OFFICE OF CIVILIAN DEFENSE
Washington, D. C.

CIVIL AIR PATROL

OPERATIONS MEMORANDUM)
NO. 19)

NATIONAL HEADQUARTERS
WASHINGTON, DECEMBER 11, 1942

MAINTENANCE OF AIRCRAFT RADIO EQUIPMENT CAP OPERATING BASES AND STATIONS

1. General

a. The problem of keeping CAP aircraft radio equipment in proper operating condition, especially in the case of airplanes engaged in intensive daily operations, is assuming major proportions. The radio installations on most CAP airplanes consist of equipment which was designed for intermittent operation on private aircraft which would ordinarily be used on an average of not more than 200 hours per year. On Coastal Patrol operations, some of this equipment is being used as much as 100 to 150 hours each month. In other words, airline performance is being demanded of equipment which was not designed for this heavy-duty service.

b. In view of the foregoing and on account of the present difficulty in securing aircraft radio equipment and repair and replacement parts and materials, it is suggested that the following servicing plan be put into effect and carried out so far as practically possible, to the end that maximum efficiency and length of life may be obtained from this equipment.

2. Inspection and Servicing

a. After every twenty-five (25) hours of operation, receivers and transmitters should be removed from their airplanes and given a thorough inspection on the bench. The tubes should be tested in a good tube tester, and any necessary replacements should be made. The date of inspection and, in the case of new tubes, the date of installation should be entered on a paper sticker pasted on each tube.

b. When inspecting receivers, check all voltages to see that they are of proper value. Inspect the vibrator rectifiers or dynamotors to see that they are operating properly. Check resistors, filter and by-pass condensers for leakage. If any of these are found to be faulty, replace them at once. Check all soldered connections and resolder any that may be loose or weak. Check relay contacts; if corroded, dirty or burned, clean with fine sandpaper. Check jacks for proper contact. Check variable condensers to make sure the plates are not bent or rubbing together. Tighten screws on tuning knobs. Check ground connections.

c. Follow the same procedure when inspecting transmitters. In addition thereto, make certain that the crystal and radio-frequency amplifier circuits are in proper resonance, using a 0-100 d.c. milliammeter in the plate circuit for this purpose. (Minimum "dip" indicates resonance.) Check the speech and modulator equipment from microphone to output. Do not "modulate" the transmitter except under load as otherwise it might be damaged. Check antenna connections. Check antenna reels for proper operation.

d. If any circuit or part is not functioning properly, do not reinstall the equipment until all trouble has been completely corrected and the equipment is in proper operating condition. The mal-functioning of the radio installation on an airplane may result in loss of life or failure of an important mission. An ounce of prevention in such a case is worth many tons of cure.

e. The date of last bench inspection should appear on a sticker displayed conspicuously on the front of each piece of radio equipment.

3. Spare Equipment

So far as practicable, there should be on hand spare receiving and transmitting units in thoroughly first-class operating condition and ready for immediate installation to replace equipment that may need repair or overhaul. The equipment thus replaced should be made completely ready for service without delay in order that it may be available when needed. Such procedure will reduce to a minimum the time aircraft have to be out of commission for radio repairs.

4. Servicing Equipment and Supplies

a. The following is a suggested list of radio servicing equipment and supplies:

(1) The usual radio mechanics' hand tools; such as pliers, screw drivers, wrenches, files, etc.
(2) Electric soldering iron, flux, and solder (rosin core not acid core).
(3) A 12-volt storage battery or two 6-volt storage batteries in series.
(4) A good serviceable tube tester.
(5) The following meters of at least the ranges indicated in each case:
    (a) Voltmeter, d.c., 0-15 volts.
    (b) Voltmeter, d.c., 0-600 volts.
    (c) Milliammeter, d.c., 0-100 milliamperes.
    (d) Radio-frequency ammeter, 0-1 or 0-2½ amperes.
    (e) Ohmmeter, reading up to 500,000 ohms.
(6) Two or three neon bulbs.
(7) Spare radio tubes and sockets for the type of equipment in use at the base.

(8) Push-back wire and soldering lugs.
(9) A bottle of clear shellac.
(10) Supply of miscellaneous small resistors and by-pass condensers.
(11) Insulating tape.
(12) Roll of No. 10 or No. 12 gauge stranded phosphor bronze antenna wire.
(13) Rubber wind cones for trailing antennas. If these are not available, use ordinary "stubby" type pint-size beer cans with bottoms removed. Connect cans (with pouring neck forward) to end of antenna wire with a deep-sea type fishing line swivel.

b. Any additional radio equipment and supplies that may be available will generally be found useful.

5. Technical Data

There should be on file in the radio shop a complete set of technical data, circuit diagrams and service manuals for each type and make of radio equipment used by the base. This information may be obtained from the manufacturers of the equipment, who are also in a position to furnish technical advice regarding proper steps to be taken to overcome any difficulty that may be encountered with their equipment.

6. Maintenance Records and Inspection Schedule

Simple records should be kept on the maintenance and repair of each piece of radio equipment and the regular 25-hour bench inspection schedule should be carefully followed. The fact that the equipment is functioning properly at the end of 25 hours of operation is no excuse for putting off the scheduled inspection or for assuming that the inspection is not necessary. Adherence to the schedule will prevent many troubles before they develop, and will add greatly to the efficiency and safety of operations.

By direction of National Commander JOHNSON:

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