SEMAE3079

Testing aircraft communication systems

Overview

This standard identifies the competences you need to test aircraft communication systems, in accordance with approved procedures. It covers both fixed wing and rotary winged aircraft. You will be required to use appropriate drawings, specifications, and test documentation to test the various items of equipment. You will be expected to carry out the appropriate testing procedures. The communication equipment will include intercom (clear), intercom (secure), high frequency (HF) radio, very high frequency (VHF) radio, ultra high frequency (UHF) radio, cockpit voice recorder, crash position indicators, digital data links, secure radio links, flight entertainment systems, satellite Communications (SATCOM) and selective calling (SELCAL).

Your responsibilities will require you to comply with organisational policy and procedures for the tests undertaken and to report any problems with the testing activities, components or equipment that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work and will provide an informed approach to applying the testing techniques and procedures. You will understand the aircraft communication systems being tested, and their application, and will know about the testing techniques, test equipment and methods, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring that the tested system functions to the required specification.

You will understand the safety precautions required when carrying out the testing operations. You will be required to demonstrate safe working practices throughout and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow the appropriate procedures for use of tools and equipment to carry out the required tests
3. set up and carry out the tests using the correct procedures and within agreed timescales
4. record the results of the tests in the appropriate format
5. review the results and carry out further tests if necessary
6. leave the aircraft and work area in a safe and appropriate condition, free from foreign object debris on completion of the activities

Knowledge and understanding

You need to know and understand:

1. the specific safety practices and procedures that you need to observe when testing communication systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
2. the health and safety requirements of the work area where you are carrying out the activities, and the responsibility these requirements place on you
3. the safety procedures that must be carried out before work is started on the aircraft
4. the hazards associated with testing aircraft communication systems, and with the tools and equipment used, and how to minimise them and reduce any risks
5. the protective clothing and equipment (PPE) to be worn and where it can be obtained
6. the precautions to be taken to prevent electrostatic discharge (ESD) damage to circuits and sensitive components (such as use of earthed wrist straps)
7. what constitutes a hazardous voltage and how to recognise victims of electric shock
8. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
9. the correct operating procedures of the system being tested
10. electrical bonding specifications and their importance
11. test specifications of the systems you are working on; their interpretation and currency/issue checks
12. who can provide guidance to clarify the specifications and who can provide assistance in applying test methods and techniques
13. test equipment to be used and its selection for particular tests
14. why tool/equipment control is critical and what to do if a tool or piece of equipment is unaccounted for on completion of the activities
15. the techniques, methods and procedures to be used during the tests
16. calibration of test equipment (where applicable) and the currency/issue checks

to be done

17. the fault finding techniques to be used if the system fails the tests
18. how to analyse test results
19. displaying/recording test results and the documentation used
20. authorisation procedures for changes to test procedures
21. problems or errors that may affect test results
22. any environmental controls required relating to the testing
23. documentation to be used on completion of all tests
24. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1.

Carry out all of the following during the testing activities:

1.1 obtain and use the appropriate documentation (such as job instructions, aircraft communication system test procedures, quality control documentation, history sheets, flight logbook, aircraft standards and specifications)
1.2 adhere to procedures or systems in place for risk assessment, COSHH, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
1.3 provide and maintain a safe working environment for the testing activities
1.4 obtain the correct tools and equipment for the activity and check that they are in a safe, tested and usable condition and within current calibration date
1.5 obtain clearance to work on the aircraft and observe all relevant isolation and safety procedures
1.6 ensure that safe working distance procedures are set up (where appropriate)
1.7 carry out the tests using the specified techniques and procedures
1.8 return all tools and equipment to the correct location on completion of the testing activities

2.

Test aircraft communication systems which include both of the following:

2.1 VHF radio
2.2 intercom (clear)

Plus four more items from the following:

3. secure radio links
4. cockpit voice recorder
5. crash position indicators
6. SELCAL
7. HF radio
8. SATCOM
9. flight entertainment systems
10. GPS systems
11. UHF radio
12. digital data links
13. intercom (secure speech)
14. aircraft communication address reporting system (ACARS)
15. interphone (such as internal communications)
16. audio integrating (such as microphones, headphones, cockpit loudspeakers)

17. integrated automatic tuning (such as digital data links)
18. audio and video monitoring (such as voice recorders, passenger conversation/movement, external cameras)
19. other specific communication system

1.

Test aircraft communication equipment, using tools or test equipment which include seven of the following:

1.1 `special-to-type' test equipment
1.2 modulation analyser
1.3 headset
1.4 multimeter
1.5 torque spanners
1.6 wattmeter
1.7 TDR equipment
1.8 RF signal generator
1.9 oscilloscope
1.10 bonding tester
1.11 VWSR equipment
1.12 wire locking pliers

2.

Carry out all of the following types of test:

2.1 bonding tests
2.2 distortion checks
2.3 signal-to-noise checks
2.4 power output
2.5 serviceability checks
2.6 VWSR checks
2.7 continuity checks
2.8 receiver sensitivity

3.

Deal with two of the following levels of complexity during the testing activities:

3.1 equipment with no faults
3.2 equipment with faults
3.3 equipment with intermittent faults

4.

Use two of the following fault finding techniques during the testing activities:

4.1 six point
4.2 input-to-output
4.3 equipment self-diagnostics
4.4 injection and sampling
4.5 half-split
4.6 function testing
4.7 emergent problem sequence

4.8 unit substitution

5.

Review and record fault symptoms and history of problems using four of the following:

5.1 data sheets
5.2 log cards/history sheet
5.3 fault records
5.4 calibration records
5.5 aircraft documentation
5.6 maintenance records
5.7 other specific recording method

6.

Carry out tests in compliance with one of the following standards:

6.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
6.2 BS, ISO or BSEN standards and procedures
6.3 customer standards and requirements
6.4 Ministry of Defence (MoD)
6.5 Military Aviation Authority (MAA)
6.6 Aerospace Quality Management Standards (AS)
6.7 company standards and procedures
6.8 Federal Aviation Authority (FAA)
6.9 manufacturers standards and procedures

Behaviours

You will be able to apply the appropriate behaviours required in the workplace to meet the job profile and overall company objectives, such as:

- strong work ethic
- positive attitude
- team player
- dependability
- responsibility
- honesty
- integrity
- motivation
- commitment

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