

Appendix 1

Existing Avionics Standards

Equipment manufactured and approved under earlier standards are acceptable unless that standard has been cancelled or the equipment approval has been withdrawn. No new equipment approvals will be issued against superseded standards.

TSO, ATSO, ETSO and EUROCAE standards refer to other documents, such as RTCA documents, for technical standards. The TSO, ATSO, ETSO or EUROCAE standards may also modify, change or have additional sections of the referred technical documents.

Most TSOs refer to RTCA/DO-178B for software considerations, RTCA/DO-160(at a version specified in the TSO) for environmental considerations and RTCA/DO-254 for hardware aspect of complex designs. Later revisions or EUROCAE equivalents are also acceptable. An earlier version of DO-178 may be acceptable and Annex II of EASA [AMC 20-115C](#) provides further details.

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
Aeronautical Mobile High Frequency Data Link (HF DL) Equipment	TSO-C158 : 2004		ETSO-C158 : 2012		DO-265 : 2000		
Air Data Computer (ADC)	TSO-C106 : 1988		ETSO-106A1 : 2013	AS8002A : 1996			
Aircraft Audio Systems and Equipment	TSO-C139 : 2005		ETSO-C139 : 2010		DO-214A : 2013		
Airspeed Instruments	TSO-C2d : 1989		ETSO-C2d : 2003	AS8019A : 1996			
Altimeter, Pressure Actuated, Sensitive Type	TSO-C10b : 1959		ETSO-C10b : 2003	AS392C : 1959			
Anticollision Light Systems	TSO-C96a : 1989		ETSO-C96a : 2003	AS8017C : 2011			
Area Navigation Equipment Using Multi-Sensor Inputs	TSO-C115c : 2012		ETSO-C115c : 2013		DO-187 : 1984	ED-58 : 1988	
Audio Selector Panels and Amplifiers	TSO-C139a : 2014				DO-214A : 2013	ED-18 : 1985	
Automatic Dead Reckoning Computer Equipment Utilizing Aircraft Heading and Doppler Ground Speed and Drift Angle Data (Air Carrier Aircraft)			ETSO-C68a : 2003		DO-158 : 1975		
Automatic Direction Finding (ADF) Equipment	TSO-C41d : 1985		ETSO-2C41d : 2003		DO-179 : 1982	ED-51 amd 1 1987	
Automatic Pilots			ETSO-C9c : 2003	AS402C : 2012			
Automatic Pressure Altitude Reporting Code-Generating Equipment	TSO-C88b : 2007		ETSO-C88a : 2003	AS8003 : 1974			
Aviation Visual Distress Signals	TSO-C168 : 2004			AS5134A : 2001			
Bank and Pitch Instruments Artificial Horizon Attitude Gyro Attitude Indicator	TSO-C4c : 1959		ETSO-C4c : 2003	AS396B : 1958			
Batteries Lithium Sulphur Dioxide	TSO-C179a : 2011		ETSO-2C179a : 2012				
Batteries Nickel-Cadmium and Lead- Acid	TSO-C173a : 2013		ETSO-C173 : 2008		DO-293A : 2009		
Batteries Non-Rechargeable Lithium Cells	TSO-C142a : 2006		ETSO-C142a : 2008		DO-227 : 1995		
Batteries Rechargeable Lithium Cells	TSO-C179a : 2011		ETSO-2C179 : 2012		DO-311 : 2008		
Battery Based Emergency Power Unit (BEPU)	TSO-C174 : 2005		ETSO-C174A1 : 2013		DO-293A : 2009		
Carbon Monoxide Detector Instruments	TSO-C48a : 2009		ETSO-2C48a : 2010 ETSO-C48 : 2003 IV				
Cargo Compartment Fire Detection Instruments	TSO-C1d : 2004		ETSO-C1c : 2003	AS8036A : 2013			
Cockpit Image Recorder Systems	TSO-C176a : 2013		ETSO-C176 : 2010			ED-112 amdt 2 : 2003	
Cockpit Voice Recorder Equipment (CVR)	TSO-C123c : 2013		ETSO-C123b : 2010			ED-112 amdt 2 : 2003	
Circuit Card Assembly Functional Sensors using Satellite-Based Augmentation System (SBAS) for Navigation and Non-Navigation Position/Velocity/Time Output	TSO-C204 : 2013				DO-229D Change 1 : 2013		

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
Circuit Card Assembly Functional Class Delta Equipment Using The Satellite-Based Augmentation System For Navigation Applications	TSO-C205 : 2013				DO-229D Change 1 : 2013		
Circuit Card Assembly Functional Sensors using Aircraft-Based Augmentation for Navigation and Non-Navigation Position/Velocity/Time Output	TSO-C206 : 2013				DO-316 : 2009		
Course Deviation Indicator (CDI)	See receiver equipment standard						
Crewmember Portable Protective Breathing Equipment	TSO-C116a : 2009		ETSO-C116 : 2003	AS8031A : 1999 AS8047 : 1987			
Data Link Recorder Systems	TSO-C177a : 2013					ED-112 amdt 2 : 2003	
Direction Instrument, Magnetic (Gyroscopically Stabilized)	TSO-C6e : 2008		ETSO-C6e : 2010	AS8013A : 1996			
Direction Instrument, Magnetic Non- Stabilized Type (Magnetic Compass)	TSO-C7d : 1989		ETSO-C7d : 2003	AS398B : 2001			
Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)	TSO-C5F : 2007		ETSO-C5e : 2003	AS8021 : 1981			
Distance Measuring Equipment (DME) Operating Within The Radio Frequency Range of 960-1215 MHz	TSO-C66c : 1991		ETSO-2C66b : 2003		DO-189:1985	ED-54 : 1987	
Doppler Radar Ground Speed and/or Drift Angle Measuring Equipment (for Air Carrier Aircraft)			ETSO-C65a : 2003		DO-158 : 1975	WG7C/1-74 : 1974	
Electric Tachometer: Magnetic Drag (Indicator And Generator)	TSO-C49b : 1995		ETSO-C49b : 2003	AS404C : 2001			
Electronic Map Display Equipment for Graphical Depiction of Aircraft Position	TSO-C165a : 2013		ETSO-C165 : 2010		DO-257A : 2003		
Emergency Locator Transmitter (ELT) 121.5 MHz / 243 MHz			ETSO-2C91a : 2003		DO-183 : 1983		
Emergency Locator Transmitter (ELT) 406MHz	TSO-C126b : 2012		ETSO-C126a : 2012		DO-204A : 2007	ED-62A : 2009	
Engine Driven Direct Current Generator/Starter Generator	TSO-C56b : 2006		ETSO-C56bA1 : 2013	AS8020 : 1980			
Equipment that Prevents Blocked Channels used in Two-Way Radio Communications Due to Simultaneous Transmissions	TSO-C122a : 2005		ETSO-2C122 : 2003		DO-209 : 1992	ED-68 : 1992	
Equipment that Prevents Blocked Channels used in Two-Way Radio Communications Due to Unintentional Transmissions	TSO-C128a : 2005		ETSO-2C128 : 2003		DO-207 : 1991	ED-67 : 1991	
Extended Squitter Automatic Dependent Surveillance - Broadcast (ADS-B) and Traffic Information	TSO-C166b : 2009		ETSO-C166b A1 : 2013		DO-260B : 2009 with Corrigendum 1	ED-102A : 2012 with Corrigendum 1	
Fire Detectors (radiation sensing type)	TSO-C79 : 1963		ETSO-C79 : 2003				
Flight Data Recorder Systems (FDR)	TSO-C124c : 2013		ETSO-C124b : 2010			ED-112A :2013	
Flight Data Recorder Interface Unit		ATSO-C1007a : 2013					

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
Flight Deck (Sedentary) Crewmember Protective Breathing Equipment	TSO-C99A : 2008		ETSO-C99 : 2003	AS 8031A : 1999			
Flight Director Equipment				AS8008 : 1984			
Flight Information Services – Broadcast (FIS-B) Data Link Systems and Equipment	TSO-C157a : 2011		ETSO-C157a : 2012		DO-267A : 2004		
Fluorescent Lighting Ballast/Fixture Equipment	TSO-C141 : 1999		ETSO-C141 : 2003	AS4914C : 2011			
Fuel and Oil Quantity Instruments	TSO-C55A : 2007		ETSO-C55a : 2012	AS405D : 2012			
Fuel Flow Meter	TSO-C44C : 2006		ETSO-C44c : 2008	AS407D : 2012			
Full Authority Digital Engine Control (FADEC)				AIR 5924A : 2013			
Geosynchronous Orbit Aeronautical Mobile Satellite Services Aircraft Earth Station Equipment	TSO-C132 : 2004		ETSO-C132 : 2008		DO-210D Change 3: 2006		
GPS: Active Global Navigation Satellite System (GNSS) Antenna	TSO-C190 : 2007		ETSO-C190 : 2010		DO-301 : 2006		
GPS: Ground Based Augmentation System Positioning and Navigation Equipment	TSO-C161a : 2009		ETSO-C161a : 2012		DO-253C : 2008		
GPS: Ground Based Augmentation System Very High Frequency Data Broadcast Equipment	TSO-C162a : 2009		ETSO-C162a : 2012		DO-253C : 2008		
GPS: Ground-Based Regional Augmentation System (GRAS)					DO-310 : 2008		
GPS: Navigation Sensors Using the Global Positioning System Augmented by the Satellite Based Augmentation System also known as Wide Area Augmentation System (WAAS)	TSO-C145d : 2013		ETSO-C145c - 2010		DO-229D Change 1: 2013		
GPS: Stand-Alone Navigation Equipment Using the Global Positioning System Augmented by the Satellite Based Augmentation System	TSO-C146d : 2013		ETSO-C146c - 2010		DO-229D Change 1: 2013		
GPS: Supplemental Navigation Sensors for Global Positioning System Equipment Using Aircraft-Based Augmentation	TSO-C196b : 2013		ETSO-C196a : 2012		DO-316 : 2009		
Ground Proximity Warning Equipment (GPWS)	TSO-C92c : 1996		ETSO-C92c : 2003		DO-161A : 1976		
Headsets and Speakers	TSO-C139 : 2005		ETSO-C139 : 2010		DO-214A : 2013		
Helicopter Terrain Awareness Warning System (HTAWS)	TSO-C194 : 2008		ETSO-C194 : 2012		DO-309 : 2008		
High Frequency (HF) Radio Communications Receiver Equipment Operating within the Radio Frequency Range 1.5 to 30 MHz	TSO-C170 : 2004		ETSO-C170 - 2012		DO-163 : 1976		
High Frequency (HF) Radio Communications Transceiver Equipment Operating within the Radio Frequency Range 1.5 to 30 MHz	TSO-C170 : 2004		ETSO-C170 - 2012		DO-163 : 1976		
High Frequency (HF) Radio Communications Transmitter Equipment Operating within the Radio Frequency Range 1.5 to 30 MHz	TSO-C170 : 2004		ETSO-C170 - 2012		DO-163 : 1976		
Horizontal Situation Indicator (HSI)	See receiver equipment standard						

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
ILS Glide Slope Receiving Equipment Operating within the Radio Frequency Range of 328-6-335-4 MHz	TSO-C34e : 1988		ETSO-2C34f : 2003		DO-192 : 1986	ED-47B amdt 1 : 1997	
ILS Localizer Receiving Equipment Operating within the Radio Frequency Range 108-112 MHz	TSO-C36e : 1988		ETSO-2C36f : 2003		DO-195 : 1986	ED-46B : 1995	
Integrated Modular Avionics Hardware Elements	TSO-C153 : 2002						
Light Aviation Secondary Surveillance Transponder (LAST)			ETSO-2C509 : 2007			ED-115 : 2002	
Lightweight flight recorder systems - information collection and monitoring systems	TSO-C197 : 2010		ETSO-2C197 : 2010			ED-155 : 2009	
Low-Range Radio Altimeter	TSO-C87a : 2012		ETSO-C87a : 2013		Replaced by ED-30	ED-30 : 1980	
Mach Meters	TSO-C95a : 2007		ETSO-C95a : 2012	AS8018A : 1996			
Manifold Pressure Indicator	TSO-C45b : 2006		ETSO-C45bA1 : 2013	AS8042 : 1985			
Maximum Allowable Airspeed Indicator	TSO-C46a : 1968		ETSO-C46a : 2003				
Microphones (Except Carbon)	TSO-C139a : 2014		ETSO-C139 : 2010		DO-214 : 1993		
Microwave Landing System (MLS) Converter Equipment Interim Standard	TSO-C93 : 1976		ETSO-2C93b : 2003			ED-36B : 2007	
Microwave Landing Systems (MLS) Receiving Equipment	TSO-C104 : 1982		ETSO-2C104a : 2003		DO-177 : 1981	ED-36B : 2007	
MMR: Combined Instrument Landing System (ILS)/Microwave Landing System (MLS) Receiving Equipment			ETSO-2C500a : 2003			ED-88 : 1997	
Mode A/C Transponder Equipment with Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) Transmission Capability		ATSO-C1004a : 2009			DO-260B with Corrigendum 1 : 2011	ED-102A : 2012 with Corrigendum 1	
Mode S Aircraft Data Link Processor			ETSO-2C501 : 2003			ED-82A : 1999	
Multi Mode Receiver	See individual parts (VOR, GPS etc)						
Multipurpose Electronic Displays	TSO-C113a : 2012		ETSO-C113 : 2003	AS8034B : 2011			
Navigation Data Storage System	TSO-C109 : 1985		ETSO-C109 : 2003	Global Systems, Inc., document "Minimum Performance Standard (MPS) for the Airborne Navigation Data Storage/Systems," dated March 31, 1983.			<i>Additional standards contained in TSO document</i>
Next Generation Satellite Systems (NGSS) Equipment	TSO-C159a : 2010				DO-262A : 2008		
Night Vision Goggles (NVG)	TSO-C164 : 2004 <i>Standard used as a basis for the development of an Australian standard.</i>	See CAO 82.6			DO-275 <i>Standard used as a basis for the development of an Australian standard.</i>		

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
Optional Display Equipment for Weather and Ground Mapping Radar Indicators	TSO-C105 : 1984		ETSO-C105 : 2003		DO-174		
Overspeed Warning Instrument	TSO-C101 : 1987		ETSO-C101 : 2003	AS8007 : 1978			
Oxygen Demand Regulators Crewmember	TSO-C89a : 2008		ETSO-C89 : 2003	AS8027 : 1995			
Oxygen Mask Crewmember Demand	TSO-C78a : 2008		ETSO-2C78 : 2008	AS8026A : 1996			
Oxygen Mask Assembly Continuous Flow (for Non-Transport Category Aircraft)	TSO-C103 : 1984		ETSO-C103 : 2003	AS8025A : 1999 AS1224B : 1996			
Passenger Oxygen Mask Assembly, Continuous Flow	TSO-C64b : 2008		ETSO-C64a : 2003	AS8025A : 1999			
Passive Global Navigation Satellite System (GNSS) Antenna	TSO-C144a : 2007		ETSO-C144a : 2010		DO-228 : 1995		
Passive Thunderstorm Detection Equipment	TSO-C110a : 1988		ETSO-C110a : 2003		DO-191 : 1986		
Pitot and Pitot Static Tubes - Electrically Heated	TSO-16a : 2006		ETSO-C16a : 2009	AS8006 : 1988			
Portable Gaseous Oxygen Supply (PGOS)			ETSO-2C512 : 2008	AS1046C : 2006			
Portable Megaphones	TSO-C137a : 2008			AS4950B : 2007			
Position Lights	TSO-C30c : 1989		ETSO-C30c : 2003	AS8037C : 2013			
Powerplant Fire Detection Instruments (Thermal and Flame Contact Types)	TSO-C11e : 1991		ETSO-2C11e : 2003	AS8028 : 1980			
Pressure Instruments Fuel Oil Hydraulic	TSO-C47A : 2006		ETSO-C47aA1 : 2013	AS408C : 2001			
Radar Approach and Beacon Systems for Helicopters	TSO-C102 : 1984		ETSO-C102 : 2003		DO-172 : 1980		
Radio Magnetic Indicator (RMI)	See receiver equipment standard						
Radio Marker Receiving Equipment	TSO-C35d : 1971		ETSO-2C35d : 2003		DO-143 : 1970		
Rate Gyro				AS1104 : 1969			
Recorder Independent Power Supply	TSO-C155a : 2010		ETSO-C155a : 2013				
Selective Calling (SELCAL) Equipment	TSO-C59a : 2005		ETSO-C59 : 2003		DO-93 : 1959		
Single Phase 115 Vac, 400 Hz Arc Fault Circuit Breakers	TSO-C178 : 2006		ETSO-C178 : 2013	AS5692A : 2009			
Stall Warning Instruments	TSO-C54 : 1961		ETSO-C54 : 2003	AS403A : 1958			
Stand-Alone Extended Squitter Automatic Dependent Surveillance – Broadcast (ADS-B) Transmit Only Equipment	TSO-C166b : 2009	ATSO-C1005a : 2009			DO-260B : 2009 with Corrigendum 1		
Static ('DC to DC') Electrical Power Converter (for Air Carrier Aircraft)	TSO-C71 : 1961		ETSO-C71 : 2003				<i>Additional standards contained in TSO document</i>
Static Electrical Power Inverter	TSO-C73 : 1963		ETSO-C73 : 2003				<i>Additional standards contained in TSO document</i>

EQUIPMENT	FAA TSO	ATSO	ETSO	SAE	RTCA	EUROCAE	OTHER
Systems for Non-Required Telecommunications Services (in Non-Aeronautical Frequency Bands) (ASNRT)			ETSO-2C514 : 2008				<i>Additional standards contained in TSO document</i>
Temperature Instruments: <ul style="list-style-type: none"> • Cylinder Head Temperature • Indicator • Exhaust Gas Temperature • Indicator • Free Air Temperature • Indicator • Induction System • Temperature Indicator • Turbine Inlet Temperature • Indicator 	TSO-C43c : 1995		ETSO-C43c : 2003	AS8005A : 1996			
Terrain Awareness Warning System (TAWS) also known as Enhanced Ground Proximity Warning System (EGPWS)	TSO-C151c : 2012		ETSO-C151b : 2007		DO-161A : 1976		
Traffic Advisory System (TAS) Equipment	TSO-C147 : 1998		ETSO-C147 : 2003		DO-197A chg 1 : 1997		
Traffic Alert and Collision Avoidance System Equipment (TCAS) I	TSO-C118 : 1998		ETSO-C118 : 2003		DO-197A chg 1 : 1997		
Traffic Collision Avoidance System (TCAS) II also known as Collision Avoidance System (ACAS) II	TSO-C119d : 2013		ETSO-C119c : 2009		DO-185B chg 2 : 2013		
Transponder Air Traffic Control Radar Beacon System (ATCRBS) Equipment Mode A/C	TSO-C74d : 2008	ATSO - 1C74c : 2003			DO-144A : 2008		
Transponder Air Traffic Control Radar Beacon System (ATCRBS)/Mode S Transponder	TSO-C112e : 2013	ATSO-1C112 : 2009	ETSO-C112d : 2013		RTCA/DO-181D	ED-73E : 2011	
Turn and Slip Indicator	TSO-C3e : 2007		ETSO-C3d : 2003	AS8004 : 1975			
Underwater Locating Devices (Acoustic) (Self-Powered)	TSO-C121b : 2012		ETSO-C121b : 2013	AS8045A : 2011			
VDL Mode 2 Communications Equipment	TSO-C160a : 2012		ETSO-C160a : 2013		DO-281B chg 1 : 2014		
VDL Mode 3 Communications Equipment Operating within the Frequency Range 117.975-137.000 MHz	TSO-C163a : 2007				DO-271C : 2005		
Vertical Velocity Instruments (Rate of Climb) also known as Instantaneous Vertical Speed Indicator (IVSI)	TSO-C8e : 2007		ETSO-C8e : 2010	AS8016A : 1996			
VHF Radio Communications Transceiver Equipment Operating Within Radio Frequency Range 117.975-137 MHz	TSO-C169a : 2007				DO-186B : 2005	ED-23C : 2009	
VOR Receiving Equipment Operating within the Radio Frequency Range of 108-117.95 MHz	TSO-C40c : 1988		ETSO-2C40c : 2003		DO-196 : 1986	ED-22B : 1988	
Weather and Ground Mapping Pulsed Radars	TSO-C63d : 2012		ETSO-2C63c : 2003		DO-173 : 1980	ED-38 amdt 1 : 1992	
Windshear Warning and Escape Guidance Systems for Transport Airplanes	TSO-C117a : 1996		ETSO-C117a : 2003	ARP 4102/11C : 2002			