

Statement of Javier de Luis

Before the

United States Senate Committee on Commerce, Science and Transportation

Examining the Federal Aviation Administration's Oversight of Aircraft Certification

June 17, 2020

I would like to thank Chairman Wicker, Ranking Member Cantwell and the members of the Committee on Commerce, Science and Transportation for holding this hearing and allowing me to submit this written statement.

My name is Javier de Luis. My sister, Graziella de Luis, was on board Ethiopian 302 when it crashed last year. She was a US citizen, living in Rome and working for the UN. Her loss is compounded for me because, as an aerospace engineer (MIT, PhD) with over three decades of experience in this industry, I am very familiar with the development and certification of complex aerospace systems. The information that has come out since the crash detailing the design, testing and certification failures on the part of Boeing and the FAA, provide a constant reminder to me that this tragedy should not have happened. This was not an act of God, this was a failure of man.

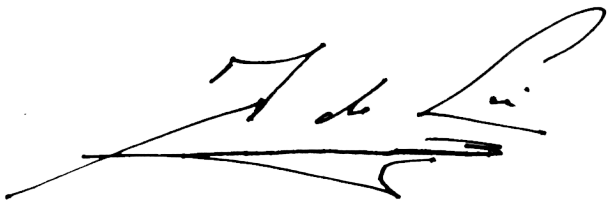
I will not rehash Michael Stumo's excellent and detailed testimony that he has submitted to this Committee. I wholeheartedly concur with all his points and associated recommendations. I will take this opportunity to briefly highlight three key issues that I feel deserve your attention, and should be addressed in any proposed legislation.

1. MCAS. When the accidents happened, initial reports referred to MCAS as a "stall-prevention system". Later, we were told that it wasn't there to prevent stalls, but to smooth out the handling of the aircraft during certain flight conditions. However, as yet no data has been made available to any independent reviewer that shows how this airplane behaves with and without MCAS. I would like to ask a very simple question: is this airplane stable with MCAS turned off? If it is, then why keep it, given its central role in these two accidents? If it isn't, then it would seem that turning MCAS off when the angle of attack sensors disagree, as has been proposed as part of the return to flight, might not be a good idea. The secrecy surrounding this system should give us pause. The committee should insist that this data be made available for review, something that the Joint Authority Technical Review report requested over eight months ago.
2. Amended certificates. There is a fundamental incompatibility between a 50 year old airplane design decisions and modern aircraft systems. The 737 Max has two computers, but only operated one at time, along with associated single sensors for key measurements, including angle of attack. This design architecture dates back to the 1960's, when there

were no computers in the cockpit. At that time, it made sense to have one set of instruments reporting to the pilot, and one to the co-pilot. Modern aircraft are not designed this way. There are multiple and redundant computers and sensors, with data being analyzed hundreds of times per second to quickly identify when something goes wrong or a sensor goes bad. When faced with a difficult aerodynamic problem with the Max, Boeing decided to solve it inexpensively through software instead of making costlier airframe changes. And this would have been fine, except that they decided to run this software fix on systems that did not and still do not have the level of redundancy and reliability that we expect. Essentially, they hacked together a 21<sup>st</sup> century software fix on a 1960's hardware system. The FAA allowed this to happen, because it lacked expertise and visibility into the design. This cannot be allowed to continue. Boeing cannot be allowed to continue to certify its own designs, especially those systems that directly impact vehicle safety, with little to no outside review.

3. FAA Expertise. I feel that it is important to remember that no new data came out of the Ethiopia crash that was not already there and available after Indonesia. Let me repeat: we learned nothing new after the crash that killed my sister that was not already known after the Lion Air crash four months prior. If the FAA (and NTSB) had properly evaluated what that data was telling them and grounded the fleet after the Indonesian crash, my sister would be alive today. This is not 20/20 hindsight. All the data was there and available, and it clearly showed that they had a systemic software problem that affected multiple aircraft systems, but they treated it as if it was a simple fix, telling pilots to simply turn the MCAS system off. To do its job properly, the FAA must be required to draw in experts from outside (academia, National Academies, government labs), to assist them in this work. Otherwise, they will understandably rely on the engineers at Boeing, which, as we have seen in the months since the crash, can have different incentives that do not necessarily line up with the public interest.

Thank you for your time and the opportunity to provide this testimony,

A handwritten signature in black ink, appearing to read 'J. de Luis', with a long horizontal line extending to the left and a flourish at the end.

Javier de Luis, PhD