



AEROSPACE INFORMATION REPORT

AIR5713™**REV. A**

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Superseding AIR5713

(R) In-Service Reliability Data of Continuously Active Ball Screw
and Geared Flight Control Actuation Systems

RATIONALE

Revision A provides an update of the in-service reliability data of continuously active ball screw and geared flight control actuation systems that are used on commercial transport aircraft.

AIR5713A has been reaffirmed to comply with the SAE Five-Year Review policy.

FOREWORD

The information in this document is compiled from various sources as answers to a survey performed in 2001 and 2018. It is assumed that these answers reflected the best knowledge of their authors at the time and were expressed in good faith. It is to be highlighted that this informative material has not been submitted to any validation process other than the regular SAE document approval process.

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1. SCOPE

This Aerospace Information Report (AIR) has been written to provide in-service reliability data of continuously active ball screw and geared flight control actuation systems.

1.1 Purpose

The purpose of this information report is to compile the results of the survey as detailed in the foreword so the data can be made available to the industry as an aid for those specifying, designing, and certifying mechanical actuators, as well as those developing reliability and safety analyses and reports for these actuators.

NOTE: This reliability data could assist in addressing the failure mode and effect analysis (FMEA) for new electro-mechanical actuators that are based on similar mechanical sub-assemblies by using the equivalent functional (e.g., duty cycle) and environmental conditions. For example, it is especially relevant when the FMEA relates to equipment that is considered as critical like for primary flight control system.

1.2 Field of Application

This report is written with commercial aircraft flight control system applications in mind, but the data presented is equally applicable to other aircraft systems or other aircraft categories.

2. REFERENCES

There are no referenced publications specified herein.

3. SURVEY

3.1 Questionnaire

The questionnaire provided in Appendix A has been used as the first step of this data collection process. The purpose of the questionnaire was to identify:

- The type of equipment used in each application
- Some of the applicable requirements in order to assess how much the actuator corresponds to the targeted category or to be able to later define sub-categories (e.g., size, linear/rotary) if it was found necessary
- The test experience
- The relevant in-service reliability data

3.2 Answers

Complete or partially completed questionnaires have been received from 10 companies, air framers, and equipment manufacturers which covered 25 applications. Of these applications, 18 have been found relevant as control surface actuators used with "primary flight control-like" duty cycles:

- 14 horizontal stabilizer actuators (11 commercial transport aircraft, 2 business jet aircraft, 1 military transport aircraft)
- 2 stabilator actuation systems (1 fighter aircraft, 1 military helicopter)
- 1 rudder actuator (business jet aircraft)
- 1 leading edge flap actuator (various fighters)