AEROSPACE RECOMMENDED PRACTICE

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Superseding ARP4102/1

On-Board Weight and Balance System

RATIONALE

This document has been determined to contain basic and stable technology which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared “Stabilized” by the SAE S-7 Flight Deck Handling Qualities Stds for Trans Aircraft Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. SCOPE:

1.1 This document recommends criteria for the flight deck display of an On Board Weight and Balance System. The system may have the capability of a primary operational device or be a secondary advisory source of information of weight and center of gravity position.

The recommendations apply to transport aircraft and describe the operational and functional requirements for the display of an On Board Weight and Balance System.

2. REFERENCES:

2.1 Documentation: This annex should be used in conjunction with the ARP4102 Core Document. In addition, the following documents may be applicable:

- SAE S-7 ARP4101, Flight Deck Layout and Facilities
- SAE S-7 ARP4102/4, Flight Deck Alerting System (FAS)
- SAE S-7 ARP4102/7, Electronic Displays
- SAE S-7 ARP4102/9, Flight Management Computer System
- SAE S-7 ARP4105, Nomenclature and Abbreviations for use on the Flight Deck
- SAE AS8034, Airborne Multi-Purpose Electronic Displays

2.2 Definitions:

2.2.1 OBWBS: Aircraft On Board Weight and Balance System.

2.2.2 Primary System: One which may be used as the sole means of providing indications of Weight and Center of Gravity position for all standard modes of aircraft operation.

2.2.3 Secondary System: One which may be used as an advisory device and as an adjunct to other means of Weight and Balance and Center of Gravity computations.

3. OPERATIONAL REQUIREMENTS:

3.1 General:

3.1.1 The display shall function and be fully usable throughout the range of environmental conditions expected to be encountered by the aircraft in operation.

3.1.2 The display must be highly reliable, and false indications must be kept to an absolute minimum. Faults which result in system degradation must be adequately annunciated.

3.1.3 For a primary system, total systems error must be 1% or less of actual weight and 1% of MAC C.G. position (or 5% of total aircraft C.G. range, whichever is less), for both ground operation (static and rolling) and in flight. The percent MAC, of course, must be within the operational limits of the aircraft type.

3.1.4 The system may optionally have the capability of providing an input to other Data Acquisition Units.

3.1.5 When used for in-flight CG management, the system should provide a warning to the flight crew whenever the CG position is not within the operational envelope.

3.2 Functional Requirements:

3.2.1 An automatic test function capability shall be provided for a primary display system. For a secondary system, the test function should be initiated by a single action by the flight crew.

3.2.2 The test function must detect and annunciate system malfunction in a simple readily understandable format.

3.2.3 The system display shall be capable of showing appropriate data on the ground (static and rolling) and in flight.

3.2.4 Resolution and display of weight shall be in units adequate to remain within the accuracy tolerance of the total system. Resolution and display of CG shall be to one decimal place, expressed in terms of percent of mean aerodynamic chord (%MAC). Weight and CG display resolution and units shall not affect the accuracy of the total system. (Optionally, CG position may be provided in units of stabilizer trim setting).