "Executive Biography of Eric Lindblad." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/eric-lindblad.page>.
- "Executive Biography of Greg Hyslop, D.Sc." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/greg-hyslop.page>.
- "Executive Biography of Greg Smith." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/greg-smith.page>.
- "Executive Biography of Heidi B. Capozzi." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/heidi-b-capozzi.page>.
- "Executive Biography of J. Michael Luttig." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/j-michael-luttig.page>.
- "Executive Biography of Jenette E. Ramos." Boeing. Accessed November 17, 2019. <https://www.boeing.com/company/bios/jenette-ramos.page>.

- “Executive Biography of John Hamilton.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/john-hamilton.page>.
- “Executive Biography of Kimberly (Kim) Smith.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/kim-smith.page>.
- “Executive Biography of Leanne Caret.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/leanne-caret.page>.
- “Executive Biography of Linda Mills.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/linda-mills.page>.
- “Executive Biography of Lynne Hopper.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/lynne-hopper.page>.
- “Executive Biography of Michael Arthur.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/key-orgs/boeing-international/sir-michael-arthur.page>.
- “Executive Biography of Sheila Remes.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/sheila-remes.page>.
- “Executive Biography of Stanley (Stan) A. Deal.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/stanley-a-deal.page>.
- “Executive Biography of Ted Colbert.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/ted-colbert.page>.
- “Executive Biography of Timothy Keating.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/timothy-keating.page>.
- “Executive Biography of Walt Odisho.” Boeing. Accessed November 17, 2019.
<https://www.boeing.com/company/bios/walt-odisho.page>.
- Gröndahl, Mika, Allison Mccann, James Glanz, Umi Syam, and Blacki Migliozi. “In 12 Minutes, Everything Went Wrong.” *The New York Times*. The New York Times, December 26, 2018.
<https://www.nytimes.com/interactive/2018/12/26/world/asia/lion-air-crash-12-minutes.html>.
- Kitroeff, Natalie with Gelles, David; Nicas, Jack; Kaplan, Thomas; and Haberman, Maggie. *After 2 Crashes of New Boeing Jet, Pilot Training Now a Focus*. The New York Times. March 26, 2019.
- Levin, Alan. *Fight For Survival on Doomed Jet Came Down to Two Cockpit Wheels*. Bloomberg. June 20, 2019.
- Lynberg, Matthew. *Crashworthiness*. NHTSA. August 02, 2018.
- McKenna, Kate. *Boeing Factory Tour Seattle: How Planes Are Made*. Escape. July 10, 2017.
- Minutephysics. *How Airplanes Are Made*. YouTube. December 19, 2014.

- Rauhala, Emily. *Two Plane Crashes In Five Months: What the Lion Air and Ethiopian Airlines Flights Have in Common*. The Washington Post. March 13, 2019.
- Topham, Gwyn. *Lion Air Pilots Were Looking At Handbook When Plane Crashed*. The Guardian. March 20, 2019.
- Topham, Gwyn. *Ethiopian Flight 302: Second New Boeing 737 to Crash In Four Months*. The Guardian. March 10, 2019.
- Vox. *The Real Reason Boeing's New Plane Crashed Twice*. YouTube. April 15, 2019.
- Weiss, Stanley and Amir, Amir. *Boeing Company*. Britannica. August 30, 2019.
- Zhang, Benjamin. *The Amazing History of the Boeing 37, The Best-Selling Airliner of All Time*. Business Insider. November 26, 2018.