

Primary Flight Training Manual

Version 3

(for Instructors)



March 20, 2005

Acknowledgement

This update to the Primary Flight Training Manual is based on the original version written by Richard C. Lindberg. The original manual was adapted from “Primary Flight Training Course for Clubs,” by Don Sobbe, as published in RCM Magazine in February and March 1984.

This latest revision of the document contains new material as well as references to additional resources that are available to Instructor Pilots. The new material has been put together by Ray Capobianco, John Parisi and Jim Orsborn and is based on the current Flight Instruction Program.

The MCRCF Flight Instruction Program operates under the general guidelines of the Flight Verification Committee which oversees the certification and all Instructor Pilots and administers the Flight Verification Exam for Solo Pilots.

Summary of Changes

Feb 20, 2005 – Original, revised edition. Changed the paragraph titles to discuss twelve “**Training Objectives**” (with Purpose, Key Elements and Evaluation sections) as opposed to “Lessons” as in the original version. The new terminology suggests that a Flight Instructor might cover multiple Training Objectives during one lesson; while other Objectives may require several flights spanning multiple lessons. Once the Instructor has covered the twelve Training Objectives, the student should be fully prepared to take the Initial, “Trainer Pilot” Flight Qualification Exam.

Mar 5, 2005 – Version 2. This version clarifies the point that the initial twelve Training Objectives cover the skills needed to successfully complete the Initial Flight Verification Exam. By passing this exam, the student will be granted permission to perform solo (unrestricted) flight operations with a high winged, flat bottom trainer aircraft. A subsequent Flight Verification Exam needs to be passed before the pilot is granted full, unrestricted flight permissions.

March 20, 2005 – Version 3. Added a new version of the Waiver of Liability statement.

PRIMARY FLIGHT TRAINING MANUAL
(Instructors)

INTRODUCTION

The function of this manual is to provide an organized and progressive series of **Training Objectives** that will not only assist you in teaching your students to fly, but to fly safely with a basic understanding of their equipment and its limitations. Your function, as an instructor, is to teach this material to the student, monitor his understanding and performance, and develop the skills and abilities he needs to fly safely.

Teaching is basically the communication of information. Teaching a skill, such as R/C flying, is a process of building confidence. The Training Objectives described in this manual are set up so that the student can gain insight and understanding in easy steps. This will build confidence in his ability so that by the time he is ready to solo, it will be just another flight. In the course of preparing for the solo flight, you and he will both be confident of the outcome. Keep in mind that no two people learn at the same rate and even fast learners have days when nothing goes right. Don't push. If a student is having trouble in one area, go on to something else and come back to the problem area another time. Quite often it helps to review a Training Objective that the student is familiar with and able to do well. This gets his mind off the trouble spot and restores his confidence.

This Primary Flight Training Manual for Instructors has identified twelve (12) Training Objectives that should be covered in the Flight Instruction Program. This manual discussed each of these Training Objectives in three areas:

- 1) Purpose
- 2) Key Elements
- 3) Evaluation

Students enrolled in the MCRCF Flight Instruction Program may have been provided either or both of the following documents: 1) Flight Training Program (Student Packet) and / or 2) MCRCF Flight Training Manual. Both of these documents discuss the MCRCF Flight Training Program in slightly different ways. In either case, your task is to cover all twelve Training Objectives discussed in this manual, regardless of how or what sequence the material is presented.

This more detailed format of this manual will enable you to easily monitor the student's progress. The student's Flight Training Manual contains a Training Log which you should fill out, along with comments and recommendations. In this way, the next instructor will know what areas the student is working on and what areas may need review. No time will be wasted and no part of the course will be missed. If the student's progress permits, several Training Objectives can be covered in one training session. The Key Elements section of each objective contains an outline of the minimum knowledge and performance requirements. Instructors should make an effort to explain each of the Key Elements for each Training Objective to insure that the student gains the best possible understanding of the Training Objectives.

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GENERAL COMMENTS

Revised two-step Flight Verification Process: Note that in 2003 the MCRCF Board approved a two step process for obtaining a Solo Flight certificate. The initial Flight Verification Exam will grant pilots permission to fly unaccompanied (solo) as long as they are flying a High Wing, Flat Bottom Trainer style aircraft. Pilots need to take a second exam before they will be granted an un-restricted, Solo Pilot certificate.

Waiver of Liability Forms: As the first step, have your student fill out and return a Waiver of Liability form.

Personal Availability: Instructor Pilots are expected to maintain a reasonably high level of availability. The position is not a “title” to be acquired without a degree of commitment to follow through and help others enjoy the sport.

Difficult Students: Difficult student come in many different varieties. Learn to expect the unexpected! One student may have extremely low self confidence and thus find it difficult to routinely handle things that they are actually capable of handling; while another may suffer from over confidence and be all too willing to try things that they are totally unprepared to handle.

As an instructor, you have accepted a responsibility to every club member to teach your students to become responsible and safe pilots who we can all be proud of and enjoy as fellow club members. If you ignore this responsibility, you will produce pilots who will be hazards to themselves, you, and everyone else.

“In the beginning the student knows nothing. After several lessons he is an expert, and from then on he knows less and less.”

Graffiti in Flight School john.

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**TRAINING OBJECTIVE 1 – Ground Safety Check and Aircraft Familiarization
(Step 1)**

PURPOSE:

Teach the student how to properly pre-flight his model. When this objective has been met the student should be able to inspect his model and identify any deficiencies that could cause a malfunction or safety hazard. He should also be able to start and adjust the engine safely.

KEY ELEMENTS:

1. Inspection of the aircraft structure and determine the CG.
2. Inspection of the radio installation.
3. Inspection of all linkages and control surfaces, including controls for proper throw, direction and freedom of movement.
4. Inspection of the engine and fuel system installation and security, including fuel lines and props.
5. Instructor's demonstration of safe engine starting procedure and engine adjustment.
6. Student starts and adjusts the engine with minimal assistance.
7. Instructor teaches the student how to identify rich and lean engine settings.

EVALUATION:

The student should be able to perform each of the key elements that comprise this training objective. Selected key elements from this training objective should be reviewed at the start of every training session.

TRAINING OBJECTIVE 2 – Radio and Field Operating Procedures (Step 1)

PURPOSE:

Teach the student how to use the radio at the field. When this objective has been met the student should be aware of the necessity for proper frequency control at the field. The student should exhibit self-disciplined use of the radio and safe operation of his model at the field.

KEY ELEMENTS:

1. The need for frequency control.
2. Proper usage of club frequency pins.
3. Impound and frequency poll.
4. Conducting a radio range check.
5. Abnormal operation of the radio and interference.
6. Flight Batteries: A. Charging B. Voltage checking C. Life.
7. Servos – Proper operation and safe load limits.
8. Non-flight operations in the pit area.
9. Engine operation in the pits.
10. Taxing on the field.

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11. Proper use of and operations on the runway.
12. Flight (pilot's) box and boundaries.
13. Other flight traffic and right-of-way procedures on the field.
14. Restricted air space (pits and parking lot).

EVALUATION:

Students should understand the requirements of this training objective and practice all of the key elements at appropriate times during all flight operations. Selected key elements should be reviewed at the start of all following lessons.

TRAINING OBJECTIVE 3 – Initial Flight Familiarization (Step 1)

PURPOSE:

Introduce the student to controlling the model in flight. When this objective has been met the student should be familiar with the model's controls and their use in flight.

KEY ELEMENTS:

1. Instructor flies and lands the student's model to evaluate its performance and airworthiness.
NOTE: This flight should be conducted in a safe and conservative manner. The model will most likely be the student's first R/C model and his confidence in your ability as a pilot and his own ability as a modeler will be reinforced if he sees his model make a successful flight. Be careful not to do anything during this flight that might undermine the student's feeling of accomplishment
2. On the ground, familiarize the student with the controls and what kind of reactions he can expect from them. Example: Explain the necessity of holding a little up elevator during turns to prevent the model from diving. Keep it simple!
3. Explain the procedures you will use to give the transmitter to the student and take it from him during the flight.
4. Explain what you would like him to do. Example: "Just get familiar with the controls and don't worry about losing control. That's why I'm here!"
5. With the model trimmed in level flight and a REASONABLE airspeed, allow the student to fly it. Whenever possible verbally correct his control inputs rather than doing it yourself. Don't let the student get nervous. If you see this happening, take the controls and let him relax.

EVALUATION:

The lesson is complete when the instructor has determined that the student is able to determine and execute proper control inputs to achieve a desired change in the model's attitude. Example: The model dives and the student uses up elevator to stop the dive. Proficiency and accurate control are not criteria at this point.

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TRAINING OBJECTIVE 4 – Basic Flight Maneuvers (Step 2)

PURPOSE:

Acquaint the student with several basic flight maneuvers and teach the student how to properly control the model during these basic maneuvers.

KEY ELEMENTS:

1. Level flight and trim
2. Banked turn
3. Straight climb
4. Climbing turns
5. Gliding
6. Disorientation

NOTE: An explanation of disorientation and the use of trim should pre-cede the lesson. The five maneuvers should be taught in the order listed, if possible.

EVALUATION:

This Training Objective has been met when the student can perform the maneuvers without assistance from the instructor. Each maneuver should be done with a reasonable degree of accuracy. Example: Turns should be fairly smooth and altitude maintained fairly well.

TRAINING OBJECTIVE 5 – Accuracy Maneuvers (Step 2)

PURPOSE:

Teach the student to perform the five basic maneuvers to a standard that will develop proficiency in their execution. Develop the student's skills and ability to control the model in a specific manner.

KEY ELEMENTS:

1. Level flight, maintaining heading and altitude.
2. Level flight at reduced power. Maintaining heading, altitude, and trim.
3. Both left and right turns to specific headings.
4. Climbing turns to specific headings.
5. Power off (idle) glides that require the student to maneuver the model to a specific area and approximate altitude.

Example: Have the student close the throttle over the North end of the field at 200 feet and glide to the South end, arriving at an altitude of about 100 feet.

NOTE: Keep in mind that the objective is to develop skill .ability and an awareness of the model's position relative to directions and altitude. Don't insist on mechanical precision. Review disorientation with the student if necessary.

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EVALUATION:

This Training Objective has been met when the student can perform all of the in-flight maneuvers with only verbal instructions. At this point, the student should be able to recover from simple mistakes without the Instructor pilot needing to take control of the model.

TRAINING OBJECTIVE 6 – Stalls (Step 2)

PURPOSE:

Develop the student's understanding of stalls; their cause and avoidance. Teach the student to recognize and recover from stalls.

Key ELEMENTS:

1. Pre-flight discussion of stalls – what causes them and how to recover.
2. Practice of stalls by the student with power and without power.
3. Stalls in turns. (Take-off, departure stalls.)

NOTE: take-off and departure stalls are almost impossible to set up with most trainers, but do occur in more advanced models. Therefore, it is recommended that power be reduced to about 1/3 throttle, and a steep climbing turn be entered. The stall entry will look similar to a spin entry with the model rolling toward the high wing. During this lesson it should be emphasized to the student that a stall can occur at any airspeed and is a function of angle of attack.

EVALUATION:

The Training Objective is complete when the student understands the cause of stalls and has demonstrated the key elements and proper recovery.

TRAINING OBJECTIVE 7 – Initial Emergency Procedures (Step 2)

PURPOSE:

Prepare the student for the unexpected. Acquaint the student with safe procedures to be used in emergencies.

KEY ELEMENTS:

1. Discussion of possible in-flight problems and how to deal with them.
2. Unusual attitude training: Loops and rolls. Optional: Spins (if aircraft is capable).

EVALUATION:

The key elements of this training objective are merely suggestions and there is no minimum performance requirement. The objective is to provide the student with insights that will assist him in safely dealing with the unexpected.

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TRAINING OBJECTIVE 8 - **Take-offs (Step 3)**

PURPOSE:

Teach the student how to make a normal take-off. Teach the student how to control the model during take-off; both on the ground and in-flight.

KEY ELEMENTS:

1. Discussion of the effects of torque during take-off and initial climb.
2. Use of the rudder.
3. Use of the throttle.
4. Student makes a normal take-off into the wind.
5. The Instructor should discuss cross wind take-off procedures.
6. The Instructor should also discuss aborted take-offs and emergency procedures.

EVALUATION:

The Training Objective has been met when the student has successfully taken off and established a normal climb with adequate airspeed. He must also demonstrate adequate directional control during the ground roll preceding take-off. The student should not be considered proficient at this skill until several consecutive take-offs have been performed without incident

TRAINING OBJECTIVE 9 – **Orientation Maneuvers (Step 3)**

PURPOSE:

Start developing the judgment, skill and ability necessary for the student to make his first landing. Teach the student to control the model regardless of its heading or direction relative to himself.

KEY ELEMENTS:

1. Figure 8 – The student must fly a Figure 8 pattern consisting of two 360 degree turns. One left and one right. The student must place the maneuver in front of himself at a safe distance and altitude
2. Rectangular Pattern – The student must fly a rectangular pattern at a safe altitude, with the upwind leg crossing the landing area.
NOTE: The instructor will designate the size, altitude, and distance of both maneuvers.

EVALUATION:

The Training Objective has been met when the student can fly the Figure 8 without experiencing disorientation and can fly both right and left rectangular patterns consistently and accurately.

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TRAINING OBJECTIVE 10 - Approaches to Landing (Step 4)

PURPOSE:

Prepare the student for his first landing. Develop the student's ability to visualize and perform a stable and controlled approach to landing.

KEY ELEMENTS:

1. Review of Lesson 9.
2. Discussion of proper landing techniques.
3. Student flies a rectangular pattern as in Lesson 9, but reduces power and establishes a normal glide on the base leg and continues the approach until over the end of the runway. At which point he is told to add power and go around (this is the ABORT). The minimum altitude at the end of the maneuver should be no less than 20 feet.
4. As the student becomes comfortable with the maneuver the altitude should be lowered until the instructor is confident that the model can glide to the runway with the power off (idle).
5. Landing. At this point the instructor will tell the student to continue the approach and land.

NOTE: The chances of a successful landing will be increased if the instructor reminds the student to keep the power at idle. It may be necessary to talk the student through the flare and touchdown.

EVALUATION:

This Training Objective has been met and the student can advance to supervised solo flight after the student has successfully landed the model several times and is comfortable with the maneuver.

TRAINING OBJECTIVE 11 – Supervised Solo Flight – No Buddy Box (Step 4)

PURPOSE:

This is a confidence building exercise. The student has probably been performing most flight operations without the Instructor needing to take control at any time during the flight. The student may become nervous when the Buddy Box is no longer attached, so this Training Objective is intended to overcome this tendency and prepare the student for the final Solo Flight Examination.

KEY ELEMENTS:

1. Pre-flight discussion to answer questions and resolve any problems that concern the student about the lesson.
2. Student performs a flight, under the instructor's supervision, starting with a thorough pre-flight and ending with the transmitter back at impound.
3. Instructor monitors student's performance, but assists only when necessary.

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EVALUATION:

This Training Objective is complete and the student is ready to be signed off for solo flight ONLY after he has demonstrated a practical knowledge of all course objectives AND has observed all safety and field operation rules, and has successfully flown his model unassisted.

TRAINING OBJECTIVE 12 – Further Emergency Procedures (Step 4)

PURPOSE:

Teach the student more maneuvers designed to cope with the unexpected. Acquaint the student with further situations requiring the application of basic skills to be used in emergencies.

KEY ELEMENTS:

1. Cross-wind take-offs and landings.
2. Students should perform a dead-stick landing.
3. Inverted flight (if aircraft is capable).
4. Student learns to change altitude quickly by executing Immelmann Turns and Split S's.

EVALUATION:

This Training Objective includes only suggestions and there is no minimum performance requirement. The objective is to provide the student with insights that will assist him in safely dealing with the unexpected. Experience will teach him the rest.

AT THIS POINT, THE STUDENT SHOULD BE PREPARED TO TAKE
THEIR INITIAL, "TRAINER PILOT" FLIGHT VERIFICATION EXAM.
After passing this exam, the student will be granted limited Solo Flight Permissions.

"IF THE STUDENT DOESN'T LEARN, THE INSTRUCTOR HASN'T TAUGHT."

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STUDENT TRAINING LOG
Instructor's Copy

Instructors should use the following Student Training Log as a permanent record of their training activities with each student. The log is a useful tool for maintaining contact information as well as a means for tracking progress with each student.

Student's Name: _____ AMA No. _____

Contact Number: _(_____)_____ - _____

Emer. Contact: _____ Phone: _(_____)_____ - _____

Dates: Initial Contact: _____ First Flight: _____ Solo: _____

Status	Training Objective	Comments
<input type="checkbox"/>	Safety / Acft. Familiarization	
<input type="checkbox"/>	Radio & Field Procedures	
<input type="checkbox"/>	Initial Flight	
<input type="checkbox"/>	Basic Flight Familiarization	
<input type="checkbox"/>	Accuracy Maneuvers	
<input type="checkbox"/>	Stalls	
<input type="checkbox"/>	Emer. Procedures	
<input type="checkbox"/>	Take-offs	
<input type="checkbox"/>	Orientation Maneuvers	
<input type="checkbox"/>	Approach to Landing	
<input type="checkbox"/>	Supervised Solo	
<input type="checkbox"/>	More Emer. Procedures	

Training Notes:

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TRAINING OBJECTIVE 13 – **Experience and Proficiency**

PURPOSE:

Gain experience and proficiency. Students are expected to take a period of time after obtaining their initial “Trainer Pilot” certificate to gain experience and become more proficient at basic flight operations. Safety practices should become second nature, and the student should gain confidence.

KEY ELEMENTS:

1. A period of time (but no specific, minimum time) gaining experience with their Trainer style aircraft.
2. Improved proficiency with all basic flight maneuvers.
3. Consistent pattern of compliance with all safety rules.

EVALUATION:

This Training Objective does not include a minimum time in service requirement. The objective is basically to provide the student with time to develop experience and proficiency.

TRAINING OBJECTIVE 14 – **Introductory Aerobatics**

PURPOSE:

Use the student’s Basic Trainer airplane to introduce the pilot to several new aerobatic maneuvers.

KEY ELEMENTS:

1. Ability to perform multiple (two or more) consecutive loops.
2. Ability to perform multiple (two or more) consecutive rolls.
3. Ability to perform Cuban 8 and/or Split S maneuvers.

EVALUATION:

This Training Objective is intended to show the student that Trainer Style aircraft are actually capable of many basic aerobatic maneuvers. While Slow Roll, Pilot Rolls, and Knife Edge maneuvers are not included in the list, they are certainly a sight to behold when flown by an experienced pilot.

TRAINING OBJECTIVE 15 – **Emergency Procedures**

PURPOSE:

Use the student’s Basic Trainer to gain additional experience handling in-flight emergencies.

KEY ELEMENTS:

1. Ability to handle crosswind conditions during both takeoff and landing.
2. Ability to handle “dead Stick” landings.

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3. Ability to recover from inverted flight and intentional stall flight configurations.

EVALUATION:

This Training Objective is intended to help the pilot develop flight skills needed to recover from in-flight emergencies while still flying their trainer aircraft. A solid foundation should be established in this area before proceeding on to other aircraft where recovery is much more difficult.

AT THIS POINT, THE STUDENT SHOULD BE PREPARED TO TAKE
THE FINAL “SOLO PILOT” FLIGHT VERIFICATION EXAM.

After passing this exam, the student will be granted unlimited Solo Flight Permissions.

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ADDITIONAL TRAINING RESOURCES

The MCRCF Flight Verification Committee has helped prepare several additional Training Resources as listed below.

○ **Flight Training Program (Student Packet)**

This is a basic Student Information packet that has been modeled after this manual. The material discusses the same 12 Objectives in the exact same order. The packet includes a Pre-Flight checklist and an overview of the Solo Qualification Exam.

○ **MCRCF Flight Instruction Program**

This is a much more detailed Training Manual. The material covers topics ranging from the selection of the first model (LT-40) to a brief introduction to aerobatics following the Solo Exam. The material includes a Waiver of Liability Form, both AMA and MCRCF Application Forms and several checklists. This manual covers all 12 Training Objectives, but it describes the objectives in term of a Four-Step Training Program. The extra material makes this an excellent source for the student.

○ **Solo Flight Evaluation and Certification**

This is a form that is included in the Flight Training Program (Student Packet). The form describes what the student should expect to be covered in the Solo Exam. The form may be filled out by the Flight Examiner and sent to the Club Secretary as a record of the examination.

○ **Checklists**

1. Airworthiness Checklist
2. Pre-Flight Checklist

○ **Pilot Proficiency Guides**

1. Solo Pilot Proficiency Guide
2. Sport Pilot Proficiency Guide
3. Intermediate Pilot Proficiency Guide
4. Advanced Pilot Proficiency Guide
5. Flight Instructor Proficiency Guide

○ **Information Brochures**

1. MCRCF Club Information Brochure and
2. Your First Airplane Information Brochure

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