

TECHNICAL REPORT

ISO/TR 10201

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Aerospace — Standards for electronic instruments and systems —

*Aéronautique et espace — Normes d'instruments et de systèmes
électroniques*

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.ch
Web www.iso.ch

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this Technical Report may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TR 10201, was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*.

This fourth edition cancels and replaces the third edition (ISO/TR 10201:1996), which has been technically revised.

Introduction

ISO/TC 20, *Aircraft and space vehicles*, established a Working Group (WG 2) to evaluate the status and future needs for standards in the field of aerospace electronic instruments and systems. One of the first tasks of WG 2 was to develop a comprehensive list of standards currently being used by countries which manufacture, operate, or regulate the operation and manufacture of aerospace products. This list can then serve as a basis for identifying voids and future needs for standards.

The list provided has been circulated several times to TC 20 members and liaison organizations to obtain the most complete and current information, as well as an indication of how widely these standards are being applied.

Responses indicate that these standards have wide recognition and application by a majority of the countries most actively involved in the manufacture and operation of aircraft. TC 20 has also coordinated with international, regional, and national standards bodies which are active in developing widely recognized avionics standards.

The list is divided into four categories:

- a) communications systems;
- b) navigation and guidance systems;
- c) flight management systems, cockpit controls/displays; and instruments;
- d) miscellaneous and general applications.

Each category comprises a list of the appropriate standards developed and issued by the various organizations.

The list is as complete and accurate as possible at the date of publication of this Technical Report. It is recognized, however, that this information will change. TC 20 therefore intends to update the list eighteen months before each TC 20 plenary meeting.

Aerospace — Standards for electronic instruments and systems

1 Scope

This Technical Report gives a list of standards related to electronic instruments and systems for aerospace.

2 Communications systems

2.1 FAA

TSO-C57a, *Aircraft Headsets and Speakers.*

TSO-C58a, *Aircraft Microphones (for Air Carrier Aircraft).*

TSO-C31d, *High Frequency (HF) Radio Communication Transmitting Equipment Operating within the Radio Frequency Range of 1.5 to 30 MHz.*

TSO-C32d, *High Frequency (HF) Radio Communication Receiving Equipment Operating within the Radio Frequency Range of 1.5 to 30 MHz.*

TSO-C37d, *VHF Radio Communications Transmitting Equipment Operating within 117.975 to 136.000 MHz.*

TSO-C38d, *VHF Radio Communications Receiving Equipment Operating within 117.975 to 136.00 MHz.*

TSO-C50c, *Audio Selector Panels and Amplifiers.*

TSO-C59, *Airborne Selective Calling Equipment (for Air Carrier Aircraft).*

TSO-C91a, *Emergency Locator Transmitters.*

TSO-C121, *Underwater Locating Devices (Acoustic) (Self-Powered).*

TSO-C122, *Devices that Prevent blocked Channels Used in Two-Way Radio Communications Due to Simultaneous Transmissions.*

TSO-C126, *406 MHz Emergency Locator Transmitter (ELT).*

TSO-C128, *Devices that Prevent Blocked Channels Used in Two-Way Radio Communications Due to Unintentional Transmissions.*

2.2 ARINC (AEEC)

538B (9/81), *Hand-Held Microphone.*

559A-2 (12/79), *Mark 2 Airborne HF/SSB System.*

560 (8/66), *Airborne Passenger Address Amplifier.*

566A-7 (7/85), *Mark 3 VHF Communications Transceiver.*

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- 596-4 (7/83), *Mark 2 Airborne Selcal System.*
- 597-5 (8/90), *Aircraft Communications Addressing and Reporting System.*
- 714-6 (8/90), *Mark 3 Airborne Selcal System.*
- 715-3 (7/84), *Airborne Passenger Address Amplifier.*
- 716-7 (7/87), *Airborne VHF Communications Transceiver.*
- 719-5 (7/84), *Airborne HF Single Sideband System.*
- 724-8 (7/87), *Mark 2 Aircraft Communications Addressing and Reporting System.*
- 724A (1/87), *Mark 2 Enhanced ACARS Avionics.*
- 724B-3 (12/95), *Aircraft Communications Addressing and Report System (ACARS).*
- 740-1 (6/88), *Multiple-Input Cockpit Printer.*

2.3 RTCA

- DO-136:1968, *Universal Air-Ground Digital Communication System Standards.*
- DO-163:1976, *Minimum Performance Standards — Airborne High Frequency Radio Communications Transmitting and Receiving Equipment Operating within the Radio Frequency of 1.5 to 30 MHz.*
- DO-169:1979, *VHF Air-Ground Communication Technology and Spectrum Utilization.*
- DO-170:1980, *Audio Systems Characteristics and Minimum Performance Standards Aircraft Microphones (except Carbon), Aircraft Headsets and Speakers, Aircraft Audio Selector Panels and Amplifiers.*
- DO-186:1984, *Minimum Operational Performance Standards for Airborne Radio Communications Equipment Operating within the Radio Frequency Range of 117.975-137.000 MHz.*
- DO-203:1989, *Minimum Operational Performance Standards for Mode S Airborne Data Link Processor.*
- DO-205:1990, *Design Guidelines and Recommended Standards to Support Open Systems Interconnection for Aeronautical Mobile Digital Communications — Part 1: Internetworking.*
- DO-206:1990, *Minimum Aviation System Performance Standards for Radiodetermination Satellite Service (RDSS).*
- DO-207:1991, *Minimum Operational Performance Standards for Devices that Prevent blocked Channels Used in Two-way Radio Communications Due to Unintentional Transmissions.*
- DO-209:1992, *Minimum Operational Performance Standards for Devices that Prevent Blocked Channels Used in Two-way Radio Communications Due to Simultaneous Transmissions.*
- DO-210-A:1992, *Minimum Operational Performance Standards for Aeronautical Mobile Satellite Services (AMSS) — Part A: Purpose and Scope and Equipment Performance Requirements.*

2.4 EUROCAE

- ED-18, *Audio Systems Characteristics and Minimum Performance Specifications Covering Aircraft Microphones (except Carbon), Aircraft Headsets, Handsets and Loudspeakers, Aircraft Radio Selector Panels and Amplifiers.*
- ED-23B, *MOPS for Airborne VHF Receiver/Transmitter Operating in the Frequency Range 117.975—137.000 MHz.*

ED-62, *MOPS for Aircraft Emergency Locator Transmitters (121.5/243 MHz and 406 MHz).*

ED-67, *MOPS for Devices that Prevent Unintentional or Continuous Transmissions.*

ED-68, *MOPS for Devices that Prevent Simultaneous Transmissions.*

ED-73, *MOPS for SSR Mode S Transponders.*

ED-78, *Guidance Material for the Establishment of Data Link Supported ATS Services.*

ED-82, *MOPS for Mode S Aircraft Data Link Processors.*

2.5 SAE

2.6 IEEE

2.7 ICAO

Annex 10 — Aeronautical Telecommunications, 1985, Amendments 1-68.

Volume I — Part 1: Equipment and Systems; Part II: Radio Frequencies.

Volume II: Communications Procedures.

2.8 ISO

3 Navigation and guidance systems

3.1 FAA

TSO-C34e, *Airborne ILS Glide Slope Receiving Equipment Operating within 328.6 to 335.4 MHz.*

TSO-C35d, *Airborne Radio Marker Receiving Equipment.*

TSO-C36e, *Airborne ILS Localizer Receiving Equipment.*

TSO-C40c, *VOR Radio Receiving Equipment Operating within the Radio Frequency Range of 108-118 MHz.*

TSO-C41d, *Airborne Automatic Direction Finding (ADF) Equipment.*

TSO-C60b, *Airborne Loran-A and Loran-C Receiving Equipment Operating within the Radio Frequency Range of 1800-2000 KiloHertz and 90-110 KiloHertz Respectively.*

TSO-C63c, *Airborne Weather and Ground Mapping Pulsed Radars.*

TSO-C65a, *Airborne Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (for air carrier aircraft).*

TSO-C66c, *Airborne Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 MHz.*

TSO-C67, *Airborne Radar Altimeter Equipment (for Air Carrier Aircraft).*

TSO-C68a, *Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (for Air Carrier Aircraft).*

TSO-C74c, *Airborne ATC Transponder Equipment.*

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TSO-C87, *Airborne Low Range Radio Altimeter.*

TSO-C88a, *Airborne Pressure Altitude Digitizer Equipment.*

TSO-C92c, *Ground Proximity Warning Glide Slope Deviation Alerting Equipment.*

TSO-C93, *Airborne Interim Standard Microwave Landing System Converter Equipment.*

TSO-C94a, *Airborne OMEGA Receiving Equipment.*

TSO-C104, *Microwave Landing Systems (MLS) Airborne Receiving Equipment.*

TSO-C105, *Optional Display Equipment for Weather and Ground Mapping Radar Indicators.*

TSO-C106, *Air Data Computer Minimum Performance Standard.*

TSO-C109, *Airborne Navigation Data Storage System.*

TSO-C112, *Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment.*

TSO-C113, *Airborne Multipurpose Electronic Display.*

TSO-C115b, *Airborne Area Navigation Equipment Using Multi-Sensor Inputs.*

TSO-C117a, *Airborne Windshear Warning and Escape Guidance System for Transport Airplanes.*

TSO-C118, *Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS I.*

TSO-C119a, *Traffic Alert and Collision Avoidance System (TCAS) Airborne Equipment, TCAS II.*

TSO-C120, *Airborne Area Navigation Equipment Using Omega/VLF Inputs.*

TSO-C129a, *Airborne Supplemental Navigation Equipment Using the Global Positioning System (GPS).*

3.2 ARINC (AEEC)

429-9 (3/90), *Navigation System Data Base.*

561-11 (1/75), *Air Transport Inertial Navigation System (INS).*

568-8 (4/87), *Mark 3 Airborne Distance Measuring Equipment.*

569 (10/69), *Heading and Attitude Sensor (HAS).*

570-3 (5/86), *Mark 3 Airborne ADF System.*

571-2 (5/74), *Inertial Sensor System (ISS).*

572-1 (2/71), *Mark 2 Air Traffic Control Transponder (obsolete).*

575-3 (7/71), *Mark 3 Subsonic Air Data System (Digital) DADS (obsolete).*

576 (2/69), *Mark 4 Subsonic Air Data System (All Digital Outputs) DADS (obsolete).*

577-1 (3/75), *Audible Warning System.*

578-4 (10/88), *Airborne ILS Receiver.*

- 579-2 (8/89), *Airborne VOR Receiver.*
- 580 (5/76), *Mark 1 OMEGA Navigation System.*
- 594-4 (3/84), *Ground Proximity Warning System.*
- 595 (2/75), *Barometric Altitude Rate Computer.*
- 599-1 (7/85), *Mark 2 OMEGA Navigation System.*
- 603-1 (11/85), *Airborne Computer Data Loader.*
- 704-7 (3/99), *Inertial Reference System.*
- 705-5 (4/85), *Attitude and Heading Reference System.*
- 706-4 (1/88), *Subsonic Air Data System.*
- 707-5 (7/84), *Radio Altimeter.*
- 708-6 (11/91), *Airborne Weather Radar.*
- 708A-2 (4/98), *Airborne Weather Radar with Forward Looking Windshear Detection Capability.*
- 709-5 (4/82), *Airborne Distance Measuring Equipment.*
- 710-9 (8/90), *Mark 2 Airborne ILS Receiver.*
- 711-8 (7/87), *Mark 2 Airborne VOR Receiver.*
- 712-6 (11/85), *Airborne ADF Receiver.*
- 718-4 (12/89), *Mark 3 ATC Transponder.*
- 723-3 (1/88), *Ground Proximity Warning System.*
- 727-1 (8/87), *Airborne Microwave Landing System.*
- 730-3 (1/82), *Airborne Separation Assurance System.*
- 738 (4/86), *Air Data and Inertial Reference System (ADIRS).*
- 741-P1 (3/92), *Aviation Satellite Communications System — Part 1: Aircraft Installation Provisions.*
- 741-P1-9 (11/97), *Aviation Satellite Communications System — Part 1: Aircraft Installation Provisions.*
- 741-P2 (3/92), *Aviation Satellite Communications System — Part 2: System Design.*
- 741-P4 (6/92), *Aviation Satellite Communications System — Part 4: Specification and Description Language.*
- 743 (3/90), *Airborne Global Positioning System Receiver.*

3.3 RTCA

- DO-52:1953, *Calibration Procedures for Signal Generators Used in the Testing of VOR and ILS Receivers.*
- DO-56:1954, *VOR Test Signals.*

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- DO-62:1954, *Calibration Procedures — Test Standard Omni-Bearing Selector Test Sets.*
- DO-117:1963, *Standard Adjustment Criteria for Airborne Localizer and Glide Slope Receivers.*
- DO-143:1970, *Minimum Performance Standards — Airborne Radio Marker Receiving Equipment Operating on 75 MHz.*
- DO-144:1970, *Minimum Operational Characteristics — Airborne ATC Transponder.*
- DO-148:1970, Vol. I and II — *A New Guidance System for Approach and Landing.*
- DO-152:1972, *Minimum Operational Characteristics — Vertical Guidance Equipment Used in Airborne Volumetric Navigation Systems.*
- DO-154:1973, *Recommended Basic Characteristics for Airborne Radio Homing and Alerting Equipment for Use with Emergency Locator Transmitters (ELT).*
- DO-155:1974, *Minimum Operational Performance Standards — Airborne Low-Range Radar Altimeters.*
- DO-158:1975, *Minimum Performance Standards — Airborne Doppler Radar Navigation Equipment.*
- DO-161A:1976, *Minimum Performance Standards — Airborne Ground Proximity Warning Equipment.*
- DO-164A:1979, *Minimum Performance Standards — Airborne Omega Receiving Equipment.*
- DO-166:1977, Vol. I and II — *Microwave Landing System (MLS) Implementation.*
- DO-172:1980, *Minimum Operational Performance Standards for Airborne Radar Approach and Beacon Systems for Helicopters.*
- DO-173:1980, *Minimum Operational Performance Standards for Airborne Weather and Ground Mapping Pulsed Radars.*
- DO-174:1981, *Minimum Operational Performance Standards for Optional Equipment which Displays Non-Radar Derived Data on Weather and Ground Mapping Radar Indicators.*
- DO-177:1981, *Minimum Operational Performance Standards for Microwave Landings System (MLS) Airborne Receiving Equipment.*
- DO-179:1982, *Minimum Operational Performance Standards for Automatic Direction Finding (ADF) Equipment.*
- DO-180A:1990, *Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using a Single Collocated VOR/DME Sensor Input.*
- DO-181A:1992, *Minimum Operational Performance Standards for Air Traffic Control Radar Beacon System/Mode Select (ATCRBS/Mode S) Airborne Equipment.*
- DO-182:1982, *Emergency Locator Transmitter (ELT) Equipment Installation and Performance.*
- DO-183:1983, *Minimum Performance Standards Emergency Locator Transmitters Automatic Fixed-ELT (AF) Automatic Portable-ELT (AP) Automatic Deployable-ELT (AD) Survival-ELT(s) Operating on 121.5 and 243.0 MHz.*
- DO-184:1983, *Traffic Alert and Collision Avoidance System (TCAS) I Functional Guidelines.*
- DO-185:1983, Vol. I and II, *Minimum Operational Performance Standards for Traffic Alert and Collision Avoidance Systems (TCAS) Airborne Equipment* (Reprint 1990, includes Changes 1 through 6).
- DO-187:1984, *Minimum Operational Performance Standards for Airborne Area Navigation Equipment using Multi-sensor Inputs.*

- DO-189:1985, *Minimum Operational Performance Standards for Airborne Distance Measuring Equipment (DME) Operating within the Radio Frequency Range of 960-1215 MHz.*
- DO-190:1986, *Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Omega/VLF Inputs.*
- DO-191:1986, *Minimum Operational Performance Standards for Airborne Thunderstorm Detection Equipment.*
- DO-192:1986, *Minimum Operational Performance Standards for Airborne ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328.6-335.4 MHz.*
- DO-194:1986, *Minimum Operational Performance Standards for Airborne Area Navigation Equipment Using Loran-C Inputs.*
- DO-195:1986, *Minimum Operational Performance Standards for Airborne ILS Localizer Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 MHz.*
- DO-196:1986, *Minimum Operational Performance Standards for Airborne VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 MHz.*
- DO-197:1987, *Minimum Operational Performance Standards for an Active Traffic Alert and Collision Avoidance System I (Active TCAS I).*
- DO-198:1988, *Minimum Operational Performance Standards for Airborne MLS Area Navigation Equipment.*
- DO-202:1988, *Report of Special Committee 159 on Minimum Aviation System Standards (MASPS) for Global Positioning System (GPS).*
- DO-204:1988, *Minimum Operational Performance Standards for 406 MHz Emergency Locator Transmitters (ELT).*
- DO-208:1991, *Minimum Operational Performance Standards for Airborne Supplemental Navigation Equipment Using Global Positioning System (GPS).*

3.4 EUROCAE

- 1/WG7/70, *MPS for Airborne 75 MHz Marker Beacon Receiving Equipment.*
- 1/WG9/71, *MPS for Airborne Secondary Surveillance Radar Transponder Apparatus.*
- 1/WG9/71, *Amendment No. 1 (Measurement Procedures) to the MPS for Airborne Secondary Surveillance Radar Transponder Apparatus.*
- 1/WG7C/74, *MPS for Airborne Doppler Radar Ground Speed and/or Drive Angle Measuring Equipment.*
- 2/WG7C/74, *MPS for Airborne Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Obtained Velocity Vector Data.*
- ED-22B, *MPS for Airborne VOR Receiving Equipment.*
- ED-26, *MPS for Airborne Altitude Measurements and Coding Systems.*
- ED-27, *MOPR for Airborne Area Navigation Systems Based on VOR and DME as Sensors.*
- ED-28, *MPS for Airborne Area Navigation Computing Equipment Based on VOR and DME as Sensors.*
- ED-29, *MPS for Airborne OMEGA Navigation Equipment.*
- ED-30, *MPS for Airborne Low Range Radio (Radar) Altimeter Equipment.*

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ED-36A, MOPR for Microwave Landing System (MLS) Airborne Receiving Equipment.

ED-38, MPS for Airborne Weather, Ground Mapping and Assisted Approach Radars (including Surface-Based Transponder Beacon System Characteristics).

ED-39, MOPR for Airborne Area Navigation Systems Based on Two DME as Sensors.

ED-40, MPS for Airborne Computing Equipment for Area Navigation System Using Two DME as Sensors.

ED-43, MOPR for the SSR Transponder and the Altitude Measurement and Coding System.

ED-46B, MPS for Airborne ILS Receiving Equipment (Localiser).

ED-47B, MPS for Airborne ILS Receiving Equipment (Glide Path).

ED-51, MPS for Airborne Automatic Direction Finding Equipment.

ED-52, MPS for Conventional and Doppler VHF Omnidirectional Range (C VOR and D VOR) (Ground Equipment).

ED-53A, MOPS for Microwave Landing System (MLS) (Ground Equipment).

ED-54, MOPR for Distance Measuring Equipment Interrogators (DME/N and DME/P) Operating within the Radio Frequency Range 960-1 215 MHz (Airborne Equipment).

ED-57, MPS for Distance Measuring Equipment (DME/N and DME/P) (Ground Equipment).

ED-58, MOPS for Area Navigation Equipment Using Multi-Sensor Inputs (Airborne Equipment).

ED-74, MOPS for ILS MLS Airborne Receiving Equipment.

3.5 SAE

AS791, Remote-Servoed Air Data Instruments (Turbine-Powered Subsonic Aircraft).

AS8002A, Air Data Computer, Minimum Performance Standard.

AS8003, Minimum Performance Standards for Automatic Pressure Altitude Reporting Code Generating Equipment.

AS8009A, Pressure Altimeter Systems.

ARP4256, Design Objectives for Liquid Crystal Displays for Part 25 (Transport) Aircraft.

3.6 IEEE

172-83, IEEE Standard Definitions of Navigation Aid Terms.

173-59, Standards on Navigation Aids: Measurements.

292-69, IEEE Specification Format for Single-Degree-of-Freedom Spring-Restrained Rate Gyros (reaffirmed 1986).

293-69, IEEE Test Procedure for Single-Degree-of-Freedom Spring-Restrained Rate Gyros (reaffirmed 1986).

337-72, IEEE Standard Specification Format Guide and Test Procedure for Linear, Single-Axis, Pendulous, Analog Torque Balance Accelerometer (reaffirmed 1978).

517-74, IEEE Standard Specification Format Guide and Test Procedure for Single-Degree-of-Freedom Rate Integrating Gyros (reaffirmed 1988).

529-80, *IEEE Supplement for Strapdown Applications to IEEE Standard Specification Format Guide and Test Procedure for Single-Degree-of-Freedom Rate-Integrating Gyros* (reaffirmed 1988).

530-78, *IEEE Standard Specification Format Guide and Test Procedure for Linear, Single-Axis, Digital, Torque Balance Accelerometer* (reaffirmed 1986).

647-81, *IEEE Standard Specification Format Guide and Test Procedure for Single-Axis Laser Gyros* (withdrawn 12/5/92).

836-91, *IEEE Recommended Practice for Precision Centrifuge Testing of Liner Accelerometers*.

3.7 ICAO

Circular 139, 3rd Edition, 1983 — *Aviation Use of OMEGA*.

Circular 165, Issue No. 1, 1981 — *Microwave Landing System (MLS)*.

Circular 212, 1988 — *Secondary Surveillance Radar Mode S Data Link*.

3.8 ISO

4 Flight management systems, cockpit controls/displays and instruments

4.1 FAA

TSO-C2d, *Airspeed Instruments*.

TSO-C3d, *Turn-and-Slip Instruments*.

TSO-C4c, *Bank and Pitch Instruments (Indicating Gyro-Stabilized Type) (Gyroscopic Horizon, Attitude Gyro)*.

TSO-C5e, *Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)*.

TSO-C6d, *Direction Instrument, Magnetic (Gyro-Stabilized Type)*.

TSO-C7d, *Direction Instrument, Magnetic, Non-Stabilized Type (Magnetic Compass)*.

TSO-C8c, *Vertical Velocity Instrument (Rate-of-Climb)*.

TSO-C9c, *Automatic Pilots*.

TSO-C10b, *Aircraft Altimeter, Pressure Actuated, Sensitive Type*.

TSO-C16, *Air Speed Tubes (Electrically Heated)*.

TSO-C43a, *Temperature Instruments*.

TSO-C44a, *Fuel Flowmeters*.

TSO-C45, *Manifold Pressure Indicating Instruments*.

TSO-C46a, *Maximum Allowable Airspeed Indicator Systems*.

TSO-C47, *Pressure Instruments — Fuel, Oil and Hydraulic*.

TSO-C48, *Carbon Monoxide Detector Instruments*.

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TSO-C49a, *Electric Tachometer Magnetic Drag (for Air Carrier Aircraft).*

TSO-C52a, *Flight Directors.*

TSO-C54, *Stall Warning Instruments.*

TSO-C55, *Fuel and Oil Quantity Instruments (for Reciprocating Engine Aircraft).*

TSO-C67, *Airborne Radar Altimeter Equipment.*

TSO-C87, *Airborne Low — Range Radio Altimeter.*

TSO-C88a, *Automatic Pressure Altitude Reporting Code Generating Equipment.*

TSO-C95, *Mach Meters.*

TSO-C101, *Over Speed Warning Instruments.*

TSO-C106, *Air Data Computer.*

TSO-C113, *Airborne Multi-Purpose Electronic Displays.*

TSO-C123a, *Cockpit Voice Recorder System.*

4.2 ARINC (AEEC)

577-1 (3/75), *Audible Warning System.*

585-2 (4/78), *Electronic Chronometer System (draft 7).*

594-4 (3/84), *Ground Proximity Warning System.*

601 (2/91), *Control/Display Interfaces.*

701-1 (4/83), *Flight Control Computer System.*

702-3 (12/82), *Flight Management Computer.*

703-2 (10/83), *Thrust Control Computer.*

705-5 (4/85), *Attitude and heading Reference System.*

723-3 (1/88), *Ground Proximity Warning System.*

725-2 (11/84), *Electronic Flight Instruments (EFI).*

726-1 (9/81), *Flight Warning Computer System.*

731-2 (10/83), *Electronic Chronometer.*

739-1 (6/90), *Multi-Purpose Control and Display Unit.*

747 (6/90), *Flight Data Recorder.*

4.3 RTCA**4.4 EUROCAE**

ED-41, *MPS for Airborne Fuel Quantity Gauging Systems.*

ED-42, *MPS for Fuel Flowmeter Systems to Aircraft Standards.*

4.5 SAE

AS391C, *Airspeed Indicator (Pitot Static) (Reciprocating Engine Powered Aircraft).*

AS392C, *Altimeter, Pressure Actuated Sensitive Type.*

AS394A, *Rate of Climb Indicator, Pressure Actuated (Vertical Speed Indicator).*

AS396B, *Bank and Pitch Instruments (Indicating Stabilized Type) (Gyro-Scopic Horizon, Attitude Gyro).*

AS397A, *Direction Instrument, Non-Magnetic, Stabilized Type (Directional Gyro).*

AS398A, *Direction Instrument, Magnetic, Non-Stabilized Type (Magnetic Compass).*

AS399A, *Direction Instrument, Magnetic (Stabilized Type).*

AS402A, *Automatic Pilots.*

AS403A, *Stall Warning Instrument.*

AS404B, *Electric Tachometer: Magnetic Drag (Indicator and Generator).*

AS405B, *Fuel and Oil Quantity Instruments.*

AS406, *Flight Directors (Turbine-Powered Subsonic Aircraft).*

AS407B, *Fuel Flowmeters.*

AS408B, *Pressure Instruments — Fuel, Oil and Hydraulic (Reciprocating Engine Powered Aircraft).*

AS411A, *Manifold Pressure Indicating Instruments.*

AS412A, *Carbon Monoxide Detector Instruments.*

AS413B, *Temperature Instruments (Reciprocating Engine Powered Aircraft).*

AS414B, *Temperature Instruments (Turbine Powered Subsonic Aircraft).*

AS415, *Altimeter, Pressure, Compensated (Turbine Powered Subsonic Aircraft).*

AS416, *Directional Indicating System (Turbine Powered Subsonic Aircraft).*

AS418A, *Maximum Allowable Air-Speed Instruments (Reciprocating Engine Powered Aircraft).*

ARP419, *Automatic Pilot Installations.*

AS420B, *Flight Directors (Reciprocating Engine Powered Aircraft).*

AS426, *Compass System Installations.*

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ARP427, *Pressure Ratio Instruments.*

AS428, *Exhaust Gas Temperature Instruments.*

AS429, *Rate of Climb (Vertical Speed) Indicator, Pressure Actuated (Turbine Powered Subsonic Aircraft).*

AS431B, *True Mass Fuel Flow Instruments.*

AS432B, *Tachometer Instruments (Indicator and Generator).*

ARP435, *Overspeed Warning Instrument (Turbine Powered Subsonic Aircraft).*

AS436, *Mach Meters (Turbine Powered Subsonic Aircraft).*

AS437A, *Maximum Allowable Air Speed Instruments (Turbine Powered Subsonic Aircraft).*

AS439, *Stall Warning Instrument (Turbine Powered Subsonic Aircraft).*

AS440A, *Automatic Pilots (Turbine Powered Subsonic Aircraft).*

AS443A, *Compass, Magnetic, Non-Stabilized Type (for Turbine Powered, Subsonic Aircraft).*

AS445, *Fuel and Oil Quantity Instruments (Turbine Powered Subsonic Aircraft).*

AS793, *Total Temperature Measuring Instruments (Turbine Powered Subsonic Aircraft).*

ARP794, *Airstream Deviation Instrument (ADI).*

ARP1088, *Aircraft Indicating Systems.*

AS1162, *Attitude Instruments, Pitch and Roll — Part I: Minimum Performance Standard for Equipment; Part II: Performance and Test Procedures.*

ARP1874, *Design Objectives for CRT Displays for Part 25 (Transport) Aircraft.*

ARP4067, *Design Objectives for CRT Displays for Part 23 Aircraft.*

ARP4101, *Flight Deck Layout and Facilities.*

ARP4101/2, *Pilot Visibility from the Flight Deck.*

ARP4101/4, *Flight Deck Environment.*

ARP4101/5, *Aircraft Circuit Breaker and Fuse Arrangement.*

ARP4102, *Flight Deck Panels, Controls, and Displays.*

ARP4102/1, *On Board Weight and Balance System.*

ARP4102/2, *Automatic Braking System (ABS).*

ARP4102/3, *Flight Deck Tire Pressure Monitoring System (TPMS).*

ARP4102/4, *Flight Deck Alerting System (FAS).*

ARP4102/5 Sec. I, *Primary Flight Controls by Electrical Signaling.*

ARP4102/5 Sec. III, *Engine Controls by Electrical or Fiber Optic Signaling.*

ARP4102/6, *Communications and Navigation Equipment.*

ARP4102/7, *Electronic Displays.*

ARP4102/8, *Flight Deck, Head-Up Displays.*

ARP4102/10, *Collision Avoidance System.*

ARP4102/11B, *Airborne Windshear Systems.*

ARP4103, *Flight Deck Lighting for Commercial Transport Aircraft.*

ARP4104, *Design Objectives for Handling Qualities of Transport Aircraft.*

ARP4105A, *Abbreviations and Acronyms for Use on the Flight Deck.*

ARP4107, *Aerospace Glossary for Human Factors Engineers.*

AS8001, *Minimum Performance Standard for Bank and Pitch Instruments.*

AS8004, *Minimum Performance Standard for Turn and Slip Instruments.*

AS8005A, *Minimum Performance Standard Temperature Instruments.*

AS8007, *Minimum Safe Performance over Speed Warning Instruments.*

AS8008, *Flight Director Equipment.*

AS8010C, *Minimum Performance Standard, Aviator's Breathing Oxygen Purity Standard.*

AS8013A, *Minimum Performance Standard for Direction Instrument, Magnetic (Gyroscopically Stabilized).*

AS8014, *Minimum Performance Standard Stall Warning Equipment.*

AS8016A, *Vertical Velocity Instrument (Rate-of-Climb).*

AS8018A, *Minimum Performance Standard for Mach Meters.*

AS8019A, *Airspeed Instruments.*

AS8021, *Minimum Performance Standard for Direction Instrument, Non-Magnetic (Gyroscopically Stabilized).*

AS8028, *Powerplant Fire Detection Instruments, Thermal & Flame Contact Types (Reciprocating and Turbine Engine Powered Aircraft).*

AS8034, *Minimum Performance Standards for Airborne Multipurpose Electronic Displays.*

AS8036, *Cargo Compartment Fire Detection Instruments.*

AS8039, *Minimum Performance Standard, General Aviation Flight Recorder.*

AS8042, *Manifold Pressure Instruments.*

AS8046, *Angle of Attack Instrument.*