

INTRODUCTION

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During the past few years there have been a number of Integrated Flight Control Systems and Instruments developed and produced by various instrument manufacturers.

The various systems and instruments have differed in various ways, such as the number of instruments necessary to provide complete information, the size of the instruments, the way the information is displayed on the instruments, and in several more ways.

1. PURPOSE: It is the purpose of this report to present recommended criteria in certain areas to be followed in the design of an Integrated Flight Control System in order that pilots experience less difficulty in using systems of different manufacture while at the same time not placing a block in the path of progress in the development of new systems and instruments.

2. SCOPE: The initial systems and instruments to be considered in this document are:

Flight Director Horizon
Situation Display

It is intended at a later date to expand this document to include other systems and instruments.

3. GENERAL ITEMS - ALL INSTRUMENTS:

- 3.1 The standard 4" (four inch) instrument shall be the minimum size acceptable.
- 3.2 Instruments shall be provided with integral lights, white and/or red, conforming to ARP 582.
- 3.3 Reasonable effort must be exercised to reduce cover glass glare.
- 3.4 Failure warning for the various functions shall be provided.
 - 3.4.1 Individual failure warning shall be provided for the various functions of each instrument.
 - 3.4.2 Failure warning shall cover mechanical malfunction of the function as well as power failure to the particular function. Power failure is considered as any type of power discrepancy which will result in malfunctions of the function in question.

Section 8.3 of the SAE Technical Board rules provides that: "All technical reports, including standards approved and practices recommended, are advisory only. Their use by anyone engaged in industry or trade is entirely voluntary. There is no agreement to adhere to any SAE standard or recommended practice, and no commitment to conform to or be guided by any technical report. In formulating and approving technical reports, the Board and its Committees will not investigate or consider patents which may apply to the subject matter. Prospective users of the report are responsible for protecting themselves against liability for infringement of patents."

- 3.4.3 Preferred method of failure warning is to remove the affected display from view.
- 3.4.4 When a warning flag is used, if practical, it should obscure the function indicator for which the warning is pertinent. If this is not possible, the flag should be not less than 1/4" in width nor less than 1/4 sq. in. in area.
- 3.4.5 In general, failure warning lights are not acceptable as the sole failure warning means.
- 3.5 When a mode of a multiple purpose instrument is not selected for use, the particular display involved and its associated warning signal shall not be in evidence.

4. FLIGHT DIRECTOR HORIZON:

- 4.1 Minimum information to be displayed on Flight Director Horizon.
 - 4.1.1 Roll and Pitch displacement.
 - 4.1.1.1 Performance in Roll and Pitch shall conform to the requirements of AS 441.
 - 4.1.2 Command information to correct for horizontal and vertical deviation from programmed Flight Plans.
 - 4.1.2.1 If both pure deviation and command information for any single function are included, the same indicating means shall not be used for both types of information.

Example: If both pure deviation from and command information to correct for deviation from the Glide Slope are provided, the indicating bar or needle which is used to show pure deviation can never be used to show Glide Slope command information. This bar or needle, when used for Glide Slope information, must always show pure deviation and never command.
- 4.2 The method of displaying Roll information shall be by means of an Artificial Horizon method wherein the Artificial Horizon Reference remains in a position parallel to the natural horizon and the airplane reference is fixed relative to the instrument case.