

Submitted for recognition as an American National Standard

FLIGHT DECK CONTROLS AND DISPLAYS FOR COMMUNICATION
AND NAVIGATION EQUIPMENT FOR TRANSPORT AIRCRAFT

CANCELLED

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Feb. 1994

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FLIGHT DECK AND HANDLING
QUALITIES STANDARDS FOR
TRANSPORT AIRCRAFT



1. PURPOSE: This document presents a recommended practice for the functional control and display of communication and navigation equipment on the flight deck.
2. SCOPE: The equipment covered by this document includes:
 - a. Voice communications such as Ultra High Frequency (UHF), Very High Frequency (VHF) and High Frequency (HF) Radios, Cabin/Service Interphones, Public Address (PA), Select Call (SELCAL), Call Select (CALSEL), Satellite Communications (SAT COM).
 - b. Data Link Digital Communications such as Company and Air Traffic Control networks, Transponders, MODE-S, and others.
 - c. Navigation including Very High Frequency Omnidirectional Range (VOR), Satellite Navigation (SATNAV), Tactical Air Navigation (TACAN), Automatic Direction Finders (ADF), Distance Measuring Equipment (DME), Markers (MKR), Low Range Radio Altimeter (LRRRA), Omega, Very Low Frequency (VLF), Inertial Navigation Systems (INS), Inertial Reference Systems (IRS), Microwave Landing Systems (MLS), Instrument Landing Systems (ILS). The Flight Management System (FMS) is covered under ARP 1570.
 - d. Weather Radar
3. APPLICABLE DOCUMENTS: The current revision of the following listed documents shall apply as specified herein or as a related reference document:
 - a. AS 264: Instrument and Cockpit Lighting for Transport Aircraft
 - b. ARP 268: Location and Actuation of Flight Deck Controls
 - c. AS 425: Abbreviations for Use in the Flight Deck
 - d. ARP 450: Flight Deck Visual, Audible and Tactile Signals
 - e. AS 580: Pilot Visibility from the Flight Deck - Design Objectives for Transport Aircraft
 - f. ARP 1068: Flight Deck Instrumentation Display and Associated Control Criteria for Transport Aircraft
 - g. ARP 1570: Flight Management System
 - h. ARP 1782: Color and Light Intensity Measurements for Direct View CRT
 - i. ARP 1874: Design Objectives for Electronic Displays in Transport Aircraft
 - j. AS 8034: Airborne Multi-Purpose Electronic Displays

4. DESIGN OBJECTIVES: Control and display equipment shall apply the following basic design objectives, taking into consideration the functions, their respective frequency of use and all aircraft operational and environmental conditions:
- a. Simplify operations.
 - b. Facilitate error-free operation.
 - c. Maximize crew situation awareness.
 - d. Minimize head down operation.
 - e. Provide consistency of operation for common functions.
 - f. Promote timely and accurate operations.
 - g. Ensure legibility of panel legends and displays throughout the wide range of flight deck ambient lighting conditions.
 - h. Ensure that single failures do not significantly degrade operational capability.

These design objectives, not necessarily in the order of importance, shall aim at minimizing flight crew workload.

5. GENERAL:

5.1 Definitions:

Primary: "Primary" indicates that the specified control and/or display must be readily accessible to that crew member to whom it is assigned while he is seated in his normal position with all required restraint harnesses normally required, including shoulder harness, if provided, with locking reel free.

Normal Position: For pilots "normal position" means that the pilot's seat is adjusted so as to bring the pilot to the design flight eye position (DFEP).

Accessible: For controls, "accessible" means that the control is within reach from the normal position and is capable of manual actuation by the crew member to whom it is assigned.

For instruments and displays "accessible" means that the instrument or display is unobstructed from sight of the crew member to whom it is assigned, and that it can be read or interpreted without undue strain or difficulty under the range of normal to emergency lighting conditions.

Secondary: "Secondary" indicates that operation of the specified control by the crew member to whom it is assigned may have some compromise regarding accessibility to that crew member.

- 5.2 Identification of Units: Where more than one control or display unit is installed, they should be designated as L, R, C. L refers to the Captain's side of the aircraft; R to the First Officer's side, and C to the center of the aircraft or to the auxiliary position. An alternative 1, 2, 3 designation respectively may be used.

Where other crew members are involved, it shall be so specified.

6. CONTROLS:

- 6.1 General: Controls should be designed to perform their intended function precisely, preclude overcontrol, yield predictable results, operate in consistent direction, and satisfy basic ergonomics (size, friction, torque and ease of use).

- 6.1.1 Location: Controls should be located so as to permit their use by the crew member to whom they are assigned while seated at the normal station with all required restraint harnesses normally secured, including shoulder harness, if provided, with locking reel free.

- 6.1.2 Priority: Control panels should be allocated space according to the following considerations:

- a. Frequency of use during high workload flight conditions
- b. Importance of timely and accurate operations
- c. Use by one or both pilots

In accordance with the considerations above, control panels should be allocated space in the following order of preference:

- a. Glareshield panel/Pilot's forward console or desk (if the priority system is common to both pilots, it should be allocated space in the glareshield).
- b. Forward pedestal
- c. Forward overhead
- d. Forward side panel
- e. Other locations

As a point of clarification, Forward is defined as any position in front of the design flight eye position. Additional details are discussed in ARP 1068, paragraph 3.3.

- 6.1.3 Functional Grouping: The controls of each individual piece of communication and navigation equipment which are functionally, and/or directly related shall be grouped together. Equipment not directly related by function can be remote.