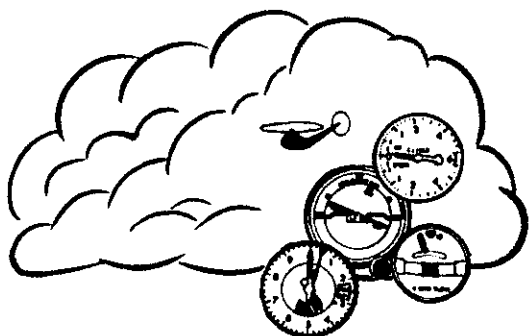


AC 61-64A

FLIGHT TEST GUIDE



INSTRUMENT PILOT

10A TECHNICAL UNIT
Helicopter

JUL 7 1986

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Revised 1977

**U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

FLIGHT TEST GUIDE

INSTRUMENT PILOT Helicopter

**REVISED
1977**

**U.S. DEPARTMENT
OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FLIGHT STANDARDS SERVICE**

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PREFACE

Part 61 of Federal Aviation Regulations, effective November 1, 1973, established a new concept of pilot training and certification requirements. This flight test guide, AC 61-64A, has been prepared by Flight Standards Service of the Federal Aviation Administration to assist the applicant and the instructor in preparing for the flight test for the Instrument Pilot Helicopter Rating. This guide contains information and guidance concerning the pilot operations, procedures, and maneuvers relevant to the flight test required for the Instrument Rating. A suggested flight test checklist is included for the convenience of those who may find such a checklist useful.

In addition to providing help to the applicant and the instructor, this guide will be useful to FAA Inspectors and designated pilot examiners in the conduct and standardization of flight tests. Persons using this guide in connection with instrument pilot training and flight tests should also refer to the applicable *Federal Aviation Regulations; Airman's Information Manual; Instrument Flying Handbook, AC 61-27B; Civil Use of U.S. Government Instrument Approach Procedure Charts, AC 90-1A*; and other pertinent advisory circulars.

This edition supersedes *Advisory Circular 61-64, Flight Test Guide (Part 61 revised) Instrument Pilot Helicopter*, dated 1973.

Comments regarding this guide may be directed to U.S. Department of Transportation, Federal Aviation Administration, Flight Standards National Field Office, Examinations Branch, AFS-590, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

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SUGGESTED FLIGHT TEST CHECKLIST APPOINTMENT WITH INSPECTOR OR EXAMINER:

Name _____

Time/Date _____

PROPERLY CERTIFICATED HELI- COPTER WITH DUAL CONTROLS

- View-Limiting Device
- Aircraft Documents:
 - Airworthiness Certificate
 - Registration Certificate
 - Operating Limitations
 - Owner's Handbook/Manual
- Aircraft Maintenance Records:
 - Airworthiness Inspections
 - Required Equipment Checks
- FCC Station License

PERSONAL EQUIPMENT

- En Route Charts
- SIDs and STARs
- Instrument Approach Charts
- Instrument Checklist
- Current AIM
- Flight Plan Form
- Flight Logs
- Computer

PERSONAL RECORDS

- Pilot Certificate
- Medical Certificate
- Signed Recommendation
- Written Test Results
- Logbook
- Notice of Disapproval (if applicable)
- Approved School Graduation Certificate (if applicable)
- FCC Radiotelephone Operator Permit
- Examiner's Fee (if applicable)

GENERAL INFORMATION

PILOT TRAINING AND CERTIFICATION CONCEPT

Part 61 of the Federal Aviation Regulations has been revised and upgraded to reflect the complexity of the modern aircraft as well as its operating environment. In the past, airman certification requirements could be met by training a student to pass a written test and then to demonstrate the ability to perform predetermined flight training maneuvers during a flight test. Rather than merely duplicating on the flight test the maneuvers used for training, the new training and certification concept requires that the applicant receive instruction in and demonstrate competency in *all pilot operations* listed in pertinent sections of the Part 61. A pilot operation, as used herein, is a group of related procedures and maneuvers involving skills and knowledge required to safely and efficiently function as a pilot. The specific procedures and maneuvers used to teach the pilot operations are not listed in Part 61. Instead, the instructor is permitted to select procedures and maneuvers from FAA-approved training publications pertinent to the certificate or rating sought. The instructor indicates by logbook endorsement that the applicant has

demonstrated competency in all the required pilot operations and is considered qualified to pass the flight test. On the flight test, the examiner¹ selects the procedures and maneuvers to be performed by the applicant to show competency in each required pilot operation.

The procedures and maneuvers appropriate to the Instrument Pilot Helicopter rating are contained in *Instrument Flying Handbook, AC 61-27B*; *Airman's Information Manual*; and *Civil Use of U.S. Government Approach Procedure Charts, AC 90-1A*.

USE OF THIS GUIDE

The pilot operations in this flight test guide, indicated by Roman numerals, are required by § 61.65 of Part 61. This guide is intended only to outline appropriate pilot operations and the minimum standards for the performance of each procedure or maneuver which will be accepted by the examiner as evidence of the pilot's competency. With the exception of Pilot Operation III, Instrument Approaches (FAR 61.65(c)(3)), it is not intended that the applicant be tested on every procedure or maneuver within each pilot operation, but only those considered necessary by the examiner to determine competency in each pilot operation. Throughout the flight test, certain procedures

¹The word "examiner" is used hereafter in this guide to denote either the Federal Aviation Administration Inspector or designated pilot examiner who conducts an official flight test.

or maneuvers may be evaluated separately or in combination with other procedures or maneuvers.

This guide contains an **Objective** for each required pilot operation. Under each pilot operation, pertinent procedures or maneuvers are listed with **Descriptions** and **Acceptable Performance Guidelines**.

1. The **Objective** states briefly the purpose of each pilot operation required on the flight test.
2. The **Description** provides information on what may be asked of the applicant regarding the selected procedure or maneuver. The procedures or maneuvers listed have been found most effective in demonstrating the objective of that particular pilot operation.
3. The **Acceptable Performance Guidelines** include the factors which will be taken into account by the examiner in deciding whether the applicant has met the objective of the pilot operation. The airspeed, altitude, and heading tolerances given represent the minimum performance expected in good flying conditions. However, consistently exceeding these tolerances before corrective action is initiated or prematurely descending below DH or MDA, is indicative of an unsatisfactory performance. Any procedure or action, or the lack thereof, which requires the intervention of the

examiner to maintain safe flight will be disqualifying.

In the event the applicant takes the instrument pilot flight test and the commercial pilot flight test simultaneously, the maneuvers selected by the examiner for each may be combined and evaluated together, where practicable.

GENERAL PROCEDURES FOR FLIGHT TESTS

The ability of an applicant for an instrument pilot helicopter rating to perform the required pilot operations is based on the following:

1. Completing a checklist for instrument flight operations appropriate to the helicopter and equipment used.
2. Performing procedures and maneuvers within the helicopter's performance capabilities and limitations, including use of the helicopter's systems.
3. Performing emergency procedures and maneuvers appropriate to the helicopter.
4. Piloting the helicopter with smoothness and accuracy.
5. Exercising judgment.
6. Applying aeronautical knowledge.
7. Showing mastery of the helicopter, with the successful outcome of a procedure or maneuver never seriously in doubt.

Failure of any required pilot operation is a failure of the flight test. The examiner or the applicant may discontinue the test at any time when the failure of a required pilot operation makes the applicant ineligible for the certificate or rating sought. If the test is discontinued, the applicant is entitled credit for only those entire pilot operations that were successfully performed.

FLIGHT TEST PREREQUISITES

An applicant for the instrument pilot helicopter flight test is required by § 61.39 of the Federal Aviation Regulations to:

“(1) Have passed any required written test since the beginning of the 24th month before the month in which he takes the flight test;

“(2) Have the applicable instruction and aeronautical experience prescribed in this Part;

“(3) Hold a current medical certificate appropriate to the certificate he seeks or, in the case of a rating to be added to his pilot certificate, at least a third-class medical certificate issued since the beginning of the 24th month before the month in which he takes the flight test;”

* * * * *

“(5) Have a written statement from an appropriately certificated flight instructor certifying that he has given the applicant flight instruction in preparation for the flight test

within 60 days preceding the date of application, and finds him competent to pass the test and to have satisfactory knowledge of the subject areas in which he is shown to be deficient by his FAA airman written test report. However, an applicant need not have this written statement if he—

“(i) Holds a foreign pilot license issued by a contracting State to the Convention on International Civil Aviation that authorizes at least the pilot privileges of the airman certificate sought by him;”

HELICOPTER AND EQUIPMENT REQUIREMENTS FOR FLIGHT TEST

The applicant is required by § 61.45 to provide an airworthy helicopter for the flight test. This helicopter must have fully functioning dual controls, must be capable of and its operating limitations must not prohibit, the pilot operations required on the flight test. Flight instruments required are those appropriate for controlling the helicopter without outside references. The required radio equipment is that necessary for communications with ATC and for the performance of VOR, ADF, and ILS (glide slope, localizer and marker beacon) approaches.

PILOT OPERATIONS

Procedures/Maneuvers

I. MANEUVERING BY REFERENCE TO INSTRUMENTS

Objective

To determine that the applicant can safely and accurately maneuver the helicopter in instrument conditions.

Procedures/Maneuvers

A. Straight-and-Level Flight

1. Description The applicant may be asked to demonstrate straight-and-level flight with changes in airspeed. The applicant will be expected to maintain altitude and heading and to accurately control airspeed.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the basis of the ability to maintain altitude within ± 100 ft., heading within $\pm 10^\circ$, and airspeed within ± 10 kts. of that assigned.

B. Turns

1. Description The applicant may be asked to demonstrate heading changes using various means to determine rate and amount

of turn in level, climbing, and descending flight. This may also include changes in airspeed. Turns for this demonstration may be selected from the following:

- a. Standard rate turns.
- b. Timed turns.
- c. Turns to predetermined headings.
- d. Magnetic compass turns.
- e. Steep turns.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the ability to complete level, climbing, and descending turns to within $\pm 10^\circ$ of the desired heading while maintaining the desired airspeed within ± 10 kts. In level turns, the applicant shall maintain desired altitude within ± 100 ft. Climbing and descending turns shall be completed within ± 100 ft. of the desired altitude. Changes of airspeed shall be completed within ± 100 ft. of the desired altitude and ± 10 kts. of the desired speed.

C. Climbs and Descents

1. Description The applicant may be asked to demonstrate changes of altitude including:

- a. Constant airspeed climbs and descents.
- b. Rate climbs and descents.
- c. Climbs and descents to predetermined altitudes and headings.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the ability to maintain airspeed within ± 10 kts. and vertical rate within ± 200 ft. per minute of that desired. Level-offs and rollouts shall be completed within ± 100 ft. and $\pm 10^\circ$ of the altitude and heading assigned.

II. IFR NAVIGATION

Objective

To determine that the applicant can safely and efficiently navigate in instrument conditions in the National Airspace System in compliance with Instrument Flight Rules and ATC clearances and instructions.

Procedures/Maneuvers

A. Time, Speed, and Distance

1. Description The applicant may be asked to demonstrate preflight and inflight computations to determine ETE, ETA, wind correction angle, and groundspeed.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the basis of the ability to make accurate and timely computations.

B. VOR Navigation

1. Description The applicant may be asked to demonstrate:

- a. Intercepting a VOR radial at a predetermined angle.
- b. Tracking on a selected VOR radial.

c. Determining position using intersecting VOR radials.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the basis of accuracy in determining position by means of cross bearings, interception procedures, and ability to maintain orientation and the assigned flight path.

C. ADF Navigation

1. Description The applicant may be asked to use ADF for homing, intercepting and tracking predetermined radio bearings to and from non-directional beacons, and for determining position by use of cross bearings.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the basis of accuracy in determining position by means of cross bearings, interception procedures, and the ability to maintain orientation and the assigned track.

D. Navigation by ATC Instructions

1. Description The applicant may be asked to demonstrate the ability to comply with ATC instructions and procedures. This includes navigation by adherence to radar vectors and specific instructions for headings and altitude changes.

2. Acceptable Performance Guidelines

Evaluation of the applicant's performance shall be based on the promptness and accuracy shown in responding to and complying with ATC navigation instructions.

III. INSTRUMENT APPROACHES

Objective

To determine that the applicant can execute safe and accurate instrument approaches to published minimums under instrument conditions.

Procedures/Maneuvers

A. VOR Approach

1. Description The applicant will be required to demonstrate a published VOR approach procedure. A circling approach will not be required.

2. Acceptable Performance Guidelines The applicant shall descend on a course so as to arrive at the MDA at or before the missed approach point, in a position from which a normal landing approach can be made. The missed approach point shall be determined by accurate timing from the final approach fix. Deviations of more than ± 10 kts. from the desired approach speed shall be disqualifying. Descent below minimum altitudes during any part of the approach or descent below the MDA prior to the examiner reporting the runway environment in sight, shall also be disqualifying.

B. ILS Approach

1. Description The applicant will be required to demonstrate a published ILS approach procedure. A circling approach will not be required.

2. Acceptable Performance Guidelines

As directed by the examiner, the applicant shall descend on a straight-in approach to the DH, arriving at a position from which a normal landing approach can be made. Deviations of more than ± 10 kts from the desired approach speed shall be disqualifying. Descent below minimum altitudes during any part of the approach, full scale deflection of the CDI or the glide slope indicator after glide slope interception or descent below the DH prior to the examiner reporting the runway environment in sight, shall also be disqualifying.

C. ADF Approach

1. Description The applicant will be required to demonstrate an ADF approach using a published NDB (non-directional beacon) approach procedure. A circling approach will not be required.

2. Acceptable Performance Guidelines

The applicant shall descend on a course so as to arrive at the MDA at or before the missed approach point, in a position from which a normal landing approach can be made. The missed approach point shall be determined by accurate timing from the final approach fix. Deviations of more than ± 10 kts. from the desired approach speed shall be disqualifying. Descent below minimum altitudes during any part of the approach or descent below the MDA prior to the examiner reporting the

runway environment in sight, shall also be disqualifying.

IV. CROSS COUNTRY FLYING³

Objective

To determine that the applicant can competently conduct en route and terminal operations within the National Airspace System in instrument conditions, using radio aids and complying with ATC instructions.

Procedures/Maneuvers

A. Selection of Route

1. Description The applicant may be asked to select a route for an IFR flight of at least 100 nautical miles, based on information contained in the *Airman's Information Manual*, *En route Charts*, *Instrument Approach Procedure Charts*, and other appropriate sources of information. This includes facilities for all departures and arrivals.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the ability to obtain and apply pertinent information for the selection of a suitable route. Failure to determine current status and usability of facilities shall be disqualifying.

³The examiner may ask the applicant to plan an IFR cross-country flight and set out on course. The flight may be continued only long enough for the examiner to determine the applicant's competence in IFR cross-country flying.

B. Procurement and Analysis of Weather Information

1. Description The applicant may be asked to procure and analyze weather reports and forecasts pertinent to the proposed flight. This information should provide (1) forecast weather conditions at destination, (2) the basis for selecting an alternate airport, and (3) the basis for selecting a route to avoid severe weather.

2. Acceptable Performance Guidelines The applicant shall correctly analyze the weather reports and forecasts and understand their significance to the proposed flight. Failure to recognize conditions which would be hazardous to the flight shall be disqualifying.

C. Development of Flight Log

1. Description The applicant may be asked to develop a flight log for the proposed flight. This log should include at least the en route courses, estimated ground speeds, distances between checkpoints, estimated times between checkpoints (ETEs), and amount of fuel required. On the basis of the log, the applicant is expected to prepare an IFR flight plan for the examiner's review.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the completeness and accuracy of the flight log and flight plan.

D. Aircraft Performance and Limitations

1. Description The applicant may be asked to apply the information contained in the helicopter flight manual or manufacturer's published recommendations to determine the aircraft performance capabilities and weight and balance limitations.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on the proper application of aircraft performance and loading data in the conduct of the proposed flight.

E. Aircraft Systems and Equipment

1. Description The applicant may be asked to explain the use of the instruments, avionic equipment, and any special system installed in the helicopter used, including indications of malfunctions and limitations of these units.

2. Acceptable Performance Guidelines The applicant's performance shall be evaluated on knowledge of the instruments and equipment which are installed in the helicopter used for the flight test.

F. Preflight Check of Instruments and Equipment

1. Description Prior to takeoff, the applicant may be asked to perform a systematic operational check of engine instruments, flight instruments, and avionic equipment. All equipment should be appropriately set for the departure clearance requirement.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the thoroughness and accuracy of the checks and procedures. Failure to properly check and set instruments and equipment shall be disqualifying.

G. Maintaining Airways or ATC Routes

(see Pilot Operation II on page 9.)

H. Use of Radio Communications

1. Description The applicant may be asked to demonstrate the use of two-way radio voice communication procedures for reports, ATC clearances, and other instructions. Radio communications may be simulated at the discretion of the examiner.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on the basis of the use of proper frequencies, correct phraseology, and the conciseness, clarity, and timeliness of transmissions. Acceptance of clearances based on facilities or frequencies not appropriate to the equipment being used or to the aircraft performance capabilities shall be disqualifying.

I. Holding Procedures

1. Description The applicant may be directed, by ATC or the examiner, to hold in either a standard or a nonstandard pattern at a specified fix. The applicant should make a proper entry as described in the *Airman's Information Manual*, remain within protected

airspace, apply adequate wind correction, and accurately time the pattern so as to leave the fix at the time specified.

2. Acceptable Performance Guidelines

The applicant's performance shall be evaluated on compliance with instructions, entry procedure, orientation, accuracy, and timing. Deviations of more than ± 100 ft. from the prescribed altitude or more than ± 10 kts. from holding airspeed shall be disqualifying.

J. Instrument Approach Procedures

(see Pilot Operation III on page 11.)

V. EMERGENCIES

Objective

To determine that the applicant can promptly recognize and take appropriate action for abnormal or emergency conditions and equipment malfunctions while in instrument conditions.

Procedures/Maneuvers

A. Recovery from Unusual Attitudes

1. Description The examiner may place the helicopter in unusual flight attitudes which could result from vertigo, wake turbulence, lapse of attention, or abnormal trim conditions. The applicant should recover and return to the original altitude and heading. For this demonstration, the examiner may limit the use of flight instru-

ments by simulating malfunctions of the attitude indicator and heading indicator. However, particular care should be exercised to avoid overcontrolling or critical flight attitudes when performing these maneuvers.

2. Acceptable Performance Guidelines

Evaluation shall be based on the promptness, smoothness, and accuracy demonstrated. All maneuvering shall be conducted within the operating limitations of the helicopter used. Any loss of control or abrupt control usage, which makes it necessary for the examiner to take over to avoid exceeding any operating limitation of the helicopter shall be disqualifying.

B. Equipment or Instrument Malfunctions

1. Description The applicant may be asked to demonstrate the emergency operation of the retractable gear (if appropriate), and of the electrical, fuel, deicing, and hydraulic systems if operationally practicable. Emergency operations such as emergency gear extension (if applicable), or discharge of a pressure fire extinguisher system will be *simulated only*. Occasionally, during the performance of flight maneuvers described elsewhere in this guide, the examiner may simulate a partial or complete loss of flight instruments, navigation instruments, or equipment.

2. Acceptable Performance Guidelines

The applicant shall respond to emergency situations in accordance with procedures outlined in the manufacturer's published recommendations. The applicant's performance shall be evaluated on the basis of competency in maintaining aircraft control, knowledge of the emergency procedures, judgment displayed, and the accuracy of operations.

C. Loss of Radio Communications

1. Description The examiner may simulate loss of radio communications. The applicant should know the actions required pertaining to altitudes, routes, holding procedures, and approaches.

2. Acceptable Performance Guidelines

Evaluation shall be based on the applicant's knowledge of, and compliance with, the pertinent procedures required by Part 91 of the Federal Aviation Regulations and the emergency procedures outlined in the *Airman's Information Manual*. An explanation or simulation of the proper procedures for loss of radio communications is acceptable.

D. Engine-Out Procedures

1. Description The applicant may be asked to demonstrate the ability to positively and accurately maneuver the helicopter during engine-out situations.

In the case of a single-engine helicopter, the examiner may simulate a power failure by closing the throttle (or rotating the throttle to flight-idle, if appropriate). The applicant should enter autorotation immediately.

In the case of a multiengine helicopter, the examiner may simulate a power failure by closing the throttle (or rotating the throttle to flight-idle, if appropriate) on one engine. The applicant should promptly accomplish the prescribed single-engine procedures.

2. Acceptable Performance Guidelines

In the case of a single-engine helicopter, evaluation shall be based on the applicant's ability to safely enter autorotation. Slow reaction to the simulated emergency, such as failure to lower the collective pitch immediately, failure to maintain rotor r.p.m. within the allowable limits, failure to maintain directional control within $\pm 20^\circ$ of the original heading during the autorotation entry, or failure to maintain an airspeed within ± 10 kts. of that recommended by the manufacturer shall be disqualifying.

In the case of a multiengine helicopter, evaluation shall be based on the applicant's ability to promptly identify the inoperative engine, and to follow the procedures outlined in the manufacturer's published recommendations. In cruising flight, the applicant shall maintain heading and altitude within $\pm 20^\circ$ and ± 100 ft. respectively. If the helicopter is incapable of maintaining altitude

with an engine inoperative under existing circumstances, the applicant shall maintain an airspeed within ± 10 kts. of that recommended by the manufacturer.

During approaches, the applicant shall promptly correct any deviation from the desired flight path.

Any loss of control that makes it necessary for the examiner to take over, or any attempt at prolonged flight contrary to the single-engine operating limitations of the helicopter shall be disqualifying.

E. Missed Approach Procedures

1. Description At any time during an instrument approach, the applicant may be asked to execute the missed approach procedure depicted on the approach chart being used. If the examiner does not specifically ask for the missed approach, and fails to report the runway in sight at the DH on a precision approach, or the MAP (missed approach point) on a non-precision approach, the applicant should immediately initiate the missed approach procedure as described on the chart, or as directed by ATC.

2. Acceptable Performance Guidelines Evaluation shall be made on the basis of the applicant's judgment in deciding when to execute the missed approach; the appropriateness of communications and navigation procedures; the ability to maintain positive control, and to operate all systems in accord-

ance with applicable operating instructions for the helicopter being used. Descent below the MDA or DH, as appropriate, prior to initiation of the missed approach procedure shall be disqualifying except in those instances where the runway environment was in sight at MDA or DH.