SPECIALIZED HELICOPTERS

Helicopter Instrument Syllabus

Helicopter Instrument & Add-On Instrument Rating Manual

Record of Revisions

Rev. #	Page #	Revision Date	Insertion Date	By	Comments
0	All	11/05/2014	11/05/2014	Christopher Gularte	Original

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Required Equipment and materials

Students should have a current version of the following:

- Instrument Maneuvers Manual-Helicopter (by: Specialized Helicopters)
- Instrument Flying Handbook (FAA-H--8083-15*)
- Test Prep Instrument (ASA-TP-I-15)
- PTS Instrument (ASA-8081-4*)
- Airport/Facility Directory – Southwest US
- Aviation Weather (AC 006-6A)
- Aviation Weather Services (AC 00-45*)
- FAR/AIM
- IFR Enroute Low Altitude Chart L3/L4
- R44 POH
- Southwest Vol 2 of 4 (Northern California)
- US Terminal Procedures

Course Objective and Enrollment Prerequisites

INSTRUMENT RATING / ADD-ON INSTRUMENT RATING.

COURSE OBJECTIVE

The student will obtain the knowledge, skill, and aeronautical experience necessary to meet the requirements for an Instrument Rating, Helicopter.

COURSE COMPLETION STANDARD

The student must demonstrate through knowledge tests, flight tests, and show through appropriate records that he/she meets the knowledge, skill, and experience requirements necessary to obtain a Helicopter Instrument Rating.

LESSON DESCRIPTION AND STAGES OF TRAINING

Each lesson is fully described within the syllabus, including the objectives, standards, and measurable units of accomplishment and learning. The stage objectives and standards are described at the beginning of each stage within the syllabus.

TESTS AND CHECKS

The syllabus incorporates stage checks and end-of-course tests. The student must complete the stage exams, pilot briefings, and end-of-course exams that are described within the syllabus. The Chief Instructor is responsible for ensuring that each student accomplishes the required stage checks and end-of-course tests in accordance with the school's approved training course. However, the Chief Instructor may delegate authority for stage checks and end-of-course tests to the Assistant Chief Instructor or a check instructor.

ELIGIBILITY FOR ENROLLMENT

The student must hold at least a private pilot helicopter certificate prior to enrolling in the flight portion of the program. The student may enroll with an instrument rating airplane or powered lift, for a Helicopter Instrument Rating Add-On.

REQUIREMENTS FOR GRADUATION

A student must meet the requirements listed in CFR 14 Part 141 and satisfactorily complete the training outlined in this syllabus. Upon completion of the requirements of FAR Part 141, including a satisfactory Stage III flight check and a pass in the Knowledge Test (if required), the student will be eligible for the Practical Test.

FLIGHT SYLLABUS

Instrument Rating Course Outline

Completion of this course is based upon compliance with the minimum requirements of this syllabus and upon the student's level of proficiency. The flight portion of the course consists of three stages. Each stage has corresponding ground lessons. The following timetable lists the minimum flight hours required by the FAA part 141 training program and the hours in our curriculum.

FLIGHT TRAINING MINIMUM HOUR REQUIREMENTS – INITIAL AND ADD-ON			
		FAA Part 141 Initial IFR	FAA Part 141 Add-on IFR Rating
Stage I Lessons 1-8	Attitude Flying + Instrument Flight Maneuvers	10	5
Stage II Lessons 9-15	VOR's, Intercept, Tracking & Holds. Partial Panel Maneuvers	10	5
Stage III Lessons 16-30	Precision & Non Precision Instrument Approach Procedures, VOR & GPS, IFR ATC Operations, Instrument Cross country	15	5
Totals		**35**	**15**

- ✓ If training is to be completed in a R44, prior to Stage 3, student will receive 5 hours VFR R44 dual instruction.
- ✓ Students are strongly advised to complete 5 hours of VFR instruction in the R44 prior to any IFR training in order to log all flight hours as PIC in the R44 per SFAR 73 requirements.
- ✓ It is recommended to group 2 lessons into one flight session in order to accomplish the training in a more efficient manner

STAGE I – IFR FLIGHT TRAINING

STAGE OBJECTIVE

During this stage, the student will obtain the foundation for all instrument flight maneuvers and will learn to control the helicopter's attitude and performance solely by reference to instruments.

STAGE COMPLETION STANDARD

Before advancing to Stage II, the student will demonstrate proficiency in basic instrument flight maneuvers to the FAA practical test standards.

FLIGHT I

TRAINING	INITIAL	ADD-ON
DUAL	1.0	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will be introduced to scanning and to managing the performance of the helicopter solely by reference to instruments and to the three fundamental skills of instrument flying - scanning, interpretation and control. He/she will learn the importance of, and how to conduct the necessary preflight preparation and preflight procedures.

CONTENT:

Lesson Introduction

Preflight preparation
- Aircraft Logbooks
- Certificates and Documents
- Minimum Equipment List & 91.205
- Radio Terminology for Instrument flight

Preflight Procedures
- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks before Takeoff Check

Instruments Piloting Skills
- Positive Exchange of Flight Controls
- Scanning and Straight & Level Flight
- Scanning and Climbs, Descents and Level Off
- Scanning and Standard rate turns, entry & exit

Post-flight Procedures
- After Landing and Securing

COMPLETION STANDARDS:

The student will understand the preflight procedures for instrument flight, and the scanning and control techniques for straight & level flight, climbs & descents and standard rate turns.

FLIGHT 2

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review and practice the items introduced in Lesson I to gain proficiency in scanning and control & performance of the helicopter. The student will learn to perform climbs & descents at constant airspeeds and constant rates. The student will also learn to combine climbs & descents, turns and change of airspeeds and to improve the three fundamental skills of instrument flying - scanning, interpretation and control.

CONTENT:

Lesson Review

Preflight preparation

- Aircraft Logbooks
- Certificates and Documents
- Minimum Equipment List & 91.205
- Radio Terminology for Instrument flight

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks before Takeoff Check

Instruments Piloting Skills

- Positive Exchange of Flight Controls
- Scanning and Straight & Level Flight
- Scanning and Climbs, Descents and Level Off Scanning and
- Standard rate turns, entry & exit

Post-flight Procedures

- After Landing and Securing

Lesson Introduction

- Constant Airspeed climbs and descents
- Constant Rate climbs and descents
- Constant Airspeed and Constant Rate climbs and descents
- Combination maneuvers, climbs & descents, turns, speeds, rates

COMPLETION STANDARDS:

The student should perform the maneuvers to within the following limits: holding altitude to +/- 200 feet, headings to +/- 20°, speeds to +/-10 knots. The student will be developing his/her scan to identify excursions outside the standards and initiate prompt recovery.

FLIGHT 3

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review and practice the items introduced in Lessons 1 and 2 to gain proficiency in the control & performance of the helicopter and to improve the three fundamental skills of instrument flying - scanning, interpretation and control

CONTENT:

Lesson Review

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks before Takeoff Check

Instruments Piloting Skills

- Positive Exchange of Flight Controls
- Scanning and Straight & Level Flight
- Scanning and Climbs, Descents and Level Off
- Scanning and Standard rate turns, entry & exit
- Constant Airspeed climbs and descents
- Constant Rate climbs and descents
- Constant Airspeed and Constant Rate climbs and descents
- Combination maneuvers, climbs & descents, turns, speeds, rates

COMPLETION STANDARDS:

The student will be able to fly within the practical test standards holding altitude to +/-100 feet, headings to +/- 10°, and speeds to +/-10 knots. The student will be developing his/her scan to promptly identify and recover from excursions outside the standards by further developing the three fundamental skills of instrument flying — scanning, interpretation and control.

FLIGHT 4

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review and practice the items introduced in Lessons 1 to 3 to gain proficiency in the control & performance of the helicopter and to improve the three •fundamental skills of instrument flying - scanning, interpretation and control. The student will be introduced to Steep Turns, and Unusual Attitude recognition & recovery.

CONTENT:

Lesson Review

Preflight Procedures

Preflight Inspection
Cockpit Management
Use of Checklists
Instrument Checks before pick up
Instrument Checks before Takeoff Check

Instrument Piloting Skills

Positive Exchange of Flight Controls
Scanning and Straight & Level Flight
Scanning and Climbs, Descents and Level Off
Scanning and Standard rate turns, entry & exit
Constant Airspeed climbs and descents
Constant Rate climbs and descents
Constant Airspeed and Constant Rate climbs and descents
Combination maneuvers, climbs & descents, turns, speeds, rates

Lesson Introduction

Steep Turns
Unusual attitudes recognition and recovery
- Failed Attitude Indicator and Heading Indicator.

COMPLETION STANDARDS:

The student will be able to fly within the practical test standards holding altitude to +/-100 feet, headings to +/- 10°, and speeds to +/- 10 knots. The student will be developing his/her scan to promptly identify and recover from excursions outside the standards by continuing to develop the three fundamental skills of instrument flying - scanning, interpretation and control Steep Turns will be performed to within +/- 200 feet in altitude, within +/-10° bank of 30°, and Within +/- 10 knots.

FLIGHT 5

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will practice the basic instrument maneuvers, steep turns, unusual attitude recovery, and will be introduced to compass turns, timed turns and instrument autorotations.

CONTENT:

Lesson Review

Preflight Procedures

Preflight Inspection
Cockpit Management
Use of Checklists
Instrument Checks before pick up
Instrument Checks Before Takeoff Check

Instrument Piloting Skills

Combination maneuvers, climbs & descents, turns, speeds, rates
Steep Turns
Unusual Attitude recovery

Lesson Introduction

Compass Turns
Timed Turns
Instrument Autorotations

COMPLETION STANDARDS:

The student will be able to fly within the practical test standards holding altitude to +/-100 feet, headings to +/- 10°, and speeds to +/-10 knots. The student will be refining his/her scan to prevent excursions outside the standards by continuing to refine the three fundamental skills of instrument flying - scanning, interpretation and control.
Steep Turns will be performed to within +/-100 feet in altitude, within +/- 5° bank of 30°, and within +/- 10 knots. Compass Turns and Timed Turns will have a roll out accuracy of+/-10°. Instrument Autorotations will be entered promptly, maintaining 60-70 knots with Rotor RPM in the green.

FLIGHT 6

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will practice the basic instrument maneuvers, steep turns, unusual attitude recovery, compass turns, timed turns and instrument autorotations. The student will be introduced to additional workload items -operating radios & GPS, and handling simulated emergency situations, specifically partial panel operations simulating loss of Attitude Indicator, Heading Indicator, and Turn Coordinator - while maintaining control of the helicopter solely by reference to instruments within the practical test standards tolerances.

CONTENT:

Lesson Review

Preflight Procedures

Preflight Inspection

Cockpit Management

Use of Checklists
Instrument Checks before pick up
Instrument Checks before Takeoff Check

Instrument Piloting Skills

Combination maneuvers, climbs & descents, turns, speeds, rates, full & partial panel

Steep Turns

Unusual Attitude recovery, full & partial panel

Compass Turns

Timed Turns

Instrument Autorotations

COMPLETION STANDARDS:

The student will be able to fly within the practical test standards while handling additional workload and simulated emergencies, holding altitude to +/-100 feet, headings to +/- 10°, and speeds to +/-10 knots. Steep Turns will be performed to within +/- 100 feet in altitude, within +/- 5° bank of 30°, and within +/-10 knots. Compass Turns and Timed Turns will have a roll out accuracy of+/-10°. Instrument Autorotations will be entered promptly, establishing 60-70 knots, maintaining the Rotor RPM in the green.

FLIGHT 7

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The lesson will be a review of the basic instrument maneuvers, steep turns, unusual attitude recovery, compass turns, timed turns, instrument autorotations prior to the Stage I check. Additional workload items -operating radios & GPS, and handling simulated emergency situations will be introduced to ensure the student can maintain control of the helicopter solely by reference to instruments within the practical test standards

CONTENT:

Lesson Review

Preflight Procedures

Preflight Inspection
Cockpit Management
Use of Checklists
Instrument Checks before pick up
Instrument Checks before Takeoff Check

Instrument Piloting Skills

Instrument Take-off
Combination maneuvers, climbs & descents, turns, speeds, rates - full & partial panel
Steep Turns
Unusual Attitude recovery, full & partial panel Compass Turns
Timed Turns
Instrument Autorotations

COMPLETION STANDARDS:

The student will be able to fly within the practical test standards while handling additional workload holding altitude to +/-100 feet, headings to +/- 10°, and speeds to +/-10 knots. The student will have developed his/her scan to prevent excursions outside the standards. Steep Turns will be performed to within +/-100 feet in altitude, within +/- 5° bank of 30°, and within +/-10 knots. Compass Turns and Timed Turns will have a roll out accuracy of+/-10°. Instrument Autorotations will be entered promptly, establishing 60-70 knots, maintaining the Rotor RPM in the green.

FLIGHT 8 - STAGE I FLIGHT CHECK

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

During this stage check, the Chief Flight Instructor, or a Check Instructor designated by the Chief Flight Instructor will evaluate the student's proficiency and completion of the Stage I requirements, and will determine if the student is prepared to proceed to Sage II

CONTENT:

Lesson Review

Preflight Procedures

Preflight Inspection
Cockpit Management
Use of Checklists
Instrument Checks before pick up
Instrument Checks before Takeoff Check

Maneuvers

Instrument Take-off
Straight & Level Flight
Climbs, Descents and Level Off
Standard rate turns, entry & exit
Constant Airspeed climbs and descents
Constant Rate climbs and descents
Constant Airspeed and Constant Rate climbs and descents
Combination maneuvers, climbs & descents, turns, speeds, rates - full & partial panel
Steep Turns
Compass Turns
Timed Turns
Unusual Attitude Recovery, full & partial panel
Instrument Autorotations

Post-flight Procedures

After Landing and Securing

COMPLETION STANDARDS:

The student will demonstrate the maneuvers to the Practical Test Standards

STAGE II – IFR FLIGHT TRAINING

STAGE OBJECTIVE

This stage allows the student to extend the skills learned in the previous stage by adding the use of VOR's for intercepts, tracking, hold entries & holding in both full and partial panel situations.

STAGE COMPLETION STANDARD

This stage will be complete when the student has satisfactorily completed the Stage II flight check, and will specifically be able to demonstrate proficiency when performing all VOR and holding operations under simulated IFR conditions.

FLIGHT 9

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

For students who will be training in the R44, this lesson should a familiarization flight in the R44 to get the student comfortable under the hood in the R44. The power settings for R44 climbs, level flight at various speeds, and descents at 500 and 1000 fpm should be practiced. The student will be introduced to the VOR, tuning, identifying and establishing his/her position relative to the station. The lesson will continue with intercepting various radials and tracking to and from the station

CONTENT:

Lesson Introduction

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR
- Intercept radials
- Tracking to/from the Station

Post-flight Procedures

- After Landing and Securing

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station while maintaining simulated instrument flight within the practical test standards.

FLIGHT 10

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

Students will develop their skills from lesson 9, becoming proficient with simulated instrument flight in the R44. The power settings for R44 climbs, level flight at various speeds, and descents at 500 and 1000 fpm should be practiced The student will be practice VOR, tuning, identifying and establishing his/her position relative to the station. The lesson will continue with intercepting various radials and tracking to and from the station

CONTENT:

Lesson Introduction

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks Before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR Intercept radials
- Tracking to/from the Station

Post-flight Procedures

- After Landing and Securing

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station while maintaining simulated instrument flight within the practical test standards.

FLIGHT 11

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review VOR operations, tuning, identifying and establishing his/her position relative to the station, intercepting various radials and tracking to and from the station. The student will be introduced to partial panel operations with the loss of the attitude and heading indicators requiring magnetic compass turns and timed turns while performing VOR operations

CONTENT:

Lesson Review

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks Before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR
- Intercept radials
- Tracking to/from the Station

Post-flight Procedures

- After Landing and Securing

Lesson Introduction

Partial Panel operations while:-

- Tuning & Identifying VOR
- Establishing position relative VOR
- Intercepting radials
- Tracking to/from the Station

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station under partial panel operations while maintaining simulated instrument flight within the practical test standards.

FLIGHT 12

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review VOR operations, full panel and partial panel and be introduced to hold entries, direct, teardrop and parallel and holding.

CONTENT:

Lesson Review

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks Before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR
- Intercept radials
- Tracking to/from the Station
- Partial Panel operations

Post-flight Procedures

- After Landing and Securing

Lesson Introduction

Hold Entries and Holding

- Direct
- Teardrop
- Parallel

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station under partial panel operations. The student will be able to enter the hold using direct, teardrop and parallel entries and then to hold.

FLIGHT 13

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review VOR operations, hold entries: direct, teardrop and parallel; and will be introduced to wind correction adjustments to create a one minute inbound leg and partial panel operations in the hold.

CONTENT:

Lesson Review

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR
- Intercept radials
- Tracking to/from the Station
- Hold Entries and Holding
  - Direct
  - Teardrop
  - Parallel

Post-flight Procedures

- After Landing and Securing

Lesson Introduction

Wind corrections for headwinds/tailwinds, crosswinds Partial Panel operations hi the hold

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station under partial panel operations, to enter the hold using direct, teardrop and parallel entries, to hold and make adjustments to compensate for headwinds/tailwinds and crosswinds while under partial panel conditions.

FLIGHT 14

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The student will review VOR operations, holding with direct, teardrop and parallel entries; wind correction adjustments to create a one minute inbound leg while under partial panel conditions, including the loss of the H.S.I. requiring navigation on VOR2 or in failover mode if training in the R22-GT.

CONTENT:

Lesson Review

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks Before Takeoff Check

Instruments Piloting Skills

- Tune & Identify VOR
- Establish position relative VOR
- Intercept radials
- Tracking to/from the Station
- Hold Entries and Holding
  - Direct
  - Teardrop
  - Parallel
  - Wind corrections for headwinds/tailwinds, crosswinds
  - Partial Panel operations

Post-flight Procedures

- After Landing and Securing

COMPLETION STANDARDS:

The student will be able to establish his/her position relative to the VOR, to intercept radials and track to/from the station under partial panel operations, to enter the hold using direct, teardrop and parallel entries, to hold, to make adjustments to compensate for headwinds/tailwinds and crosswinds while under partial panel conditions. The student will carry out these maneuvers to Practical Test Standards in preparation for the Stage n flight check

FLIGHT 15 STAGE II FLIGHT CHECK

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

This will be the Stage II flight check to review VOR operations, hold entries: direct, teardrop and parallel with correction adjustments to create a one minute inbound leg under partial panel conditions.

CONTENT:

Lesson Review

Preflight preparation

Preflight Procedures

- Preflight Inspection
- Cockpit Management
- Use of Checklists
- Instrument Checks before pick up
- Instrument Checks Before Takeoff Check

Instrument Piloting Skills

- Tune & Identify VOR
- Establish position relative to VOR
- Intercept radials
- Tracking to/from the Station
- Hold Entries and Holding
  - Direct
  - Teardrop
  - Parallel
  - Wind corrections for headwinds/tailwinds, crosswinds
  - Partial Panel operations in the hold

Post-flight Procedures

- After Landing and Securing

COMPLETION STANDARDS:

The student will meet * the Practical Test Standards while conducting VOR intercept, tracking, holds using direct, teardrop and parallel entries, making adjustments to compensate for headwinds/tailwinds and crosswinds while under partial panel.

✓ If there are any excursions outside the PTS limits, the student will identify these promptly and make corrective control inputs to recover flight to within the PTS limits

STAGE III –IFR FLIGHT TRAINING

STAGE OBJECTIVE

During this stage, the student will learn to conduct Precision & Non Precision Instrument Approaches using ILS, GPS and VOR Instrument Approach Procedures, carry out IFR operations using ATC services and complete the Instrument Cross country as specified in FAR 141 (d)(2)(iv)

STAGE COMPLETION STANDARD

This stage is complete when the student can accurately plan and conduct IFR operations including departure, en route, and arrivals using the Instrument Rating Practical Test Standards for Helicopters.

- ✓ If continuing training in the R44, and not already completed, prior to starting Stage III, the student must complete 5 hours in the R44 to meet the SFAR 73 PIC requirements, which will cover:
  - Enhanced autorotations
  - Manual throttle control (gov. off)
  - Low G recognition, proper recovery
  - Low RPM recognition and recovery
  - VFR SFAR 73 checkout to endorse the student to act as PIC in the R4

FLIGHT 16

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

During this lesson the student will fly VOR, ILS & Localizer Instrument Approach Procedures using the basic VOR and ILS Navaids for course guidance and positional awareness.

CONTENT:

Lesson Introduction

VOR approaches ILS approaches
Localizer approaches

These approaches will be conducted using the basic VOR or ILS navigation aids with DME from the GPS as necessary

Lesson Review

Fly to the Initial Approach Fix (IAF) for the relevant VOR, ILS and Localizer procedure, fly the course reversal as required, and fly the procedures to a landing complying with 91.175. The instructor should remove the view limiting device prior to the Missed Approach Point to give the student practice in landing.

COMPLETION STANDARDS:

The student will demonstrate the ability to fly to the IAF, execute the procedure turn and fly the approach to a landing. The student will not exceed half full-scale deflection at any time during the maneuvers

FLIGHT 17

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

During this lesson the student will fly VOR, ILS & Localizer Instrument Approach Procedures, Missed Approach Procedures, and DME arcs using the basic VOR and ILS Navaids for course guidance and positional awareness.

CONTENT:

Lesson Introduction

VOR approaches ILS
approaches Localizer
approaches

These approaches will be conducted using the basic VOR or ILS navigation aids with DME from the GPS as necessary

Lesson Review

Fly to the Initial Approach Fix (IAF) for the relevant VOR, ILS and Localizer procedure, fly the course reversal as required, hold, and fly the procedure to a landing or missed approach, complying with 91.175. The instructor should alternately remove or not the view limiting device prior to the Missed Approach Point to give the student practice in landing and going missed. DME Arcs

COMPLETION STANDARDS:

The student will demonstrate the ability to fly to the IAF, execute the procedure turn and fly the approach, landing or executing the missed approach procedure. The student will not exceed half full-scale deflection at any time during the maneuvers. The student will fly the DME Arc remaining within 1 nm of the defined arc distance

FLIGHT 18

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	0.5	0.5

LESSON OBJECTIVE:

The lesson will familiarize the student with instrument approach procedures using the GPS.

CONTENT:

Lesson Content

GPS approaches

- GPS Approach set up and activation
- Fly to the IAF
- Hold Entry with course reversal as appropriate
- Hold
- Use of Suspend function for remaining in hold
- Fly the approach
- Execute the missed approach procedure solely using the GPS

COMPLETION STANDARDS:

The student will demonstrate the ability to fly to the IAF, execute the procedure turn and hold entry if appropriate, and fly the approach, landing or executing the missed approach procedure. The student will not exceed half-scale deflection at any time during the maneuvers. The student will demonstrate complete understanding of the approach features of the GPS.

FLIGHT 19

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

The lesson will review and refine the student's ability to set up and fly instrument approach procedures using the GPS.

CONTENT:

Lesson Content

GPS approaches

- GPS Approach set up and activation
- Fly to the IAF
- Hold Entry with course reversal as appropriate
- Hold
- Use of Suspend function for remaining in hold
- Fly the approach and land, circle to land or:
- Execute the missed approach procedure solely using the GPS

COMPLETION STANDARDS:

The student will demonstrate the ability to fly to the IAF, execute the procedure turn and hold entry if appropriate, and fly the approach, landing or executing the missed approach procedure. The student will not exceed half-scale deflection at any time during the maneuvers. The student will demonstrate complete understanding of the approach and missed approach features of the GPS.

FLIGHT 20

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

To ensure the student is able to fly all I AP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will also practice DME Arcs. During this lesson the student will use the GPS in overlay mode entering the appropriate approach procedure while navigating with the basic Navaids. The student will be introduced to taking practice departure clearances and reading back, flying practice instrument departures, and performing "In-Range Checks" using the WRIMTIM mnemonic.

CONTENT:

Lesson Content

Practice departure clearance
Practice instrument departure
DME Arc
VOR, ILS, Localizer, GPS approaches
GPS Approach set up as overlay for non GPS approaches
Fly to the IAF
Hold Entry with course reversal as appropriate
Hold
Use of Suspend function for remaining in hold
Fly the approach and land, circle to land or:
Execute the missed approach procedure using appropriate Navaids

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to set up and fly all non precision and precision approaches required by the Practical Test Standards. The student should be flying the procedures with no more than 2 divisions of deflection from center.

FLIGHT 21

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

To ensure the student is able to fly all I AP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will also practice DME Arcs. During this lesson the student will use the GPS in overlay mode entering the appropriate approach procedure while navigating with the basic Navaids. These procedures will be practiced under partial panel conditions. The student will practice departure clearances and reading back, flying practice instrument departures, and performing "In-Range Checks" using the WRIMTIM mnemonic.

CONTENT:

Lesson Content

Practice departure clearance
Practice instrument departure
In Range Checks - WRIMTIM
VOR, ILS, Localizer, GPS approaches under Partial Panel
GPS Approach set up as overlay for non GPS approaches
Fly to the IAF
Hold Entry with course reversal as appropriate
Hold
Use of Suspend function for remaining in hold
Fly the approach and land, circle to land or:
Execute the missed approach procedure using appropriate Navaids

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to set up and fly all non precision and precision approaches required by the Practical Test Standards. The student should be flying the procedures with no more than 2 divisions of deflection from center while under Partial Panel.

FLIGHT 22

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

To ensure the student is able to fly all IAP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will also practice DME Arcs. During this lesson the student will use the GPS in overlay mode entering the appropriate approach procedure while navigating with the basic Navaids. These procedures will be practiced under partial panel and simulated emergency situations (governor failure, hydraulic failure).

CONTENT:

Lesson Content

Practice Departure clearance
Practice instrument departure
In Range checks - WRIMTIM
VOR, ILS, Localizer, and GPS approaches under Partial Panel
Simulated Emergencies - Hydraulics Failure, Governor Failure, HSI
GPS Approach set up as overlay for non GPS approaches
Fly to the IAF
Hold Entry with course reversal as appropriate
Hold
Use of Suspend function for remaining in hold
Fly the approach and land, circle to land or:
Execute the missed approach procedure using appropriate Navaids

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to set up and fly all non precision and precision approaches required by the Practical Test Standards. The student should be flying the procedures with no more than 2 divisions of deflection from center while under Partial Panel and while handling the in-flight simulated emergencies.

FLIGHT 23

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

To enable the student to refine his/her skills and accuracy while flying all IAP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will also practice DME Arcs. During this lesson the student will use the GPS in overlay mode entering the appropriate approach procedure while navigating with the basic Navaids as appropriate. These procedures will be practiced under both partial panel and simulated emergency situations

CONTENT:

Lesson Content

Practice departure clearance
Practice instrument departure
In Range checks - WRIMTIM
VOR, ILS, Localizer, and GPS approaches under full panel and partial panel
Simulated Emergencies - Hydraulics Failure, Governor Failure, H.S.I, AI, TC
GPS Approach set up as overlay for non GPS approaches
Fly to the IAF
Hold Entry with course reversal as appropriate
Hold
Use of Suspend function for remaining in hold
Fly the approach and land, circle to land or:
Execute the missed approach procedure using appropriate Navaids

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to set up and fly all non precision and precision approaches required by the Practical Test Standards. The student should be flying the procedures with no more than 1 division of deflection from center (horizontal and vertical) while under partial panel and while handling the in-flight simulated emergencies.

FLIGHT 24

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

The student will carry out lesson 23 in a RADAR controlled environment, refining his/her skills and accuracy while flying all IAP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will use the GPS in overlay mode while navigating with the basic Navaids as appropriate.

CONTENT:

Lesson Content

Practice departure clearance
Practice instrument departure
In range checks
Under radar control - vectors
VOR, ILS, Localizer, and GPS approaches
GPS Approach set up as overlay for non GPS approaches
Use of ATC in vectored approaches and own navigation
Terminate the approaches in landing, circle to land and published missed approach procedures.

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to fly all non precision and precision approaches required by the Practical Test Standards in a RADAR controlled environment. The student should be handling the ATC communications and flying the procedures with no more than 1 division of deflection (horizontal and vertical).

FLIGHT 25

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

The student will repeat lesson 24 in a RADAR controlled environment to refine his/her skills and accuracy while flying all lAP's using basic VOR and ILS Navaids and using GPS overlay procedures to straight in landings, circling landings and missed approaches. The student will use the GPS in overlay mode while navigating with the basic Navaids as appropriate under both partial panel and simulated emergency situations

CONTENT:

Lesson Content

Practice departure clearance
Practice instrument departure
In range checks
Radar control, vectors and own navigation procedures
VOR, ILS, Localizer, and GPS approaches under Partial Panel
Simulated Emergencies - Hydraulics Failure, Governor Failure, HSI
GPS Approach set up as overlay for non GPS approaches
RADAR vectors and own navigation procedures
Terminating approaches with a straight in landing, circling or missed approach procedure

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to fly all non precision and precision approaches in a RADAR controlled environment as required by the Practical Test Standards. The student should be flying the procedures with no more than 1 division of deflection from center (horizontal and vertical) while under partial panel and while handling the in-flight simulated emergencies.

FLIGHT 26

TRAINING	INITIAL	ADD-ON
DUAL	3.5	3.0
PRE/POST	1.5	1.5

LESSON OBJECTIVE:

The student will plan and conduct the IFR cross country consisting of at least lOOnm along airways or ATC-directed routing with an instrument approach at each airport and three different kinds of approaches with the use of navigation systems

CONTENT:

Lesson Introduction

Pre Flight Planning

Weather, obtaining, interpretation of reports and forecasts
Cross country planning
Fuel
Routing
IFR Flight Planning
File IFR flight plan
Obtain IFR Clearance - CRAFT
Cockpit Organization

IFR Operations

Helicopter start up, IFR pre flight checks
Instrument Take off
Airport departure procedure
Departure Control
Center communications
Approach Control
In range checklist
Approaches - review and planning
Instrument approaches - procedures
Tower /non Tower approach and landing
Shut down

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to plan and execute an IFR Cross Country flight and will have met the requirements of 141 (e)(ii).

FLIGHT 27

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.0	0.5

LESSON OBJECTIVE:

The student will review, refine and practice his/her skills in preparation for the Stage HI flight The student will intercept and track VOR radials, carry out In-Range checks, hold entries, holds, fly VOR, ILS, Localizer and GPS approaches, steep turns, unusual attitude recoveries under full and partial panel, DME arcs, and instrument autos. The student will also deal with simulated emergencies. This flight will be conducted in a RADAR controlled environment with the student carrying out all radio set up and communication tasks with ATC

CONTENT:

Lesson Content

Departure clearance
Instrument departure
In range checks
Radar control
Instrument maneuvers
VOR, ILS, Localizer, and GPS approaches under full and partial panel
Simulated Emergencies - Hydraulics Failure, Governor Failure, HSI
Use of RADAR vectors and own navigation
Approaches terminating in straight in landings, circling and missed

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to fly all non precision and precision approaches required by the Practical Test Standards. The student should be flying the procedures with no more than 1 division of deflection from center (horizontal and vertical) while under partial panel and while handling simulated in-flight emergencies.

FLIGHT 28 STAGE III / END OF COURSE CHECK

TRAINING	INITIAL	ADD-ON
DUAL	1.5	1.0
PRE/POST	1.5	0.5

LESSON OBJECTIVE:

During this lesson, the Stage III and final Flight Check will be conducted by the Chief Flight Instructor or a designated check instructor. The student will demonstrate the knowledge and proficiency that meets or exceeds the minimum standards as outlined in the Instrument Rating - Helicopter Practical Test Standards. In addition, the student will demonstrate sound judgment in aeronautical decision making and skill competences in cockpit resource management.

CONTENT:

Oral examination and Flight Check

Preflight Preparation

- Weather Information
- Cross Country flight planning

Preflight Procedures

- Aircraft Systems related to IFR Operations
- Aircraft Flight Instruments and Navigation Equipment
- Instrument Cockpit Check
- Preflight checks for IFR
- Instrument Take-offs

Air Traffic Control Clearances & Procedures

- Air Traffic Control Clearances
- Compliance with departure, en route and arrival procedures and clearances
- Holding Procedures (hold entries, holding, course reversal)

Flight by Reference to Instruments

- Basic Instruments flight maneuvers
- Recovery from Unusual flight attitudes, full and partial panel

Navigation Systems

- Intercepting and tracking navigational systems and DME Arcs

Instrument Approach Procedures

- Non Precision Approach
- Precision Approach
- Missed Approach
- Circling Approach
- Landing from a straight in or circling approach

Emergency Operations

- Loss of Communications
- Approaches with loss of primary flight instrument indicators
- Systems and Equipment Malfunctions
- Electrical System Malfunction
- Fire or Smoke
- Hydraulic System Malfunction
- Engine and Components Malfunctions
- Anti-torque Failure (This task applies to a hover and in flight).
- Drive Train Failure
- Abnormal Vibrations
- Warning Lights
- Tachometer Failure

Post flight procedures

- Checking instruments & equipment

COMPLETION STANDARDS:

The student will demonstrate the knowledge and proficiency that meets or exceeds the minimum standards as outlined in the Instrument Rating - Helicopter Practical Test Standards

FLIGHT 29 CHECKRIDE PREPARATION

1.5 HOURS DUAL

1.5 HOURS PRE/POST FLIGHT DISCUSSION

LESSON OBJECTIVE:

To prepare the student in a realistic scenario for his instrument practical test.

CONTENT:

File IFR Flight Plan
DP
ATC clearance
Radio communications
IAP
Holding procedures
Recovery from unusual attitudes
Instrument scanning
Instrument maneuvers
VOR, ILS, Localizer, and GPS approaches under full and partial panel
Simulated Emergencies – Hydraulics Failure
Use of RADAR vectors and own navigation
Approaches terminating in straight in landings, circling and missed

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to fly all required maneuvers well within the limits prescribed by the Practical Test Standards.

FLIGHT 30 CHECK RIDE PREPARATION

1.5 HOURS DUAL

1.5 HOURS PRE/POST FLIGHT DISCUSSION

LESSON OBJECTIVE:

To prepare the student in a realistic scenario for his instrument practical test.

CONTENT:

File IFR Flight Plan
DP
ATC clearance
Radio communications
IAP
Holding procedures
Recovery from unusual attitudes
Instrument scanning
Instrument maneuvers
VOR, ILS, Localizer, and GPS approaches under full and partial panel
Simulated Emergencies – Hydraulics Failure
Use of RADAR vectors and own navigation
Approaches terminating in straight in landings, circling and missed.

COMPLETION STANDARDS:

At the completion of this lesson, the student will be able to fly all required maneuvers well within the limits prescribed by the Practical Test Standards.

GROUND TRAINING SYLLABUS

Summary of lessons

Ground Lesson Plans – Summary

- Lesson 1 Instrument Scanning
- Lesson 2 Flight Instruments
- Lesson 3 Unusual Attitude & Partial Panel
- Lesson 4 VOR
- Lesson 5 Holding Patterns, Procedure Turns & DME Arcs
- Lesson 6 RADAR & DME
- Lesson 7 Weather Reports & Forecasts
- Lesson 8 Helicopter Icing
- Lesson 9 Instrument Departures & En Route
- Lesson 10 Radio Procedures for IFR Departures
- Lesson 11 Instrument Landing System
- Lesson 12 Instrument Approaches
- Lesson 13 Lost Communications
- Lesson 14 Global Positioning System
- Lesson 15 FAA IFR Regulations & PTS
- End of Course Ground Exam

Minimum required Ground Training Hours Per FAR PART 141 Requirements

	INITIAL	ADD-ON
GROUND HOURS	**30**	**20**

✓ The above listed minimum hour requirements do not match with the lesson plan hours established on each ground lesson. Students that can show understanding and application of subject areas may use less hours than noted on each ground lesson plan.

GROUND LESSON 1 INSTRUMENT SCANNING TECHNIQUE 2.0 HOURS

LESSON OBJECTIVE:

The student will be introduced to flight solely by reference to instruments, to the fundamental skills in instrument flying, the flight instruments, control & performance method of helicopter control, and scanning methods and techniques.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 1, Pl-7 & 10-17 ;
Chapter 2, Pl 9-28

Spatial Disorientation AC 60-4A
Flight solely by reference to instruments
Three fundamental skills in Instrument flying:
- Instrument Cross Check
- Instrument Interpretation
- Helicopter control

The six instruments, layout, functions.

ASI	AI	ALT
TC	HI/HSI	VSI

Attitude Instrument Flying
Control & Performance
- Control Instruments
- Performance Instruments
- Power settings for R22/R44 Instrument maneuvers - P9 UHIR44 Instrument Course manual

Scanning techniques
- Selective Radial Scan
- Basic T Scan
- Choice of Scans
  - Straight & Level
  - Turns
  - Climbs & Descents

Other Scans
Rolling in and out of turns
Entering or exiting from climbs and descents
Developing scanning skills
Common scanning problems and avoidance

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands how to control the flight of the helicopter solely by reference to instruments, how to scan, interpret and make appropriate control inputs and the avoidance of common problems.

GROUND LESSON 2 FLIGHT INSTRUMENTS 2.5 HOURS

LESSON OBJECTIVE:

The student will learn how the helicopter's flight instruments (pitot static, gyroscopic and magnetic compass) operate. The students will also learn about instrument errors, and pre-flight checks.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 3, P29-64; FAR 91.187; 91.205; 91.411; 91.413; AIM 7-2-1 to 7-2-5.

Instruments required for IFR Flight - FAR 91.205
Pitot Static
- Pitot system
- Static system
  - Air Speed Indicator
  - Altimeter
    - AIM 7-2-1 thru 7-2-5
  - Vertical Speed Indicator
- Instrument errors
- Effect of blocked pitot
- Effect of blocked static
- Preflight checks
- FAR 91.411,91.413

Gyroscopic
- Properties of a gyroscope
  - Attitude Indicator
  - Heading Indicator
    - Non slaved
    - Slaved
    - R44 installation
  - Turn Coordinator
  - Horizontal Situation Indicator

Magnetic Compass
- Compass errors (VDMONA)
- Review PI2 in R44 Instrument Course manual

Instrument errors
Pre-flight checks
Review IFR Pre-flight check list P7 in R44 Instrument Course manual
FAR 91.187

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 3 UNUSUAL ATTITUDES & PARTIAL PANEL 2.0 HOURS

LESSON OBJECTIVE:

The student will learn how to recognize and recover from unusual attitudes.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 7 PI 19-128, and Chapter 8 Instrument Flight on Partial Panel P129-146; FAR 91.187

Unusual attitudes
- Definition
- Causes
- Recognition

Recovery techniques
- With a full instrument panel
- Under partial panel conditions

Instrument Flight on a partial panel
- Review of three fundamental skills of instrument flying
- The use of cross-check to identify failed instrument or instruments
  - Review of Pitot Static failures
  - Review of Gyro failures
  - Cover up failed instrument (s)
- Control inputs
- All gyros fail
- FAR 91.187

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 4 VOR 2.0 HOURS

LESSON OBJECTIVE:

The student will learn the VOR, its uses, how it operates, ground and helicopter equipment, cockpit display, how to position fix, track radials, VOR chart representation and interpretation, required checks and the VOR display in the HSI.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 12, P253-288; AIM 1-1-3 to 1-1-6,1-1-12 to 1-1-13; FAR 919.171; AFD; IFR Enroute Low Altitude chart

What is the VOR
Uses of VOR
How the VOR works
VOR range and volumes
VOR's and airways
Use of AFD to determine VOR information
VOR/DME, TACAN, VORTAC
Cockpit Display instrument
- Omni Bearing Selector
- Course Deviation Indicator
- Flags, on/off, To/From
- Course Deviation

Using the VOR
- Tuning, Identifying

VOR Receiver checks FAR 91.171
- VOT
- VOR on ground
- VOR in air
- Dual VOR
- VOR on an airway
- Records

Position fixing
- Over VOR
- Using two VOR's, VOR/DME

VOR in the HSI.

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 5 HOLDING PATTERNS, PROCEDURE TURNS & DME ARCS

2.0 HOURS

LESSON OBJECTIVE:

The student will learn the following maneuvers that an instrument pilot must be able to perform efficiently, holding patterns including course reversals, procedure turns, DME arcs

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 28, P523-544; AIM 5-3-7; TERPS.

- Holding Patterns Why
  - Racetrack pattern with 5 basic elements Holding Fixes
    - VOR
    - NDB
    - Locator Outer Marker
    - VOR radial at a DME fix
    - VOR/VOR
    - GPS waypoint
  - Standard Holding pattern
  - Published Holding patterns
  - Non Published Holding patterns
  - Taking down clearances
  - Drawing holding patterns
  - Timing in the hold and leaving at EFC
  - Corrections for Wind
    - Headwinds/Tailwinds
    - Crosswinds
  - Hold entries
    - Parallel
    - Teardrop
    - Direct
  - 5 T's in the hold
  - Timed approaches
  - Procedure Turns
    - 45°/180°
    - Base or Teardrop turn
    - Procedure Turn limits
  - DME Arcs
    - Intercepting the Arc
    - Tracking the Arc
      - Using VOR/DME
      - Using the GPS on published arcs
      - Wind correction

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 6 RADAR & DM 2.5 HOURS

LESSON OBJECTIVE:

The student will learn the operation and use of RADAR, ASR, PAR, Vectoring, Transponders and DME in an IFR environment

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 10 P163-196, Chapter 14 P329-334; AIM 1-3-1 to 1-3-4,4-1-19; FAR 91. 215,411,413; AFD; IFR Enroute Low Altitude chart,

- RADAR
  - Definition
  - Uses of RADAR
  - Benefits of RADAR
  - Surveillance Radar
    - Air Route Surveillance Radar
    - Airport Surveillance Radar
    - AFD information on Radar services
    - Radar traffic information services
    - Use of SSR radar in providing radar service - the transponder
    - RADAR based approaches available from Surveillance Radar
    - Radar vectoring
      - Departures
      - En Route
      - Approach
      - MVA
    - Radar Approaches
      - ASR
      - PAR
      - No gyro Radar approaches
    - Using the Transponder & radio terminology
    - Primary RADAR
      - How it works
      - Disadvantages
    - Secondary RADAR (SSR)
      - How it works
      - Benefits of SSR
    - Transponders & SSR
      - Codes, Code selection, Emergency codes
      - Mandatory Transponder requirements
      - FAR 91.215
      - AIM 4-1-19
      - Transponder Checks, 91.411, 91.413
      - Mode A, C, S
      - Services available with Mode S
    - DME
      - How it works & slant distance
      - VOR/DME pairing

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 7 WEATHER REPORTS & FORECASTS 2.0 HOURS

LESSON OBJECTIVE:

The student will learn how to obtain weather reports and forecasts necessary to plan and safely execute an IFR flight, to determine fuel requirements, select alternates, and to obtain in flight weather

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 23, P415-449; FAR 91.103,91.167,169; AIM 7-1-21 to 7-1-30.
In addition, students should have read Advisory Circular AC 00-45E and IFPM Chapters 18 thro 22 before this lesson.

Obtaining a weather briefing
- Flight Service
- DUATS
- FAR 91.103
  - Standard Weather briefing contents, Outlook & Abbreviated briefings
  - Airmets & S, T, Z
  - Sigmets & Convective Sigmets
- Weather Reports
  - Weather Depiction Charts
    - VFR, MVFR, IFR
  - Surface Analysis Charts
  - Radar Summary Charts
  - METAR and SPECI
    - AIM 7-1-30
  - PIREPS
    - AIM 7-1-21 thro 7-1-29
- Weather Forecasts
  - Low Level Significant Weather - Prognostic Charts
  - Terminal Area Forecasts TAP
    - AIM 7-1-30
    - FAR 91.167, 91.169, AIM 7-1-30 (decode TAP for Fuel and Alternate planning)
  - Area Forecasts (FA)
  - TWEB
  - Winds Aloft
  - Severe Weather Outlook Charts
- EFAS - Flight Watch
- HIWAS
- ATIS/AWOS/ASOS

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 8 HELICOPTER ICING 2.0 HOURS

LESSON OBJECTIVE:

The student will learn the causes, formation mechanisms, effects and dangers of icing on helicopter flight and performance.

CONTENT:

Reference: Wagtendonk, Principles of Helicopter Flight, Chapter 24, P221-225. FAR 91.527, AIM 7-5-12

When ice forms
Ice accretion rates
- Temperature and water drop size
  - Clear Ice
  - Rime Ice
- Water content of air
- Kinetic Heating
- Shape of Airfoils and other aircraft components
- Mechanical flexion and vibration

Ice formation at differing temperatures
Anti icing
Consequences of Ice accretion
Intake Icing
Carburetor Icing
FAR 91.527
AIM 7-5-12

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 9 INSTRUMENT DEPARTURES 2.5 HOURS

LESSON OBJECTIVE:

The student will learn how to prepare for and depart on an IFR flight.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 25 P479-502, Chapter 26 P502-514, Chapter27 P515-522; AIM 8-1-1; FAR61.57, 91.103,91.167, 91.169,91.175; TERPS; AFD.

- Preflight considerations for an IFR flight - FAR 91.103
  - Instrument Rating current FAR 61.57
  - Medically fit (IMSAFE, AIM 8-1-1)
  - Weather, FSS and DUATS briefings
  - FAR 91.167, 91.169
  - Departure, Destination & Alternates "A"
  - Route of Flight
  - NOTAM's/TFR's
    - L, D, FDC, GPS
  - Charts
    - Departure Procedures
    - En Route charts
    - TERPS Approach charts
    - VFR sectionals
    - AFD
  - Flight Log with fuel & reserves
  - Filing IFR flight plan
- Flight Planning
  - Preferred IFR Routes (AFD)
  - Tower En Route Control Routes (AFD)
  - Direct (OROCA and T Routes)
  - Flight Plan AIM 5-1-7
- Departures
  - Take Off minimums, FAR 91.175, "T"
  - Climb out & climb rates
  - Departure Procedures
  - Obtaining Clearance
    - Towered & non towered airports
    - Radio calls sequence
    - CRAFT
    - Clearance Void Time
  - Departure and Radar Contact
    - Radio Calls
    - Compulsory Reporting points
    - Flying airways FAR 91.181

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 10 RADIO PROCEDURES FOR IFR DEPARTURES 2.0 HOURS

LESSON OBJECTIVE:

The student will learn how to prepare for and depart on an IFR flight using the correct radio phraseology and in the correct sequence considering start up and pre-flight checks. The student will learn how to file, request and receive an IFR Clearance, and depart under IFR. The instructor will play the role of FSS, Clearance Delivery/Ground Control, Tower, Departure Control and ARTCC during this lesson.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 25 P479-502, Chapter 26 P507-512; AIM 4-2-3, 4-2-4,4-2-6, 4-3-17, 4-4-1 to 4-4-10, 5-2-1 to 5-2-6.

- IFR Flight Planning
  - Preparation and filing of Flight Plan
  - ATIS, AWOS/ASOS
- Obtaining Clearance
  - Requesting an IFR Clearance
    - Towered airport
    - Non towered airport
    - CRAFT
    - Read backs
    - Clearance Void Time
- Start & Preflight Checks
  - Engine Start
  - Normal and IFR preflight checks
- Departures
  - Hold for Release
  - Expect Departure Clearance Time
  - Departure Control
  - Contacting Departure & Radar contact
  - Departure Procedures
- Air Route Traffic Control Center
  - Call in
  - Reporting requirements

COMPLETION STANDARDS:

The student will understand and be competent to handle all aspects of IFR radio communication from Flight Plan filing through En-Route, using the correct radio calls for the appropriate stage of the flight.

GROUND LESSON 11 INSTRUMENT LANDING SYSTEM (ILS) 2.5 HOURS

LESSON OBJECTIVE:

The student will learn the Instrument Landing System, and how to fly the ILS, and the LDA & SDF.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 13, P289-328;
AIM 1-1-9 to 1-1-10, AIM 2-1-1 to 2-1-9, AIM 7-1-16 to 7-1-18; FAR 91.175,97.3; TERPS;
IFR Enroute Low Altitude chart.

One of four precision approaches (ILS, MLS, PAR, GPS-LPV) ILS main components

- Localizer
- Glideslope
  - Normal & False Glideslopes
- Marker Beacons
- Approach Lights

Missed approach point (DH)
FAR 91.175 Landing
Helicopter minimums FAR 97.3
Cat I, II, III overview
Runways for Precision Approaches

- VASI/PAPI
  - 2 Bar
  - 3 Bar
  - PAPI
- Runway Lighting
  - Edge lighting
  - End lights
  - REIL
  - Touchdown Zone lighting
  - Centerline lighting
  - Taxiway turn off lighting
  - Taxiway lights
  - Pilot Controlled lighting
- Precision Instrument Runway markings
- Inoperative ILS Components & TERPS
- LDA
- SDF

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 12 INSTRUMENT APPROACHES 2.0 HOURS

LESSON OBJECTIVE:

The student will learn how to navigate from the En Route structure to the ground, using STAR'S, the different standard Instrument Approach procedures, Contact Approach and Visual Approach procedures.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 29 P545-570, and Chapter 30 P571-581; AIM 5-4-1 to 5-4-12, AIM 10-1-2 & 3; FAR 91.175, 97.3; FAAIFR Pilot Exam-O-Gram No 42 Instrument Approach Procedures for Helicopters.

STAR'S
In Range checks - UHI R44 Instrument Course, Maneuvers section P8
Segments of an Instrument Approach
- Arrival segment
- Initial approach segment
- Intermediate approach segment
- Final approach segment
  - Step down fixes
  - Intercepting the Glideslope
  - FAR 97.3
  - FAR 91.175
  - AIM 10-1-2
- Missed approach segment
- Point in Space approaches AIM 10-1-3

Review ILS, LOG, VOR, GPS approach charts
Review Copter approaches charts
- Approach Chart identification
- Radio Communication frequencies
- Plan view incl holding & missed approach procedure
- Profile view
- Minimum Safe Altitude circle (MSA)
- Approach Minimums
- Timing to Missed Approach Point
- DH & MDA
- Visual Reference per 91.175
- MVA

Circle to Land and Circling minimums
Landing at airports with no published Instrument Approach procedures
Contact Approach
Visual approach

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 13 LOST COMMUNICATIONS 2.0 HOURS

LESSON OBJECTIVE:

The student will learn how to handle two way radio communication failure while operating on an IFR Flight Plan

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 24, P467;
FAR 91.185; AIM 6-4-1 to 6-4-3

Verification of radio failure
- Previously assigned frequency
- Radio and Intercom panel settings
- If hear other traffic, ask for a relay
- 2nd Comm radio
- EFAS 122.0, FSS 122.2, Emergency 121.5

Squawk 7600

In VFR conditions
- Continue in VFR conditions and land

In IFR conditions
- Route
  - Assigned route
  - Radar vectors
  - Route expected in a further clearance
  - Route filed in the flight plan
- Altitude - for the route segment being flown, highest of
  - Assigned
  - MEA converted
  - Expected in a further clearance
- Clearance Limits
  - If fix from which an approach begins
  - If not a fix from which an approach begins

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 14 GLOBAL POSITIONING SYSTEM 6.0 HOURS

LESSON OBJECTIVE:

The student will obtain a thorough understanding of the GPS navigational system for IFR flight and will use the GARMIN 430 Simulator to develop his /her skills with the receiver.

CONTENT:

Reference: ASA Pilot's Manual 3, Instrument Flying, Chapter 16, P341-352; UHI
R44 Instrument Course manual, GPS Ground Lesson Outline;
AIM 1-1-19; Garmin GNS 430 Pilots Guide & Reference Manual;
AOPA Air Safety Foundation Technology Report 1 - GPS Technology

GPS - World wide three dimensional navigation system , satellite based
Managed by US Dept of Defense
Available to civilian users world wide
Four elements
- 24 Satellites in 1 lOOOnm orbit
- Wide Area Augmentation System (3 Satellites, 25 ground stations)
- Ground based control system in Colorado Springs
- Receiver in the aircraft

Satellite coverage for IFR navigation
System accuracy
IFR operations - requirements
- Receiver
- Installation
- Database

GPS navigation in the Departure, En Route & Approach environments
- AIM 1-1-19
- What is permitted & what is not

WAAS
- Accuracy
- Non precision approaches
- Precision approaches

NOTAM's
En Route, Terminal & Approach modes & sensitivities
RAIM
- What is it
- RAIM failures
- RAIM predictions

GPS & VLOC
Auto sequencing & suspend

Simulator exercises using the GARMIN 430 SIMULATOR - see PI 6 (3 hours of)

COMPLETION STANDARDS:

The instructor will determine, though oral quizzing, that the student understands the material covered before proceeding to the next ground lesson.

GROUND LESSON 15 INSTRUMENT REGULATIONS & PTS 3.0 HOURS

OBJECTIVE:

The student will review the FAA regulations which apply to IFR flight, and the Practical Test Standards which apply to the Instrument Rating Helicopter

CONTENT:

Review the FAR's which specifically reference instrument flight

61.51, 61.57,141,61.195,91.103,91.109,91.167-187,91.205,91.209, 91.213, 91.215,91.217, 91.217,91.411,91.413,91.503, 91.527, 95, 97.3

Review the Practical Test Standards for Instrument Rating/Flight Instructor Instrument (as appropriate)

COMPLETION STANDARDS:

The instructor will determine, though oral or written quizzing, that the student understands the material covered before proceeding to the end of course FAA written exam.

END-OF-COURSE FAA WRITTEN EXAM

OBJECTIVE:

The student will take and pass the FAA instrument written exam.

CONTENT:

The instructor will provide a sign-off showing that the student shows a working knowledge off all required subject areas and ground training appropriate to the IFR written test.
The student will then take the endorsement, picture ID and appropriate materials to the FAA testing center and take the written exam.

COMPLETION STANDARDS:

The student will complete the FAA Instrument Rating Helicopter Knowledge Test with a minimum passing score of 70%, and the instructor will review each incorrect response to ensure complete understanding before the student progresses to the FAA Instrument Rating Helicopter Practical Test.

IFR STUDY NOTES AND ADDITIONAL INFORMATION

GPS Procedures

Student Practical Exercises (study & practice on Garmin 430 Simulator)
Student should be fully knowledgeable on all items in bold

- Power up and check Database currency
- Check Instrument Panel Self Test screen for correct displays
- Entering Com frequencies and making active, volume and squelch setting, use of Audio Panel to select radios
- How to select 121.5 Emergency Frequency by pressing & holding Com flip-flop button
- Selecting Cursor, entering Nav frequencies and making active, use of Nav volume knob for ident, use of Nav switch on audio panel for listening to Nav radio & identing morse on VOR/LOC
- Understanding of, and selecting VLOC & GPS modes using CDI button
- Use of OBS in GPS mode. Use of OBS for suspending and enabling auto-sequencing while flying approaches U
- Understanding and use of magenta line and HSI CDI for course guidance in VLOC, GPS & OBS modes. Need to select correct course with CDI needle for course guidance.
- Use of "Direct to" button for navigating to airports, Nav aids and way points
- Use of Range buttons to zoom map in & out
- Press & hold Clear button returns to Nav group default page
- Use of outer right hand knob to select Group Pages and inner knob to select the pages inside a group
    - NAV group
        - Default page - CDI, Dist, Dtk, Brg, GS, Trk, ETE
        - Map page
        - Navcom page - frequencies for airport in "direct to" waypoint
        - Position page- present position, alt MSL, bearing & distance from nearest airport
        - Satellite status
        - Vertical Navigation
    - WPT group
        - Airport Location
        - Airport runways
        - Airport frequencies
        - Airport approaches
        - Airport arrival procedures
        - Airport departure procedures
        - Intersections
        - NDB's
        - VOR's
        - User waypoints
    - AUX group
        - Flight planning
        - Utility – RAIM prediction
        - Set up 1
        - Set up 2
    - NRST group
        - Nearest Airport - how to select nearest airport, direct, enter, enter to navigate to it
        - Nearest Intersection
        - Nearest NDB
        - Nearest VOR
        - Nearest User
        - Nearest Center
        - Nearest Flight Service
        - Nearest Airspace
- Use of Procedure button for Approaches
    - Selecting destination airport
    - Select an approach for the airport

- Selecting the transition - Initial Approach Fix or Vectors
- Loading & Activating the approach
- Executing an approach with a Hold Entry - use of suspend
- Executing an approach with a Procedure Turn
- Flying the approach to the MAP
- Flying the Missed Approach Procedure – use of suspend and course guidance to the MAP Hold

- Create Flight Plan, FPL, Catalogue, Menu, Create New Flight Plan, Enter Waypoints, Activate, add an approach

Instrument, Instructor, and ATP references per the Practical Test Standards

FAR Part 61	.35.39.39.51.57.65
FAR Part 91	.103.131.167-187.205.207.213.411.413
FAR Part 97	Standard Instrument Approach Procedures
AC 00-6	Aviation Weather
AC 00-45	Aviation Weather Services
AC 61-13	Basic Helicopter Handbook
AC 61-21	Flight Training Handbook
AC 61-23	Pilot Handbook of Aero Knowledge
AC 61-84	Role of Preflight Preparation
AC 90-48	Pilots Role in Collision Avoidance
AIM	Airman's Information Manual. Chapters 1-1,1-2,2-1,3-2,3-3, 4-1 to 4-4, Chapter 5 all, 6-4,7-1,9-1, Chapter 10 all.
DP	Departure Procedures
STAR	Standard Terminal Arrivals
AFD	Airport Facility Directory
FDC/NOTAM	National Flight Data Center/Notam
IAP	Instrument Approach Procedures
AC 60-14	Aviation Instructors Handbook
AC61-65	Certification Pilots and Flight Instructors
AC 61-92	Use of Distractions
AC 67-2	Medical Handbook for Pilots
AC 91-23	Pilots Weight & Balance Handbook
PTS	Practical Test Standards, Private, Commercial, Instrument, Instrument Instructor

Additional References

Instrument Ground School - UHIR44 Instrument Course Manual
Instrument Flying Handbook - ASA - 3
Instrument Oral Guide - ASA - Michael Hayes
IFR en-route Low Altitude Chart IFR Area Charts

Links:
Garmin 430 training syllabus
http://www8.garmin.com/manuals/288_SampleTrainingSyllabus.pdf

IFR STUDY NOTES

1. Course Reversal=Holding Pattern, Procedure Turn (1 minute, DME distance, remain within, scale)
2. All flight maneuver transitions = Power + Attitude Indicator, explain your scan — radial-selective
3. VFR on Top = Appropriate VFR Altitude above MEA (FAR 91.159), pilots must request VFR-on-Top
4. Pressure Altitude @ airport = Altitude (corrected for Standard Pressure) @ Field Elevation
5. VFR to IFR = Contact FSS (Air File)
6. IFR Alternate Airport required unless= forecast >1000' above airport, >400' above approach, 2sm visibility from ETA to +1 hour FAR91.167 (b)(ii)
7. Weather min for alternate=forecast> 200' above approach, 1sm visibility at ETA, check alternate
   minimums "A" FAR91.169 (c)(l)(ii)
8. IFR Fuel minimums (no alternate/alternate^ 30 minutes FAR91.167 (a)(3)
9. Climbs & Descents = 5001pm min, 1500fpm max - expected by ATC
10. Simultaneous Approach = On Tower Frequency, AIM 5-4-14,5-4-15
11. Substitute Middle Marker = not necessary
12. Min. Equipment = Equipment appropriate for facilities used
13. Most Current Airport info = Airport Facilities Directory plus (L) Local & Distant (D) Notams
14. Last assigned altitude = Established on Segment
15. Sigmet issued for ~ Widespread dust storm < 3sm visibility
16. VOR Checks = VOT, VOR ground, VOR air, VOR/VOR, VOR on Airway, 30 days, record keeping FAR91.171
17. Level -off = 10% before target altitude (e.g. 500fpm descent, add power at +50')
18. Convective Outlook = Thunderstorms, Clouds with greatest turbulence = Cumulonimbus
19. What is an Abbreviated Clearance = Cleared as Filed to Destination Airport
20. Airmet = every 6 hours
21. Contact Approach = Clear of Clouds + 1 statute mile
22. Radar Service Terminated = 1200, resume normal/position reports
23. MOCA = obst clearance +assures navigation signal only 25sm, 22nm from VOR
24. MEA=assures radio nav + obst clearance, mountains 2000'+4nm from course, other 1000'+4nm
25. Designated Mountainous Areas=AIM Chapter 5-6-5
26. Prognostic Chart = Conditions forecast to exist
27. Failed Heading Indicator (no Directional Gyro)=UNOS or Timed Turns (3 degrees/second), half standard rate on final approach, emergency situation in IMC, 91.187
28. Turns to an East or West heading = No Error if Smooth Turns
29. Turns from a North heading = At first compass moves in opposite direction
30. Turns to a North heading= roll out prior to target heading (see page 12)
31. Turns to a South heading = roll out past the target heading (see page 12)
32. Missed Approach = Passage of MAP, Time elapsed, VOR goes TO to FROM, Decision Height, GPS goes TO to FROM, GPS enters Suspend mode - Cancel Suspend with OBS button to sequence to Missed Approach Procedure and navigate to MAP Hold.
33. Compulsory reporting points = Fixes selected to define the route which ATC expects to be reported
34. Timed Approach = Must have operating Control Tower, AIM 5-4-9
35. E.T.E. = Time to first intended Landing Point even if Alternate is required
36. ATIS Changes = Upon receipt of an official change
37. No MCA specified = Use MEA
38. Minimum Safe/Sector Altitudes (MSA)= for emergencies, 1000'clearance above all obstructions in the sector within 25nm of facility - FAR 97.3 (1)
39. Minimum Vectoring Altitude (MVA)=1000' above terrain, 2000' in mountains, 300' above floor of controlled airspace

40. Visual Descent Points (VDP)=point on non precision app where normal descent to runway may be made
41. Pilot proceeding to Alternate = Landing Minimums for Approach to be Used
42. Helicopter minimum® = 1/2 published visibility, no change to MDA or DH. FAR97.3 (d-1)
43. IFR Routes begin at = Instrument Departure
44. Heading Indicator/Directional Gyro - How does it work, Where is it in R44, What is Rigidity in Space
45. Hydraulic Failure= Localizer easier than ILS (risk of glide slope max deflection forcing missed)
46. R44 Emergency Procedures under IFR Conditions^ Study all - different actions in IMC from VFR
47. Auto-Rotations under IFR= Min Rate of Descent (55 knots)
48. Landing, Airport with no Instrument Approaches = MEA ->VFR->Field->VFR Minimums
49. Helicopters = do not "Circle to Land" after approach- use best approach avail - straight in.
50. Three things necessary to descend below DH or MDA=abte to land on runway with normal rate of descent & normal maneuvers, required visibility (% published for copters but not less than 1200' RVR, or % mile), visual references identified for intended runway (FAR 91.175)
51. Instrument Approach Procedures=FAR97.3 d,d-l,e,f,g,h,h-l,i,j,l,m,n,o,o-l,p,r,s,v,w,x.
52. Helicopter Point-in-Space approaches (PinS)= AIM 10-1-3
53. Helicopter Vortices= 3 rotor diameters (ABM 7-3-7)
54. Area Forecasts=msl, TAR/TAF=agl
55. Approach Plates=Complete familiarization, detailed reviews, thorough talk/walk through, incl "A", "T", Inoperative components, lost comm.,
56. Take off mini mums for helicopters under Parts 91, & 135 = FAR 91.175
57. IFR pilot currency= Currency requirements FAR 61.57 (c) & (d)
58. What is a Clearance Limit ?
59. Lost Comm=Two Way Radio Comm Failure in IFR, FAR 91.185
60. ATC & Radar Vectors^ scenarios, lost comm., meaning of "cleared for the approach"
61. VOR equipment check for IFR operations=checks, timing, records FAR 91.171(a),(b),(c),(d)
62. H,L,T Vor's= properties & how to recognize on Sect/Lo Alt En-Route charts, comms, HIWAS
63. VOR's=read and interpret the VOR box data on the charts
64. Lo AH En-Route Charts=thorough knowledge of chart/legend/symbols/usage/interpretation
65. How to get airport weather en-route= FSS, ATIS, ARTCC, Tower
66. SID/DP, STARS what are they, why do they exist, use in IFR Flight Plans
67. How often is a Localizer, VOR, DME morse identifier signal repeated
68. What is a False Glide Slope?
69. What is the reason for positioning of a COP symbol?
70. What do you do if you have a DME failure?
71. Radio Talk, first call en route = Helicopter 727KP, 5000 feet (climbing 6000 feet)

ATTITUDE INSTRUMENT FLYING

HI = Heading Indicator
A / S = Airspeed Indicator
AI = Attitude Indicator
MP = Manifold Pressure
ALT = Altimeter
VSI = Vertical Speed Indicator
TC = Turn Coordinator

MANEUVER	PRIMARY	PRIMARY	PRIMARY	SECONDARY	SUPPORTING
	PITCH	BANK	POWER	PITCH	BANK
STRAIGHT & LEVEL	ALT	HI	A/S	AI VSI	TC AI
STRAIGHT & LEVEL AIRSPEED CHANGE	ALT	HI	TACH / MP INITIALLY A/S-as You reach desired Value	AI VSI	AI TC
CONSTANT AIRSPEED CLIMBS & DESCENT ENTRY	AI	HI	TACH / MP	VSI	AI TC
CONSTANT AIRSPEED CLIMBS & DESCENT (STABLIIZED)	A/S	HI	TACH / MP	AI	AI TC
CONSTANT RATE CLIMB / DESCENT (ENTRY)	A/S	HI	TACH / MP	AI	AI TC
CONSTANT RATE CLIMBS / DESCENT (STABILIZED)	VSI	HI	A/S	AI	AI TC
TURN CONSTANT RATE	ALT	ENTRY-AI IN TURN – TC ROLLOUT - AI	A/S	AI VSI	IN TURN - AI
TURN CONSTANT RATE (CHANGE IN AIRSPEED)	ALT	TC	TACH / MP INITIALLY A/S-as you reach desired Value	AI VSI	AI

PRE-FLIGHT HOVER CHECKS FOR IFR FLIGHT - CHECKLIST

These checks establish that the three gyro instruments, the VSI and compass are operating satisfactorily before flight in instrument conditions

Before pick-up check that:-

- **THERE ARE NO FLAGS SHOWING ON THE AI, HI/DG or TC**
- **THE ATTITUDE INDICATOR IS ERECT (NO PITCH OR BANK ON LEVEL GROUND WITHIN 5 MINS)**
- **THE FREE/SLAVE SWITCH IS IN SLAVE POSITION**
- **THE MARKER BEACON AUDIO PANEL SWITCH IS ON/DOWN**
- **THE MARKER BEACON RADIO RECEIVER IS SWITCHED ON, HI (bright) for daytime, or LO (dim) at night as appropriate**
- **THE AIRFIELD BAROMETRIC PRESSURE & PUBLISHED FIELD ELEVATION ARE WITHIN 75 feet (AIM 7-2-3 a.3)**

1 **From 3-5ft hover, raise collective.** Check VSI shows positive climb indication

At an 8-10 foot hover (to avoid tail strike on pitch checks):

2 **Cyclic forward, aft and side-to- side (gentle movements)**

Check: Attitude Indicator shows correct pitch and bank indications

3 **Pedal turn Left and Right (approx 10° left and right)**

Check: Heading Indicator + Compass are aligned, no bank on the AI. Turn Co-ordinator shows correct turn indication and ball is free to move

4 **Lower Collective, descend to 3-5ft hover.** Check VSI shows descent indication

5 **Attitude Indicator/Turn Coordinator Ball:** Adjust Attitude Indicator to level in the Hover, and check position of the Turn Coordinator ball

C = Clearance limit (you will usually be cleared all the way to your destination). This is the clearance limit defined in 91.185 (c)(3)
R = Routing
A = Altitude
F = Frequency (Departure)
T = Transponder Code

In-Range Check Perform before IAF (Initial Approach Fix)

W = Weather (ATIS, AWOS, ASOS) – wind, altimeter setting.
Determine runway in use and select approach to be flown. Get relevant approach plates on knee board and review
R = Nav Radios – Tune main & back up Nav Radio frequencies from approach place –ILS, VOR, DME, GPS.
= Comm Radios 1 & 2 set main and stand-by frequencies (approach, tower, Unicom)
= Set GPS – destination airport, select approach, select IAF/vectors, activate approach
I = Check/set instruments for normal operation – AI, Altimeter setting, DG/Compass recession/slaving
M = Minimums – review MDA, DH, DME avail/not – as appropriate
T = Time to MAP (based on 90 KIAS corrected to estimated ground speed)
I = Odemtofu (morse – VOR, localizer, NDB, DME) – localizer may not be in range
- check when in range
M = Missed Approach Point, procedure and instructions

Landing Check

L = Landing Light (as appropriate)
E = Engine Instruments (Green, No Warning Lights, Carb-heat and Fuel)
C = Collective Friction (Off)
H = Hydraulics (On)

6T's at a Fix

T = Time
T = Turn
T = Twist
T = Throttle
T = Talk
T = Think

CALL OUTS In the climb & descent

1000' to GO
500' to GO
200' to GO (Fly the needles)
100' to GO
0' Level off or if at Missed Approach Point/DH, execute Missed Approach Procedure

IFR FLIGHT

1. Cruise: Use MCP from POH, R44 I, 22-23" 110 Knots in level flight
   R44 II, 21-22" 120 Knots in level flight

2. Holds and Approaches R44 I, 20"-21" is 90 knots in level flight
   R44 II, 18"-19" is 90 knots in level flight

3. Descents at 90 knots 1000fpm (non-precision approach)
   R44I, 13-14" MAP
   R4411,12-13" MAP
   500fpm (precision approach, 3° glideslope)
   R441, 16-17" MAP R44II, 15-16" MAP

4. Corrections - Increase speed / Climb Increase power by approx. 1" MAP

5. Corrections - Decelerate speed / Descend. Decrease power by approx. 1" MAP

6. Standard Rate Turn: Calculate: AS/10 + ½

   example: 110 knots /10 = 11 + 5.5 = 16.5 degree bank angle :

   90 knots / 10 = 9 + 4.5 =13.5 degree bank angle

7. Climbs: Maximum rate: 60 KIAS and max continuous power (see POH 2-9)
   Cruise climb: MCP and speed for >500fpm

8. Steep Turns: 30° bank until 15° prior to roll-out heading, needs
   +1" MAP once established in the turn. Remove after roll out

9. Timed Turns (any IAS) Degrees to be turned/3. Always use standard rate.
   e.g. every 30 degrees =10 seconds.

Minimum Equipment List Day Flight FAR 91.205

M = Magnetic Compass
A = Airspeed Indicator
T = Tachometer
S = Shoulder Harness

F = Fuel Gauge
O = Oil Pressure Gauge
O = Oil Temp. Gauge
L = Landing Gear Indicator

M = Manifold Pressure Gauge
A = Altimeter
T = Temp. Gauge for Each Liquid Cooled Engine
S = Safety Belts

Night Flight

F = Extra Fuse
L = Landing Light
A = Anti Collision Light
P = Position Light
E = Electric (Generator/Alternator)

Robinson R22/R44 (No fly unless operational)

Low RPM Warning (Light *&* Horn)
OAT Gauge (Power Settings & ice considerations)
Alternator
Governor
Hydraulics (R44)

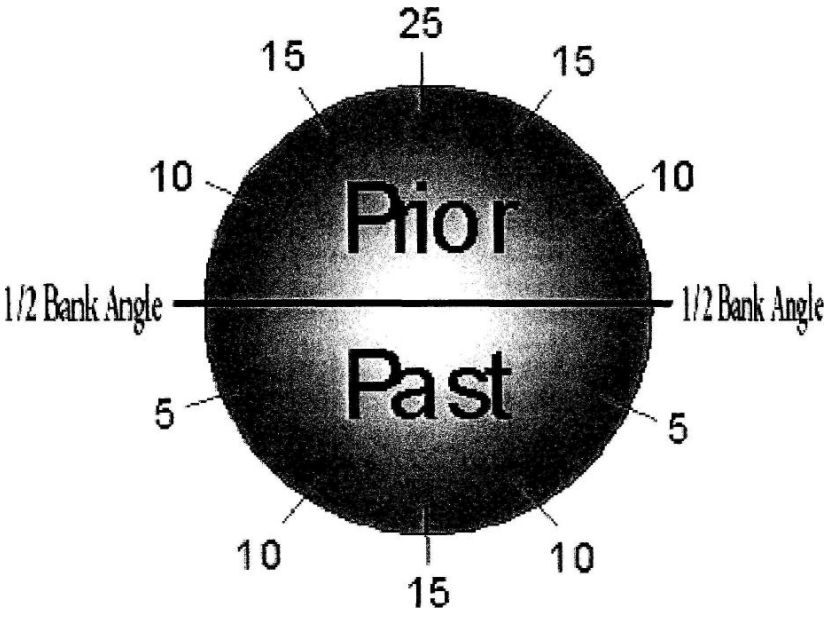
Minimum Equipment List IFR Flight FAR 91.205

G	=	Gyro (AI)
G	=	Gyro (HI)
G	=	Gyro (TC)
I	=	Inclinator (Ball)
C	=	Clock
A	=	Altimeter
R	=	Radio's necessary
A	=	Alternator

Compass Errors

V = Variation (true north, magnetic north)
D = Deviation (compass error from the aircraft installation)
M = Magnetic Dip
O = Oscillation (Fluid inside the Compass)
N = North turning error
A = Acceleration Errors on an east-west heading – AN-DS (Acceleration gives north turning error, deceleration gives south turning error)

UN-OS = Undershoot (prior) the roll-out turning to a North heading
= Overshoot (past) the roll-out turning to a South heading



GROUND CONTROL APPROACHES

1. Normally available from Military Bases (e.g. March Riverside, Los Alamitos) and is a ground controller talk down.

   Provides radar ATC services to aircraft operating in the vicinity of one or more civil and/or military airports in a terminal area. The facility provides services of a ground controlled approach (GCA); i.e., ASR and PAR approaches. A radar approach control facility may be operated by FAA, USAF, US Army, USN, USMC, or jointly by FAA and a military service:

   1. Army Radar Approach Control (ARAC) (Army).
   2. Radar Air Traffic Control Facility (RATCF) (Navy/FAA).
   3. Radar Approach Control (RAPCON) (Air Force/FAA).
   4. Terminal Radar Approach Control (TRACON) (FAA).
   5. Air Traffic Control Tower (ATCT) (FAA). (Only those towers delegated approach control authority.).

2. Two types of Approach - ASR, Approach Surveillance Radar - NON-PRECISION
   - PAR, Precision Approach Radar -PRECISION

3. ASR - Ground controller provides you with information from radar readouts about your position relative to the runway to be used. Controller will provide you with current altimeter and MDA, and will give you distance (range) from the threshold, distance left or right of the center-line and course to fly. You are responsible for deciding on the vertical flight path you will follow and increasing or decreasing your rate of descent.

   You may not descend below the MDA for the approach (typically 500' above threshold elevation) and the normal 91.175 decision criteria for landing or going missed apply

4. PAR - Ground controller will provide you with current altimeter and DH, and will give you guidance instructions (course, range and glide-slope) to put you and keep you on his approach profile, equivalent to the localizer and glide-slope of an ILS. Controller will instruct you to turn left or right by degrees and to increase/decrease your descent rate to stay on the approach profile. He will fly you down his "ILS" and you follow his instructions.

   You may not descend below the DH for the approach (typically 200' above threshold elevation) and the normal 91.175 decision criteria for landing or going missed apply

5. Both of these approaches can be flown when you have no/failed radio navigation equipment since the controller is keeping you on his "localizer / glide-slope" and all you do is fly the helicopter. All you require is two way radio communication.

Proper Radio Phraseology and Technique

A Review and Tutorial

By Austin S. Collins adapted for Universal by George McNeil

INTRODUCTION

For complete, detailed and definitive information on this subject, consult the FAA Aeronautical Information Manual, all of Chapter 4, Air Traffic Control, but especially to Section 2, Radio Communications Phraseology and Technique. Read the Pilot / Controller Glossary in the Appendices.

Some of the issues will be matters of absolute right and wrong, where there is a correct and proper way to do something and also one or more incorrect or improper ways to do it. Other issues, however, will be matters of *style,* where one way sounds proficient and professional and another way sounds sloppy and amateurish... although both ways may be technically acceptable. And finally, there will be situations where there may be more than one right way to say it. In any case, though, what's really important is that you:

1.) Make yourself clearly understood
2.) **Comply with the regulations as spelt out in the FAR/AIM and**
3.) Do not give any other pilot or air traffic controller a legitimate reason to get annoyed.

Also, bear in mind that these concepts and principles of good radio work become more important as the airspace gets more congested. At a busy airport, you'd better get it right the first time. Otherwise, the consequences could be extreme..

You don't need to talk like an auctioneer, either. Speaking at a normal pace is fine as long ***as you say only exactly what needs to be said.*** Saying three words slowly and clearly is much better than saying twelve words very fast when the same meaning can be conveyed.

Finally, remember that courtesy is always appropriate. "Please" and "Thank You" are usually called for, as are such phrases as "good morning," good afternoon," "good evening" or "good night." However, on an ***extremely*** congested channel- such as the tower frequency during a peak arrival and departure period at a major international airport - even these should be dropped in favor of the briefest, most to-the-point calls.

TOPICS

Part I. Precision, Concision and Standardization

Rule number one of aviation radio: **Be precise and concise.**

Rule number two of aviation radio: **Follow the standard sequence.**

Eliminate all unnecessary words; get to the point. Say what needs to be said - *no more, no less* - and then unkey the mike to let other people talk. Use only the essential words, eliminating extraneous verbiage. And use only the ***right*** words; remember that words have very specific legal meanings in the world of aviation radio.

Avoid hesitating, rambling and vocalized pauses such as "uh," "urn," "er" and "ah." "And" is also a very common vocalized pause, primarily when it is used to open a transmission. Many pilots do this almost unconsciously. Like all vocalized pauses, it is a sign that the pilot doesn't know exactly what words he wants to use as he begins speaking. Don't leave the mike open while you gather your thoughts! Think about what you want to say *before* you key the mike, and then say it clearly and confidently, without hesitation. Then un-key the mike and let other people talk.

1. If you want to say something lengthy, such as a flight plan or IFR position report, what should you do?
   A) Just key the mike and start talking, figuring out what you want to say as you go.
   B) Jot it down beforehand so you can say it clearly and confidently without hesitation.
   C) Speak loudly and fast instead of using a normal, conversational tone..

Answer: B.

This is a quotation from the Aeronautical Information Manual, Chapter 4, Section 2-2, paragraph b:

> Think before keying your transmitter. Know what you want to say and if it is lengthy; e.g., a flight plan or IFR position report, jot it down.

This is a quotation from the Aeronautical Information Manual, Chapter 4, Section 2-2, paragraph c:
Speak in a normal, conversational tone.

For instance, suppose you are in Helicopter N727KP, a Robinson R44, you are ten miles north west of Scottsdale, you have ATIS information Mike and you wish to enter class D airspace and land on the ramp at Universal. When you call Scottsdale Tower to request landing instructions, what should you say? Here are two examples of how this call might sound one good and the other bad.

Example (a) (BAD):

"And, Tower, this is, *uh, November 727KP with* you at, *urn,* about ten or fifteen miles to the, *ah, east, ah* west... no, I mean northwest... and we have the ATIS. We'd like to, *uh,* do a full stop landing at the Universal Ramp."

This pilot made several errors. Let's consider what they were.

First, he used a lot of unnecessary words and phrases, including one that annoys many air traffic controllers - "with you." It may surprise you to learn that phrases like "with you" or "checking on" do *not* appear in the Pilot / Controller Glossary and have no official meaning! When used by itself a statement like "with you" or "checking on" is meaningless; when used in addition to a regular transmission it is redundant. Try to refrain from using such terminology as a substitute for the actual information you are supposed to provide.

- He used a lot of vocalized pauses, including the one he used to open the transmission - "and."
- He didn't have his exact position in terms of range and bearing from the airport

ready. This
understandably exasperates controllers
- He rambled and hesitated throughout the transmission.
- He failed to provide the current ATIS code.
- He needlessly specified that he wanted to make a full stop landing. Controllers will always assume that an
inbound pilot wishes to make a full-stop landing unless he requests otherwise.
- He needlessly specified that he wanted to make a landing at the ramp.

Example (b) (GOOD):

"Scottsdale Tower, helicopter 727KP, ten north west, inbound Universal with Mike"

This pilot said nothing but what he needed to say and he said it without faltering. If the frequency was very congested and the tower controller was really busy he would be thankful for a brief, to the point, professional radio call using minimum airtime.

Hold the Mayonnaise!

One of the keys to effective radio communications is eliminating unnecessary words from your transmissions. This can be accomplished by thinking about what you want to say *before* you key the mike. Let's consider a transmission. Then let's replace all the unnecessary words with the word "mayonnaise." Then we'll *hold the mayonnaise* and see how it cleans up the call.

"And, NorCal Approach, this is, uh, helicopter 727KP with you."

"Mayonnaise, NorCal Approach, mayonnaise, mayonnaise, helicopter 727KP

mayonnaise." "NorCal Approach, helicopter 727KP."

Now let's try the same thing with a situation that applies specifically to us.

"And, Monterey Tower, this is Robinson R44 helicopter N727KP, and we are at the MillionAir ramp with information Tango. We're ready for departure to the north today."

"Mayonnaise, Monterey Tower, mayonnaise helicopter 727KP, mayonnaise MillionAir with information Tango. Mayonnaise ready for departure mayonnaise north mayonnaise.

"Monterey Tower, helicopter 727KP, MillionAir with information Tango, North departure."

Every initial call up should follow a specific four-part sequence - "who, who, where, what."
- who you're calling, who you are, where you are and what you want if it's a request or what you're doing if
it's a report.

In other words -
- the full and proper name of the facility being called (on initial call up only)
- your *full* aircraft identification (on initial call up only)
- your location (if needed) and
- the type of message to follow *or* your request (if it's short)

This is in accordance with the Aeronautical Information Manual, Chapter 4, Section 2-3, paragraph a., 1.

Let's consider another situation to further illustrate this concept. You are in helicopter N990UH, ready to depart the circles at Provo to practice in the traffic pattern at Provo. Here are two examples, one good and the other bad.

Example (c) (BAD):
"Uh, Salinas Tower, this is, *urn, 727KP* and we are, *er,* at the Aviation ramp, we have ATIS information Juliet and we are ready to go. We want to stay in the traffic pattern."

Again, this pilot made several errors.

- He used a lot of unnecessary words and phrases such as “this is, “ “we are at” and “we have.” This excess verbiage pads out the transmission, wastes time and makes the pilot sound sloppy and amateurish, like he doesn’t know what he’s doing.
- He used a lot of vocalized pauses such as “uh,” “um,” “er” and “ah.”
- He forgot to specify his aircraft type.

Now, let's look at how it *should* be done.

Example *(A)* (GOOD):

'Salinas Tower, helicopter 727KP, Aviation Ramp with Juliet, request close traffic."

This pilot "held the mayonnaise" … he was both precise and concise. He eliminated all unnecessary words, i.e. got to the point. He said what needed to be said - no more, no less. And then he un-keyed the mike to let other people talk. The controller will immediately recognize the fact that he is dealing with a pro who knows what he's doing, and will do whatever he can to be of assistance. This pilot has successfully prejudiced VTC in his favor... in the first ten seconds of his flight!

HELICOPTER 727KP: "NorCal Approach, helicopter 727KP,

request."

TRACON: "Helicopter 727KP, Squawk 0434, say request"

HELICOPTER 727KP: "Helicopter 727KP is a Robinson R44, 5 miles south of Salinas, 1600 feet, request vectors for the practice VOR 31 to Salinas with Kilo."

You told NORCAL: who you are, where you are, and what you are requesting, they know you have the current ATIS. Otherwise they will either have to give you the ATIS numbers or more likely, they will tell you to go and get it and report back when you have it, not professional and a waste of their time and airtime.

If the frequency was very quiet, you could give all your information and request on the first call but keep in mind the controller may be working more than one frequency and may be listening to another aircraft that you can’t hear.

EXAMPLE (g):

HELICOPTER 727KP: "Phoenix Approach, helicopter 727KP, request"

TRACON: "helicopter 727KP, go ahead"

HELICOPTER 727KP: "helicopter 727KP is a Robinson R44, 8 miles north east of Williams Gateway, 3500 feet, request vectors (own navigation) to the ILS 30C with Papa."

TRACON: "Roger, squawk zero four eight eight and ident."

HELICOPTER 727KP: "Zero four eight eight and ident, helicopter 727KP."

TRACON: *(a moment later)* "helicopter 727KP, radar contact 8 miles north east of Williams Gateway.

Radar Vectors, heading 120 degrees, climb and maintain 4000 feet."

HELICOPTER 727KP: 'Vectors, 120 degrees, 4000 feet, helicopter 727KP."

If the frequency is very quiet, you can go ahead and give your full request as a single transmission.

Part II. Making Position Reports at a Non-Towered Airport

When flying into or out of a heavily used airport that does not have an operating control tower, courtesy, patience, professionalism and style on the radio are extra important. If the airport has ASOS or AWOS, listen to it as soon as you are in reception range - this is often 20 miles or more. This is your source of information for runway to be used, ceiling, visibility and local altimeter setting. As soon as you have the latest "one minute" information as this is called, you can start the remainder of your WRIMTIM

If you are anything less than totally familiar with the airport, pullout the A/FD or approach plates and take a second to review the airport diagram, the navaids on or near the field and any other pertinent information.

Monitor the UNICOM and/or common traffic advisory frequency or frequencies to see what's going on. By "listening for a minute or two, you should be able to confirm which runway is in use, whether it's right or left traffic (the AFD will also give you this) and how many airplanes are presently inbound, outbound or in the pattern. Then you won't have to call to request an airport advisory. How often have you been flying at a non-towered airport with half a dozen planes doing touch-and-goes, all of them constantly making position and intention reports, when suddenly some idiot calls up right in the middle of it and asks for an airport advisory? If he had listened, even for a moment, to the CTAF then he would have been able to almost immediately figure out everything he needed to know without contributing to the congestion !

This is a quotation from the Aeronautical Information Manual, Chapter 4, Section 2-2, paragraph a: Listen before YOU transmit. Many times you can get the information you want through ATIS or by monitoring the frequency.

There is a difference between UNICOM and CTAF. UNICOM is for communicating with the FBO. CTAF is for communicating with other pilots in the air or on the ground. (At some airports, it's the same frequency. At others, it's two different frequencies.) Use the CTAF to make position reports beginning 5-10 miles out. Report on every leg of the traffic pattern. Use the following format:

1. State the full, proper name of the airport and the word "traffic." (This clarifies that you are talking to other airplanes in the vicinity of this airport as opposed to someone on the ground or a particular individual)
2. State your own full, proper call sign - including aircraft type - helicopter.
3. State your location. This can either be in the form of range and bearing to the airport or your position in the traffic pattern. If it is the latter, then you should include which leg you are on as well as whether it is left or right traffic and for which runway. If the pattern is especially busy, you may wish to be even more specific. For example, you might say "midfield left downwind" or "abeam the numbers left downwind" instead of just "left downwind."
4. If you plan to make anything other than a normal approach to a normal full-stop landing, clarify. For example, you might say "touch and go," "short approach," "long landing," "low approach only," "stop and go" or "simulated engine failure."
5. Repeat the name of the airport. (Many airports share CTA frequencies and pilots often only catch the end of a transmission.) You *do not* say the word "traffic" this time, however.

Example (h) (BAD):

"Um, two delta delta is on a, *uh,* a downwind now. *And,* this will be a, a full stop."

This pilot made several errors.

- He failed to identify the airport at the beginning and end of his call. Now pilots at all the airports within a hundred miles or more that share the same CTAF frequency are looking around to see who's on downwind.
- He failed to use his full call sign.
- He failed to say his aircraft type - helicopter.
- He failed to say whether it was a left downwind or a right downwind.. He failed to specify which runway he was planning to land on.
- He needlessly said that this will be a full-stop landing. (A full-stop is always assumed unless otherwise advertised.)
- He used a lot of vocalized pauses.

Example (i) (GOOD):

"Watsonville Traffic, helicopter 727KP, left downwind, runway 20 left, Watsonville"

You are operating 727KP, turning left base for runway 20 at Watsonville Airport. What call should you make?

A) "Watsonville, helicopter 727KP, left base."
B) "Watsonville, 727KP turning left base."
C) "Watsonville Traffic, helicopter 727KP turning left base runway 30, Watsonville Traffic."
D) "Helicopter 727KP landing runway 20, Watsonville Airport."
E) "Watsonville Traffic, helicopter 727KP turning left base runway 30, Watsonville ."
F) "Watsonville Traffic, we're turning left base runway 30, Watsonville."

Answer: E

A is incorrect because it did not begin with the phrase "Watsonville Traffic," it did not conclude with "Watsonville," it did not include the runway.
B is incorrect because it did not begin with the phrase "Watsonville Traffic, it did not include helicopter, it did not conclude with "Watsonville" it did not include aircraft type and it did not include the runway.
C is not correct because it finished with the phrase "Watsonville Traffic". There is no word traffic at the end.
D is incorrect because it did not begin with the phrase "Watsonville Traffic", it did not include the leg of the traffic pattern.
F is incorrect because it included neither the aircraft type nor call sign.

A Complete Set of Perfect Traffic Pattern Transmissions at a Non-Towered Airport:

"Watsonville traffic, helicopter 727KP, 5 miles north west, inbound to enter the traffic pattern for runway20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP, 1 mile north west, entering 45 degree midfield left downwind, runway 20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP turning left base runway 20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP turning final, runway 20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP clear of runway 20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP hover taxi to the ramp/ taxi to runway 20, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP taking off runway 20, north west departure, Watsonville."

* * *

"Watsonville traffic, helicopter 727KP upwind runway 20, departing north west, final call, Watsonville."

For practice, try reading this series out loud several times in a row. Think about how it sounds and flows.

Part III. Handling Handoffs

When one air traffic controller directs you to call another air traffic controller you should do things differently from when you are making an initial call up.

When an approach controller hands you off to a tower controller:

This typically occurs while being vectored for an approach - visual or instrument - and therefore it is usually a fairly high-workload time for the pilot. As a result, the pilot often panics and bungles the handoff call.

First, *listen* on the tower frequency for at least a couple of seconds before making a transmission! Don't just switch frequencies and immediately start talking, as far too many pilots do in this potentially stressful and distracting situation. Remember, ***the tower controller already knows you're there!***

By definition, when a radar handoff occurs, the new controller has your information in front of him. Remember you have five "T's" to perform and you will get to Talk after first flying and secondly navigating the helicopter.

AVIATE, NAVIGATE, COMMUNICATE.

If you can't break into a congested frequency to make a call, don't worry about it; don't let it frustrate you or divert your attention. If you can't call the tower, sooner or later the tower will call you. It's not a problem.

Also, bear in mind that the tower controller already knows everything he needs to know about you - when you call, there is no need to tell him anything other than who you are. It is considered a courtesy, however, to state your position in terms of an approach fix so that he knows where to glance at the radar screen.

Example (i) (BAD):

"Uh, Long Beach Tower, this is helicopter 727KP with you on the, *er,* ILS runway 20 approach; *urn,* one thousand six hundred feet, inbound from the... southeast for a … full stop landing, please."

That was a lot of unnecessary information - the tower already knows everything the pilot just said.

Example (k) (GOOD):

"Monterey Tower, helicopter 727KP, two miles from BECCA."

Now the controller can simply glance at his radar screen to find the target outside the outer marker. Then he will respond with "cleared to land", "continue" or something similar, as appropriate.

When a tower controller hands you off to a departure controller:
Again, since the controller at TRACON already knows everything he needs to know about you from the handoff, all you

have to do is identify yourself and confirm your altitude.

Example (l):

"Monterey Departure, helicopter 727KP, two thousand five hundred for four thousand."

When an approach (or center) controller hands you off to another approach (or center) controller, either at the same facility or a different one:
Again, since the next controller already knows everything he needs to know about you from the handoff, all you have to do is identify yourself and confirm your altitude.

Example (m):

You are helicopter 727KP; you are level at 8,000 feet. When you are told by Salt Lake Center to switch to Albuquerque Center, what should you say?

A) "Albuquerque Center, helicopter 727KP, level eight thousand."
B) "Albuquerque Center, this is helicopter 727KP, with you level at eight thousand, heading 180 degrees."
C) "Albuquerque Center, helicopter 727KP, with you level at eight thousand, IFR to Scottsdale"
D) "Albuquerque Center, helicopter 727KP, eight thousand."
E) "Albuquerque Center, helicopter 727KP, with you eight thousand."

Answer: A

Answers B and C are incorrect because the pilot provided a lot of unnecessary information, including his assigned heading and his destination. He also used extraneous verbiage such as "this is" and "with you."
D is incorrect because by deleting the word "level" the pilot makes it unclear whether it is helicopter 990UH checking in at eight and the controller would not immediately know if the pilot was climbing, descending or level. Note what the AIM has to say about this subject:

AIM 5 Section 3. En Route Procedures

5-3-1. ARTCC Communications

2. The following phraseology should be utilized by pilots for establishing contact with the designated facility; (a) When operating in a radar environment; On initial contact, the pilot should inform the controller of the aircraft's assigned altitude preceded by the words "level." or "climbing to," or "descending to," as appropriate; and the aircraft's present vacating altitude, if applicable.

When an approach (or center) controller terminates VFR radar service and suggests a frequency where you can request further flight following:

In this case, the next controller you contact will have no idea who you are, where you are or what you want. So you should use the procedure explained in Part II of this tutorial, Making Requests with ATC.

As you are cruising along at 3,500 feet, Albuquerque Center tells you "Helicopter 727KP, radar service terminated, squawk VFR, for further flight following suggest Phoenix Approach frequency 123.7, Good day."

What should you say when you contact Phoenix?
A) "Phoenix Approach, helicopter 727KP, level three thousand five hundred."
B) "Phoenix Approach, helicopter 727KP, twenty miles south west of Phoenix at three thousand five hundred feet, request VFR flight following to Scottsdale."
C) "Helicopter 727KP, with you at three thousand five hundred."
D) "Helicopter 727KP, with you."

Answer: B

Albuquerque Center cancelled radar service, which means that Phoenix Approach has no idea who helicopter 727KP is, where he is or what he wants. So the pilot must make an initial call. It would also be acceptable to say "Helicopter 727KP, request" and then wait for the controller to call back before providing all of the information included in choice B. A, C and D are incorrect because the nature of the pilot's transmission seems to imply that he assumes the controller is already supposed to know who he is, which will cause the controller to look around for a progress strip - which, of course, he will not find. C and D are also incorrect because they include the nonsense phrase "with you". A would be correct if this were a radar handoff, which it isn't.

Part IV. Acknowledging Radio Calls from ATC

When given instructions:

Respond by repeating the instructions - using essential words only! - and then ***conclude*** with your abbreviated call sign (or your full call sign if there is a similar-sounding call sign on the same frequency).

EXAMPLE *(*n):

TRACON: "Helicopter 7KP, turn left heading two seven zero."

HELICOPTER 727KP: "Left two seven zero, helicopter 7KP."

When given information:

Respond by saying "Roger" if you received and understood the entire transmission. It is neither necessary nor preferred that you read back the information you were given. Do not say "Roger" unless you received and understood the entire transmission. If you need something repeated or clarified, use the words "say again," "confirm" or "verify." You may conclude with your abbreviated call sign, but this is optional.

EXAMPLE *(o):*

TRACON: "Helicopter 727KP, Riverside Airport is now VFR, winds calm, scattered at one thousand five hundred, overcast at three thousand, ATIS information Delta is current, runway two seven in use,

expect vectors for the visual approach."

HELICOPTER 727KP: "Roger, helicopter 727KP."

Or

HELICOPTER 727KP: "Helicopter 727KP."

Or

HELICOPTER 727KP: "Roger."

or, if the pilot missed all or part of the transmission —

HELICOPTER 727KP: "Say Again, helicopter 727KP."

or, if the pilot is unsure about some specific component of the transmission

HELICOPTER 727KP: "Confirm vectors for the visual runway two *seven* for helicopter 727KP?"

When ***given instructions mixed with information:***

Respond by reading back only the instructions, ***not*** the information.

NorCal Approach says "Helicopter 727KP, turn left heading three three zero to intercept the localizer ILS 31, practice approach approved, no separation services provided, maintain one thousand six hundred feet until established, wind 240 degrees twenty five knots."

What would be the best response?

A) "Roger, understand intercept the localizer, wind 240 degrees twenty five knots, helicopter 727KP."

B) "Left turn to heading three three zero, intercept the localizer, vectors for the ILS seven, wind zero niner zero at one one gusting to one five, Flight Express Trainer Three."
C) "Three three zero, cleared for the approach, maintain one thousand six hundred until established, helicopter 727KP."
D) "Roger, helicopter 727KP."

Answer: C What response is expected when ATC issues an IFR clearance to pilots **of airborne aircraft?**

A) Read back the entire clearance as required by regulation.
B) Read back those parts containing altitude assignments or vectors and any part requiring verification.
C) The read-back should be unsolicited and spontaneous to confirm that the pilot understands *everything* that the controller said.
D) Acknowledge with "Roger" unless you have a specific question.
E) Read back only altitude assignments unless something has been amended.

Answer: B

You may recognize this one - it is the FAA's own test question, #4395. According to the Aeronautical Information Manual, Paragraph 4-4-6, pilots of airborne aircraft should read back those parts of ATC clearances and instructions containing altitude assignments or vectors and any part requiring verification. Pilots, not realizing this, often try to read back every single thing ATC told them. This contributes to frequency congestion and often annoys the controller. All he wants or needs to hear is that the pilot received and understood the actual *instructions* he was given. If the pilot has a question about something else in the transmission, he should use the words "say again," "confirm" or "verify."

When asked a yes-or-no question:

Respond with either "affirmative" or "negative." Do *not* say "Roger" instead of "affirmative." "Roger" does *not* mean "yes!" It means "I received and understood all of your last transmission." Likewise, do not use potentially ambiguous or silly-sounding slang such as "ten-four" or "you bet." Some controllers just groan and roll their eyes when they hear things like that, but others get deeply irritated.

As it says in the AIM, 4-2-1 (c), "Jargon, chatter and 'CB' slang have no place in ATC communications."

(Saying your call sign at the end is typically not necessary, since in this case it is usually quite obvious who responded. If there may be any doubt, however, go ahead and use your call sign.)

Salinas Tower asks, "Helicopter 727KP, will this be a full-stop landing?"

What should your response be?
A) "Roger."
B) "Affirmative."
C) "Wilco."
D) "Yes, it will."

Answer: B

"Roger" means "I received and understood all of your last transmission," but it is not an answer. "Wilco" means "I will comply with your instructions." "Yes" should not be used because single-syllable responses can be difficult to understand over the radio, especially when transmission or reception quality is poor.

When provided with traffic reports or alerts:

Respond with either "traffic in sight" or "looking for traffic." Do *not* use military slang such as "tally ho" or "no joy" unless you are a military pilot in a military airplane on a military mission. Do not use indefinite phrases like "okay" ... which does not make it clear whether you see the traffic or not!

"EXAMPLE (p):

TRACON: "Helicopter 727KP, traffic at your ten o'clock and two miles, eastbound at two thousand, a Piper Navajo."

Part V. Read backs

There are only three things that you are actually ***required*** by federal law to read back. The first is a Land And Hold Short Operation (LAHSO) clearance, which you must read back in its entirety. The second is a runway hold short clearance, which you must also read back in its entirety. The third is a taxi clearance with a runway assignment and/or a runway hold short assignment. At some airports, you are required to read back *all* taxi clearances.

Although not mandated by federal law. ATC will expect you to read back the following:

- Clearances
- Holding of any type
- Heights, headings, altimeter settings
- Instructions

The final responsibility for getting a clearance right always rests with the pilot, so read things back... and also request verification if you are at all in doubt about what a controller said.

In general, when reading anything back, use only the essential words. As always, try to eliminate excess verbiage.

EXAMPLE (q):

TRACON: "Helicopter 727KP, turn left heading three three zero, you are five miles from SNOWL, maintain three thousand one hundred until established, cleared ILS runway three zero approach at Williams Gateway."

HELICOPTER 727KP: "Left, three three zero, three thousand one hundred until established, cleared for the approach, helicopter 727KP."

Note the use of the words "left" or "right". These should be read back since A TC will occasionally get you to turn the long way round to a heading for aircraft spacing/separation purposes.

EXAMPLE (r):

HELICOPTER 727KP: "Scottsdale Clearance Delivery, Helicopter 727KP at Universal with Tango, IFR Tucson, request clearance."

CLEARANCE DELIVERY: "Helicopter 727KP, you are cleared to the Tucson Airport, after takeoff fly heading 260 degrees, intercept the Phoenix 336 degree radial, climb northwest bound, maintain four thousand, expect five thousand one zero minutes after departure. Departure frequency 120.7, squawk will be assigned by the tower."

HELICOPTER 727KP: "Cleared to Tucson, 260degrees, intercept Phoenix 336, climb north west, four thousand, expect five thousand after 10, 120.7, squawk with tower, helicopter 727KP."

EXAMPLE (s):

HELICOPTER 727KP: "Scottsdale Clearance Delivery, Helicopter 727KP at Universal with Tango, IFR Blythe, request clearance."

CLEARANCE DELIVERY: "Helicopter 727KP, you are cleared to the Blythe Airport via the Scottsdale Five Buckeye transition, then V16, Blythe, maintain four thousand, expect six thousand one zero minutes after departure. Departure frequency will be 120.7, squawk zero three two four."

HELICOPTER 727KP: "Cleared Blythe, Scottsdale 5 Buckeye, VI6, Blythe, four thousand, expect six thousand after ten, zero three two four, helicopter 727KP."

Part VI. Operating at Large and Busy Airports

Some helicopter pilots- such as those who have trained at Long Beach - have had extensive operational experience at large and busy airports. Others may have had relatively little.

It is important to be able to function in this environment. The four major hazards for helicopter pilots to consider are:

- Loss of separation in the air with fixed wing traffic
- Runway and taxiway incursions
- Wake turbulence
- Radio misunderstandings or confusion

Remember that you will be flying a helicopter in an environment oriented primarily towards heavy airplanes. Although everyone is, at least in theory, equally important, ATC tends to be prejudiced (by necessity) towards serving the needs of a 300-passenger turbojet rather than the needs of a single-pilot training helicopter.

Logically, a controller would rather make the helicopter pilot wait five minutes while the Boeing takes off or lands than make the Boeing wait five minutes while the helicopter takes off, lands or crosses the runway. If you want to cope and make friends, be READY and be FLEXIBLE.

Whether they want you to fly 360's over a shopping mall while you wait to cross the runway, or shoot your final approach at 60 knots, cheerfully comply and you will be able to operate with a minimum of stress. If you complain or say "unable" on a regular or frequent basis you will quickly acquire a bad reputation and your service will suffer. This is reality.

If it is a safe and legal clearance - accept it and comply with it. If it is not - advise ATC immediately.

While flying into or out of a major international airport, put yourself in a "high alert" mode. Scan aggressively for traffic, listen attentively on the frequency and obey all directions promptly. Don't be shy about making special requests if they are necessary to stay safe and legal. The controller might make incorrect assumptions about your helicopters capabilities. For example, he may offer you a direct departure without any open areas in the event of an engine failure, or a departure which forces you into the AVOID area of the Height - Velocity diagram. Or he may offer you a descent through developing icing conditions, requiring vectors around and away from the clouds. Or he may give you an altitude change and airspeed change combination which your helicopter cannot achieve.

Remember that even when you are flying under VFR if you are in Class B airspace you are under the direct and continuous control of ATC and you must immediately comply with any and all safe and legal clearances issued to you, including all airspeed, altitude and heading assignments. ***If you can't comply for some reason, you must advise A TC right away.*** You are expected and required to promptly and clearly refuse clearances that you cannot accept.

Carelessness in this area can lead to a loss of separation... or worse, a mid-air collision!

Moreover, do whatever is necessary to avoid wake turbulence. Follow the tips and guidelines published in the AIM even if it means making a special request with ATC. Avoid rotor downwash, AIM 7-3-7, vortices are a hazard to other aircraft up to three rotor diameters.

Flight crews of scheduled airlines have an excellent procedure - the captain maneuvers the aircraft and the first officer handles such things as clearances and checklists. As crew of a single pilot helicopter, you don't have that luxury. So you'll have to be extra vigilant if you want to keep yourself (and your career) alive. Do the following:

1. Review the airport diagram carefully and in detail prior to arrival and departure if you are not thoroughly familiar with the field.
2. Even if you are familiar with the field, keep the airport diagram available as you taxi.
3. Read back all instructions completely and carefully.
4. Write everything down, especially when the instructions are complex.
5. Listen for amended instructions - especially for sudden commands.
6. Be absolutely fluent with all standard airport markings and signs. Pay special attention to the subtle distinctions between similar symbology.
7. When in doubt – ASK

CFII Ground Lesson Plans

(unless noted all references are to ASA Pilots Manual 3 - Instrument Flying - 5th Edition 2004)

1. Instrument Flight, Attitude Flying, Scanning Techniques (Ch1, Pl-7 & P10-17 ; Ch2, P19-28)
2. Instruments and instrument errors - Pitot-Static, Gyroscopic Instruments (Ch 3, P29-64; FAR 91.187; 91 JOS; 91.411; 91.413; AIM 7-2-1 to 7-2-5)
3. Unusual Attitudes (Ch7, P119-128) & Partial panel (Ch8, P129-146; FAR 91.187; 91.205)
4. VOR - operation, types (H,L,T) & volumes, intercepts, tracking, VOR checks, HSI (Chl2, P253-288; AIM 1-1-3 to 1-1-6; AIM 1-1-12 to 1-1-13; FAR 91.171; AFD; IFR Enroute Low Altitude chart)
5. Holds, holding patterns, entries, procedure turns, course reversals, teardrop turns, wind correction, DME arcs (Ch 28, P523-544; AIM 5-3-7; TERPS)
6. Radar, ATC/ARTCC/TRACON, vectors, ASR & PAR, Transponders- modes A/C/S, DME (Ch 10, P163-196 & Ch 14, P329-334; AIM 1-3-1 to 1-3-4; AFD; IFR Enroute Low Altitude chart)
7. Obtaining weather (Ch 23, P415- 449), weather & fuel requirements for destination & alternate (FAR91.167; 91.169; AIM 7-1-21 to 7-1-30; Advisory Circular AC 00-45E)
8. Helicopter Icing. Induction & airframe, avoidance, dangers, consequences, Pilot actions (Wagtendonk, Chapter 24; FAR 91.527; AIM 7-5-12)
9. Instrument departures - Pre-flight planning & preparation, take off minimums/weather, Victor Airways, MEA, MOCA, MCA, MRA, COP, MAA, NOTAMS L D G FDC, TFR's, IFR night plans, clearances, DP's, En Route (Ch 25, P479-502; Ch 26, P502-514; Ch 27, P515-522; AIM 8-1-1; FAR 91.167; 91.169; 91.175; TERPS; AFD)
10. Radio Procedures for IFR Departures - Filing, Obtaining Clearance, Release, Departure (AIM 4-2-3,4-2-4,4-2-6, 4-3-17,4- 4-1 to 4-4-10,5-2-1 to 5-2-6; Ch 26 P507-512)
11. ILS - localizer, glideslope, markers, approach lighting systems & inoperative components, LDA's *&* SDF's (Ch 13, P289- 328; AIM 1-1-9 to 1-1-10; AIM 2-1-1 to 2-1-9; AIM 7-1-16 to 7-1-18; FAR 91.175, FAR 97 J; TERPS; *IFR* Enroute Low Altitude chart)
12. Instrument Approaches - WRIMTIM, STAR'S, segments, approach charts, Copter & PinS approaches, helicopter
    minimums, approach lighting & inoperative components, missed approaches, Circle to Land, MSAs, MVA, descent below MDA/DH (Ch 29, P545-570 & Ch 30, P571-581; AIM 5-4-1 to 5-4-12; AIM 10-1-2 & 3; FAR 91.175; FAR97.3)
13. Lost Communications -Verify, Squawk, Route-Altitude-Clearance Limit (Ch 24, P467; FAR 91.185; AIM 6-4-1 to - 6-4-3
14. Global Positioning System - GPS Description, Operation, Equipment, Failures/RAIM, G Notams (Ch 16, P341-352; AIM 1-1-19 to 1-1-21; AIM 1-2-1 to 1-2-2)
15. Instrument Regulations - 61.51,61.57,141,61.195,91.103,91.109,91.167-187,91.205,
    - 91.213,91.215,91.217,91.411,91.413,91.503, 91.527,973, and general knowledge about the areas covered in Part 95 and 97
    - Practical Test Standards - Instrument Rating/Flight Instructor Instrument
16. The student will be given reading assignments which over the period of the course will cover the following:-

    AIM Chapter 1 Sections 1,2,3 Chapter 2 Sections 1,2,3 Chapter 3 Sections 2,3, 5
    Chapter 4 Sections 1, 2,3,4 Chapter 5 Sections 1,2,3,4,5,6 Chapter 6 Section 4
    Chapter 7 Section 1,3 Chapter 9 Section 1 Chapter 10 Section 1

On a final note: (Never fly VFR into a cloud or into IFR conditions in a helicopter)

Consider that the helicopter is not stable under any condition; hence, adequate reference to the ground must always be maintained in order to keep you from losing control.

Helicopters that are allowed to fly under actual IFR conditions must have auto pilots. It has been proven over and over again that even current and rated IFR helicopter pilots that operate in a cloud without an auto pilot lose control of the helicopter within seconds. That's why the FAA requires 3 axis autopilots in order to fly single pilot helicopters under IFR in controlled airspace (less than 1000 cig. and 3 miles vis).

Do not attempt flight for any reason into a cloud without a 3 axis auto pilot, you will not be able to handle it ever. Training for IFR in a helicopter is just that, training, you are not going to be able to control the helicopter under IFR conditions after this course or when you obtain an IFR rating. Please visit the NTSB accident page for more support to this issue and pay special attention to the significant amount of helicopter accidents that occur from pilots flying into limited visibility situations.

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