

Actuation System Failure Detection Methods

RATIONALE

This document has been reaffirmed to comply with the SAE 5-year Review policy.

FOREWORD

This AIR is a sister document to AIR4094 and AIR4253. It provides only the failure detection method detail to accompany the more complete architecture and hardware descriptions contained in the referenced AIRs.

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## SAE AIR5273

### 1. SCOPE:

This AIR provides descriptions of aircraft actuation system failure-detection methods. The methods are those used for ground and in-flight detection of failures in electrohydraulic actuation systems for primary flight control. The AIR concentrates on full Fly-By-Wire (FBW) flight control actuation though it includes one augmented-control system. The background to the subject is discussed in terms of the impact that factors such as the system architecture have on the detection methods chosen for the flight control system. The types of failure covered by each monitoring technique are listed and discussed in general. The way in which these techniques have evolved is illustrated with an historical review of the methods adopted for a series of aircraft, arranged approximately in design chronological order.

#### 1.1 Purpose:

The purpose of this document is to aid the designers of the systems of the future by showing what succeeded in the past.

### 2. REFERENCES:

#### 2.1 Applicable Documents:

The latest issue of the documents shall be used except in those cases where an invitation for bid or procurement contract specifically identifies the issues in effect on a particular date. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence.

##### 2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Web site: [www.sae.org](http://www.sae.org). Telephone: (724)-776-4970

SAE AIR4094, Aircraft Flight Control Systems Descriptions.

SAE AIR4253, FBW Actuation System Descriptions.

SAE Paper 831484, Development of Redundant Flight Control Actuation Systems for the F/A-18 Strike Fighter, H.E. Harschburger.

SAE Publication, Aircraft Flight Control System Design, E.T. Raymond and C.C. Chenoweth.

##### 2.1.2 U.S. Government Publications: Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094. Web site: <http://assist.daps.mil> or <http://stinet.dtic.mil/>

MIL-F-9490, Flight Control Systems – Design, Installation and Test of, Piloted Aircraft, General Specifications for.

MIL-STD-882, System Safety Program Requirements.