https://youtu.be/swlVkYVSlIE?si=pteN5o5Mcos4mP9p

REVEALED: This System KILLS in 39 Seconds and Nothing is Being DONE!
Mentour Pilot

A new and, to pilots, previously-unknown system causing severe safety issues when activated...

Sound familiar? Well, the problem is that we are not talking about MCAS here.

Instead a new system which has already activated at least twice with some very scary results.

- [Pilot] We need everything you have. –

In a departure from my normal way of working, I'm now making this video to highlight this danger before something really bad happens and hopefully, to get your help to get the regulators to intervene.

I also want to highlight that while none of the information that I'm about to explain in this video is disputed, the regulator currently disagrees with my conclusion. And I will leave it up to you to decide who is right or wrong here. Stay tuned.

When I worked on my videos about the horrible Boeing 737 MAX accidents a few months back, I was struck by just how sad it was, but the issue with MCAS wasn't properly understood by the pilots and regulators already after the first crash. If that had been the case, then maybe the second accident could have been avoided, so I decided that if I ever came across something similar, I would use my social media reach to try and inform the pilot community as soon as I possibly could.

But at the same time, I thought that this would obviously never happen again because my industry learns from the hard lessons that it's been taught, so all systems must surely be well understood, evaluated and explained by now, right? Well, I will let you be the judge of that. Now, I will tell this story in the context of two separate incidents, which happened back in 2023. But since this video is done in a pre-emptive effort rather than learning from something horrible that has already happened, I have access to very limited information about the first incident and only the preliminary report from the second. But it is really important to point out that what happened on these flights is already outlined in the NTSB's interim report, as well as in some leaked information from the FAA.

And we have not found anything that disputes how the related systems performed nor the effects that they had. So the only thing that's really in question here is how the FAA, and, in continuation, EASA, has decided to react on it.

On March 5th, 2023, an almost brand new Boeing 737 MAX-8 from Southwest Airlines was getting ready to operate a flight from Havana, Cuba, over to Fort Lauderdale in Florida. A completely normal flight from what we can tell.

I'm saying that because, as I mentioned, we don't have a full report on it yet, but what we do know is that there were 147 passengers on board, as well as two pilots and four cabin crew. The two pilots eventually lined up as normal on Runway 06 and around 16:30 in the afternoon, they started accelerating down the runway.

We don't know which of the two pilots were pilot flying, but it won't really matter for this story anyway.

But what we do know is that the initial part of the takeoff proceeded normally, with the gear being retracted after rotation, and the aircraft continuing along its cleared departure route. But as it was climbing through approximately 800 feet, it suddenly ingested a huge turkey vulture into its right-hand engine and also hit another one straight over the aircraft nose.

Now bird strikes are a part of life for an airline pilot. During the busiest migratory months, I normally experienced a bird strike in some form almost every week, but it's pretty rare that we hit birds of that size and that they are ingested into the engines. The size of the bird was later estimated as 1.2 to two kilos or three to four pounds, which was around the four-pound certification requirements of the CFM LEAP-1B engines fitted to the 737 MAX.

In any case, this bird caused some immediate severe damage to the fan of the number two engine, actually breaking off a whole fan blade and also damaging several others.

But the engine did what it was supposed to do and contained the shards of those blades inside of the enclosure, and it also initially continued to run, which caused unbalance in the fan and therefore, some severe vibrations.

Remember that. The pilots immediately realized that they had suffered some type of damage to their engine.

They, therefore, went through the fault isolation process, identified the number two engine as the faulty one and executed the memory items for engine fire, severe damage and separation in order to secure it.

And according to our initial information, the right-hand engine fire warning also activated at this time.

Because of all of this, the pilots quickly also called in a Mayday to the Cuba controllers, explaining the situation and asking if they could get vectors back for a potential emergency landing. Again, the details are quite scarce at the moment.

But as the pilots were dealing with this, thick, acrid, white smoke was quickly entering the passenger cabin from the air-conditioning vents and risers. Pictures from the flight shows a visibility of only a few seat rows in the cabin, and this smoke soon also entered the cockpit all by in a much less dense capacity.

Now again, getting bad odors into the cabin after a bird strike to the engine is not very uncommon.

It generally smells like you're cooking a chicken for several minutes if a bird has been ingested into the core of the engine, but this was very different.

This smoke was white, and, like I mentioned, acrid in smell, and it quickly started irritating the throats and eyes of the passengers and crew on board. The pilots quickly ran through their associated checklist, and when they were done, they executed a successful single-engine approach into Runway 06, the same runway as they had just taken off from.

Once the aircraft came to a stop on the taxiway just off the runway, the two pilots decided to immediately evacuate the aircraft, as the cabin was at that point still full of smoke. Luckily, no one was seriously hurt in this incident, even though some passengers required some later medical attention due to respiratory issues.

Now news of this incident soon reached both the FAA and the NTSB, and an Annex 13 investigation was opened into it, but maybe it wasn't heavily prioritised amongst the hundreds of other bird strike reports that pour in every day. I don't know. What we do know is that not much happened initially, but it would soon turn out that this was far from just a normal bird strike.

Fast forward to the 20th of December, 2023, about nine months after the first event.

On this day, another Southwest Airlines crew was getting ready to operate Flight 554 from New Orleans International Airport over to Tampa in Florida. Again, the aircraft used was a fairly new Boeing 737 MAX 8, and as it turns out, the fact that it was a MAX is going to be important here. But I want to emphasize here that the MAX is not the only aircraft affected by what I'm about to tell you.

In any case, the preparation for this flight proceeded in a normal fashion, with the weather along the route expected to be good.

At the airport, there was only some light winds from a northeasterly direction, few clouds and a temperature of 16 degrees Celsius, a great day for flying, in other words. Since we only have access to the preliminary report, we don't know the experience level of the pilots and crew on this flight. But we do know that there were 133 passengers and six crew on board, and that the captain was going to operate as pilot flying on this particular leg.

So, once everyone was on board and the pre-flight was complete, the two pilots finished up their before-start checklist and soon requested push and start by the New Orleans Ground Controller. After having started their engines, which, on the MAX, takes a lot of time, Southwest Airlines Flight 554 soon started taxiing out towards Runway 11 for departure. The before-take-off checklist and associated procedures were completed according to standard operating procedures, and at time 14:14, the aircraft received its take-off clearance and the captain moved the thrust levers forward. This accelerated the two giant LEAP-1B engines first to 40% to stabilize them equally, and then once he pressed the TO/GA, into 83%, which was the calculated take-off thrust setting. Now, before we continue much further here, I want to talk a little bit more about these engines, because they will hold a very critical place in this story.

As most of you know, the Boeing 737 MAX is vastly more fuel efficient than its predecessor, the 737NG.

Now, some of those gains come from aerodynamic improvements in the form of better winglets and a more round APU exhaust, but the vast majority comes from the fantastic CFM LEAP-1B engines.

In my videos about the MAX accidents, I highlighted the kind of engineering hoops that Boeing had to go through in order to fit those substantially larger engines under the wing of the 737.

But even though I touched on it, one thing that I didn't go into much detail about was the fan of those engines.

You see, the jet engine, as a principle, hasn't changed much over the last few decades, but what has become abundantly clear is that a larger fan in the front of the engine can move a bigger volume of air backwards than a smaller fan can. And since it's more economic to move a larger volume of air backwards slower than to accelerate a smaller volume more to achieve the same thrust, a bigger fan is obviously better.

But it's not only the diameter of the fan which is important for this, it's also the size and number of fan blades.

If you look at a CFM56 from the older NG and a LEAP-1B from the front, you will notice that the LEAP has fewer but wider fan blades, which adds to the overall efficiency gain.

But this also brings a problem. Bigger individual fan blades means a bigger potential imbalance if one blade should fail for whatever reason. And that rotary imbalance could then cause huge loads on the shaft bearings, supports and even the fan frame and the pylon who holds the engine in place.

In other words, these vibrations, if left unchecked, could cause some further serious damage.

Now, there were a few ways of mitigating this problem. One would be to just strengthen the affected components by basically beefing them up, but that would add a lot of unwanted weight to the engine which would reduce its overall efficiency.

The other solution was to create a new system that could activate in case of an imbalance and somehow reduce the overall vibrations caused. So how could that be done then? Well, if the fan rotor was centered in position, using structurally-weakened components, then if heavy enough vibrations were encountered, those components could break and allow the fan rotor to move in a bigger circle and find a new center. And that would reduce the immediate loads transmitted to the rest of the structure. This was a very smart solution which enabled big weight savings and it was named the load reduction device or the LRD.

Now, the LRD was designed to be operating completely independently of any pilot input, basically just helping the pilots out in case of a severe damage, so it was therefore not described in any pilot manual.

But it turns out that there was one feature of this LRD that was initially very poorly understood and of which knowledge would have been very appreciated by us pilots who actually fly the MAX.

You see, the activation of the LRD also meant that the Oil A Sump would open up through the creation of a gap between the flange of the Aft One and Two bearing supports and the fan frame. Translation? In case the LRD activated, most of the engine oil would be almost instantaneously released into the airflow of the engine and therefore, into the core upstream of the engine compressor stages.

Now, that might not sound so bad. I mean, the engine would have already failed so it wouldn't need its oil anyway, but this is where we come to the next technical detail, the air conditioning system.

Now, before I continue, I just want to point out here that this LRD system is not unique to the 737 MAX LEAP-1B engine.

It is also used in the LEAP-1A, fitted to most Airbus A320neos, as well as the engines powering the Boeing 777 and the 787 and possibly other modern engines as well.

But at least in the case of the 787, it would not come with the same effects that I'm about to describe.

And I'm not fully clear on the effects it will have in the Airbus or the Boeing 777 either, since these events both happen on the 737 MAX.

And in the MAX, the design of the air conditioning system would make this feature very relevant as we will soon see.

Let's go back to the Southwest Jet, which was now accelerating down the runway in New Orleans.

The takeoff was initially completely uneventful and after rotation, the captain asked for the first officer to raise the gear and everything then continued completely normally, until at an altitude of around 800 feet, where the captain called out, "Bird!" As he saw something black swish by his left hand window. Within moments, the pilots could then hear a thump followed by severe vibrations, a complete loss of thrust from the number one engine as well as a fire bell master warning fire and illumination of the fire handle on the left side.

The captain instinctively pushed right rudder to counteract the yaw and then called for the engine fire, severe damage or separation checklists from the quick reference card. But as soon as the first officer started executing these items, intense acrid white smoke quickly started filling the cockpit.

He later reported that, within seconds, he could barely see the captain in the left hand seat, so he immediately called out, "Masks!".

After a few seconds, both pilots then pulled out their masks from their storage boxes and quickly donned them.

Now the crew oxygen masks in the cockpit are designed so that they can be donned using only one hand.

To do that, we grab the red handle and pull the mask out of the box, squeezing the handle which inflates the back of the mask so it expands and makes it easy to fit it over our head.

When the handle is then released, the mask will contract and seal tight over our face and after that, we can then choose the settings as either normal, which mixes outside air and oxygen, 100% which gives 100% oxygen on demand or emergency which gives 100% oxygen under positive pressure, something that's good if smoke or fumes is present.

These masks are good at what they are designed to do, but even though they can be fitted with only one hand, the reality is that the pilots would have had to first remove their headset, then get the mask on and then, finally put their headsets back on, whilst potentially also, depending on the mask type, having to change the audio control to mask in order to be able to communicate.

And this, especially getting the headset back on, is something that typically requires two hands to do properly.

And if you have things like glasses, it can be further complicated. Remember that, because it will become important later.

In any case, these two pilots had soon donned their masks and established communications. The first officer could now continue to execute the checklist. But here came the next problem. You see, the smoke was now so thick that the captain could barely make out his colleague in the right seat nor his instruments on the screens in front of him.

So he soon found himself looking at his head up display since that was the only thing that he could see clearly.

And head up displays are not fitted as standard on the MAX, nor is it available in the right-hand seat in most cases even when it's fitted. So what was going on here? Well, it turns out that the aircraft had hit a huge female bald eagle which had, once again, severely damaged the fan blades this time, to the left hand engine. These had then caused the severe vibrations that the pilots had felt and it had also, for the second time in nine months, activated the LRD which then reduced the vibrations.

But it had also started dumping oil straight into the engine core. And here is where the air conditioning and pressurization system comes in. You see, in order for the passengers and crew to be able to breathe normally, without the use of oxygen masks when we're flying at high altitudes, we need to artificially increase the pressure inside of the cabin. The way we traditionally do this is by the help of something known as bleed air which comes from the engines. It's called bleed air because we effectively bleed some pressure away from the compressor part of the engine. And this bleed air is then used for several things including engine and wing de-icing, pressurization of water tanks and hydraulic reservoirs, but mainly, as I said, for the air conditioning and pressurization. That is achieved through two contraptions known as air conditioning packs who also cools down the air, removes some of the water content and controls the temperature.

Now, I know it might sound a little bit strange that we are taking air from inside of the engines to breathe, but remember that under the normal circumstances, this air is siphoned away before the combustion chambers, meaning that the air is completely clean. Now this bleed air system also actually steals a little bit of trust from the engines, meaning that it's not super efficient, which is why the Boeing 78 uses electrical compressors for this instead. But overall, it's a very common and handy solution which most aircraft still use. On the Boeing 737, all the way from the Classic generation through the NG and now on the MAX, this pressurization system has been divided into two different sides.

Bleed air from the right engine is used to provide air for the passenger cabin and, to a smaller extent, also the cockpit.

And the left engine provides bleed primarily to the cockpit. Obviously, the left engine provides far more bleed air than the cockpit needs, so some of it is also going into something known as the mix manifold and then gets distributed into the cabin as well, but the ventilation rate is significantly higher in the cockpit than the rest of the cabin.

Now this system does include various check valves, constructed to trip off the system if an over-pressure or an over-temperature condition is sensed, and one of those sensors is called the Pressure Regulating Shutoff Valve, or PRSOV, which is triggered to close if the RPM of the core, also known as the N2, drops below 62%. And that would then stop all bleed air coming from that affected engine. Now having heard all of this, can you maybe start to see the problem in this scenario? After the bird strike had activated the load relief device, it now dumped around 14 quarts or 13 liters of engine oil straight into the compressor. Once it was in there, it was then heated up by the compression and basically carbureted into a fine aerosol, which was then pulled into the air conditioning system at the fourth and the tenth stage of the compressor.

Those oil particles were then pushed through the air conditioning pack and then straight into the cockpit, where it appeared as a thick white acrid smoke. Toxology analysis of the smoke later showed that it contained high levels of formaldehyde and acraline, so high, in fact, that they could, in this scenario, reach potentially lethal levels within 39 seconds.

So that was now what had happened on board Flight 554. Since the eagle had hit the left engine, it was now the cockpit that was being filled with smoke, whilst in the earlier Cuba event, it had been the right engine, where the smoke had primarily entered into the passenger cabin. In that case, the toxology analysis showed that because of the much greater volume in the passenger cabin, the concentration of toxins was not able to reach lethal levels, but could still be very uncomfortable and, of course, form a risk for people with pre-existing conditions.

I also want to mention here that dropping the passenger oxygen masks would not help in this scenario, since they are not sealed and works by mixing generated oxygen with the surrounding air, so the smoke would be inhaled anyway.

I'm saying this because in the Cuba event, passengers allegedly pried the oxygen mask panels open in order to get the oxygen masks out, which, like I explained, would not have helped.

Anyway, the pilots of Flight 554 had now don their oxygen masks, which meant that they could, at least, breathe safely, but the visibility was still a big concern. The first officer kept reading through the checklist where he soon reached the fire handle related engine confirm pull step. And once that handle was pulled, the smoke started to dissipate and the visibility improved as the air was now supplied by the healthy right engine instead.

Now the left engine had actually failed properly here, which meant that the core RPM had dropped below 62% within approximately 16 seconds after the eagle had hit and that had already closed the PRSOV. So at the time that the first officer pulled the fire handle, almost two and a half minutes had passed, which meant that the smoke had likely already started to improve before the handle was pulled.

But this also meant that the smoke would have potentially become even worse if the engine had continued to run like in the Cuba event.

Now once the reference items were complete and the pilots felt that they had the situation more under control, they declared an emergency to air traffic control.

ATC recordings also showed that they asked the controllers to get everything they had, in terms of rescue vehicles out to help them as they prepared for the landing. The captain then made a PA to the passengers, advising them about the fact that they were returning to the airport and that they would see fire trucks after landing. And this is something that is always a good thing to do, as that sight might otherwise cause nervous flyers quite some extra concern.

Overall, based on the limited information that we have in this report, it looks like the pilots and cabin crew did a great job under these circumstances. The pilots eventually finished up their checklist, briefed the approach and then flew a successful, single-engine visual approach back into New Orleans without any further issues.

Now, flying a visual approach with masks on is not as easy as it sounds, because the mask severely limits the peripheral vision, but it is also a quicker way to get down on the ground, so I completely understand why they did that. After landing, the cockpit environment had cleared enough for the crew to taxi into the stand and disembark normally, which is a very positive outcome from this event, in other words. But I would personally be very interested in hearing if those first seconds of inhaling this dangerous smoke has had any long-term health effects for the pilots. Hopefully, we will learn more about that in the NTSB final report, and I really hope that they are okay. But now, we get to where this saga takes a very strange and, in my mind, potentially dangerous turn.

Because initially, nothing really happened, but around 10 months later the FAA appears to have also opened up an investigation into this.

By that time, Boeing had already issued a bulletin, explaining the LRD system to the pilots and telling them that any engine failure with smoke should be treated like a severe damage.

The bulletin also said that the memory items should be done methodically, but rapidly in this case, including donning the mask as appropriate. It also explained the most appropriate checklist sequence to use in this case as well as a few more things, but it didn’t change any procedures. Instead, it mainly reinforced what we pilots were already trained to do. The FAA seem to initially also have been on the ball, and an investigation team was dispatched to look into these incidents further.

And they soon realized that this LRD system, which was already certified and like I mentioned present on several different aircraft types, had this very unfortunate side effect of dumping engine oil straight into the compressor.

Now the investigators were obviously concerned when they realized the effect that this could have, especially on the MAX where an activation on the left hand side could fill the cockpit with toxic smoke in just a few seconds.

So in October of 2024, 10 months after the last known event, according to articles in The Seattle Times, the investigators produced an internal document where they described the problem and the catastrophic effects it could potentially have.

They also outlined six different recommendations on how to deal with this issue, and those recommendations reads as follows.

One, due to the potential catastrophic risk associated with an LRD activation on the number one engine, which can quickly expose the flight deck to high concentrations of potentially lethal aerosolized chemicals at the critical phase of flight, we propose the following mitigation strategy to be required by emergency airworthiness directive, until such a time as a permanent fix is implemented: Firstly, all Boeing 737 MAX aircraft shall perform takeoffs with PACK 1 off if PACK 2 is available.

PACK 2 can adequately pressurize the aircraft and maintain temperature levels in the cabin.

Now if PACK 2 is not available, then the APU bleed can supply air-conditioned air and pressurization.

If both PACK 2 and the APU bleed are unavailable, well then, the aircraft is not authorized for flight.

If this procedure is used, PACK-1 can then be selected on after reaching the acceleration altitude or 3,000 feet above ground, whichever is higher.

Alternatively, the most conservative approach is to conduct all takeoffs in the Boeing 737 MAX with both PACKs off, and with the APU bleed supplying conditioned air and pressurization. So this was the very first point, and what all of this essentially meant was that the aircraft should be prepared for a potential bird strike or equivalent by making sure that if that happened and the LRD activated, the smoke could not fill the cockpit and make an already bad situation many magnitudes worse.

Now sure, this recommendation would create a bit of hassle for MAX pilots out there, but I can personally guarantee that we pilots prefer that to the risk of experiencing the scenario I just told you.

The second recommendation said that, at a time interval acceptable to the administrator, they should require a design change which could detect the immediate impulse of a bird strike or fan blade out event and automatically close the affected engine PRSOV or trip the associated PACK.

That new design should not only rely on N2 core speed reduction, but rather the immediate impulse to ensure that the PRSOV is closed as quickly as possible. Now, from the information that I have been able to gather, this fix could be done by a software change, so likely it wouldn't even require any hardware update.

The third point highlighted the need for a review of all new design features on the Boeing 737 MAX and make sure that they are all adequately shown and explained in the pilot's manuals because yet again, there was now a system on board, in this case the LRD, whose existence, activation and, crucially, whose operational effect was not explained to the pilots in their manuals, similar to what had happened in the case of MCAS.

The fourth recommendation just highlighted the fact that Boeing's initial bulletin was incorrectly written since it indicated that they were still looking into why the oil spill happened when their own presentation clearly explained that this was an expected outcome of the LRD activation, not the smoke in the cockpit, but the oil spill.

The fifth recommendation said that all oxygen masks in the cockpit should be changed to the single goggle and mask design, and that's because around 15% of the world's MAX fleet is still using a mask that requires separate goggles, which, in this case, would mean longer eye exposure to the irritating and toxic smoke.

And finally, the sixth recommendation required Boeing to reassess the likelihood of an LRD activation as they had stated during certification that they expected maximum one event every year.

But those two events had happened nine months apart, which might be a fluke, but might also not be.

Now all of these recommendations were from a pilot's perspective very reasonable and to the point.

If there is one thing that we all should have learned from the 737 MAX accidents is that it's better to prevent that risk from happening than to assume that pilots will react in a certain way and just inform them through a bulletin.

So what do you guys think that the FAA did here? Well, whatever it was, it certainly didn't add any actions to remedy this situation.

In fact, the only reason that we know about these investigator's recommendations is because their internal memo was leaked to the press and then published by Bloomberg and The Seattle Times, among others.

After receiving the information from its investigators, the FAA apparently convened a Corrective Action Review Board, CARB.

And in that review, they decided that no recommendations or emergency airworthiness directive was needed at that time. Unconfirmed reports also indicate that the lead investigator who had issued those recommendations was also suddenly removed from those investigations.

Now the National Transportation Safety Board, NTSB, are now working on their own investigation into these incidents, which, again, is what I'm basing most of this story on. And they might come with their own recommendations eventually, which I certainly hope that they do. But that just doesn't help the fact that there seemed to be something very problematic going on here. I have reached out to the FAA, asking for their version of the story and how their CARB came to the conclusion that this didn't constitute a big enough risk to act on, and I just received this response back, plus a promise of a call which never materialized.

So here comes the statement. The FAA held a Corrective Action Review Board, CARB, on November 26th, 2024, to discuss the CFM LEAP-1B engine bird strikes leading to smoke entering Boeing 737 MAX aircraft.

The CARB work included evaluating several internal FAA safety recommendations. And based on the available data, the CARB determined that the issue does not warrant immediate action, and the FAA will follow its standard rulemaking process to address it. The FAA issued a Continued Airworthiness Notification to the International Community, CANIC, about new information Boeing provided to operators of aircraft with LEAP-1B engines.

The new information contains enhanced instructions that direct flight crew more quickly to the appropriate actions when they experience abnormal engine indications. Background: the FAA continues to assess if these events could affect engines with similar structural designs. As you can see, this didn't really answer anything, and I followed up with more questions, but have not received any answer. I've also talked with a representative of the engine manufacturer, who was extremely helpful, and explained that the LRD had functioned as designed in this case, and that they were very pleased that the NTSB had now confirmed in their interim report that they are working with Boeing to find a solution.

He also wanted me to include their statement about these incidents, and it goes like this: We support the NTSB's investigation, and we continue to work closely with Boeing and the authorities on learning from this event.

Now, EASA, the European Safety Agency, apparently took part in the FAA's CARB and also agreed with their conclusion, which makes this whole thing even more bewildering to me.

And for those of you who aren't yet horrified about this and maybe even agree with the FAA's assessment that there's nothing urgent to see here, let me take you into an alternate sequence of events, one that will hopefully make you and the FAA understand why I am making this video.

So let's start by looking at a completely made-up flight with Butter airlines, the airline that my friend Ben and I are using when we teach our virtual Boeing 737 courses. Here it comes.

It's evening in Salzburg, Austria, when our fictional crew is taxing out for takeoff on Runway 16.

The captain is pilot flying, and all the procedures have been completed except for the before takeoff checklist below the line.

The crew has spent a lot of time briefing the departure, because just ahead of them, to the right, is a huge mountain on the foothills of the Alps, and high terrain is also present on their left side, where a beautiful castle is perched on top of a big hill.

Because of these obstacles, there are special procedures outlined in the briefing for Salzburg, and in case of an engine failure after takeoff, the crew needs to remember to delay the normal acceleration and flap retraction.

And they also need to make a slight right turn, before turning more than 180 degrees left in order to keep the turning radius tight enough to avoid the mountains around them. Now the captain is confident. He has flown here many times before, and knows the procedures by heart. Anyone flying to this airport also needs to do special simulator training, where these procedures are practiced, and engine failures, well, they almost never happen anyway.

His colleague, however, is not quite as confident. He has only flown around 1,000 hours in total, and this is the first time that he is in Salzburg for real after the special simulator training.

And that's also why they have chosen the captain as pilot flying for this leg. As the darkness falls, the Boeing 737 MAX lines up on the runway, completes the last part of the checklist, and soon receives its takeoff clearance.

The special procedure also call for full engine thrust, so this should be a fun takeoff.

But what the pilots don't realize is that it's migratory season for the Canada geese, and a large flock is right now getting ready to land on the grassy field just next to the runway, about two thirds down.

The captain moves the thrust levers up to 40%, and the first officer then calls, "Stabilized." TO/GA is then pushed, and the two LEAP-1B engines roar into life, quickly accelerating the aircraft down the runway.

The first officer calls 80 knots, to which the captain responds, "Checked", and the next call is an automatic V1 call from the aircraft, indicating that they are now committed to the takeoff. But just as that happens, two of the last Canada geese swoops down in front of the aircraft and gets sucked into the left engine.

This immediately breaks loose one of the fan blades, causing severe vibrations and the activation of the LRD.

The engine stops delivering thrust, which means that the captain now pushes right rudder to stay on the runway, as the first officer calls out, "Rotate." The rotation is slightly slower than normal, around two to two and a half degrees per second due to the failure, and just as the captain is doing this, thick white smoke starts pouring into the cockpit.

The captain now has a choice to make, continue concentrating on the rotation and the initial maneuvering of his aircraft, or immediately reach for his oxygen mask, and he chooses to continue flying.

His colleague, the first officer, is able to get his oxygen mask on, but this also now means that a communication barrier is raised between the two pilots, as establishing communication with only one wearing a mask is a little bit difficult.

The rotation takes about seven seconds to complete, but after the aircraft is airborne, the engine failure means that there's still a lot of precise handling required to make sure that the control is maintained.

We train pilots to not do anything below 400 feet, except to raise the gear with a positive rate of climb and cancel any warnings. After 400 feet, the pilot flying should ask the pilot monitoring to state the malfunction, but the problem is that it takes about 30 seconds to reach 400 feet with this type of failure.

And the reason we don't want to rush things is because it's really easy to make mistakes in situations like this, and shutting down the wrong engine would be truly catastrophic. Now the obvious thing might be for the first officer to take controls as soon as possible here, since he has the oxygen mask on, but taking over controls during an engine failure at low altitude is not as easy as it might sound, and remember that, depending on the smoke concentration, he might not even see his instruments properly. So the captain continues to concentrate on his flying, at least initially, all whilst coughing and with his eyes burning. And it's also now getting harder and harder for him to see his instruments through his tears and the smoke. Now, do you remember how long it theoretically took for the levels of formaldehyde and acrolein to reach deadly levels in these events? Yeah, only around 39 seconds according to that leaked document. So as this aircraft reaches 400 feet, 37 seconds has already passed and the captain starts slumping down in his seat.

The first officer calls out for him, but he doesn't get any answer back. So the first officer now takes control as per standard operating procedures, but he is struggling to see the instruments, since he doesn't have a head-up display.

And in front of the aircraft, the mountains are now looming. The first officer is alone, the engine has failed, the cockpit is full of smoke and he now has to fly a very complicated maneuver by himself, while also doing the memory items for an engine severe damage in order to stop the smoke from continuing to fill the cockpit.

This does not look good. Now, if you guys think that I'm overdoing this, I am not.

To my knowledge, no airline out there is training their pilots in how to deal with a combined severe engine failure and a smoke event at the same time, and certainly not with a pilot incapacitation added on top of that.

And all of those things have been shown as possibilities if this was to happen in the wrong time at the wrong place.

And it's also worth remembering here that these activations have already happened twice.

Would the captain be able to get his mask on in the example that I just showed you? Maybe. But again, my money would be on him just concentrating on flying during the rotation and early climb. And in any case, a maybe just isn't good enough here.

So knowing all of this, if you were sitting in the back of this aircraft climbing out of Salzburg, would you have preferred if these pilots had just been told to turn off the left pack to avoid this whole scenario? Yeah, the engine would still have failed, but now it would have been an engine failure like any other, something that the crew would have been well trained for.

The reason I'm asking this is because from where I'm sitting, it looks like the FAA and possibly also the EASA has taken the opposite stance and is choosing to simply do nothing whilst waiting for the NTSB's recommendations.

And getting to that final report can still take months or even a year.

I normally never make videos like this, but I've also never come across anything like this before.

I have really, really tried to find a weak spot in my logic and to find a valid reason for the FAA's decision to not issue a temporary airworthiness directive. But the more I look into this, the stranger it becomes.

And it also reminds me more and more of that gentleman's agreement back in the '70s which led to the fatal accident of Turkish Airlines Flight 981 and, of course, the recent MCAS debacle.

I also want to be very clear here. I don't really blame Boeing or CFM at this point.

The engine was certified with this system and it's unlikely that Boeing knew that the activation would have this effect and Boeing also quickly issued a bulletin explaining it and giving guidance to its pilots about how to deal with it.

So it's ultimately the FAA's job to make sure that actions are being taken to eradicate serious threats.

Safety through bulletin just doesn't seem to be very effective when it comes to systems like this.

We are also awaiting information about the other aircraft that have this system installed. No one that I've talked to can say if the Airbus A320neo would be affected in a similar way or if it already has some sort of software safeguard in place and that also goes for the Boeing 777. In any way, no matter how I look at this, I cannot come up with a single good reason for the FAA to have disregarded their own investigator's recommendations. So if you are an American out there, I would suggest that you contact your congressman or woman and ask them to get to the bottom of this.

I want nothing more than the safest possible outcome for my colleagues and right now, it doesn't feel like that is being dealt with.

Like I mentioned, I have reached out to CFM, the FAA, Boeing and EASA for comments about this and I'm still awaiting answers from Boeing and the EASA. If I get something, I will probably put that out into the Community tab here.

The information in this video is based on the NTSB's interim report, a leaked FAA internal document dated the 28th of October as well as CFM's presentation about the LRD and several articles to which I have linked to here in the description below. The opinions that I have laid forward are my own but I know that they are also widely shared by several of my colleagues as well and I also know that many of them didn't fully understand the width of the problem when they read Boeing's bulletin about the LRD, so hopefully this will help.

Now I hope that you have found this video interesting. Please watch these videos next and consider joining my Patreon crew if you want to support this kind of work. My name is Petter Hörnfeldt and you're watching Mentour Pilot.

Have an absolutely fantastic day and I'll see you next time. Bye bye!