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MILITARY STANDARD

AIRCREW STATION DISPLAYS AND ASSOCIATED EQUIPMENT, DEFINITIONS OF

FSC MISC

DEPARTMENT OF DEFENSE
Washington, DC 20301

Aircrew Station Displays and Associated Equipment, Definitions of

MIL-STD-1555

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Recommended corrections, additions, or deletions should be addressed to the 4950th Test Wing (4950/TZSA), Wright-Patterson Air Force Base, Ohio 45433.

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1. PURPOSE AND SCOPE

1.1 Purpose. The purpose of this standard is to achieve standardization of the definitions listed herein which will eliminate major problems in effecting communications among the DOD services.

1.2 Scope. This standard covers definitions for computers and aircrew station displays and their associated sensors.

2. REFERENCED DOCUMENTS (Not applicable).

3. DEFINITIONS

3.1 Accelerometer, indicator. An instrument that displays the magnitude of normal (Z axis) acceleration forces of the aircraft in flight.

3.2 Accelerometer, transducer/transmitter, angular. A device that, when mounted near the center-of-gravity of the aircraft, senses angular accelerations around either the normal (vertical), longitudinal (roll), or transverse (pitch) axis of the aircraft and provides electrical signals to remote systems.

3.3 Accelerometer, transducer/transmitter, axial. A device that, when mounted near the center-of-gravity of the aircraft, senses accelerations along either the normal, longitudinal, or transverse (lateral) axis of the aircraft and provides electrical signals to remote systems.

3.4 Altimeter, cabin pressure indicator. A pressure sensing instrument that displays the pressure altitude in feet of the pressurized aircraft cabin.

3.5 Altimeter, pressure. An aneroid instrument that senses barometric static pressure and displays in feet the aircraft pressure altitude above mean sea level normally referenced to standard day conditions of temperature and pressure. Adjustment for nonstandard day barometric pressures is accomplished by a setting knob.

3.6 Altimeter, radar. An instrument that displays the height (absolute altitude) of an aircraft as determined by the reflected electromagnetic energy from the surface of the earth.

3.7 Altimeter, servoed/pneumatic. An instrument that has both primary and standby modes of operation. The instrument contains an integral mechanism of the aneroid type for operation of the altitude display in the standby mode. In the primary mode, the instrument is electrically servoed to display the more accurate altitude transmitted by a central air data computer or an altitude computer. The instrument automatically reverts to the standby mode of operation in the event of failure of the electrical system.

3.8 Altimeter-encoder. A pressure altimeter that displays altitude in feet and encodes this altitude electrically for the altitude reporting transponder.

3.9 Altimeter set, height indicator. An instrument that indicates the actual height (absolute altitude) of the aircraft above the surface or terrain over which it is flying. The sensing of altitude is accomplished by electromagnetic ranging signals of the altimeter set.

3.10 Bearing distance heading indicator (BDHI). A BDHI displays aircraft magnetic or true compass heading, relative bearing, and slant range distance in nautical miles to the selected navigation facility. It receives signals from aircraft navigational radio receivers ADF, TACAN, or VOR and from the aircraft compass system.

3.11 Central air data computer (CADC). As a minimum, a CADC accepts pneumatic inputs of pitot and static pressure, and electrical inputs from an angle of attack transmitter and a total air temperature probe. Air data functions are computed based on these inputs and static pressure defect compensation, and other specialized computations such as for aircraft wing sweep are performed as necessary. The computer provides multiple air data outputs in electrical format as required by using systems or indicators. Typical air data outputs include:

a. Pressure altitude

b. Indicated airspeed

c. Mach number

d. Static (ambient) air temperature

e. True airspeed.

3.12 Compass, magnetic, pilot standby. A liquid damped magnetic compass that provides heading reference in relation to the earth's magnetic poles.

3.13 Computer, altitude. A mechanism that converts pneumatic inputs of static pressure into electrical outputs corrected for temperature and static system installation position errors as a function of airspeed.

3.14 Computer, flight director. A computer that processes attitude, radio, and altitude signals in addition to pilot selected heading and course settings, and provides bank and pitch commands to the pilot's flight director display for intercepting and maintaining a selected heading or radio beam.

3.15 Computer, letdown, vertical/navigation. Computes steering commands in the vertical axis based on pilot preselected letdown or penetration angle operable from cruise altitude to approximately a 1,000-foot altitude. It is normally used for high-performance penetration from cruise altitude to terminal-area capture of ILS ground aids.

3.16 Computer, logic and monitor. A logic and monitor computer that accepts validity or other monitor signals from avionics equipment and uses system logic to sort out and identify failures to subsystem and component levels.

3.17 Computer, rotation go-round. A computer that provides pitch and bank steering commands to a flight director display for takeoff, or for go-round in the event of a missed approach.

3.18 Computer, true airspeed. A mechanism that converts basic inputs of pitot pressure, static pressure, and total air temperature into true airspeed outputs.

3.19 Electronic attitude director indicator (EADI). The EADI displays information similar to the standard ADI, but with no moving parts other than controls and switches. The EADI presents the symbols on a display using either a CRT or light-emitting matrix. Symbols consist basically of an aircraft symbol, vertical and horizontal director indices (when applicable), roll lubber line with pitch indices, heading information, and sky-ground texture separation for horizon reference. Other symbols can be generated and displayed by mode selection such as; ILS window, airspeed deviation, altitude, flight path, predicted flight path, range, etc. Modes may consist of landing, cruise, weapon delivery, and takeoff.

3.20 Gyro, rate. A single-degree-of-freedom gyroscope which senses rate of rotation about a selected axis (pitch, roll, or yaw).

3.21 Gyro, turn-rate switching. A single-degree-of-freedom gyroscope which senses rate of turn. When the aircraft attains or exceeds a certain rate of turn (15° per minute), the gyro electrically cuts off erection devices of a vertical gyroscope to prevent false erection during turns.

3.22 Gyro, turn-rate transmitting. A single-degree-of-freedom gyroscope which senses aircraft rate of turn and provides an electrical signal to a rate-of-turn indicator.

3.23 Head-up display (HUD). The HUD is a display which presents collimated symbol images in the pilot's forward field-of-view. These symbols provide flight control and performance information and can be situation or command, or a combination of both. In VFR conditions the symbology complements the real world visual cues and in IFR conditions the symbology provides surrogate real world cues as well as the situation and command symbols. The HUD is also

capable of presenting electro-optical information from low light level TV and infra red. It may provide takeoff, navigation, attack modes, and landing information via select symbology format for each mode of operation.

3.24 Horizontal situation display (HSD). The HSD displays geographic orientation, mission data, and sensor threat and attack data to the pilot. The first group of data is the navigational information and situation of the aircraft which is pictorially and numberically presented. The second group of data is stored mission data, such as destination, based on target position and direction. In addition, the display may be slewed to special positions in which printed instructions appear such as takeoff and landing regulations and emergency procedures. The third group of data is the electronic environment of the aircraft. Processed sensor data, such as radar, IR, TV, et cetera, may be displayed either as a separate image or an overlay to the map if used.

3.25 Horizontal situation indicator (HSI). The HSI receives information from the aircraft navigational radio receivers (ADF, VIR, TACAN, etc.) and compass system, and displays bearing information to a radio beacon, magnetic heading, course, course deviation, slant range, and distance in nautical miles to a TACAN beacon. It also provides course selection, command heading, course deviation, and heading error signals to the flight director computer.

3.26 Indicator, airspeed. An aneroid instrument that senses and displays the static and pitot pressures in knots of indicated airspeed of an aircraft.

3.27 Indicator, airspeed and mach number. An instrument that displays both airspeed and mach number on correlated scales.

3.28 Indicator, angle of attack. An instrument that displays local angle of attack of the aircraft in degrees, units, or other appropriate symbology, and is servo driven by electrical signals from the angle of attack transmitter/ transducer.

3.29 Indicator, attitude flight director (2-axis remote). An instrument that displays signals received from a remote primary vertical gyro reference, flight director computer, and from rate transmitting gyros. It displays pitch, bank, and roll attitude relative to local earth horizon, and glideslope deviation information and presents computer steering commands for instrument approach and enroute navigation.

3.30 Indicator, attitude flight director (3-axis remote). An instrument that presents the same information as the 2-axis indicator and also displays magnetic heading information received from the compass system or from a directional gyro.

3.31 Indicator, attitude, gyro-contained. An instrument that senses and displays the pitch and bank attitude of an aircraft from a gyro assembly within the indicator case.

3.32 Indicator, attitude, remote. An instrument that displays pitch and bank attitude information from remote vertical gyro signals.

3.33 Indicator, engine pressure ratio (EPR). An EPR indicator displays the ratio of two engine pressures, inlet to outlet pressure, at certain stations in the engine and is related to output in certain engines.

3.34 Indicator, exhaust gas temperature. An instrument that displays the gas temperature of the turbine discharge section of the aircraft engine. Indication is given in centigrade degrees.

3.35 Indicator, lift margin. An instrument which provides the pilot with the necessary information to:

a. Determine, prior to flight, that adequate power is available to accomplish safe flight under existing operating conditions

b. Determine, at any time, the load-lifting capability of the aircraft under a specified set of operating conditions.

3.36 Indicator, mach. An instrument which displays the ratio of the indicated airspeed of the aircraft in relation to the speed of sound at flight altitude.

3.37 Indicator, radio magnetic. An indicator which displays aircraft relative bearing and heading from signals it receives from the aircraft ADF, TACAN, or VOR receivers and the aircraft compass system.

3.38 Indicator, range. Displays in nautical miles the distance (slant range) of the aircraft to the rho-theta navigation transponder beacon (TACAN).

3.39 Indicator, rate of fuel flow. An indicator which, when connected to a proper rate of flow transmitter, displays the rate of fuel flow to a particular engine in pounds per hour (PPH).

3.40 Indicator, tachometer. An indicator which, when connected to a proper transducer, displays the rotational speed of a turbine wheel or engine in revolutions per minute (RPM) or in percent of rated RPM.

3.41 Indicator, true airspeed. An indicator which displays the true airspeed of an aircraft.

3.42 Indicator, turbine inlet temperature. An instrument that displays the gas temperature of the turbine inlet section of the aircraft engine. Indication is given in centigrade degrees.

3.43 Indicator, turn and slip. A self-contained indicator which displays aircraft rate of turn in terms of a 2- or 4-minute turn and aircraft slip by use of a small ball in a fluid-filled glass tube.

3.44 Indicator, vertical velocity (speed). An aneroid instrument that senses static pressure and displays in feet per minute the vertical velocity component of the aircraft (rate of change of aircraft altitude).

3.45 Instrument system, vertical scale/air data. A system comprised of vertical scale indicators using moving scales read against fixed center reference lines for the displayed functions of altitude, vertical speed, airspeed, mach, acceleration, and angle of attack.

3.46 Moving map display (MMD). A display which aids the crew members in navigation. It consists of a projected film positive of a navigation map, compass rose, miles-to-go, bearing-to-destination, ground track, aircraft position, and steering error; along with the capability of selecting data charts, emergency procedures, and photographs. Modes generally consist of Manual, North-Up, Heading-Up, Data, Test, and OFF. Navigation update can be accomplished with the proper computer techniques.

3.47 Multifunction display (MFD). A general purpose display which may be used in many places in the cockpit. It has the capability of operating as a VSD or HSD. Since the display is capable of projecting maps, electronically writing a raster and caliographic TV format and symbols its purpose and modes are only limited by the writing speed and memory. In addition to the modes listed for the VSD and HSD other possible modes such as energy management, engine management, integral test and maintenance, data link, ECM, remotely piloted vehicle display, etc, can be displayed.

3.48 Pitot tube. A tube which senses air pressure in relation to airspeed.

3.49 Pitot-static tube. A tube in the airstream which senses pitot and static pressures.

3.50 Total air temperature probe. The total temperature probe is mounted on the aircraft fuselage or at engine inlets to sense the total temperature of the airstream passing the probe. The temperature sensed is provided to central air data computers, engine inlet control computers, or similar equipments.

3.51 Transmitter/tranducer, angle of attack or sideslip. A device that senses and transmits an electrical output proportional to the local airflow angle of attack or angle of sideslip depending upon the location of the transmitter on the aircraft. If mounted on the side of the aircraft, it provides angle of attack and if mounted on the bottom of the fuselage, it provides sideslip angle. This transmitter is also known as an airstream direction detector or a relative wind transducer.

3.52 Transmitter/transducer, rate of fuel flow. A sensor which senses the rate of fuel flow in pounds per hour to an engine and transmits an electrical signal proportional to rate of flow to an indicator.

3.53 Two-gyro platform. A two-gyro platform consists of a vertical gyroscope which provides pitch and roll reference and a directional gyroscope which is vertically stabilized by the vertical gyroscope to provide accurate heading reference. The output of the heading reference is normally slaved to the output of a magnetic azimuth detector in order to provide a continuous accurate heading signal. A compass controller is normally provided in order to select the following modes of operation:

a. D.G. - free drifting directional gyroscope

b. SLAVED - directional gyro slaved to a magnetic azimuth detector

c. COMPASS - output taken directly from the magnetic azimuth detector.

3.54 Vertical gyroscope. A 2-degree-of-freedom gyroscope whose spin axis is always pointing to the center of the earth and which provides pitch and roll reference to an attitude indicator or any other system that requires such information.

3.55 Vertical situation display (VSD). A VSD is a television format display which provides aircraft pitch, roll, and heading information. The VSD symbology consists basically of an aircraft symbol, vertical and horizontal director indices (when applicable), roll lubber line with pitch indices, heading information, and sky-ground texture separation for horizon reference. A VSD also has the capability of displaying weapon delivery data attack radar information, terrain following radar data, electronically generated display and electro-optical data including low light level TV and infra red. When any mode other than a VSD mode is selected, the VSD may display a simplified form of attitude information.

4. GENERAL REQUIREMENTS (Not Applicable).

5. DETAIL REQUIREMENTS (Not Applicable).

6. NOTES

6.1 Associated documents. Terms associated with this standard may be found in MIL-STD-783, AF Manual 11-1, and JCS-1. MIL-STD-783 should be obtained from the procuring activity or as directed by the contracting officer, and request for copies of AF Manual 11-1 and JCS-1 should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

6.2 International standardization agreement. Certain provisions of this standard are the subject of international standardization agreements ASCCAS 10/16 and 85/1C. When amendment, revision, or cancellation of this standard is proposed which affects or violates the internation agreements concerned, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

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