Proposed alternative Means of Compliance replacing AMC to CS-E800(1)(c)(iii) "Medium and small flocking birds" Applicable to TP400-D6 Engine

Commentator:	**CAA-UK, Safety Regulation Group**
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Comment: : The phrase "the ingestion must not cause more than a sustained 25% power loss and the engine to be shut down during test" is confusing. The actual wording in the referenced paragraph of CS-E is :- *Acceptance criteria*. The ingestion must not cause: - More than a sustained 25% power or thrust loss - The Engine to be shut down during the test. i.e. separate criteria, not combined. **Proposed Text (if applicable):** amend to "the ingestion must not cause more than a sustained 25% power loss, or the engine to be shut down during test".	
EASA Response	**Accepted.** Text will be changed accordingly.

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Commentator:	**CAA-UK, Safety Regulation Group**
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Comment: There is no reference to including the particular engine recovery characteristic in the information to be published by the design organisation. **Justification**: An airframer is required to assess failure effects at the aircraft level as part of compliance with 25.1309. The AMC material to this requirement indicates that such effects should include any bird strike events. Information on the recovery characteristic of the engine would form part of the assessment.	
EASA Response:	**Comment understood, Justification rejected.** In the frame of the Type Investigation, the engine has demonstrated full compliance to the applicable Certification Specifications. The engine will be certified independent from a particular aircraft installation applying a new Means of Compliance. This public consultation is neither addressing Aircraft level requirements nor considering aircraft level failure effects since no failure occurred following the engine MBS test.

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Commentator:	**Gabriel Rosenthal**
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Comment: As the consultation paper itself points out, a three seconds recovery time after a Medium Bird strike has been a kind of industry standard for decades. Even though airframers may not have placed direct reliance on this exact time, this may well have become the assumed time, based on previous achievement by other engines. It is difficult to see why a worse response time should be acceptable for a state-of-the-art aeroengine in 2011. As the event on US Airways flight 1549 on 15 January 2009 has shown, the requirements for engine resistance to bird strike should not be relaxed. The ability of an aeroengine to quickly recover from a bird strike and to continue producing thrust is important for the aircraft safety margin.

The TP400 engine should be made compliant to a three-second recovery time. If other engines in the past could achieve this, so can TP400.

If it is not possible to make TP400 compliant, due to the political implications of a resulting programme delay, then--as a minimum--the consent of the airframer should be obtained. The prolonged recovery time after bird strike should be assessed with regard to the effects on aircraft performance and controlability in critical flight phases. Since Medium Birds may be flocking, due consideration should be given to the effects of multiple engines being affected, either simultaneously or in short succession.

The currently proposed means of compliance appear to be very much predicated on what a particular engine has demonstrated (in one particular test?). However, to demonstrate an equivalent level of safety, it should be stated by the airframer that the achieved recovery time is acceptable for the intended application.

EASA Response	**Comments noted** It is recalled that the EASA Certification process is fully independent from any commercial or political influences. EASA is not in the position to judge whether or not other comparable turboprop engines designs have met the 3 seconds recovery since there was no European turboprop engine subject to Type Certification over the last 40 years, moreover there is no evidence that any turboprop ever met

	the 3 seconds recovery time. At US side, a similar 3 seconds recovery recommendation was introduced with AC33.76-1 in January 2001. The US Airways flight 1549 bird event was well outside the objective of Medium Bird ingestion testing safety objective. It also should be noted that the engine will be certified independent from a particular aircraft installation applying a new Means of Compliance, i.e. the energy delivered to the aircraft after the MBS and during the subsequent 3,8 sec is equivalent to or better than an acceptable realistic profile for 75% power recovery in 3s and the engine demonstrated recovery to 100% power with no damage.