

Flight Deck Alerting System (FAS)

RATIONALE

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

FOREWORD

Changes in this reaffirm are format/editorial only.

1. SCOPE:

- 1.1 This document recommends design criteria for the Flight Deck Alerting System. The FAS shall enhance safety of flight by providing early crew recognition of aircraft system or component status or malfunction as well as of crew operational error. The FAS, therefore, relates to aircraft configuration and flight phase as well as the aircraft systems. To fulfill this objective, the FAS must attract the attention of the crew, must state with clarity the nature and location of the problem, and must be highly reliable and thoroughly responsive to the operational requirements and environment. Wherever possible, it should provide guidance as to the corrective action.

2. REFERENCES:

2.1 Documentation:

This annex should be used in conjunction with the ARP4102 Core Document. The following documents may also be applicable:

- SAE S-7 ARP4101, Flight Deck Layout and Facilities
- SAE S-7 ARP4102/7, Electronic Displays
- ARINC 726, Flight Warning Computer System

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2007 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: <http://www.sae.org>

SAE ARP4102/4

2.2 Definitions:

The FAS shall consist of the LEVELS of alerts as defined by Table 1 and shall consider the Flight Phases according to ARINC 726.

2.2.1 Warning (Level 3): This corresponds to an emergency situation, such as:

- aircraft/systems in hazardous configuration
- serious system failures

2.2.2 Caution (Level 2): This corresponds to an abnormal situation, such as:

- System malfunction/failures which have no immediate impact on safety

2.2.3 Advisory (Level 1): This corresponds to a recognition situation such as:

- System malfunction/failures leading to a loss of redundancy or degradation of a system

2.2.4 Information (Level 0): This corresponds to an information situation.

2.2.5 Priorities: Level 3 has priority over Level 2 which has priority over Level 1 which has priority over Level 0.

2.2.6 Flight Phase: The alerts shall be adapted to the Flight Phase according to ARINC 726. Alerts that are unrelated to a specific flight phase shall not be inhibited or downgraded.

3. OPERATIONAL REQUIREMENTS:

3.1 General:

3.1.1 A master aural attention-getting sound (ATTENSON) shall be provided for alerting levels 1, 2, and 3, except as provided in 3.2.2 and Table 1. An additional master visual alert is optional. (MASTER WARNING, MASTER CAUTION)

3.1.2 One or more alphanumeric displays shall be provided. All alerts shall be accompanied by an explanatory message on the display.

3.1.3 The system shall contain provisions to establish suitable priorities, vary level of urgency and to inhibit alerts depending on the flight phase and current aircraft conditions and configuration.

3.1.4 Indications shall be automatically cleared from the system when fault conditions no longer exist.

3.1.5 Capability to cancel visual displays of uncorrected faults and to recall such cancelled displays shall be provided except for those LEVEL 3 alerts which are not cancellable.

- 3.1.6 The system should avoid unnecessary alerts following an intentional action such as engine shutdown.
- 3.1.7 The system should be designed to eliminate nuisance alerts.
- 3.1.8 The system should have the capability of varying the urgency level of a given alert depending on the flight phase and current aircraft conditions and configuration.
- 3.1.9 The system shall accept new alerts with a minimum of change.

3.2 Functional Requirements:

The fundamental characteristics of the FAS are described in Table 1.

- 3.2.1 Aural Alerts (ATTENSON): ATTENSON is a coined word intended to denote a unique sound selected for its “attention-getting” capability. The sound will be “unique” in that there shall be no similar sound in the flight deck. A chime is one example.
 - 3.2.1.1 The ATTENSON shall be an effective but non-irritating sound.
 - 3.2.1.2 The ATTENSON shall apply to Alerting Levels 1 (optional), 2, and 3, and shall clearly announce the level by suitable means (for example, by means of one, two, or three repetitions, or by otherwise modifying the sound).
 - 3.2.1.3 The ATTENSON should emanate from the flight deck speakers and the crew headsets.
 - 3.2.1.4 The ATTENSON or discrete aural alerts shall be self-cancelling after one cycle when followed by a voice alert message. The ATTENSON shall be self-cancelling after one or more cycles for all other conditions. Self-cancellation is interpreted to include cancellation by correction of the fault.
 - 3.2.1.5 The ATTENSON shall not activate when the display is recalled.
 - 3.2.1.6 Automatic volume adjustment shall be provided to maintain ATTENSON volume at an appropriate level relative to flight deck ambient sound.
- 3.2.2 Discrete Aural Alerts: It is considered that the ATTENSON, together with a display (and possibly a voice alert message), provide a warning superior to that of discrete aural alerts. Therefore, it is strongly recommended that discrete aural alerts are kept to the minimum. If, however, familiarity and/or usage should make desirable the use of certain discrete aural alerts, they shall be limited to a maximum of four and shall meet international standards.
 - 3.2.2.1 Discrete aural alerts shall not be preceded by an ATTENSON.
 - 3.2.2.2 Stick shaker noise shall not be combined with the ATTENSON.