

EQUIPMENT SERVICEABILITY CRITERIA
FOR
ELECTRONIC EQUIPMENT CONFIGURATION IN
ARMY MODEL OH-58A HELICOPTER

Headquarters, Department of the Army, Washington, D. C., 29 May 1969

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Section I. INSTRUCTIONS

1. Purpose. This manual furnishes the user with a procedure for evaluating the readiness condition of the equipment to perform satisfactorily its primary mission for 90 days with normal maintenance support.

2. Definitions. a. Equipment Category GREEN. Equipment free of condition that would limit the reliable performance of its primary mission for a period of 90 days of operation.

b. Equipment Category AMBER. Operationally ready equipment that possesses a limiting factor(s) which may curtail a reliable performance of its primary mission for a period of 90 days of operation.

c. Equipment Category RED. Equipment unable to perform its

primary mission immediately or possessing an unacceptable reliability for sustained performance (90 days) of its primary mission.

3. General Instructions. a. This evaluation will be performed by the operator.

b. This technical manual will be filed with the equipment log.

c. This evaluation actually will be performed on the item(s) being rated.

d. Equipment serviceability criteria items covered in this manual, but not authorized to the evaluating organization, shall be scored as "GREEN."

e. An authorized item not on hand shall be given the minimum rating designated for that item.

f. This equipment is rated on the basis of capability for immediate operation and amount of wear life remaining on time change com-

ponents. The rating is not meaningful unless each check is made with the utmost care and accuracy.

g. Record the evaluation results on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) using a separate sheet for each multiple-aspect equipment, subsystem and/or component, including those evaluated by separately published equipment serviceability criteria technical manuals. The blocks will be completed as shown below:

(1) *Block 1.* Insert the organizational designation of the unit performing the evaluation.

(2) *Block 2.* Identify system and enter its item name and model; e.g., "Avionics," OH-58A Helicopter.

(3) *Block 3.* Insert the registration, serial, or Federal stock number, as appropriate. Do not use more than one number.

(4) *Block 4.* Enter N/A.

(5) *Block 5.* Insert the standard six digit calendar date that equipment serviceability criteria evaluation is performed (example: 3 Jan 1969 would be 690103).

(6) *Block 6.* Insert the letters "ESC."

(7) *Block 7.* Insert the equipment serviceability criteria technical manual number and its date of issue.

(8) *Column a.* insert the checkpoint item number.

(9) *Column b.* Place each obtained color rating opposite the item to which it applies. (Insert "GREEN," "AMBER," or "RED," as applicable.)

(10) *Column c.* Briefly describe each test item.

(11) *Column rating.* Obtain the color rating for each subsystem by taking the lowest color rating given.

(12) *Blocks 8 and 9.* Self-explanatory.

(13) *Block 10.* Insert the subsystem color categorization.

(14) The color category for multiple-aspect equipment will not be rated any higher than the lowest-rated subsystem and/or com-

ponent. Indicate this classification at the bottom of the basic evaluation sheet thus: SYSTEM EVALUATION. (Insert **GREEN**, **AMBER**, or **RED**.) The color rating will be kept current by recording changes, as they occur, on DA Form 2404.

(15) Staple all forms applying to the same system together, with those which apply to the basic system on top.

h. Determine and record the appropriate rating for each checkpoint, each subsystem / component, and the system. The color rating for multiple-aspect equipment will be the lowest rating recorded for a subsystem/component.

NOTE

If an URGENT modification work order has not been applied to any authorized equipment, the equipment, and the system will be rated "RED."

i. Subsystems and components will be separately color rated.

j. A color rating will be assigned for the overall system.

k. The following is an example of a color categorization exception for aircraft having time change components due replacement in 150 hours. The concept is the same for all aircraft time change components, but the number of hours will vary depending on the time change factor. Those components due replacement in 150 hours or more or less than 150 hours when the replacement item is on hand or is available from the organization which is responsible for replacement of component will be given a rating of **GREEN**. If the item(s) due replacement within 50-149 hours with no part on hand or available from the organization which is responsible for replacement of components, a rating of **AMBER** will be given. If the item(s) due replacement within 0-49 hours with no part on hand or available from the organization which is responsible for replacement of components, a rating of **RED** will be given.

4. Special Instructions. The electronic configuration in aircraft may vary, depending on the year of manufacture, production run, geo-

graphical area of operation, etc. The equipments that may be installed in the various configurations are listed below. Refer to the master log of the aircraft to be tested to determine which equipments should be installed in the particular aircraft. For the purpose of ESC evaluations, equipments listed in the master log shall be considered as authorized for the particular aircraft. Equipments listed below, but not in the master log of the aircraft, shall be considered as unauthorized.

- a. Control, Communications System C-6533 ARC, Interphone Operation (item 2).
- b. Radio Set AN/ARC-114, Fm Communication (item 3).
- c. Radio Set AN/ARC-114, Fm Homing (item 4).
- d. Radio Set AN/ARC-115, Vhf Communication (item 5).

- e. Radio Set AN/ARC-51BX or AN/ARC-116, Uhf Communication (item 6).
 - f. Voice Security Facility (item 7).
 - g. Radio Set AN/ARC-116, Direction Finding (Df) Mode (item 8).
 - h. Direction Finder Set AN/ARN-89, Adf Reception (item 9).
 - i. Gyromagnetic Compass Set AN/ASN-43 (item 10).
 - j. Transponder Set AN/APX-72, IFF Transponder (item 11).
4. Reporting of Errors. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, N. J., 07703.

Section II. EVALUATION REQUIREMENTS AND PROCEDURES

6. Evaluation Requirements. a. *Aircraft Placement.* Have the aircraft placed in a location that is clear of obstructions such as large buildings, hangars, powerlines, and other aircraft.

b. *Power Application.*

CAUTION

To prevent damage to the equipment, the aircraft's master power (battery) switch must be in the OFF position at all times when an auxiliary power unit is connected to the aircraft.

(1) *Auxiliary power.* For those tests not requiring flight of the aircraft, items 2 through 9, use aircraft auxiliary power unit.

(2) *Aircraft power.* Tests given in items 10 and 11 require the use of aircraft power and aircraft flight controls. For those criteria items that require the use of aircraft flight controls or aircraft power, qualified personnel must be used to operate the aircraft. (Refer to Operator's Manual, Army Model OH-58A Helicopter, TM 55 1520 228 10.)

CAUTION

To prevent damage to equipment set the electronics equipment controls to OFF position before starting or stopping the aircraft's engine.

c. *Controls.* Before beginning the tests, set the electronic equipment controls to their normal OFF positions. Set the aircraft alternating current (ac) and direct current (dc) circuit breakers so that power is available to operate the electronic equipment. Perform the tests from each position, in turn, to insure a complete check of the electronic facilities.

CAUTION

Avionics equipment.s require a 3-minute warmup period-before operation, except the uhf radio set which requires a 5-minute warmup period.

7. Evaluation Procedures. *a. Information to be Determined by Inspection and Operation.* Evaluate each item listed and record the proper color rating on DA Form 2404 as described in section I.

ITEM 1. MWO's

Determine whether URGENT MWO's have been applied.

Condition

URGENT MWO not applied.

Rating

RED

ITEM 2. Control, Communications System C-6533/ARC.**NOTE**

The following serviceability test applies only to the interphone function of the C-6533/ARC. Other functions of the C-6533/ARC, with communication and navigation equipment interconnected, are tested in other items.

Turn on pilot's, copilot's, and crewmember's C-6533 ARC's; set for interphone operation. Operate pilot's microphone switch for interphone, and speak into microphone. Repeat from copilot's and crewmember's positions.

Condition

Adequate sidetone heard in all headsets; undistorted audio heard at a comfortable level in all headsets.

Audio not heard in any headset.

Rating

GREEN

RED

ITEM 3. Radio Set AN/ARC-114, Fm Communications.**NOTES**

1. If two AN/ARC-114's (AN/ARC-114 No. 1 and AN/ARC-114 No. 2) are used, repeat the test below for AN/ARC-114 No. 2.
2. If only a single AN/ARC-114 is authorized and it is inoperative, it will be given a rating of RED. If dual AN/ARC-114's are authorized and only one is operative, a rating of AMBER will be given. If both are inoperative, a rating of RED will be given.

Set the pilot's, copilot's, and crewmember's C-6533 ARC's for fm communications. Set the mode control to T/R. Tune to the frequency of the local fm station, and establish two-way communications from the pilot's, copilot's, and crewmember's positions, in turn.

Condition

Strength and readability of signals are adequate to maintain reliable communications from all positions.

Reliable communications possible from one or two positions only.

No reliable two-way communications possible.

Rating

GREEN

AMBER

RED

ITEM 4. Radio Set AN/ARC-114, Fm Homing.

NOTE

More conclusive tests of this equipment can be made if the tests are performed in flight. If a flight test cannot be performed, move the aircraft through a 180° arc while performing the test.

Apply power to the AN/ARC-114. Set the pilot's and copilot's C-6533, ARC's for fm communications. Set the mode control of the C-6533/ARC to T, R. Establish two-way communications with a local station. Request the station to transmit a carrier signal for at least 30 seconds. After the request has been made, switch the mode control switch on the C-6533/ARC from T/R to HOME. Observe the heading-radio bearing indicator. The red flag will drop completely out of sight. The vertical needle on the indicator will swing to the left, right, or remain centered. A left-hand needle swing will indicate that the station is to the left; a right-hand needle swing will indicate the station is to the right; a needle center condition will indicate the station is directly in front of or directly in back of the aircraft. Rotate the aircraft while observing the meter indication for the three conditions. After the test is completed, return the mode control switch to the T/R position.

Condition	Vertical pointer flag completely disappears. Vertical pointer swings to the left, right, or center.	Vertical pointer flag does not completely disappear. Vertical pointer does not swing left, right, or remain centered.
Rating	GREEN	AMBER

ITEM 5. Radio Set AN/ARC-115, Vhf Communication.

Set the pilot's, copilot's, and crewmember's C-6533 ARC for vhf communication. Set the mode control to T/R. Tune the AN/ARC-115 to the frequency of the local vhf station, and establish two-way communication from the pilot's position and then from the copilot's and crewmember's positions, in turn.

Condition	Received signals in all headsets are sufficiently reliable to maintain two-way communication.	Reliable two-way communication possible from one position only.	No reliable two-way communication possible.
Rating	GREEN	AMBER	RED

ITEM 6. Radio Set AN/ARC-51BX or AN/ARC-116, Uhf Communication.

NOTE

This radio net operates within line of sight characteristics. Manmade or natural obstructions between the aircraft and communicating stations may prevent reliable testing. Establish communications with a station located no less than 1 mile from the aircraft. *Do not* transmit on emergency ultrahigh frequency (uhf) of 248.0 megacycles (me).

Set the pilot's, copilot's, and crewmember's C-6533/ARC for uhf communication. Turn control C-6Z87/ARC-51BX or the AN/ARC-116 mode control to the T/R position. Set to the frequency of the local uhf station. Establish two-way communications from pilot's, copilot's and crewmember's positions, in turn. After communication check, tune to an unweeded frequency and check squelch disabling.

<p>Strength and readability of signals are adequate to maintain reliable communications from all positions (pilot's, copilot's, and crewmember's). Squelch disabling operative (AN/ARC-51/BX only); sidetone heard.</p> <p>condition</p>		<p>Reliable communications possible from one position only. No sidetone heard. Squelch disabling inoperative (AN/ARC-51BX only).</p>	<p>No reliable two-way communication possible.</p>
Rating	GREEN	AMBER	RED

ITEM 7. Voice Security Facility.**NOTE**

Establish two-way communication with a tactical fm station no less than 1 mile from the aircraft. A test of the CIPHER mode requires the operation of a second voice security facility installed in another aircraft or in a ground station.

Set the pilot's and copilot's C-6533/ARC for fm communications. Apply power to Control Indicator C-8157/ARC and to Radio Set AN/ARC-114. Set the mode control to T/R. Tune to the frequency of the local fm station. With the PLAIN-CIPHER switch of the C-8157/ARC at PLAIN, establish two-way communications with the station from the pilot's and copilot's positions, in turn. After a satisfactory check of the PLAIN mode of operation, place the PLAIN-CIPHER switch at CIPHER, and again establish two-way communications with the selected station from the pilot's and copilot's positions, in turn. After the test is completed, return the PLAIN-CIPHER switch to PLAIN.

<p>Strength and readability of signals are adequate to maintain reliable communications from both positions (pilot's and copilot's) in both PLAIN and CIPHER modes.</p> <p>Condition</p>		<p>Reliable communications possible from one position only in either PLAIN or CIPHER mode.</p>	<p>No reliable two-way communications possible.</p>
Rating	GREEN	AMBER	RED

ITEM 8. Radio Set AN/ARC-116, Direction Finding (Df) Mode.**NOTE**

More conutive tests of this equipment in the df mode can be made if the tests are performed in flight. If a flight test cannot be performed, move the aircraft through a 180° and while performing the tests.

Set the pilot's and copilot's C-6533/ARC for uhf communications. Set the mode control of the AN/ARC-116 to T/R. Establish two-way communication with a local uhf station. Request the station to transmit a carrier signal for at least 30 seconds. Switch the mode control from T/R to DF. Observe the heading-radio bearing indicator. The red flag will drop out of sight. The vertical needle on the indicator will swing to

the left if the transmitting station is to the left of the aircraft. The vertical needle on the indicator will swing to the right if the transmitting station is to the right of the aircraft. The vertical needle on the indicator will remain centered if the transmitting station is directly in front of or directly behind the aircraft. Rotate the aircraft while observing the vertical needle. When testis completed, set the mode control switch to T/R.

Condition	Red flag disappears. Vertical needle on indicator reflects relative position of aircraft and transmitting station.	Red flag does not completely disappear. Vertical needle on indicator does not reflect the relative position of the aircraft and the transmitting station.
Rating	GREEN	RED

ITEM 9. Direction Finder Set AN/ARN-89, Adf Reception.

NOTE

Tests performed at night or using radio stations too distant may give erroneous results.

Apply power to the AN/ARN-89. Set pilot's or copilot's C-6533/ARC for NAV signal reception. Set C-7392/ARN-39 control panel for antenna (ANT) mode of operation. With the station tuned in properly, set the C-7392/ARN-39 for COMP mode of operation. After the needle on the direction finding indicator stabilizes, operate the LOOP switch momentarily to the right and then to the left while observing the direction finding indicator. Set the C-7392/ARN-89 for the LOOP mode of operation. Set the CW-VOICE-TEST switch to CW. Using the LOOP switch, move the bearing indicator pointer to either side of the station bearing. Tune in a station, identify, and perform the following tests.

In ANT mode of operation, maximum indication on tuning meter occurs when radio set is properly tuned to same frequency as station. Undistorted station signal of adequate volume is heard in headset. For adf operation, set the mode switch to COMP.

Bearing indicator gives correct relative bearing to the station. Operation of LOOP switch moves needle to left and right of relative bearing. Needle returns to relative bearing when LOOP switch is released. In LOOP mode of operation, and with C W-VOICE-TEST switch set to CW, a beat note is heard in headset. Pitch varies as radio tuning

Condition	is changed. Volume of beat note increases as loop is rotated away from station bearing.	Bearing indicator operates correctly in COMP mode only. Bearing indicator operates correctly in LOOP mode only.	No reliable adf station signals heard (ANT mode inoperative).
Rating	GREEN	AMBER	RED

ITEM 10. Gyromagnetic Compass Set AN/ASN-43.

Position the aircraft to a known heading. Apply ac power to the gyromagnetic compass. Check to see that the power failure indicator has disappeared on heading-radio bearing indicator. See that all panel lights are lighted. Set the DIR-GYRO-MAG switch on switch panel to MAG. Adjust the heading-radio bearing indicator synchronizing knob until the annunciator is centered (nulled). Observe that the magnetic heading indicated on the dial agrees with a known magnetic heading.

Condition	All normal indications correct.	One or more normal conditions not obtained.
Rating	GREEN	AMBER

ITEM 11. Transponder Set AN/APX-72, IFF Transponder.

NOTE

To perform this test, the aircraft must be in flight.

Apply power to the transponder. Energize aircraft radio and establish communications with a local GCA facility having RT--859/APX-72 interrogation capability.

NOTE

Use locally assigned and approved frequency channel.

Set the transponder radio and transponder control switches as follows:

- (1) Set MASTER control to STBY for 1 minute; then set to NORM.
- (2) Set IDENT-MIC switch to OUT.
- (3) Set M-1 switch to ON.
- (4) Set M-2, M3/A, M-C, and MODE 4 switches to OUT.
- (5) Set MODE 1 code selector switch to 00.
- (6) Set MODE 3/A code selector switch to 0000.

NOTE

In case of close proximity to local interrogation facility, place MASTER control of transponder control on LOW rather than NORM to reduce the transponder radio sensitivity.

Set prearranged MODE 1 code settings into C-6Z80(P)/APX. Request interrogation of transponder radio by local GCA facility on MODE 1 using same code. Request results of interrogation. Repeat for each operational mode.

Condition	All interrogation results positive.	One or more interrogation reports negative.	Interrogation results negative.
Rating	GREEN	AMBER	RED

b. Rating for Electronic Configuration in Army Model OH-58A Helicopter. The color rating will be the lowest rating recorded in a above.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
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Chief of Staff.

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Distribution:

To be distributed in accordance with DA Form 12-31, (qty rqr block no. 109) operator and Crew maintenance requirements fm OH-58 aircraft.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F Fahrenheit temperature 5/9 (after subtracting 32) Celsius temperature °C

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