Comment on EASE Notice of Proposed Amendment 2017-16, Engine Bird Ingestion RMT.0671

4.3.1 Safety Impact - needs to be revisited. Empirically we cannot be "…on track to meet the desired safety goal…" if we have, in fact, suffered four high severity events (two catastrophic) within a twelve-month period. In January, 2009, an A320 crashed into the Hudson River after bird ingestions to both engines. Three months prior to that event a B737 was destroyed at Rome's Ciampino Airport after bird ingestions to both engines during approach. Three months prior to that accident, at Bourgas, Bulgaria, an A320 ingested birds into both engines during takeoff resulting in significant damage to both engines. In October, 2009 a B737 suffered a dual ingestion, damaging both engines, in Ireland.

While a huge amount has been written regarding the Hudson River crash, the catastrophic loss at Ciampino and the high risk at Bourgas seem to have been lost. It is true the ANSV has not released an official accident report on the Ciampino accident but, on February 12, 2009 the ANSV released a press report indicating that they were cooperating with accident officials from industry and government in the EU and the US. Independent accident investigations also followed.

In the Ciampino accident the pilot reported that a huge cloud of starlings engulfed the aircraft while on final approach. As he applied power to attempt a go-around both engines failed to respond. He reported they were both "…stuck around 40% N1". Out of thrust, altitude, ideas and options he dead-sticked the aircraft onto the runway. The impact of the landing causing it to suffer extensive damage and the B737 was written off as destroyed. Tear down of the engines indicated that organic material was present in quantity in the cores of both engines.

These events call into question both the way the EHWG assesses safety and the engine ingestion standards currently in place. We are still approaching the hazard in the 20th century manner, i.e., without safety management practices as detailed by ICAO in Annex 19. We are not assessing risk, rather we are relying on engineering statistical modeling to compute safety. We, therefore, actually require failures before deciding if risk is high enough to require corrective action. On the other hand, SMS assesses the threat prior to failure. Under SMS principles a catastrophic event is not required to implement corrective action. While the EHWG go into detail regarding engine power losses during a 10-year period, they do not survey actual aircraft accidents caused by bird ingestion.

We suggest that the AIA's effort to collect appropriate bird strike data for the EHWG, although laudable, is hamstrung by the decision to completely sanitize the data to erase any clues as to the manufacturer of the engines involved. This effort may be of relief to the manufacturers but should be of concern to air travelers: we are not seeing an accurate representation of the risk. The issue is not about how many engines fail, but rather the risk to the system: the aircraft.

Parsing individual engine failure data does not necessarily reflect the risk of dual engine failure in twin-engine aircraft, the cause of catastrophes.

Further, the catastrophic loss of a Falcon 20 freight aircraft in Ohio in 2005 was due to "…complete loss of engine power…" due to multiple ingestions of birds into both engines according to the NTSB final report. Both engine cores were found to contain bird remains. The birds were a small flocking bird: mourning doves. It appears that both the Ciampino accident and the Ohio accident were caused by large flocks of small birds. In both incidents the accident bird flock sizes seem to be well in excess of the number contemplated by the current bird ingestion rule. Given that the Hudson River crash was caused by birds of a size in excess of the rule and the two small flocking bird crashes resulted from encounters with small birds in flock sizes in excess of the rule, regulators must feel a sense of unease regarding the adequacy of standards.

While it is true that these high severity numbers are quite small, they do not compare well with other natural hazards such as wind shear or volcanic ash, where the loss rate is zero. It is further true that, beyond the airport fence, there is absolutely no mitigation for this hazard beyond the robustness of the aircraft's engines. The effort to require 'run on' after an ingestion, allowing the aircraft to complete an air turnback, is a huge step forward for safety.

Regarding, in **4.3.1**, "<u>Ingestion of small flocking birds</u>", the "…data shows that these encounters with large numbers of small flocking birds have not resulted in permanent engine power losses…" is not supported by fact. We recite, above, two case studies of aircraft catastrophes caused by small flocking birds ingested into engine cores, causing thrust loss. We wonder what the relevance of the phrase "permanent engine power losses" is to the ability to prevent catastrophe. If, when thrust is required from the engine in critical phases of flight (takeoff, final approach) and thrust is not available, what is the point? It appears to be an attempt to wordsmith around a clear engineering problem. Either thrust is available and the airplane flies, or thrust is not available and the airplane crashes, as above. The survival of the system, the airplane, is the critical factor, not the functioning of an engine.

Finally, the acceptance of a new concept, SMS per ICAO Annex 19, is always slow and change is difficult. The authors recall the initial resistance at the EHWG over a dozen years ago when it was proposed that two engines on a twin-engine aircraft could actually be damaged/destroyed in the same event. The idea of developing a run on time to allow for air turnback was greeted, initially, with incredulity. Now the idea is expanding to the engine size most threatened by this hazard.

Comments by Dr. Valter Battistoni and Capt. Paul Eschenfelder

Appendix A to EASA Comment

The Authors

Dr. Valter Battistoni is a graduate in law from the University of Rome. He joined the ENAC where he had a 31-year career in airport management. While an airport manager he authored over a dozen papers and professional articles on the aviation birdstrike hazard and was the chairman of the Birdstrike Committee – Italy for five years. He served as technical consultant for ENAC to the Italian courts in litigation resulting from birdstrikes on airports. He has subsequently taught seminars to airport personnel on wildlife hazards on airports and consulted on other birdstrike caused accidents. He originated and manages the website www.birdstrike.it

Captain Paul Eschenfelder received his safety management training at the Naval Postgraduate School in Monterey, Cal. He managed aviation safety management programs for a variety of naval commands. In a concomitant civil career he spent 20 years working in a variety of safety programs: he was a member of the FAA/JAA Engine Harmonization Working Group which amended engine standards for bird ingestion for large engines; he participated in the FAA REDAC for Airports when funding for airport wildlife program research was being initiated; he served two terms on the Secretary of Agriculture's Advisory Panel when Wildlife Services was attempting to establish airport wildlife work as a line of business; he was a member of the steering committees of Birdstrike Committee USA and International Birdstrike Committee. As an adjunct professor at Embry Riddle Aeronautical University he originated and led the first training program for airport wildlife control personnel in the U. S. which was acceptable to the FAA Administrator. He has written or presented over two dozen papers or presentations on aviation birdstrike hazards and mitigation. In a 32-year civil flying career he has flown a variety of large transport category aircraft ranging from the DC-9 to the A-330 in worldwide operations.

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