Conclusions

INFORMATION REDACTED PURSUANT TOTHE FREEDOM OF INFORMATION ACT (FOIA), 5 U.S.C.552(B)(6)

Findings

1. The weather; the mechanical condition and design of the vehicle, in particular, the horizontal separation of the control pedals; and the driver's experience and familiarity with his vehicle and the area of the farmers' market were not factors in this accident.

2. Although the driver had a history of medical treatment for orthopedic conditions, neither these conditions, nor his general health, nor his use of prescription medications, nor insufficient sleep or fatigue were likely to have been factors in this accident; test results did not indicate that alcohol or illicit drugs were likely to have contributed to the accident.

3. The accident driver made an error in response execution, inadvertently accelerating when he intended to brake, that resulted in the collision with the Mercedes Benz.

4. The accident driver failed to detect his error in response execution, thereby inadvertently accelerating his vehicle and propelling it through the Santa Monica Certified Farmers' Market.

5. The accident driver most likely reverted to the habitual response of hard braking or "pumping" the brakes as his stress level increased and the vehicle failed to slow, but because his foot was on the accelerator rather than the brake pedal, this response led to increased acceleration.

6. The ineffectiveness of the accident driver's efforts to stop his vehicle and the realization that he was striking objects in his path very likely increased the already high level of stress affecting him, thereby impeding his ability to quickly detect and correct his earlier response execution error.

7. The contributions of the [redacted] and use of nonprescription medications, if any, to his error in response execution and to his failure to detect that error could not be determined.

8. Santa Monica's temporary traffic plan for closure of Arizona Avenue to accommodate the Santa Monica Certified Farmers' Market was not consistent with established local, State, or national guidelines and was inadequate to ensure the safe flow of vehicular and pedestrian traffic in the area.

9. Had Santa Monica installed a temporary rigid barrier system, such as bollards, at the closure limits of the Santa Monica Certified Farmers' Market, the barrier system might have arrested or reduced the forward motion of the accident vehicle, thereby preventing it from continuing into the farmers' market and eliminating or greatly reducing the number of casualties.

10. The *Manual on Uniform Traffic Control Devices*' guidance on temporary traffic control is insufficiently clear to ensure that users will apply it to road closures not associated with highway construction or maintenance.

11. Had the accident vehicle been equipped with an event data recorder, a significantly higher level of science could have been applied to assessing and understanding the driver's behavior, as well as its contribution to this accident and the broader issue of unintended acceleration.

12. The National Highway Traffic Safety Administration's proposed rulemaking on standards governing voluntary, rather than mandatory, installation of event data recorders in light-duty vehicles will not result in obtaining the maximum highway safety benefits from this technology.

Probable Cause

The National Transportation Safety Board determines that the probable cause of this accident was the failure of the Buick driver to maintain control of his vehicle due to his unintended acceleration. Contributing to the severity of the accident was the lack of a barrier system to protect pedestrians in the Santa Monica Certified Farmers' Market area from errant vehicles.

Recommendations

To the Federal Highway Administration:

Revise the *Manual on Uniform Traffic Control Devices*, Chapter 6, "Temporary Traffic Control," to provide specific references and guidance on the use of barricades, barriers, crash cushions, and other devices, as appropriate, for road closure situations other than highway construction or maintenance. (H-04-25)

To the National Highway Traffic Safety Administration:

Once standards for event data recorders are developed, require their installation in all newly manufactured light-duty vehicles. (H-04-26)

To the city of Santa Monica:

Install a temporary rigid barrier system at the closure limits of the Santa Monica Certified Farmers' Market to provide a physical barrier to errant vehicles entering the market. (H-04-27)

Update your temporary traffic plans for roadway closures to ensure the safe operation of the city's certified farmers' markets and review and evaluate the adequacy of the plans annually. (H-04-28)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

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Member

Adopted: August 3, 2004

NHTSA-Reference No. 11206504

THE VERGE

This is reference material. It is analogous to M-B, as both companies manufacture transportation vehicles for the transport of persons to their destinations. Boeing and M-B must put their product though a series of phase and must meet public safety requirements in spaces shared by similar crafts made by other manufacturers. Both must meet mercantility standards. The companies, M-B and Boeing are Land and/or Sea Devices. They both must meet certain certification requirements and both are subject to certain forms of danger that can and do emerge within their systems during use. Each face Systematic reviews by regulatory agencies. Admitted, by and large their is more potential for lost lives in air Transportation accidents. For both companies the stakes may measured and calculated in the billions of dollars. This article discuss what led up to 246 dead. It involves systems design and execution errors.

FEATURES

By Darryl Campbell | May 2, 2019, 8:03am EDT

Illustrations by William Joel

The first sign of trouble appeared just after takeoff.

Inside the cockpit of PK-LQP, a brand-new Boeing 737 Max belonging to Lion Air, the stick shaker on the captain's side began to vibrate. Stick shakers are designed to warn pilots of an impending stall, which can cause a dangerous loss of control. They're unmistakably loud for that reason.

But the airplane was flying normally, nowhere near a stall. The captain ignored it.

About 30 seconds later, he noticed an alert on his flight display — IAS DISAGREE — which meant that the flight computer had detected a sensor malfunction. This required a bit more attention.

A modern-day passenger airplane is less like a racecar and more like a

2 of 2 identical Copies

temperamental printer: you spend more time monitoring and checking systems than you do actually driving the thing. So the captain passed control of the aircraft to the first officer and began the troubleshooting process from memory.

Like all commercial aircraft, the Boeing 737 Max has multiple levels of redundancy for its important systems. In the cockpit, there are three flight computers and digital instrument panels operating in parallel: two primary systems and one backup. Each system is fed by an independent set of sensors. In this case, the captain checked both instrument panels against the backup, and he found that the instruments on his side — the left side — were getting bad data. So with the turn of a dial, the captain switched the primary displays to only use data from the working sensors on the right side of the airplane. Easy.

All of this took under a minute, and everything appeared to be back to normal.

At 1,500 feet of altitude, the takeoff portion of the flight was officially complete, and the first officer began the initial climb. He adjusted the throttle, set the aircraft on its optimal

KEY FINDINGS

- Mistakes began nearly a decade ago when Boeing was caught flat-footed after its archrival Airbus announced a new fuel-efficient plane that threatened the company's core business. It rushed the competing 737 Max to market as quickly as possible.
- In developing the Max, Boeing not only cut corners, but it touted them as selling points for airlines. Since the 737 Max was the same plane type as its predecessors, pilots would only need a 2.5-hour iPad training to fly its newest iteration.
- MCAS is the new software system blamed for the deadly Lion Air and Ethiopian Airlines crashes. But its failure in both crashes was the result of Boeing and the Federal Aviation Administration's reluctance to properly inform pilots of its existence or to regulate it for safety.
- The FAA has admitted to being incompetent when regulating software, and, as a policy, it allows plane manufacturers to police themselves for safety. Nowhere in its amended type certification of the 737 Max is MCAS mentioned.

climb slope, and retracted the flaps.

Except the airplane didn't climb. It lurched downward, its nose pointed toward the ground.

The first officer reacted instinctively. He flicked a switch on his control column to counteract the dive. The airplane responded right away, pitching its nose back up. Five seconds later, it dove once again.

- Even still, Boeing only recommends a 30-minute self-study course for pilots on MCAS, rather than additional simulator or classroom instruction.
- Despite the two crashes, neither Boeing nor the FAA believes they've done anything wrong. A Boeing spokesperson said the company believes the system is still "a robust and effective way for the FAA to execute its oversight of safety."

The first officer brought the airplane's nose up a third time. It pitched back down.

THE 737 MAX WAS, PLAIN AND SIMPLE, A STOPGAP MEASURE

There was no memorized checklist that seemed to apply to this situation, so the captain reached for the airplane's Quick Reference Handbook (QRH). The QRH is a series of simple checklists that are designed to help pilots rapidly assess and manage "non-normal" situations. The idea is that Boeing has thought of every conceivable thing that might happen to one of its airplanes, and it has included all of them in the QRH. Basically, it's more troubleshooting. But nothing in the QRH seemed to apply, either.

M-B, in contrast, has not developed a "QRH." And if they had, there would not be time enough to use it before A CRASH.

Over the next six minutes, as the first officer struggled to control the airplane and the captain searched for the right checklist, PK-LQP climbed and dove over a dozen times. At one point, the airplane pulled out of a 900-foot dive at an airspeed of almost 375 mph, which is uncomfortably close to the 737's "redline" of 390 mph.

The flight crew had to figure something out fast before they lost

WHAT EMERGED WAS A STORY

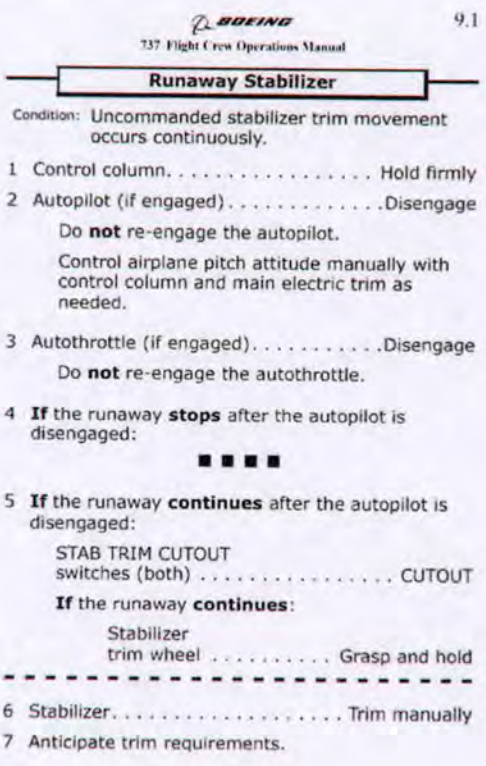
control of the airplane.

OF CASCADING FAILURE

Then the third person in the cockpit, who was technically off-duty, "dead-heading" to his next assignment, reportedly spoke up.

What about the runaway stabilizer checklist?

It was a shot in the dark, another checklist. "Runaway trim" occurs when some kind of failure causes an airplane's horizontal stabilizer to move — or "trim" — when it shouldn't be moving at all. Usually, this creates a constant up or downforce that the flight crew has to try to counteract for the remainder of the flight. It's kind of like trying to drive when your wheels are out of alignment.



BOEING 9.1

737 Flight Crew Operations Manual

Runaway Stabilizer

Condition: Uncommanded stabilizer trim movement occurs continuously.

1 Control column. . . . . Hold firmly

2 Autopilot (if engaged) . . . . . .Disengage

Do **not** re-engage the autopilot.

Control airplane pitch attitude manually with control column and main electric trim as needed.

3 Autothrottle (if engaged) . . . . . .Disengage

Do **not** re-engage the autothrottle.

4 **If** the runaway **stops** after the autopilot is disengaged:

■ ■ ■ ■

5 **If** the runaway **continues** after the autopilot is disengaged:

STAB TRIM CUTOUT switches (both) . . . . . CUTOUT

If the runaway **continues**:

Stabilizer trim wheel . . . . . Grasp and hold

6 Stabilizer. . . . . Trim manually

7 Anticipate trim requirements.

Runaway stabilizer checklist for the Boeing 737 Max. | Image: Preliminary Aircraft Accident Investigation Report, Lion Air flight 610

PK-LQP's problem was a little different. It was intermittent, temporarily reversible, and it wasn't even clear if the horizontal stabilizer was causing the problem. But they were running out of options. They followed the checklist and flipped the STAB TRIM switches to CUT OUT on the center console.

The airplane stopped pitching down. Five seconds passed. Then five minutes. Once again, PK-LQP was under their control and out of danger.

An hour later, Lion Air flight 043 landed in Jakarta, Indonesia, only a few minutes delayed. Following standard procedure, the captain reported the episode to the airline, and the airline's maintenance team checked for

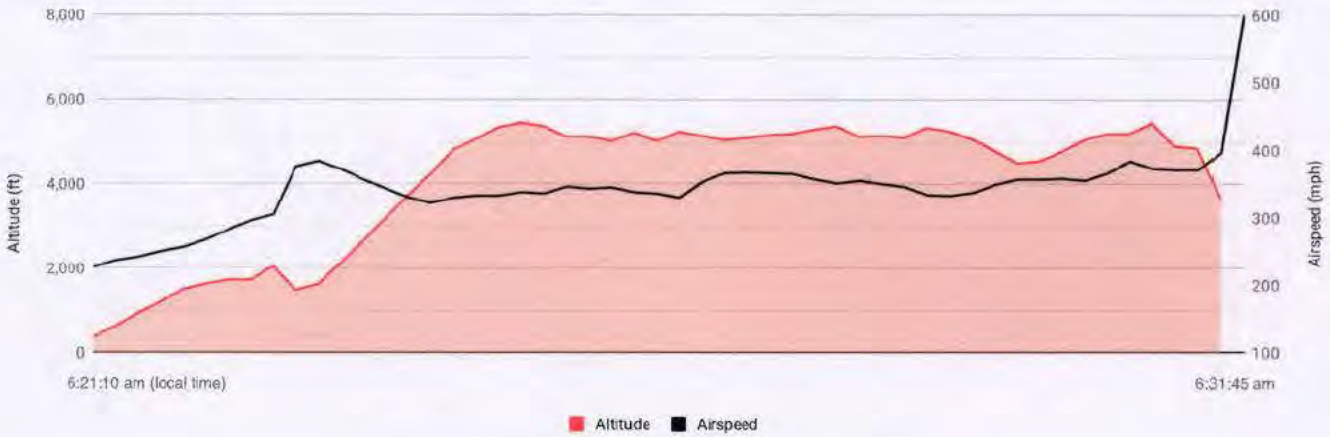
serious equipment failures, finding none. (Given what happened, that should have been a red flag for grounding & checking until sensor failure was found.

The following morning, PK-LQP, operating as Lion Air flight 610, took off at 6:20AM [redacted] local time on its way to Pangkal Pinang, Indonesia. Its stick shaker activated just after takeoff. It threw multiple errors on the flight display. It dove just after the flight crew retracted the flaps. And it relentlessly activated its automatic pitch trim in the nose-down direction 28 times over the course of eight minutes.

This time, there was no third pilot to help the flight crew.

PK-LQP may have reached 600 mph, faster than a Tomahawk missile, as it plunged into the water. It was the first 737 Max accident in its 18 months of service.

Lion Air Flight Telemetry



To industry outsiders, it was a shock. What could have brought down one of Boeing's newest, most technologically sophisticated airplanes? But those closer to the airplane's development knew better: there had been warning signs from the start.

The Verge spoke to a dozen pilots, instructors, engineers, and experts about the 737 Max and its development, rollout, and the two crashes that have claimed the lives of 346 people. What emerged was a story of cascading failure — the many small human errors at every phase of the airplane's design, certification, and

operation process. Those errors came to a terrible and deadly climax in the skies above the Java Sea in October 2018 and above the Ethiopian countryside five months later.

The story of the Max is ultimately the story of the Darwinian business cycle where mature companies like Boeing face constant threats from new products, new competitors, and the search for new growth. Sometimes this motivates them to new heights of innovation and progress. Other times, it prompts them to pull everything back in the name of cost-cutting. (In 2010 M-B pulled back in the name of cost-cutting, See page 3 in, "M-Class Signals change in Blinker Placement." The word, "Market" is code language for, "Profits."

17	200												
7													
5	137												
4	164	121	101	119									
1	30	17	35	33	35	49	28	33					
7	339	289	233	233	236	257	241	222	168	127	72	56	

A320neo orders and deliveries (as of 28 February 2019)[1]

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Orders	A319neo	–	26	19	–	2	3	5	–21	24	–	55
	A320neo	30	1,081	378	387	824	583	343	507	352	–25	4,154
	A321neo	–	119	81	341	183	301	363	418	155	–	2,292
	Total	30	1,226	478	728	1,009	887	711	925	562	–25	6,501
			–	–	–	–	–	–	–	–	–	–
									161	284	36	549

The events that led to these two fatal crashes were set in motion nearly a

decade ago, and they started not with Boeing, but with the company's European archrival, Airbus.

Boeing's 737 and Airbus' A320 are the two main players in the massive — and massively profitable — market for narrow-body passenger jets. Together, both airplanes comprise nearly half of the world's 28,000 commercial airliners. Chances are that if you've ever flown anywhere at all, you've flown on one of them.

Both manufacturers are locked in a race to make their airplanes cheaper for airlines to operate, especially when it comes to fuel.

In 2018, for instance, Southwest Airlines' fleet of 751 Boeing 737s burned through 2.1 billion gallons of fuel at an average cost of $2.20 per gallon for a total of $4.6 billion. A 1 percent increase in fuel efficiency would save $46 million. That's nothing to sneeze at, even for a company that earned $2.5 billion in net profit.

A DEVELOPMENT CYCLE CAN'T BE FAST, CHEAP, AND GOOD

So Airbus and Boeing constantly tweak their airplanes to squeeze single percentage-point gains out of them. But complete overhauls are rare: the 737 last received one in 1997, with the debut of the third-generation 737NG, while the A320 hadn't been refreshed since its launch in 1988.

Then, on December 1st, 2010, Airbus stunned the aviation community. In secret, it had developed a more efficient version of the A320 called the A320neo (which stands for "new engine option"). It would burn about 6 percent less fuel than the 737NG. That was a stunning leap in fuel efficiency, delivered at a time when the price of jet fuel was at a near-record of $2.50 per gallon.

Airlines loved it. The following summer at the 2011 Paris Air Show, the aerospace industry's equivalent of Black Friday, Airbus sold a record-setting 667 A320neos in the span of a week. That was more orders than the 737s had received in the entirety of 2010. Sales! – Profits!

Boeing was caught flat-footed. It had spent four years debating the future of its narrow-body jet program, and it still did not have an answer to its most basic question: whether Boeing should make a brand-new design or revamp the 737 yet again.

Timeline

12/1/2010	A320neo publicly announced
6/23/2011	Paris Air Show 2011
8/30/2011	Boeing 737 publicly announced
7/23/2013	MAX completes firm configuration
8/13/2015	First fuselage complete
12/8/2015	First completed airplane leaves factory
1/29/2016	Prototype first flight
3/8/2017	FAA Certifies MAX
3/27/2017	EASA certifies MAX
5/6/2017	First customer delivery
10/29/2018	Lion Air 610 crash - first fatal accident
3/10/2019	Ethiopian crash
3/11/2019	China suspends MAX flights
3/12/2019	EASA, India, South Korea suspend MAX flights
3/13/2019	Canada, US suspend MAX flights
3/14/2019	Boeing suspends deliveries
3/19/2019	USDOT requests audit of certification process

In the face of the existential threat from the A320neo, Boeing's execs made up their minds in a matter of weeks. The company would launch a fourth-generation 737, and it would do it in record time.

The 737 Max was, plain and simple, a stopgap measure.

Boeing could save billions of dollars in engineering costs by basing the Max off of the 737 platform. That gave the company a head start on design and engineering work — enough, Boeing hoped, to allow the Max to enter service just months after the A320neo.

But the project's engineers would have to overcome some monumental challenges in order to deliver on time. The first was the 737 platform itself. It would take a considerable amount of work to update a 46-year-old design with all of the technology it needed to be just as efficient as the competition.

"The 737 was conceived in the 1960s as what today we would call a regional jet, and with every variant,

"IT WAS A LITTLE BIT LIKE, 'OK PILOTS, GOOD LUCK WITH

they've pushed and pushed the thing to the end of its envelope," says Patrick Smith, an airline pilot and blogger at *Ask the Pilot*. "It makes you wonder if the platform that they're working with is just so outdated at this point."

THAT, FIGURE IT OUT.'"

At the same time, the designers couldn't update it *too* much. By law, a pilot can only fly one type of airplane at a time. However, the Federal Aviation Administration allows different models of airplanes with similar design characteristics to share a common "type certificate." So, for instance, the 737's three previous generations all have a common type certificate. When you get qualified on one model, you can fly all of them.

This allows airlines with common-type fleets to more easily substitute pilots and airplanes, making their operations more flexible. As a result, many airlines limit themselves to aircraft from one manufacturer over the other. Some, like Ryanair and Southwest, only operate a single type of plane for maximum operational efficiency.

A Boeing employee works outside of the cockpit of a Boeing 737 Max 8 airplane in the company's factory. | Photo by Stephen Brashear / Getty Images

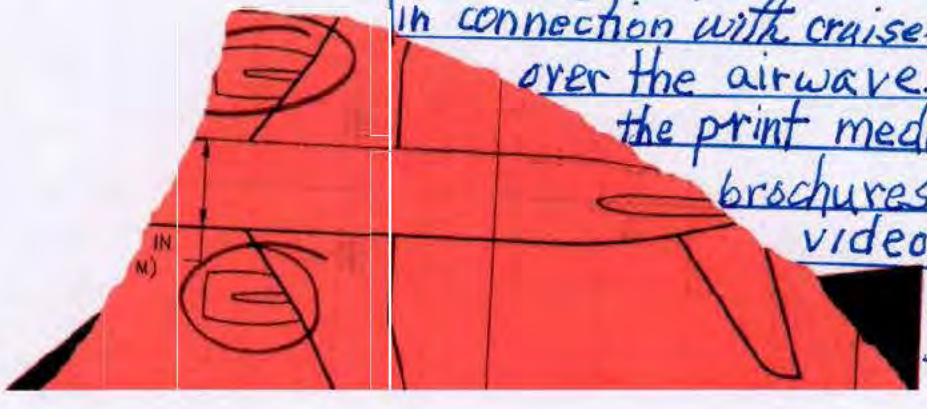
It also incentivizes manufacturers to design aircraft that will earn these common type certifications. But a type certificate is so detailed and comprehensive — covering everything from airplane dimensions to the configuration of the passenger cabin to the way the jet moves and feels in flight — that it can limit the amount of leeway designers have when trying to add a new model to an existing certificate.

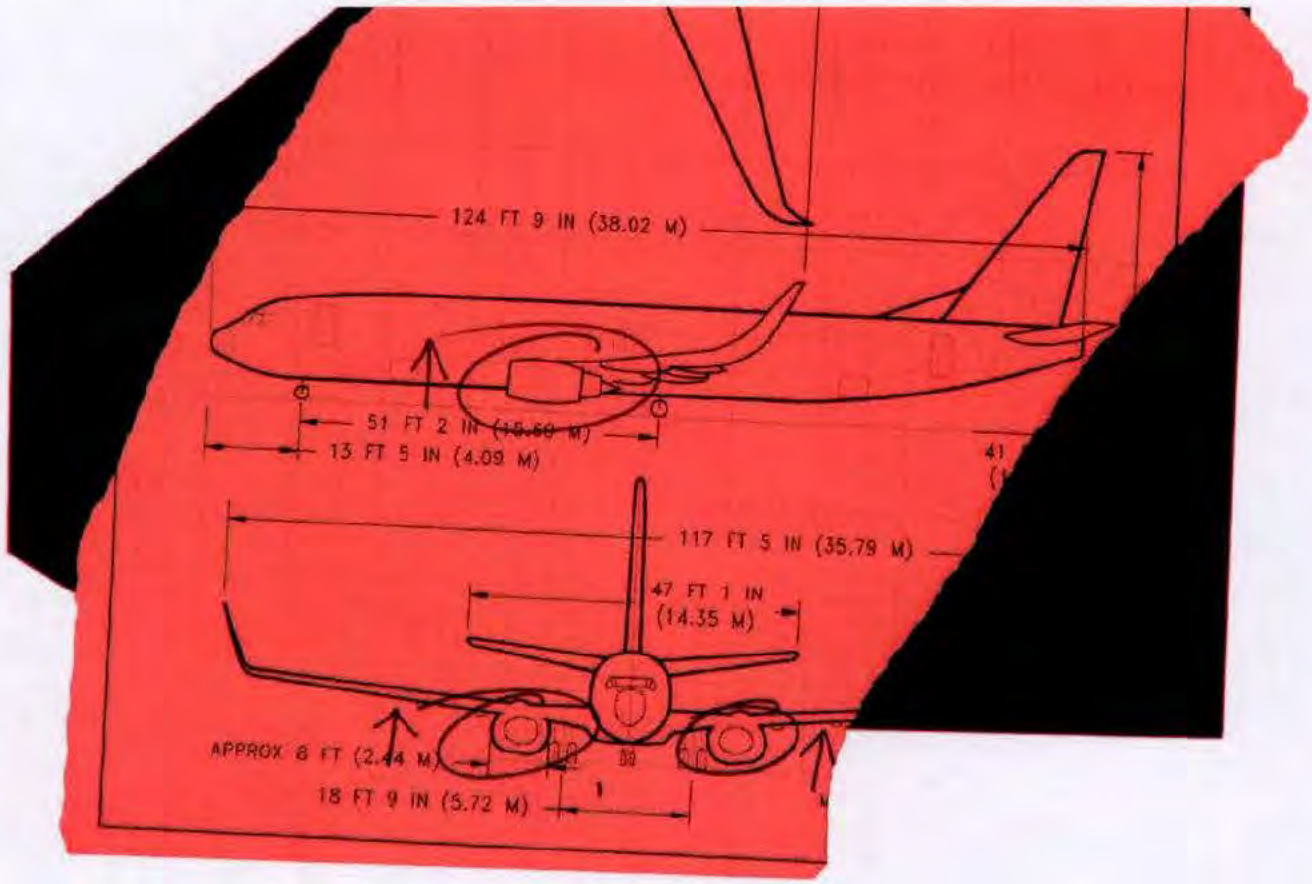
The Max, for instance, not only had to be similar to the previous-generation 737NG, which first launched in 1993, but it also had to be similar enough to the 737 Classic from 1980 and the original 737 from 1964. In essence, it had to be a cutting-edge, 21st century airplane that still felt and flew like ones designed when The Beatles were still together.

Boeing gave itself six years to do all of this — a year less than it took to develop the 777, and 18 months less than the 787. To beat Airbus, it would have to break the one unbreakable law of project management: that a development cycle can't be fast, cheap, *and* good. If it failed, Airbus could corner a $35 billion market for single-aisle airplanes for a decade or longer.

So Boeing could not afford to fail.

With regard to, "Drivers" - Lever-Confusion, "M-B reduced it's fall-out risks by controlling terms-Definitions, as well as controlling the dialogue/public discussion in connection with cruise-control, over the airwaves and in the print media, u-tube brochures & info-videos. (Driver's opinion).





Early signs were encouraging. Two years into development, Boeing promised the Max would be 8 percent more fuel-efficient than the A320neo. Five and a half years in, the FAA granted the Max its Amended Type Certification. Just months later, the program's chief pilot, Ed Wilson, boasted that pilots rated on previous versions of the 737 could switch to the Max with just "2 ½ hours of computer-based training."

This was another key selling point for airlines: no expensive classroom time, no costly simulator time. In theory, pilots could read about the Max at home, take a self-administered computer course in the morning, and be ready to fly in the afternoon.

So between its fuel and training efficiency, the Max seemed like a winning prospect for everyone — especially Boeing, which sold a record-breaking $200 billion worth of Maxes before the first prototype took to the skies.

The slick PR campaign masked a design and production process that was stretched to the breaking point. Instead of a, "PR campain," strateg, Y-B relied on a low-profile and a very hushed approach to (over) Designers pushed out blueprints at double their normal pace, often sending incorrect or incomplete schematics to the factory floor. Software engineers had to settle for re-creating 40-year-old analog instruments in digital formats, rather than innovating and improving upon them. This was all done for the sake of keeping the Max within the constraints of its common type certificate.

MCAS WAS DESIGNED TO COMPENSATE

And many pilots felt that, for the first new 737 in over 20 years, Boeing seemed to be oddly reluctant to prep them for it.

Captain Laura Einsetler, who's flown for over 30 years, including on 737s, considers an all-computer-based course to be completely inadequate as an introduction to a new airplane.

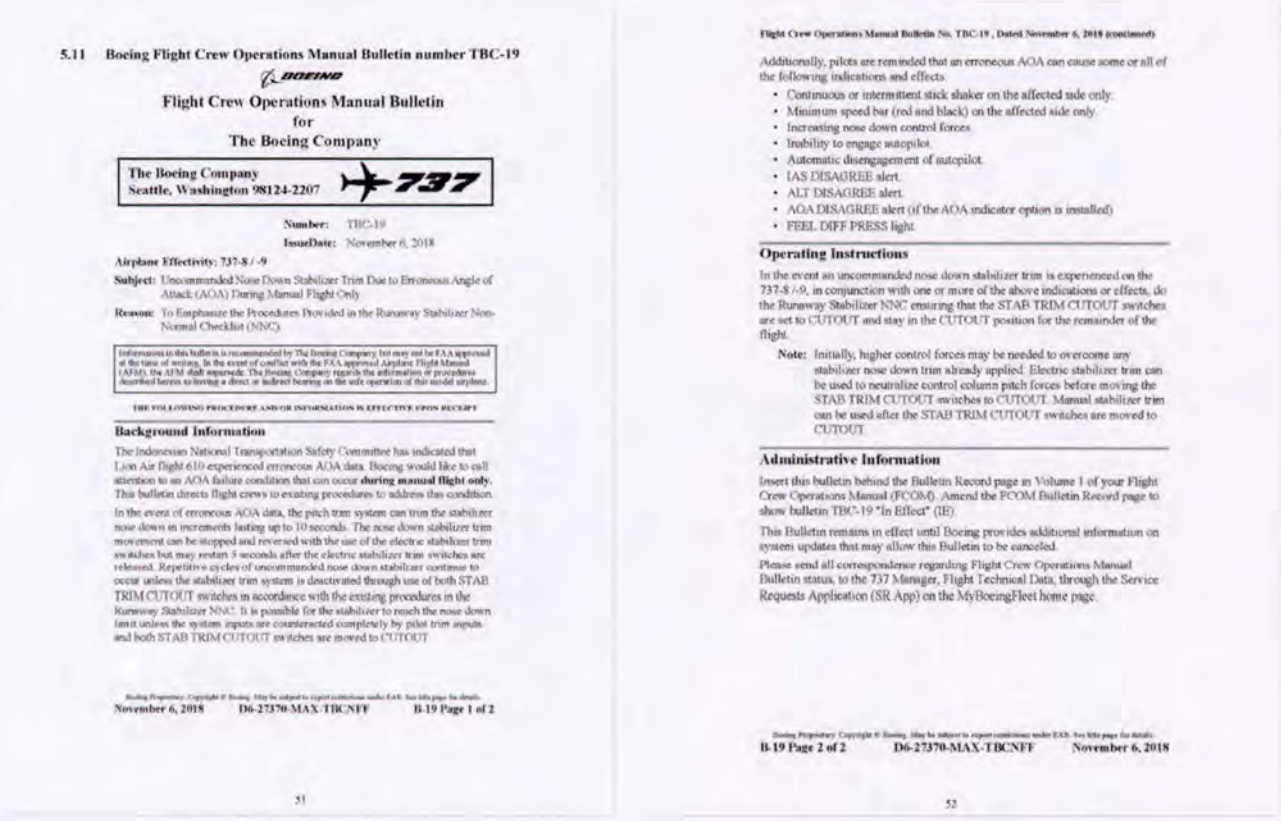
"I don't have the schematics. I don't have the cockpit panels. I don't have an instructor that I can ask questions to," she says. "You're hoping that the first time you see the Max is on a nice clear day. But sometimes it's not, and you're showing up at night or in bad weather into an airplane that has all these changes."

There was something else Boeing hadn't mentioned about the 737 Max. Eight days after the Lion Air crash, a bulletin appeared on MyBoeingFleet, the company's online portal for pilots and airlines. It read:

"Boeing would like to call attention to an [Angle of Attack] failure condition that can occur **during manual flight only**."

NHTSA Reference No. 11206504

(continued from hand-written line 3, other side.) it's design-flaw that had been causing, "Driver Confusion," "Lever Confusion," "Driver Execution errors," and similar errors in connection with, "unintensional touching," of the 'cruise-control lever' (also called a stalk), instead of the Driver's intended selection, "The Directional-Signal Lever." The physical location of the two levers is their attachment to the left side of the steering column roughly an inch behind the horizontal axis of the steering wheel. Each lever or stalk is a slight bit different in length, with the lower of the two levers, the cruise-control, being the shorter of the two levers. That lever (c-c) is located relative to the steering wheel (and the steering column, for that matter), at the 8 o'clock position. The Directional Signal is located at the 10 o'clock position, directly and vertically above the Cruise-Control leve (or stalk). Essentially, the one lever is located one atop the other. A scientific observation of the motions required to activate the levers under a particular set of standard driving conditions, demonstrates that coordinated movements of the shoulders, arms, hands and fingers, are required.



5.11 Boeing Flight Crew Operations Manual Bulletin number TBC-19

BOEING

Flight Crew Operations Manual Bulletin
for
The Boeing Company

The Boeing Company
Seattle, Washington 98124-2207 737

Number: TBC-19
IssueDate: November 6, 2018

Airplane Effectivity: 737-8 / -9

Subject: Uncommanded Nose Down Stabilizer Trim Due to Erroneous Angle of Attack (AOA) During Manual Flight Only

Reason: To Emphasize the Procedures Provided in the Runaway Stabilizer Non-Normal Checklist (NNC).

Information in this bulletin is recommended by The Boeing Company, but may not be FAA approved at the time of writing. In the event of conflict with the FAA approved Airplane Flight Manual (AFM), the AFM shall supersede. The Boeing Company regards the information or procedures described herein as having a direct or indirect bearing on the safe operation of this model airplane.

THE FOLLOWING PROCEDURE AND/OR INFORMATION IS EFFECTIVE UPON RECEIPT

Background Information

The Indonesian National Transportation Safety Committee has indicated that Lion Air flight 610 experienced erroneous AOA data. Boeing would like to call attention to an AOA failure condition that can occur **during manual flight only**. This bulletin directs flight crews to existing procedures to address this condition.

In the event of erroneous AOA data, the pitch trim system can trim the stabilizer nose down in increments lasting up to 10 seconds. The nose down stabilizer trim movement can be stopped and reversed with the use of the electric stabilizer trim switches but may restart 5 seconds after the electric stabilizer trim switches are released. Repetitive cycles of uncommanded nose down stabilizer continue to occur unless the stabilizer trim system is deactivated through use of both STAB TRIM CUTOUT switches in accordance with the existing procedures in the Runaway Stabilizer NNC. It is possible for the stabilizer to reach the nose down limit unless the system inputs are counteracted completely by pilot trim inputs and both STAB TRIM CUTOUT switches are moved to CUTOUT.

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November 6, 2018 D6-27370-MAX-TBCNFF B-19 Page 1 of 2

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Flight Crew Operations Manual Bulletin No. TBC-19, Dated November 6, 2018 (continued)

Additionally, pilots are reminded that an erroneous AOA can cause some or all of the following indications and effects:

- Continuous or intermittent stick shaker on the affected side only.
- Minimum speed bar (red and black) on the affected side only.
- Increasing nose down control forces.
- Inability to engage autopilot.
- Automatic disengagement of autopilot.
- IAS DISAGREE alert.
- ALT DISAGREE alert.
- AOA DISAGREE alert (if the AOA indicator option is installed).
- FEEL DIFF PRESS light.

Operating Instructions

In the event an uncommanded nose down stabilizer trim is experienced on the 737-8 /-9, in conjunction with one or more of the above indications or effects, do the Runaway Stabilizer NNC ensuring that the STAB TRIM CUTOUT switches are set to CUTOUT and stay in the CUTOUT position for the remainder of the flight.

Note: Initially, higher control forces may be needed to overcome any stabilizer nose down trim already applied. Electric stabilizer trim can be used to neutralize control column pitch forces before moving the STAB TRIM CUTOUT switches to CUTOUT. Manual stabilizer trim can be used after the STAB TRIM CUTOUT switches are moved to CUTOUT.

Administrative Information

Insert this bulletin behind the Bulletin Record page in Volume 1 of your Flight Crew Operations Manual (FCOM). Amend the FCOM Bulletin Record page to show bulletin TBC-19 "In Effect" (IE).

This Bulletin remains in effect until Boeing provides additional information on system updates that may allow this Bulletin to be canceled.

Please send all correspondence regarding Flight Crew Operations Manual Bulletin status, to the 737 Manager, Flight Technical Data, through the Service Requests Application (SR App) on the MyBoeingFleet home page.

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Boeing's first public acknowledgment of MCAS, via a technical bulletin released after the Lion Air crash. | Image: Preliminary Aircraft Accident Investigation Report, Lion Air flight 610

In bland technical jargon, Boeing described the exact series of events that brought down PK-LQP. The confusing series of alerts. The sudden dives. The fact that this "failure condition" would keep occurring until and unless the crew flipped the STAB TRIM switches to CUT OUT — just like the crew on PK-LQP's penultimate flight had correctly guessed.

The presence of this system, lurking somewhere in the Max's software suite, was shocking enough. Even more frightening, Boeing only gave the bare minimum of information to airlines and pilots. The bulletin didn't give the system a name or explain what it was designed to do in normal operation. It only said that sometimes it malfunctions, and that can crash your airplane.

"It was a little bit like, 'Ok pilots, good luck with that, figure it out,'" Einsetler says.

For four days, angry pilots and airline officials bombarded Boeing with demands for more information. Finally, on November 10th, another message appeared on MyBoeingFleet:

"Boeing has received many requests for the same information from 737 fleet operators," it read.

At last, Boeing admitted what the world had feared: something was fundamentally wrong with the brand-new 737 Max.

The culprit was the Maneuvering Characteristics Augmentation System (MCAS). Like the 737 Max, MCAS was made to be a stopgap.

The Max was designed around a new set of engines called LEAP-1Bs. These are much more efficient than the engines on the 737NG, but they are also much heavier and larger.

This created a design problem. The engines on the NG sit only 18 inches off the ground, and mounting the LEAP-1Bs in the same spot gave them too little clearance during takeoff. So Boeing placed them further forward and slightly higher on the wing of the Max.

That solution created an aerodynamics problem. Due to their size and position, the engines on the Max create lift when the airplane enters a steep climb (or, in aviation parlance, at high angles of attack). This extra lift causes the Max to handle differently than previous versions of the 737, but only when it's climbing steeply.

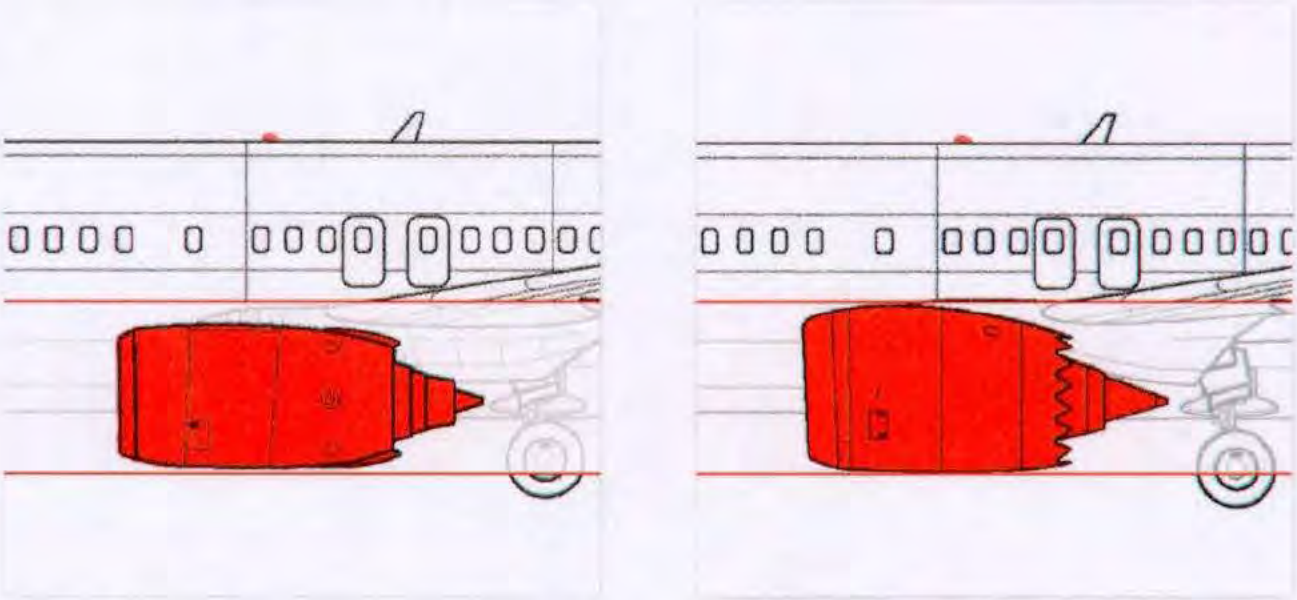
That solution created a regulatory problem. In order for different airplane models to share a type certificate, the FAA requires that they all handle the same way. A model of airplane with sensitive controls, like a sports car, can't share a type certificate with a model whose controls are much more sluggish, like a semi truck. Boeing was concerned that the FAA might consider this enough to give the Max its own type rating, undermining one of its promised selling points.

BOEING ANNOUNCED NEW ORDERS FROM MULTIPLE AIRLINES, AND IT EVEN MANAGED TO TALK LION AIR OUT OF CANCELING ITS $5 BILLION ORDER

The right fix was not obvious, says Alex Fisher, a retired British Airways pilot who writes about flight safety. Because the problem only occurred in specific

circumstances, Boeing couldn't just slap an extra set of fins on the airplane and call it a day. Aerodynamic changes "work" all the time and require a lot of design and testing to get just right. Boeing needed something precisely targeted, carefully calibrated, and nonlinear in effect. It needed software.

So MCAS was designed to compensate. It would use an angle of attack (AoA) sensor to detect when the airplane entered a steep climb. It would activate the airplane's pitch trim system, which is routinely used to help stabilize the airplane and make it easier to control, especially during climb and descent. And it would trim the airplane in modest increments for up to nine seconds at a time until it detected that the airplane had returned to a normal AoA and ended its steep climb. It seems simple enough — on paper, that is.



Engine placement on the third-generation 737 NG (left) versus the MAX (right).

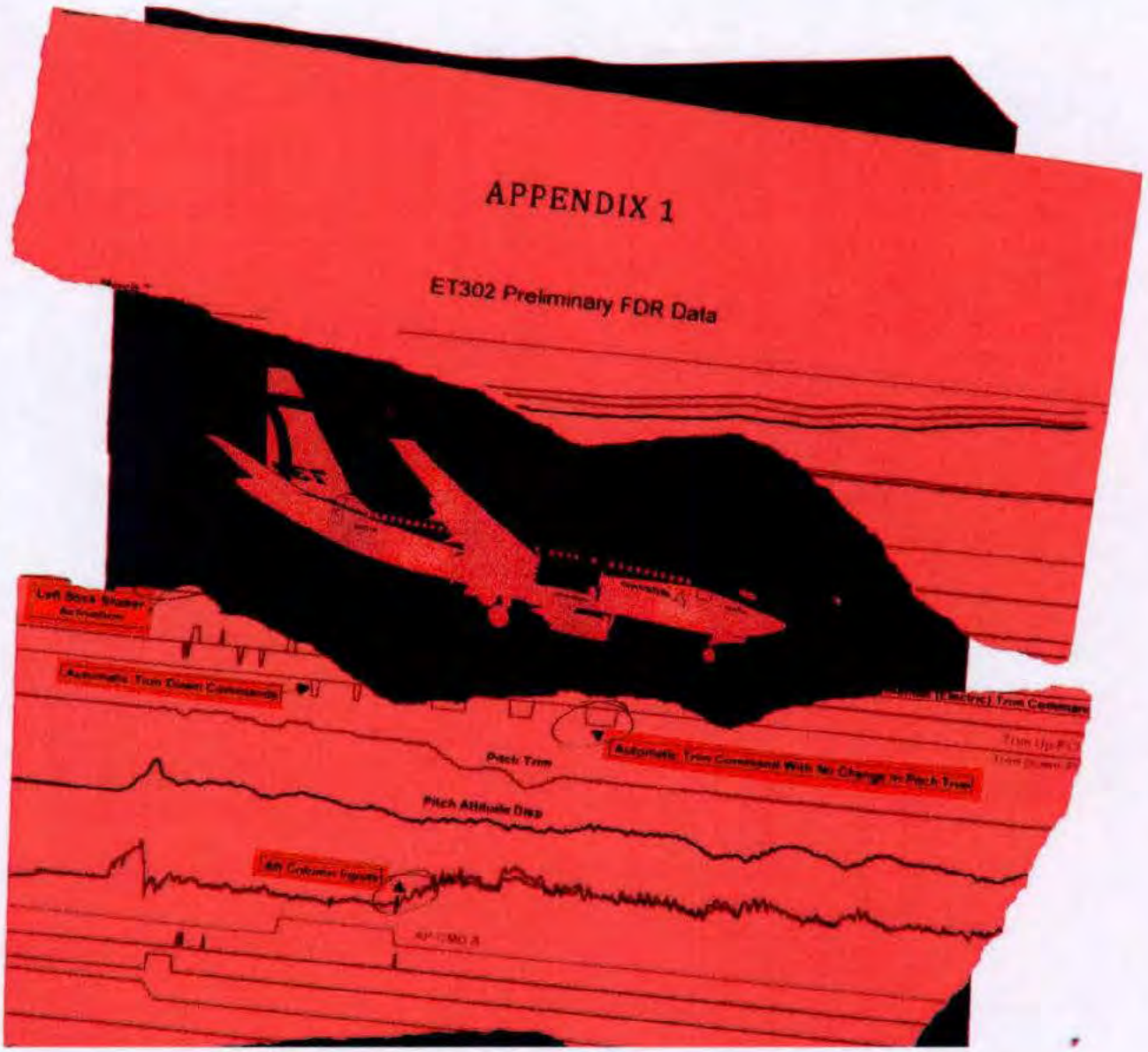
Boeing, meanwhile, defended its previous silence about MCAS.

"Since it operates in situations where the aircraft is under relatively high *g* load and near stall, a pilot should never see the operation of MCAS," read a Q&A distributed to Southwest Airlines.

The subtext: pilots were on a need-to-know basis about MCAS, and until the Lion Air crash, Boeing felt that they hadn't needed to know.

Einsetler strongly disagrees. "We need to have the understanding and knowledge of how everything works on the jet, so that we can command the jet to do what we need it to do, not just be along for the ride," she says.

"Not a lot of information got out there in a timely fashion," concurs Juan Browne, a 777 pilot with over 40 years of flying experience. "It almost makes me wonder, did Boeing engineers themselves really understand how much power and authority they built into this system?"



As Boeing burned its bridges with pilots, it sought to repair ties with its primary customers: the airlines.

Within days of the Lion Air crash, Boeing deployed account reps around the world to shore up confidence in the Max. They succeeded: between November 2018 and March 2019, Boeing announced new orders from multiple airlines, and it even managed to talk Lion Air out of canceling its $5 billion order.

The Max continued to fly.

Then, on March 10th, 2019, disaster struck again. ET-AVJ, another 737 Max 8 owned by Ethiopian Airlines, took off from Addis Ababa, Ethiopia, bound for Nairobi, Kenya. In command was Yared Getachew, the airline's youngest-ever captain. On his right was Ahmed Nur Mohammed, a fairly new first officer.

"DON'T SINK. DON'T SINK."

The stick shaker on the left control column activated just after takeoff. The altitude and AoA indicators on one side of the airplane malfunctioned. About 90 seconds after takeoff, and immediately after the first officer retracted the flaps, the airplane dove unexpectedly.

The Ground Proximity Warning System sounded in the cockpit: "DON'T SINK. DON'T SINK."

Instinctively, Captain Getachew pulled his control column back to point the nose skyward, then flicked the electric trim switch on his yoke. First Officer Mohammed, meanwhile, radioed air traffic control.

"Break, break, break," he said. "Request back to home. Request vector for

landing."

Five seconds later, MCAS activated again.

"DON'T SINK. DON'T SINK."

Captain Getachew again pulled up and again flicked the trim switch. But every time the pilots gained a few hundred feet of altitude, MCAS pushed the airplane right back down again.

It was Mohammed — the pilot whose experience was called "absurdly low" by Chesley "Sully" Sullenberger himself — who correctly diagnosed the problem.

Emergency services work at the crash site of Ethiopian Airlines flight 302. | Photo by Jemal Countess / Getty Images

"Stab trim cut-out, stab trim cut-out," he called. Getachew concurred, and

Mohammed flipped the switches to disable MCAS.

At over 400 mph of airspeed, the airplane was already past its redline. The crew had just a few hundred feet of altitude to work with, and at that speed and altitude, the aerodynamic forces on the airplane would have been immense, making it difficult to control.

"Pull up! Pull up!" said Getachew, which they did, in unison, dozens of times over the next two minutes. The airplane barely responded. Mohammed tried to adjust trim with the manual crank located on the center console. That didn't work either.

Almost three minutes after turning the electric trim system off to disable MCAS, the crew reactivated it. They must have believed that it was the only way to get the airplane back into a climb.

The pilots trimmed up twice using their thumb switches, and then MCAS activated one final time. Fifteen seconds later, the airplane crashed at over 500 knots of airspeed into a field near the town of Bishoftu, Ethiopia. None of the 157 people aboard survived.

The reckoning had come for the 737 Max. By the next day, regulators around the world began to ground the airplane.

The United States didn't follow suit, however. Boeing CEO Dennis Muilenburg reportedly called President Trump to assure him that the 737 Max was safe to fly.

On March 13th, the FAA grounded the airplane anyway. Muilenburg admitted that MCAS was directly responsible for both crashes and promised that Boeing would fix its broken system. "It's our responsibility to eliminate this risk," he said. "We own it and we know how to do it."

But why had nobody caught it in the first place? The answer might be infuriatingly simple: nobody read the paperwork.

Although the FAA is responsible for the safety of any airplane manufactured in the United States, it delegates much of the certification to the manufacturers themselves.

BUT THERE'S A DIFFERENCE BETWEEN DELEGATION AND TOTAL SUBMISSION

It has to in order to get anything certified at all, says Jon Ostrower, editor-in-chief of *The Air Current* and a former aviation reporter for *The Wall Street Journal*.

Boeing already has the people and the expertise, it pays better, and it isn't susceptible to government shutdowns. The FAA, meanwhile, says it would need 10,000 more employees and an additional $1.8 billion of taxpayer money each year to bring certification entirely in-house.

But there's a difference between delegation and total submission.

During the Max's certification process, FAA managers pressured their teams to delegate as much as possible back to Boeing. When Boeing looped the FAA back in for review, "there wasn't a complete and proper review of the documents ... review was rushed to reach certain certification dates," according to one FAA certification engineer.

The results of that rushed review are clear.

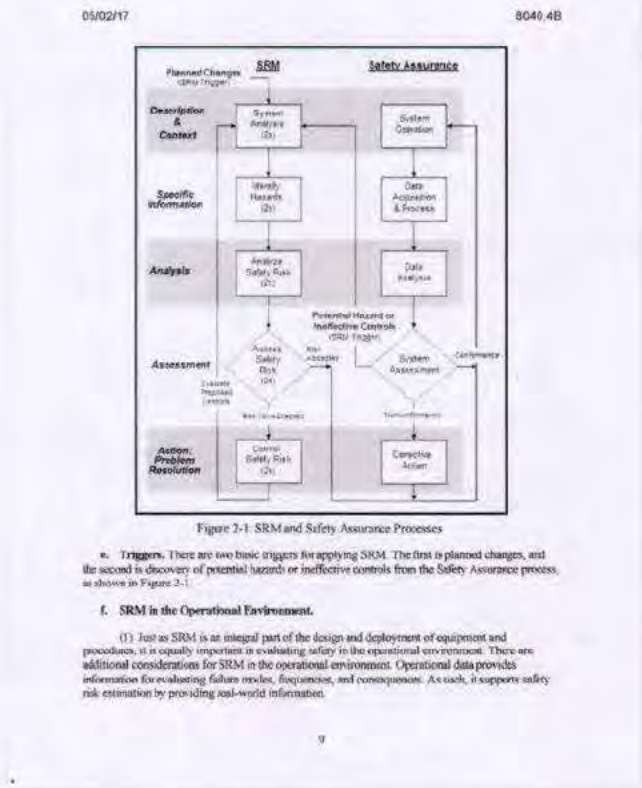

05/02/17 8040.4B

Figure 2-1. SRM and Safety Assurance Processes

e. **Triggers.** There are two basic triggers for applying SRM. The first is planned changes, and the second is discovery of potential hazards or ineffective controls from the Safety Assurance process, as shown in Figure 2-1.

f. **SRM in the Operational Environment.**

(1) Just as SRM is an integral part of the design and deployment of equipment and procedures, it is equally important in evaluating safety in the operational environment. There are additional considerations for SRM in the operational environment. Operational data provides information for evaluating failure modes, frequencies, and consequences. As such, it supports safety risk estimation by providing real-world information.

9

The FAA's general process for identifying and mitigating risk. | Image: FAA Order 8040.4B, "Safety Risk Management Policy"

Whenever it adds a new airplane to a type certificate, the FAA lists where that airplane does or does not differ from other models in the same type. In the case of the 737 Max, the FAA's list extends to 30 pages, reviewing everything from engine noise to de-icing systems, aluminum fatigue to security doors.

Yet this document dedicated to minutiae does not mention MCAS once — not by name, not by description — which is kind of astonishing when you consider that even the seat belts get a mention.

The FAA overlooked MCAS in other places, too.

As part of its certification review, the FAA assigns a "failure condition" to each system, which is basically a guess as to what would happen if that system were to break. The lowest-severity systems should only cause "some inconvenience" to passengers, while the more serious "hazardous" and "catastrophic" failure conditions can endanger the aircraft and its passengers. The more severe the failure condition, the more redundancies that system is supposed to have.

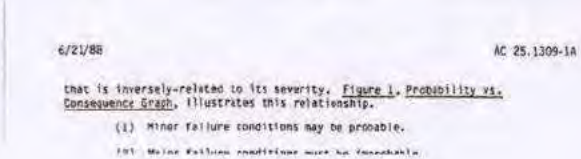
At least, that's the theory. MCAS received a "hazardous failure" designation. This meant that, in the FAA's judgment, any kind of MCAS malfunction would result in, at worst, "a large reduction in safety margins" or "serious or fatal injury to a relatively small number of the occupants." Such systems, therefore, need at least two levels of redundancy, with a chance of failure less than 1 in 10 million.

IT JUST BELIEVES WHATEVER DATA IT'S GIVEN, EVEN IF THAT DATA IS BAD

MCAS, however, does not meet any of these standards.

It has no redundancy: it takes input from just one AoA sensor at a time. That makes MCAS completely unable to cope with a sensor malfunction. It can't "sanity check" its data against a second sensor or switch to a backup if the original source fails. It just believes whatever data it's given, even if that data is bad, which is what happened on Lion Air flight 610 and Ethiopian Airlines flight 302.

It gets worse: over the last five years, 50 flights on US commercial airplanes experienced AoA sensor issues, or about one failure for every 1.7 million commercial flight-hours. Sure, that's a low rate, but it's still nearly six times above what the FAA allows for "hazardous" systems: they're only supposed to fail once every 10 million flight-hours.


6/21/88 AC 25.1309-1A

that is inversely-related to its severity. Figure 1, Probability vs. Consequence Graph, illustrates this relationship.

(1) Minor failure conditions may be probable.

Worse still: the FAA did not catch the fact that the version of MCAS

(3) Catastrophic failure conditions must be extremely improbable.

Figure 1: Probability vs. Consequence Graph

AoA Sensor failure actually here

Catastrophic Accident
Adverse Effects on Occupants
Airplane Damage
Emergency Procedures
Abnormal Procedures
Nuisance
Normal

Consequence of Failure Condition

Unacceptable

Acceptable

Probable $1x10^{-3}$ Improbable $1x10^{-5}$ Extremely Improbable $1x10^{-9}$

Probability of Failure Condition

e. An assessment to identify and classify failure conditions is necessarily qualitative. On the other hand, an assessment of the probability of a failure condition may be either qualitative or quantitative. An analysis may range from a simple report that interprets test results or compares two similar systems to a detailed analysis that may (or may not) include estimated numerical probabilities. The depth and scope of an analysis depends on the types of functions performed by the system, the severities of system failure conditions, and whether or not the system is complex. Regardless of its type, an analysis should show that the system and its installation can tolerate failures to the extent that major failure conditions are improbable and catastrophic failure conditions are extremely improbable.

(1) Experienced engineering and operational judgment should be applied when determining whether or not a system is complex. Comparison with similar, previously-approved systems is sometimes helpful. All relevant system

Par 7 7

The FAA's definition of "acceptable" versus "unacceptable" risk, and where angle of attack sensor failure falls on that spectrum. | Image: FAA Advisory Circular No. 25.1309-1A, "System Design and Analysis"

actually installed on the 737 Max was much more powerful than the version described in the design specifications. On paper, MCAS was only supposed to move the horizontal stabilizer 0.6 degrees at a time. In reality, it could move the stabilizer as much as 2.5 degrees at a time, making it significantly more powerful when forcing the nose of the airplane down.

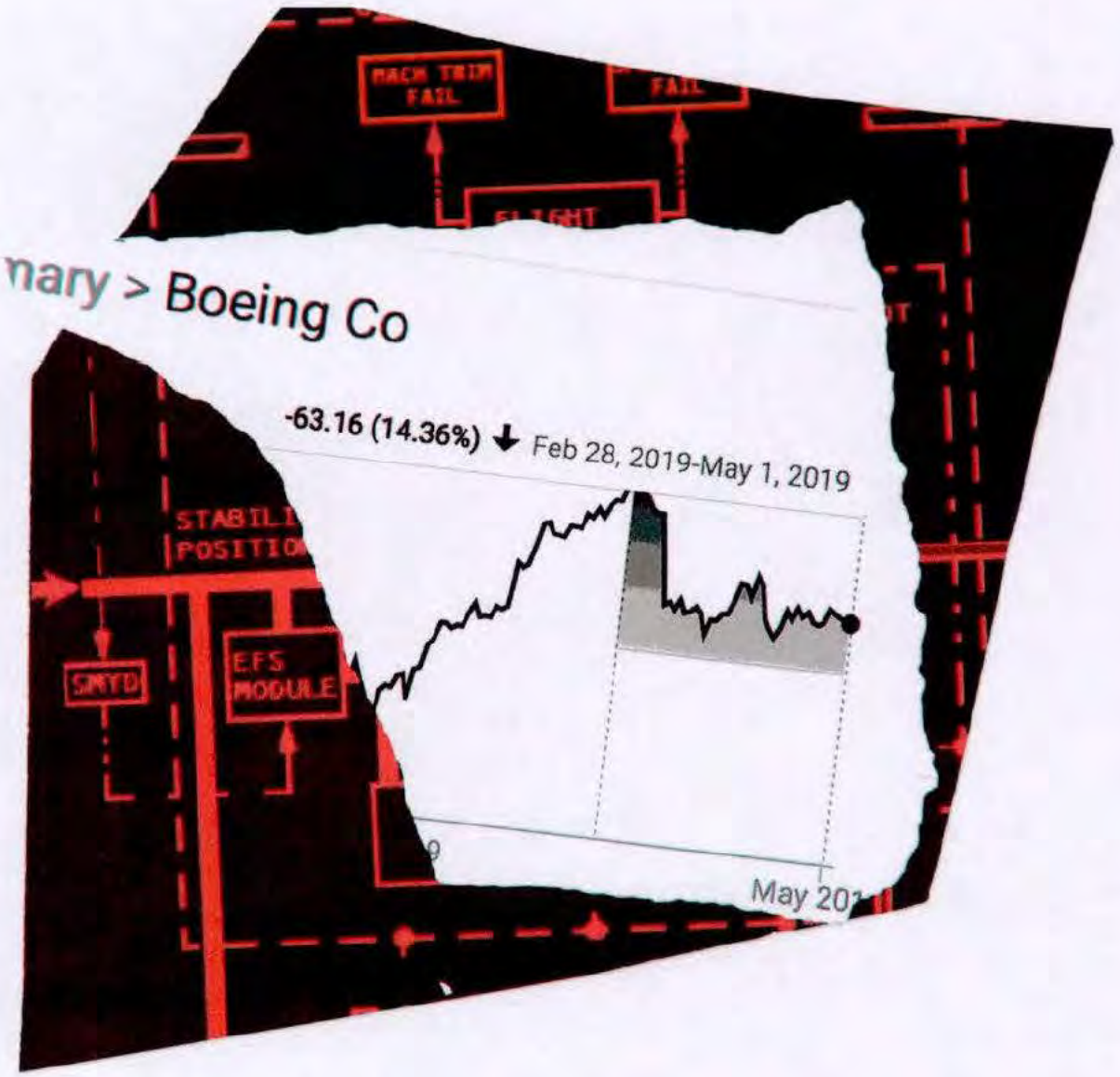
"Although officials were aware of the changes," *The New York Times* reported, "none were fully examined by the FAA."

So had anyone checked, they might have flagged MCAS for one of several reasons, including its lack of redundancy, its unacceptably high risk of failure, or its significant increase in power to the point that it was no longer just a "hazardous failure" kind of system.

When asked for comment, the agency said, "The FAA's aircraft certification processes are well established and have consistently produced safe aircraft designs."

Boeing defended the process as well. "The system of authorized representatives — delegated authority — is a robust and effective way for the FAA to execute its oversight of safety," a spokesperson told *The Verge*.

But that system only works when someone actually reads the paperwork.



On a strange way, the 737 Max's story is less about what *did* happen and more about what didn't. Nobody did anything criminal. Nobody did anything malicious. Nobody did anything wrong, in a strictly technical sense.

In fact, when viewed in business terms, Boeing did everything *right*. Between 2011 when the Max was first announced and 2018, Boeing's total annual revenue grew almost 50

FURTHER READING

- "In 12 Minutes, Everything Went Wrong," *The New York Times*

percent to $101 billion, its annual profits nearly doubled, and its stock price quadrupled. Its executives personally made tens of millions of dollars in bonuses for hitting their corporate performance targets, thanks, in large part, to the record-setting pace of 737 Max sales.

It's a perfect example of the cross purposes at which business, technology, and safety often find themselves. With its bottom line threatened, Boeing focused on speed instead of rigor, cost-control instead of innovation, and efficiency instead of transparency. The FAA got caught up in Boeing's rush to get the Max into production, arguably failing to enforce its own safety regulations and missing a clear opportunity to prevent these two crashes.

- "The real reason Boeing's new plane crashed twice," *Vox*
- "Two 737 Max Crashes in Five Months Put Boeing's Reputation on the Line," *Bloomberg Businessweek*
- "737 Max grounding threatens to unravel the aviation certification world order," *The Air Current*
- *How to Land a Plane* by Mark Vanhoenacker
- *Cockpit Confidential: Everything You Need to Know About Air Travel* by Patrick Smith
- *Boeing versus Airbus: The Inside Story of the Greatest International Competition in Business* by John Newhouse
- *Remove Before Flight* by Laura Einsetler

Boeing's bet on the 737 Max now seems to have been badly calculated. Since the two crashes, the company has lost over $25 billion in market cap. It may have to pay billions more to its suppliers and airline customers for costs related to the grounding, and that's not including the nearly $30 billion in orders that airlines have threatened to cancel. All this for an airplane whose initial development was supposed to be a great value at only $3 billion.

In Ethiopia, meanwhile, the consequences of Boeing's bet are much less abstract. A week of mourning followed the crash in Addis Ababa. Relatives of the victims flew in from Kenya, Canada, and China. Others who lived in Ethiopia were bused

to the capital by the airline.

Three days after the crash, hundreds of mourners and 17 empty caskets proceeded through the streets of Addis Ababa, ending at the Holy Trinity Cathedral.

At the crash site itself, relatives set up an arch wreathed in flowers as a memorial, under which they placed photographs of their loved ones. The airplane had struck the ground with so much force that there were no identifiable remains. Instead, families received bags of soil from the surrounding fields. ■

Correction: *We've updated our discussion of the failure rate of angle of attack sensors. It now refers to failures per total flight-hours rather than total flights, and only considers commercial passenger flights (not cargo or private flights) in its calculation.*

GAMING

Dr Disrespect breaks character to apologize over Twitch ban incident

APPLE

Apple CEO Tim Cook says report on tensions with Jony Ive is 'absurd'

POLICY

Virginia's 'revenge porn' laws now officially cover deepfakes

View all stories in Tech

DRIVER'S/INSURED'S

PERSONAL NOTES

WITH REGARD TO FEBRUARY 23, 2019

4-CAR INJURY COLLISION

LOS ANGELES I-405

DEVEOPMENT OF IDEA THAT A DANGEROUS - FLAWED-DESIGN

WAS BUILT IN TO THE CAR'S ACCELERATION SYSTEMS

02/24/19 through 06/(June) NHTSA

Reference #: 11206504

Original Date; 09 May 2019
(Received)

Personal Notes of: [redacted], Victim/Driver

Date of Accident of 23 Feb. 2019
(4-Cars & at least 3 persons injured

[redacted] Cal Driver's License: [redacted]

Mercedes-Benz Thead (e-mail) [redacted] - MBUSA
Contact Person: [redacted]

AAA Supervisor: Rich Tebach
1-661-291-3823
1-661-291-3810 (Mr. Tabach's Supervisor.

AAA: Claim #: [redacted]; Policy # [redacted]

CHP, CA.- Traffic Collision Report #: [redacted]
(Note: official Appeal of Report filed March, 2019.

[redacted]

2 of 2 identical copies of my personal notes, post-2/23/19.

May be out of order

Copies: Personal Notes of [redacted] pertaining to bodily injury - 4- Car Collision accident of 2/23/2019.

Accident Ref. #: 11206504

[redacted] M.B. 2-23-2019 - Spoke to her about what happened. She mayor may not contact me again. She said their team may look at the car & the data, etc. Also shared my concerns with the design location & operation that had/has no fail-safe re: the acceleration being full-throttle instead of gradual.

3/14/19: Found that the pol. rept (J.C.R.) trumps all with the insurance company. Thus

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CRUISE CONTROL Pages 171

Pg 27 - of M-B operator's manual - Data Stored in Vehicle - Calif Code figure 9951 Compliance. EDR - 30 seconds or less.

Conversation March 16 about 12:10 pm

W.L.A. CHP - 9565 - Sgt. Ruiz - Supervisor for Apt. Lt. Robitaille.

D. O. T. Transportation Safety Administration.

Under "Discussion"

"UA's" behave like

"wrong-pedal" occurs more frequently in driving situations that involve turning, perhaps indicating that there is an influence of the upper limbs or body that creates a more erroneous lower-limb condition"

errors in response execution = going too far."

Schmidt (1989) has argued that UAs behave like "response-execution errors in many ways, sensitive to the same factors that influence variability in human aiming movements, and are unlikely to be recognized as errors by drivers who have just made them."

"... supports a pedal-misapplication theory, and rejects a theory involving some vehicle defect.

Schmidt in 2010 may have been in error.

Source or provision Frontiers Media, SA

Schmidt, UCLA. Professor Emeritus.

3 other cars

3:40pm
2/28/2019 - Lengthy (45 min.) discussion with
Triple A adjuster Raman
1-661-852-4031

Revisited the exact circumstances of the accident of 2/23/2019 (16000 lbs) all aspects discussed. Cruise Control issue discussed extensively. "Stuck Pedal" ask 3 x by 3 different 1st responders with same question. Did you have a stuck pedal? Answer immediately, all 3 times: "No!" emphatically. This was not a matter of a stuck pedal.

(gas)

What it was, was a "gas pedal" that pinned my foot to the floor board with so much force that I couldn't pull it out. Car accelerated with maximum velocity until I lost control of the car.

My foot remained pinned at least to the point in time when the air bags deployed. Would have been at collision point to cause the air bag to deploy.

Electronics bleed; caused I car to lose control via cruise control malfunction. Unknown source of what happened to another.

Notes: 1

Accident of 2/23/2019 Alexander Butler-Porter

Claim # 01365626

3/4/2019 - No Service Manager - Wes Crowe
1-805-371-5429

Requested an Mgr. to talk to as rep. by AAA Adjustor -

619-531-1852 - Brian W.

Raman 1-661-852-4031-Trip A.

#1) M.B. 5/10/16 (Prior M.B) (Based on date of acquisition 2 of 4.)

#2) M.B. 5/9/17 Claim # 012786O-36-1-9381
5/9/17 " " 01278627 4
5/9/17 " " 01278603 6

11/2/17 Claim # 0138259 86-1-8732
11/2/17 Claim # 01302598 6-
11/2/18 Claim # 01350554 5

2/23/19 claim # 01365626

2/23/19 NHTSA ID. # 17V627800 - 10/6/17

3/4/19 - # 21,443.87 - Trip A - determined value of the car.
3/4/19 - # 23,351.87 - Total settlement.

3/5/2019 - T/C from Raman - person to examine car: Black box, etc.

Accident: Kinesiology

3/19/2019 - C350 - 2014 - claim # 01365426. CHP #: 9565-2019-00257

Location: Co-part Van Nuys. 7519 Woodman Ave.
Van Nuys, Ca. 91405 - Lot #28523569.
818-782-5315.
Brav.Ramon@aaa-calif.com

3/19/2019 - Email to Raman Brav asking to view vehicle. [redacted]

Page 28

"If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying Mercedes-Benz, USA, LLC.

Results could be recall.

To Contact NHTSA, you may call the Vehicle Safety Hotline toll-free at 1-888-327-4236; go to http:// www.safecar.gov; or write to: Administrator, NHTSA, 400 Seventh Street, S.W., Washington, DC 20590, USA.

Further Info. on vehicle safety can be found at http://www.safecar.gov.

Above from C-Class Sedan Operator's Manual, Mercedes-Benz (2055843718) Edition B 2019.

M-B VIN: WDDGF5HB2EA [redacted]

3/25/2019 - T/C to Adjustor/Claims Service (Adjuster) - Representative; Alexandra Butler-Pooter (Butler-Pooter.Alexandra@aaa-calif.com

3/25/19 Refer to Co-part Mgr.: Matthew Tee-310-771-5233
called @ 9:56 A.M. - Recording.

3/25/19 Co-part Phone: 818-782-5315 #4
Contacted Co-part - Recording received Press "4" to speak to a Customer-Service Representative.
Erica answered the phone. At first stated [redacted] could come by & had to be present; then stated that "Adjustes" called and provided my name. [redacted]
3/25/19
Co-part: 818-782-5315 (Lot #: 28523569)
Location 7519 Woodman Ave., Van Nuys, Ca. 91405

www.prevent-ip.org

Auto Safety articles on Internet

11 Jan. 2005 - from Internet Wayback Machine:

PReVENT - Reduce Accidents by 50% by 2010.

European Automotive Industry

Initiative of objectives by European Auto Industry, a Project.

Daimler-Chrysler joined BMW, Renault, PSA Peugeot Citroen, Ford, CRF, Volvo Technical Development, suppliers: Siemens VDO; SAGEM & Bosch, & Research Institute: INRETS

W203 throttle Reset. ~~Super computer~~ Chess Engine - P0120 Throttle/Petal Position Sensor/Switch A circuit Malfunction P0121 ... into output voltage, and emits the voltage signal to the engine control module ( ). . . This sensor is internal to the MAF (mass Airflow Sensor) and it is common for it to . . . . Select Reset W203 Throttle reset. They can diagnose a Mercedes problem. . . .

tech.slashdot.org/computer/cars, a maddening experience

Nothing of Value??

Does Cruise Control Cause Accidents? April 19, 2017

by: The Rosen News Team.

Source: Wall Street Journal's Report. states a French study

Several Dangers of cruise-control.

Can Accidents caused by defective Cruise-Controls.

M-B

Attorney, Alan J. Konigsberg (212) 605-8200

1-800-988-8005 (24/7).

Serve Nation-Wide

3/26/19 -- Search Internet
Accident

The Saraya Law Firm
Infographic 11/6/2016

Airbag takes 1/30th of a second to fully inflate.
Safercar.gov

Cars gone wild: The Major Contributor to Unintended Acceleration in...
by R.A. Schmidt - 2010 - cited by 23 related articles.
200 pedal errors as cause of accidents
Two main classes of explanations have been proposed for pedal errors ... errors in response choice.
ncbi.nih.gov/pmc/articles/PMC3153815/

Unintended Acceleration sometimes called: "Sudden Acceleration."
1980's: Considerable attention.
2009 & 2010 - UA accidents resurged.
Some Unknown Phenomenon w/ working
"Frontiers in Psychology - PMCID: PMC3153815
PMID: 21833265

Richard A. Schmidt and Douglas E. Young -
North Carolina Database - 92% of misapplications occured during the driving cycle. In
b) unhurried conditions; c) categorically separate from those events referred to as unintended acceleration episodes @ start up.

Notes: 2

Claim 013656426

3/5/19 - Print-out Triple A form, authorizing Triple A & its consigns to go into black box of car, etc. in order to attempt to learn the cause of the accident.

3/6/2019 - Rec AAA message to Contact M-B to "make a claim/report regarding your (661-481-4156) alleged cruise control issue." from Tiffany Nguyen (Nguyen.Tiffany2@aaa-Calif.com

12:19pm 3/6/2019 - https://mbusa.com/en/home. went to Internet, logged in, as already registered. Went to "Contact Line": 1-800-367-6372.

- Mercedes. Me — press 4, then 3 (2015 older)

- Customer Service Representative - press 5, then 3, then 5

1-800-367-6372 + 2011 Kale- manager. would info to executive referral "when you put the break on it cancelled the cruise control"

03/11/2019 - Rec. Notice from AAA regarding policy change & refund for cancellation of insurance on c350. [redacted]

1-661-852-4031

3/11/2019 - Raman Trip A - ask to sign authorization - started inspection process / call made last week on 7th or 8th & ...

Main 01365426

Accident

3-7-2019 - Spoke to Tiffany Nguyen who listened to explanation of contact & discussion with Kale' of Merc. Customer Relations. Refusal of Kale' to connect me with a manager. Tiffany said that legally, only the registered owner of the vehicle may make the request for "report/claim" v. M.B. Suggested that I write letter to M.B. with same request & to send it ret - receipt requested.

3-7-2019 - Thinking about AAA suggestion to file claim/Report V. M.B, something comes to mind about the timing of the suggestion. There is very little actual evidence at this point in time, pointing to Mercedes-Benz other than anecdotal.

3/7/2019 - Call to David Klaparda, Supervisor of Tiffany, AAA. Explained - Put M-B on notice that there is a potential defect claim w/ manufacturers
Write letter that places M-B on notice.

3/7/19 - https://www.mercedes-benz.com/en/

M-8254 Western Region - 3860 North Lakewood Blvd.
Long Beach, Ca. 90808

Customer Assistance Center - Mercedes-Benz Dr.
main office Sandy Springs, Ga. 30328

Accident 2-23-2019

3/7/19 - [redacted] relates his daughter [redacted] got her foot caught under the accelerator pedal on the way to UCLA. [redacted]

3/7/19 - Continue letter of Mercedez-Benz as directed by ACSC (AAA) on Triple A. Included are Brar, Raman - 661-852-4031, claims representative; Tiffany Nguyen, 661-481-4156, Mobile Claims Representative; Manager: David Khaparde, 818-438-3317; a supervisor, & Alexandre Butler-Porter, Claims service representative, 310-217-5280. the e-mail is: Butler-Porter. Alexandre@aaa-calif.com.

[redacted]

3/7/2019 - Tiffany Nguyen - Nguyen.Tiffany2@aaa-calif.com.

NCIC#: 9565 3/11/2019 - Records.

W.V 5825 De Soto Ave.

9565-2019-00957

610 Spring Rd.
Moorpark, Ca. 93021-1278
805-553-0800

Went @ 12:15 pm & Received a copy of the traffic Accident report.

3/7/2019 - Received, Read & Review traffic Collision report. Page 12 is both incomplete & inaccurate with regard to my statement as Party #1 (Ford) on lines 12 & 13
Par 13 & 14 under "OPINIONS & Conclusion is an unfair & incomplete

3/11/19 - Contin:
conclusion to draw & is biased and is not fully supported by the facts. Further facts were left out of the report & my condition was not adequately taken into account. my condition, emotionally & physically was such that a further statement, which might have been more accurate when I had gotten a bit of recovery & was out of the state of shock & distraught & distraught that I was in on the side of the road.

Will file my own SR-1, & will send supervisor of report, my complaints regarding

Pages 12, 13, & 14 -

This includes the "cause" line 14 & 15 as being misrepresentative of the facts!

(1)

3/12/19 M-B.

M-B. [redacted] left message - x 6327 [redacted]

[redacted] #55

M-B/VDA Rec. Notice. [redacted] (3/12/2019) - phone call return.

[redacted]

Location: 7519 Woodman Ave. 91405
Lot # 28523569.
Raman will assist me.

3/12/2019 -

3/13/19 - Black Box is Event Data Recorder.

3/12/19 - A C.D.R. Vehicle List, retrieval system via the Bosch Crash Data Retrieval Software & Hardware Products support crash data from vehicles listed. The Mercedez-Benz C350 is not listed as one of those vehicles that Data can be retrieved from.
C350 or C series 2014 M-B are not listed.
However, they can have any number of sensors.

C DR - Crash Data Retrieval
A C M - Air Bag Control Module -

Data may be preserved up to 5 sec prior to crash.
Vehicle Speed
Steering wheel Angle
CRASH Severity

(2) 3/13/19
Conti

Brake Switch States
Seat Belt States
accelerator pedal position
Order of impacts if multiple
Transmission gear position
air bag deployment data
occupant presence

Mercedez-Benz is listed as a manufacturer from who data can be easily recovered.
(from Professional Analysis and Consulting)

Some EDR info include
- Data after crash
- vehicle dynamics info for 5 sec before crash.
- Driver Inputs for 5 seconds before crash.

Accleration position
air bag deployment times
Brake pedal status.
Delta-V (impact severity
order of impacts if multiple
Pre-Crash Vehicle Data (5 sec. prior)
Seat belt status & occupant presence
Steering Wheel Angle
Valuable Crash Evidence Stored in vehicle
Vehicle Speed

Accident
02/27/2019

Ref. 3/27/19 BISNAR/ GHAST - Pers. Inj. Attorneys 800-561-4887
Filled out contact form.

From Forbes Magazine

Professor Patrick Lin - Contributor
Ph D - U.C. Santa Barbara.
B.A. U.C. Berkeley
Education

TED. ed

"The ethical dilemma of self-driving cars.

"If we think that this industry is as important as advertised, then it needs to be able to defend its design decisions in advance, not after the fact of an accident."

Polytechnic State University San Luis Obispo
Ethics and emerging Sciences Group
philosophy Professor

palin@calpoly.edu -- Contact Lin.

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from 2015 Springer Nature

Autonomes Fahren pp 69-85 cite as
Springer Vieweg, Berlin, Heidelberg
Print ISBN: 978-3-662-45853-2

Minami Tamaki, LLP, Law Firm

Updated June 7, 2018

Walter Huang - Mark Fong of Minami Tamaki LLP

NTSB - Death involving auto pilot.

Tesla denies responsibility - Blames Walter's inattention as sole cause of the Accident.

Walter had multiple warnings from car prior to the accident.

4 sec. before the accident, car accelerated from 62 to 70.8 mph.

The autopilot system should never has caused this to happen.

B. Mark Fong, partner of law firm.

415-581-1497
415-788-9000

Time Line Maker:

Timeline Maker Professional 1-800-850-0122

Purchase: $95.00 Sale Price
1-800-850-0122 (8-4pm, EST, M-F)
e-mail: sales@timelinemaker.com

Item #: P3004-01 / Order #: 4677
Transaction #: 616494 50140 Date of Purchase: 3/30/19
W. F. Debit Card.

Timeline Maker Pro - 4-5-42 install.exe
Full size: 24.9 MB

Could not print

Timeline Pro link:

1. I.P. Address: 2) click following link
https://www.timelinemaker.com/products/timeline-maker-pro/valid-download-timpro-v4-5/

3) Install by following instructions on the download page.

4) Start the Timeline Maker Pro program. If you do not see the activation window, click on Help then click on Activate.

5) When prompted, enter the following Serial Number (Copy/Paste recommended)
X1TM4-9KAJ7-Y4DV1

6) on 2 → the next screen, enter your registration information to complete the Activation.

If you encounter any difficulties with this download and activation process, you can contact Activation support.

Phone: (888) 638-0333 (8:00 AM - 4 P.M - M-F)

E-Mail: activation-support@timelinemaker.com

Thank you for ordering

Timeline Title: 2232019 Accident

Time Line

4/2/2019 - Tiffany Nguyen - telephone contact 10:33 AM
"Must follow the police Report" (Determination of fault.)
No Independent judgement nor facts evaluation. Ske is now out of picture as Driver of car #3 (Honda Pilot is now, "seriously injured" ?, has obtained an attorney.

Tiffany also stated, "I'm out of it.

4/2/2019 - Sent photos from cell & / or Google photos to get trust of the C.H.P.; also sent a sort of time line or matrix on Mr. Benz's cruise-control system & some material about its C-C problem history. Included in this history was Alexandra Butler-Porter of A.E.S.C.

Plan to complete time line; do more research on M-B C-C probs. - Submit New Time line to all parties

Also req. ACAC to do forensic study of Cruise control, black box & all Systems including Air Bag Deployment modules & info on C-C pedal etc. pedal (under dirt / Shrubs.