

Overview

This standard identifies the competences you need to carry out maintenance activities on aircraft communication systems, in accordance with the approved aircraft maintenance manual, approved change documentation (service bulletin) and airworthiness requirements. It covers both fixed wing and rotary winged aircraft, and includes units and components which provide a means of communicating from one part of the aircraft to another, between aircraft and aircraft to ground stations. The maintenance activities will include the removal, fitting and testing of a range of communication system components. You will be required to select the correct tools and equipment to use, based on the operations to be performed and the components to be removed or replaced. The communication system will include units and components associated with speech and satellite communication, data transmission, automatic calling, passenger address, interphone, audio integrating, static discharging, integrated automatic tuning, audio and video monitoring, as applicable to the aircraft type. You will remove the required components and to fit approved replacements, as appropriate. You will then need to test and adjust the completed system to meet the aircraft maintenance manual or change documentation (service bulletin) and airworthiness requirements.

Your responsibilities will require you to comply with the specific practices and procedures identified in the aircraft manual, change/service bulletin documentation and airworthiness requirements for the maintenance activities undertaken, and to report any problems with these requirements that you cannot personally resolve, or that are outside your permitted authority, to the relevant people. You must ensure that all tools, equipment and materials used are correctly accounted for on completion of the activities, and that all necessary job/task documentation is completed thoroughly, accurately and legibly. 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 appropriate maintenance techniques and procedures to aircraft communication systems. You will understand the removal, fitting and testing methods and procedures, and their application, along with the system maintenance requirements. You will know how the equipment functions, the common problems that can occur, the purpose of the individual components and associated

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defects, in adequate depth to provide a sound basis for carrying out the maintenance activities, correcting faults and for ensuring that the equipment is maintained to the required standard.

You will understand the safety precautions required when working on the aircraft communication systems, and when using the associated tools and equipment. You will be required to demonstrate safe working practices throughout, and will understand your responsibility for taking the necessary safeguards to protect yourself and others in the workplace.

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Notes:

1. This standard is designed to cover the practical experience requirements of the Airline Transport Association (ATA) Chapter 23 Communications.
2. To display competence in this standard, it is necessary to both remove and fit aircraft communication system components. You must remove components; however, you may fit a replacement component where the original was previously removed by another person. You should also be aware of how to leave a system in a safe condition if maintenance tasks cannot be completed. This covers both the physical systems and the job documentation.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directive and guidelines
2. follow the relevant maintenance schedules to carry out the required work
3. carry out the maintenance activities within the limits of your personal authority
4. carry out the maintenance activities, and replace components in the specified sequence and in an agreed timescale
5. report any instances where the maintenance activities cannot be fully met or where there are identified defects outside the planned schedule
6. complete relevant documentation in accordance with organisational requirements
7. dispose of waste materials in accordance with safe working practices and approved procedures
8. leave the aircraft and system 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 working with aircraft communication systems (including any specific legislation, regulations/codes of practice for the activities, equipment or materials)
2. the importance of maintenance on aircraft communication systems, and impact upon Extended Range Twin-Engine Operations Procedures (ETOPS) systems, Electrical Wiring Interconnect Systems (EWIS), legislation and local procedures
3. the hazards associated with removing, fitting and testing aircraft communication system components, and with the tools and equipment used, and how to minimise them and reduce any risk
4. the requirements and importance of understanding and applying human factors as defined by the regulatory requirements and the potential impact if these are not adhered to
5. the protective equipment that you need to use for both personal protection (PPE) and protection of the aircraft
6. what constitutes a hazardous voltage and how to recognise victims of electric shock
7. how to reduce the risks of a phase to earth shock (such as insulated tools, rubber matting and isolating transformers)
8. the importance of aircraft husbandry and of ensuring that, throughout the maintenance activity, the aircraft and work area are maintained free from foreign objects, and the implications of FOD to the safety of the aircraft
9. how to extract and use information from aircraft manuals, log books, flight logs, charts, circuit and physical layouts, specifications, symbols used in aircraft communication systems, and other documents in the maintenance process
10. how to carry out currency/issue checks on the specifications you are working with
11. terminology used in aircraft communication systems, and the use of system diagrams and associated symbols
12. the principles of operation of the communication system being worked on, and

the function of the various units that make up the system

13. the various mechanical fasteners that are used and their method of removal and replacement (such as threaded fasteners, special securing devices)

14. the importance of using the specified fasteners for the installation and why you must not substitute others

15. why securing devices need to be locked and labelled, and the different methods that are used to remove and install them

16. the torque loading requirements on the fasteners and what to do if these loadings are exceeded or not achieved

17. the various types of electrical connector that are used, methods of unlocking, orientation indicators and locating and locking-in of the connections

18. the techniques used to remove components from aircraft communication systems without damage to the components or surrounding structure (such as the need to protect the circuit integrity by covering and labelling exposed circuits)

19. the importance of applying electrostatic discharge (ESD) avoidance procedures when working on sensitive equipment or devices

20. the need to label and store correctly components that require repair or overhaul, and to check that replaced components have the correct part/identification markings and accompanying release documentation

21. the techniques used to position, align, adjust and secure the replaced components to the aircraft without damage to the components or surrounding structure

22. methods of lifting, handling and supporting the components/equipment during the maintenance activities

23. why electrical bonding is critical, and why it must be both mechanically and electrically secure

24. the tools and equipment used in the maintenance activities and their calibration/care and control procedures

25. 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

26. how to recognise defects (such as incorrectly seated plugs and sockets, ineffective fasteners, foreign object damage or contamination)

27. how to carry out routine checks and servicing of the aircraft communication system (including performing antenna VSWR checks, checking function of radios and passenger address system)

28. the need to check that cabin/cockpit switches, selectors and circuit breakers are in the correct position before applying any form of external power (such as

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electrical, hydraulic, air or vacuum)

29. the types of test to be carried out on the aircraft communication system and the test equipment to be used

30. the methods and procedures to be used to carry out the various tests on the communication system

31. the importance of carrying out the tests in the specified sequence, checking readings/movements at each stage

32. how to record the results of each individual test and the documentation that must be used

33. how to analyse the test results, and make valid decisions about the acceptability of the communication system

34. the procedures to be followed if the equipment or system fails to meet the test specification

35.

the recording documentation to be completed for the activities undertaken and, where appropriate, the importance of marking and identifying specific pieces of work in relation to the documentation

36.

the procedure for the safe disposal of waste materials and scrap components

37. the extent of your own authority 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 maintenance of the aircraft communication system equipment:

- 1.1 ensure that appropriate authorisation to work on the aircraft is obtained, and observe all relevant isolation and safety procedures
- 1.2 obtain and use the correct documentation (such as job instructions, technical instructions, aircraft manuals and maintenance documentation)
- 1.3 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 dates
- 1.4 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
- 1.5 ensure that the relevant safety devices and mechanical/physical locks are in place (where appropriate)
- 1.6 where appropriate, apply electrostatic discharge (ESD) avoidance procedures
- 1.7 use approved removal, fitting and testing techniques and procedures at all times
- 1.8 return tools and equipment to the correct storage location on completion of the activities
- 1.9 ensure that work carried out is correctly documented and recorded
- 1.10 ensure that any outstanding tests are correctly documented

2.

Carry out maintenance on three of the following aircraft communication systems:

- 2.1 speech communication (such as HF radio, VHF radio, UHF radio, intercom (clear), intercom (secure speech))
- 2.2 satellite communications (such as SATCOM, GPS systems, crash position indicators)
- 2.3 data transmission and automatic calling (such as telecommunications/teleprinter, Selcal, Calsel, ACARS)
- 2.4 passenger address
- 2.5 interphone
- 2.6 audio integrating (such as microphones, headphones, cockpit loudspeakers)
- 2.7 static discharging
- 2.8 integrated automatic tuning (such as digital data links)
- 2.9 audio and video monitoring (such as voice recorders, passenger conversation/movement, external cameras)

3.

Remove and fit four different communication system components (at least two must be from group A):

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Group A

1. aerials/antennas
2. voice recorder
3. amplifiers
4. intercom station boxes
5. receiver units
6. antenna switching units
7. cameras
8. monitors
9. satellite beacons
10. tuning units
11. transformers
12. display panels
13. transponders
14. transmitter units
15. control units

Group B

16. switches
17. static discharge wicks
18. speakers
19. instruments/gauges/indicators
20. relays
21. headsets
22. wires/cables
23. microphone units
24. unit trays
25. handsets
26. plugs/sockets
27. other specific components

1.

Carry out fifteen of the following maintenance activities:

- 1.1 removing access panels and covers to expose components to be removed
- 1.2 carrying out fault diagnosis and system checks
- 1.3 preparing the system for maintenance (such as isolating)
- 1.4 disconnecting electrical connections
- 1.5 replacing damaged/defective components
- 1.6 removal of bonding
- 1.7 refitting components in the correct position, orientation and alignment
- 1.8 removing cable securing devices
- 1.9 removing securing devices and mechanical fasteners
- 1.10 making mechanical connections

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- 1.11 supporting equipment to be removed
- 1.12 making electrical connections
- 1.13 dismantling equipment to an appropriate level
- 1.14 carrying out bonding
- 1.15 covering (protecting) exposed components, wires, pipework or vents
- 1.16 installing cable securing devices
- 1.17 torque loading as required
- 1.18 checking components for serviceability
- 1.19 carrying out functional checks of the system
- 1.20 ensuring that replacement components have the correct part numbers
- 1.21 labelling (and storing in the correct location) components that require repair or overhaul
- 1.22 setting, and adjusting/tuning replaced components (such as power output, voltage, frequency presets)
- 1.23 applying bolt locking methods (such as split pins, wire locking, lock nuts)
- 1.24 carrying out area inspections prior to task closedown

2.

Service/check aircraft communication systems, to include carrying out five of the following:

- 2.1 checking operation of speech communication system
- 2.2 checking operation of satellite communications
- 2.3 checking operation of data transmission and automatic calling system
- 2.4 checking operation of passenger address, entertainment and comfort system
- 2.5 replacing static discharge wicks
- 2.6 checking operation of interphone system
- 2.7 checking operation of audio integrating system
- 2.8 checking operation of integrated automatic tuning system
- 2.9 checking operation of audio and video monitoring system

3.

Carry out three of the following types of test/check on aircraft communication systems:

- 3.1 continuity check
- 3.2 built in test equipment BITE test
- 3.3 'special-to-type' tests
- 3.4 bonding tests
- 3.5 distortion checks
- 3.6 power output
- 3.7 voltage standing wave ratio (VSWR) checks

Using five of the following:

8. 'special to type' test equipment
9. oscilloscope
10. multimeter
11. modulation analyser

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12. time domain reflectometer (TDR) equipment
13. RF signal generator
14. bonding tester
15. voltage standing wave ratio (VSWR) equipment
16. headset
17. aircraft power source
18. wattmeter
19. external power source
20. insulation resistance (Megger) tester

1.

Complete the relevant paperwork, to include one from the following and pass it to the appropriate people:

- 1.1 job cards/work sheets
- 1.2 aircraft cabin log
- 1.3 computer records
- 1.4 aircraft log book
- 1.5 aircraft technical log

2.

Carry out maintenance on aircraft communication systems in compliance with one of the following:

- 2.1 Civil Aviation Authority (CAA)/European Aviation Safety Agency (EASA)
- 2.2 Extended Range Twin-Engine Operations Procedures (ETOPS) (where appropriate)
- 2.3 Ministry of Defence (MoD)
- 2.4 Military Aviation Authority (MAA)
- 2.5 Aerospace Quality Management Standards (AS)
- 2.6 Federal Aviation Authority (FAA)
- 2.7 aircraft maintenance manual/approved change documentation (service bulletin)
- 2.8 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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