ORWGP 60-3.01

4 April 2025

Mountain Flying Certification

Initial Qualification Training Course Syllabus

HEADQUARTERS, OREGON WING

EUGENE, OREGON

OPR: ORWG/DOV

Preface

This Oregon Wing pamphlet serves as the approved guidelines for Oregon Wing Pilots, Instructor Pilots**,** and Check Pilots to use for an initial qualification training (IQT) for the Mountain Flying Certification (MFC) qualification.

Oregon Wing Standardization and Evaluation (ORWG/DOV) is the office of primary responsibility for this pamphlet. Recommended changes, additions, or deletions to this pamphlet should be coordinated with ORWG/DOV.

Overview and Course Goals

1. This course is intended to complete initial Mountain Flying Certification (MFC) for CAP Mission Pilots who have not previously been certified. If a pilot is renewing their MFC (every 36 months) refer to the abbreviated "Mountain Flying Re-Certification Training Guide" syllabus.
2. A wing-level endorsed Mountain Flying Ground Training course must be successfully completed prior to beginning the first sortie of this flight training program.
3. Pilots who complete this program will be able to perform with precision and confidence all of the tasks and flight maneuvers required for safe and efficient performance of mountain search operations.
4. The flight training should be accomplished at the least possible cost in money and time, with the least amount of paperwork consistent with the course objectives.
5. It is expected that after completing the ground training and flight training sorties in this syllabus the trainee will complete a form 70-91 check flight with a qualified Mission Check Pilot / MFC Skills Evaluator which will satisfy the MFC qualification as well as the renewal of the standard Mission Pilot (24 month) re-qualification.
6. All training flights in this training syllabus will be flown with a current and qualified CAP Check Pilot or Instructor with MFC Skills Evaluator qualification.

Note: this syllabus has been adapted from the "Mountain Fury" course. It has been updated with more current information and condensed to 3 training sorties instead of 4.

Implementation

The flight training program consists of four sorties:
The first training sortie covers skills in planning for high altitude search sorties, calculating performance data and has been designed to allow the trainee experience in the differences in aircraft performance at high density altitudes compared to normal flight operations at lower altitudes. This sortie will not involve flying into mountainous terrain and should be flown well above the ground level to provide safe recovery options in case of any inadvertent stall or spin events.

The second training sortie introduces normal and emergency flight maneuvers at typical search speeds and aircraft configurations in various types of mountainous terrain. The main goal of this sortie to introduce the pilot to the high-altitude mountainous terrain flying environment, emphasize the importance of maintain a safe indicated airspeed, and develop awareness and skills necessary to avoid, and if needed safely recover from, unsafe flight conditions. If possible, this sortie should include operations into and out of a high-altitude airport, but if that is not available, then an approach to a simulated airfield along with verbal discussions of the proper procedures and considerations associated will suffice.

The third training sortie covers proper planning and execution of actual search operations in high mountainous terrain areas. The goals of this sortie are to build upon the skills learned in the first 2 sorties and extend the training to actual search techniques that will maximize the effectiveness of the available search time available.

The fourth, and final, flight will be the evaluation sortie, to be flown as a Form 91 check with additional Mountain Flying evaluation elements. The successful completion of this check flight will result in the renewal of the trainees Mission Pilot qualifications and the initial signoff of their "MFC" operation qualification. The check pilot must be both a current and qualified Form 91 Check Pilot and a "MFC" Skills Evaluator.

Aircraft to be Used

The same make and model aircraft should be used for each of the sorties and the final CAP Form 91 check ride. This course has been designed for (and it is highly recommended to be used with) a Cessna 182 non-turbo aircraft. Using a turbo aircraft would be highly desirable for actual search missions at higher altitudes, but using a non-turbo aircraft in training is better for the trainee to experience the significantly reduced performance effects of normally aspirated aircraft. This is also the most common aircraft type within the Oregon Wing.

Sortie #1 – Basic Sortie Planning and Aircraft Performance

Training Time Requirements

The trainee should expect to spend at least one hour in preflight planning for this sortie prior to meeting with the instructor. The trainee and instructor should plan on an additional hour of discussions and briefing prior to the commencement of the flight. Sortie one will require one and one half to two hours of flight time. Finally, a debrief and completion of paperwork will require one additional hour.

Objectives

1. Develop trainee's ability to plan and execute a flight to a high search altitude.
2. Develop awareness of aircraft performance by comparing calculated aircraft performance from the POH performance charts to actual performance at different density altitudes.
3. Develop trainee's knowledge of effect of altitude on turn and climb performance.
4. Develop trainee's proficiency in normal and emergency flying techniques for high altitude search operations.
5. Refresh skills in maximum performance takeoffs and landings.

Detailed Description of First Sortie

Preflight Preparation

A considerable amount of preparation is required of the trainee pilot prior to this sortie. This is intended to allow the prediction of aircraft performance and comparison of predictions with actual performance. These items should be completed prior to meeting with the instructor pilot so that the sortie can be accomplished as expeditiously as possible.

Obtain the following information from the instructor pilot and enter it on the outline/data form:

- ☐ The instructor's weight and the weight of his/her personal equipment
- ☐ The location or locations in which the sortie will be flown.
- ☐ Aircraft Information including basic weight and balance numbers.
- ☐ Weather information.
- ☐ Calculate expected aircraft performance numbers.

Weight and Balance

Trainee will complete a standard weight and balance data calculation based on the actual aircraft, crew and fuel load. Trainee and instructor will discuss the effects of aircraft weight and balance on higher altitude flight operations and review options to reduce gross weight on real missions. A copy of the weight and balance data should be uploaded to the WIMRs sortie files.

Performance Calculations:

Calculate pressure altitudes, density altitudes and critical airspeeds at the airport elevation, 6,000 feet, 10,000 feet and 12,000 feet MSL altitudes and fill these in on the sortie data form. Also calculate and record the expected takeoff and landing performance data.

Preflight Briefing:

- **Safety**. Safety is of paramount concern to everyone. If weather at the time of the sortie is of any concern postpone the sortie for another day. Ensure an accurate Operation Risk Management (ORM) has been completed and the overall risk for all crewmembers is LOW. While flying the sortie, the air work should be conducted at an altitude far away from any obstacles and well above terrain. A minimum clearance of 3,000 feet AGL is suggested for sufficient altitude to recover from an inadvertent stall/spin is needed. Verify that appropriate survival equipment is on board, and that both crewmembers have clothing suitable to spend the night in the open if an off-airport landing occurs.

- **Weather**. The trainee should provide the instructor with his/her personal assessment of the weather conditions based on the contents of a standard weather briefing. Specific items needed include forecast clouds and weather, winds and temperatures aloft, and the presence of turbulence. The instructor will confirm and discuss the weather briefing data with the Trainee and a final decision will be made as to whether the conditions are good for safe training.

- **Flight Plan**. The trainee should review the flight plan (filed earlier) with the instructor, and review route and airport departure procedures.

- **Aircraft Preflight**. Perform standard preflight inspection and add discussions about options to reduce gross weight by adjusting crew size, fuel load, and removing unnecessary equipment, if needed.

- **High altitude physiology**. Review the physiological impacts of flying at high density altitudes and typical signs of hypoxia. Discuss the possible use of and verify availability oxygen equipment and whether it is working properly before flight.

- **Aircraft Performance**. The instructor should review the pre-flight performance data entered by the trainee on the sortie data form. Select a target altitude for performing high altitude maneuvers the equates to approximately 10,000 ft. density altitude.

Takeoff and Climb

- Practice performing high density altitude engine lean-out procedure for takeoff (normally aspirated engines only, in accordance with the POH), and determine proper flap settings.
- Have the trainee identify takeoff and abort points on the field and review the departure routing. The instructor pilot should note the actual takeoff point relative to the predicted takeoff point and record the value.
- The trainee should establish a climb at Vy. Wait for the VSI to stabilize and record the max power initial rate of climb on the data form.
- Climb to approximately 6,000 feet DA (or 3000ft AGL, whichever is highest) for the first set of maneuvers.

Note: Using the autopilot and "FLC" mode to set and hold the target Vy speed can help provide a stable platform for recording ROC data.

Aircraft Performance at 6,000 ft. Density Altitude

The first set of maneuvers is intended to provide a performance baseline for comparison to the

same maneuvers later flown at higher density altitudes. Comparing them while flying and when reviewing the numbers in the post-flight debrief will provide good training opportunities to fully understand the differences in aircraft performance at higher altitudes.

The first set of items after leveling off is to record actual altitudes, airspeeds and power settings for level flight. This gives some basic performance data that represents typical search conditions.
The second set of maneuvers is designed to test and record actual indicated and true airspeeds for stall conditions in search configuration and at various bank angles.

The third set of maneuvers allows the trainee to practice and record actual performance numbers for canyon turn maneuvers at different bank angles.

The fourth set of maneuvers involves landing configuration performance to include slow flight and stall recoveries.

Aircraft Performance at 10,000 ft. Density Altitude

This portion of the sortie take the aircraft to a high-density altitude environment and then allows the trainee pilot to repeat the same maneuvers that were covered in the lower altitude section above and compare differences in actual performance numbers and feeling of aircraft responsiveness.

An additional item is added to this high altitude set, being the demonstration of a modified wingover technique emergency canyon turn. This maneuver is only practiced at the higher altitude and away from actual terrain, to provide excess time and altitude to recover from any inadvertent stall or spin entry event.

Landing Performance at Arrival Airfield

The goal of this portion of the sortie is to allow the Trainee to practice skills involving calculating actual expected aircraft landing and go-around climb performance before performing the actual final approach into a destination airfield. This skill is required to ensure safe arrivals and landings at unfamiliar, high-altitude airfields.

Post flight Debrief

- Start with a basic debrief on the sortie and answer any general questions about the maneuvers performed. Discuss items that could have been done different.
- Compare all of the calculated performance data with the actual data recorded during the flight.
- Compare differences in aircraft performance observed between the lower and higher altitudes.
- Discuss the importance of managing gross weight, and options / considerations with fuel, crew and baggage that can be used to maximize performance for high altitude searches.

- Ensure a complete debrief is entered into WIMRs.
- Set up a schedule for more planning and flying sortie number 2.

Detailed Description of Emergency Course Reversal Maneuvers:

The Canyon Turn (Steep Turn)

The canyon turn is an **emergency maneuver** used to reverse course with a level turn that requires the least possible distance in turn diameter. It also requires the least forward distance. When properly executed this maneuver approaches the structural certification limit (2.0 g with flaps deployed) and aerodynamic limit (stall speed) of the aircraft to obtain the minimum achievable turn diameter. **It should only be used to escape from emergency situations** such as turning into a narrow valley in which the aircraft cannot out climb the terrain, or when the aircraft has been inadvertently maneuvered to head directly into terrain at very close distance.

For any turn, the diameter of the turn increases by the square of the airspeed and decreases with the tangent of the bank angle. The net result is that the tightest turn that an aircraft can make in level flight is at the steepest bank angle which can be safely flown at the smallest margin above stall speed which the pilot can safely maintain. There are limits to how much bank angle can be used; however, since induced drag increases with increasing bank angle, very steep bank angles will require more power than may be available, and this will cause the aircraft to descend during such a turn even if full power is used. The g load produced by a very steep bank can also exceed the structural limitations of the aircraft. And finally, a very steep bank is difficult to maintain accurately and makes it difficult to perform this maneuver precisely.

Search operations are usually conducted with partial flap extension to improve stall margin and deck angle at search airspeed. Since all normal category light aircraft have at least a 2 g load limit with flap extension, all such aircraft can safely use a 60-degree bank for this maneuver. Also, the decrease in stall speed from using a partial flap setting allows the maneuver to be flown at a slower speed than with flaps up. For most aircraft this will allow a turn to be made with flaps in a smaller diameter than at a steeper bank angle with flaps up.

The ideal entry speed for the maneuver is one that is slightly higher than the stall speed in a 60-degree bank. Stall speed varies by model year, so you should check your POH for applicability. Also note that stall speed decreases as aircraft weight decreases by approximately half the percentage decrease in aircraft gross weight. Thus, when flying at lighter weights than maximum gross slower entry airspeeds may be used. If the conditions are turbulent higher speeds are necessary to maintain a safe margin above stall speed.

The safest way to begin this maneuver is from level flight, without attempting a pitch up before rolling in. If you have a small amount of excess airspeed over the optimum entry airspeed, you can bleed that speed off as you maintain altitude in the turn. If you have a large amount of excess airspeed you may want to pull up to slow down first, but it's best to return the nose to a level attitude before rolling in to the turn as this minimizes the chances for an inadvertent stall.

Since this maneuver is flown with the wing at a high angle of attack, the induced drag is increased which also increases the power required to maintain level flight. The power required will often exceed the power available, even at full throttle. Still, an early and smooth application of full power will aid in performing the maneuver with the least possible loss of altitude. You should be looking outside of the aircraft, slightly to the side of nose. Note the horizon picture relative to the cowl as you roll in to the turn as this shows you the approximate pitch attitude to maintain through the turn. If you raise the nose unintentionally the aircraft can stall before the maneuver is completed. If you let the nose drop you may lose an excessive amount of altitude before completing the turn. Roll the aircraft to approximately 60 degrees of bank with aileron and coordinated use of rudder. Keep the ball centered -- an uncoordinated stall from this attitude could be fatal at low altitude. Upon reaching this bank angle reduce aileron input to neutral or as necessary to maintain the bank angle. As you roll in apply just enough back pressure to maintain the pitch attitude you saw before you began the roll. To achieve the minimum possible turn radius smoothly increase back pressure on the control yoke until the stall warning begins to sound, then stop increasing back pressure. If the nose starts to drop, roll out slightly until the nose rises to the entry attitude, then roll back in to a 60-degree bank. Begin to roll out when safely headed away from terrain.

If performed correctly, 180 degrees of turn will be accomplished in about 11 seconds in a C-182 at a search altitude of 10,000 feet density altitude. The forward travel would be equivalent to that of flying straight ahead for less than 4 seconds. This is indeed a very tight turn.

The Modified Wingover -- (OPTIONAL MANEUVER)

Note: This maneuver is being included here from the original Mountain Fury Syllabus, but the ORWG standard guidance is that a 60-degree bank canyon turn provides the same level turn effectiveness in a safer and more familiar flight maneuver format, and the Modified Wingover is not recommended for actual canyon escape conditions. This option maneuver can be performed in this training, but only with an experienced Mountain flying instructor who is comfortable with teaching it, and only of the student has the desire to see it. The demo of this will confirm the 60-degree bank canyon turn is just as effective.

The name of this maneuver is deceptive -- the only things it shares in common with the wingover known to aerobatic pilots is its name and the general appearance of the maneuver. It is vastly different in execution however, and its goals are different as well. **You should not attempt this maneuver on your own outside the training environment with an experienced mountain flying instructor who has had previous training and proficiency in spin recoveries.** This maneuver is taught in some mountain flying courses as an alternative to the steep bank canyon turn. The maneuver is highly dynamic, with constant changes of pitch, bank, heading, and airspeed. If you do not handle the controls as described here, you stand a very good chance of executing a stall/spin which would likely be fatal if entered at typical search altitudes. This maneuver is designed to use the natural stability of the aircraft in pitch and bank to let the aircraft fly itself out of danger while minimizing pilot control inputs that could lead to a departure from controlled flight (i.e. stall/spin). Enter the maneuver from normal search airspeed with an **abrupt pull-up to approximately 30 degrees of pitch attitude**. At this point,

fully release back pressure on the yoke and **apply moderate rudder pressure** in the desired direction of turn. **Ailerons should remain neutral** throughout the maneuver. Some pilots completely let go of the yoke after the pull-up to ensure that they make no inadvertent aileron or elevator inputs. The goal of using the controls this way is to not apply hazardous control inputs due to the excitement of escaping from a dangerous situation. As soon as you release back pressure the natural pitch stability of the airplane will cause the nose to start to come back down. Airspeed will be decreasing however as the nose is still above level flight attitude. The airplane will not stall though, as there is no up elevator to cause the wing to exceed its stall angle of attack. The natural yaw-roll stability of the airplane will cause the rudder pressure to roll the airplane into a bank. The ball on the turn coordinator will stay centered and the aircraft will remain in coordinated flight because there is no adverse yaw from the ailerons (which have remained centered). If you apply back pressure or aileron here, you risk stalling the aircraft in uncoordinated flight with potentially disastrous consequences. **Rudder pressure should be eased off as the bank angle exceeds 45 degrees**, and then reversed as needed to keep the bank angle from exceeding 60 degrees. By this time the nose of the aircraft will be falling through level and the heading should be passing through 90 degrees of turn. You may need to apply back pressure at this point to keep the nose from dropping too low which will lead to an excessive loss of altitude and a wider turn. Recover from the turn with back pressure and coordinated aileron and rudder to assume a safe heading away from terrain. **Stalls are avoided if the aircraft is being flown "unloaded,"** i.e., with the wing not being required to fly at a high angle of attack to produce increased lift. If you do not release back pressure, the angle to attack of the wing will increase and the airplane could stall. If you limit the bank angle in the turn to 45 degrees, the airplane will not reach 90 degrees of heading change before the nose drops through level flight. The result will be a much wider turn and excessive loss of altitude before the turn is completed. If performed correctly, the diameter of the turn will be like that obtained from using the canyon turn described above. You cannot use this maneuver though when searching just below a cloud deck as you would enter the clouds during the pull-up. This turn also uses up more distance in the forward direction than the canyon turn as there is a delay from the initial pull-up to the initiation of the turn. The gain in altitude will usually not increase terrain clearance as the climb angle of the airplane will usually be less than the angle of a mountain with steep terrain.

MFC Training Sortie #1 - Aircraft Performance

PILOT _____ **CAP ID:** _____

INSTRUCTOR PILOT _____ **CAP ID:** _____

Date of Sortie _____ **Aircraft Tail# / Type** _____/ _____

Location _____

☐ Instructor/Check Pilot Signature (when complete) _____

Preflight Preparation:

Verify the following actions have been performed and entered on recording form. Review as necessary:

- Weight and balance
- Airspeed calculations
- Weather briefing
- Preflight briefing
  - ☐ Safety, ORM, survival equipment and clothing
  - ☐ Weather, including clouds, winds, temperatures and turbulence
  - ☐ Flight plan, discussed and filed
  - ☐ Discuss gross weight management and equipment needed
  - ☐ High altitude physiology – discuss signs of hypoxia and use of oxygen equipment
  - ☐ Aircraft performance – calculate/discuss all expected performance numbers

Aircraft:

Aircraft Tail#: _____ Basic Wt.: _____
Crew Wts: MP: _____lbs. MO: _____lbs. MS: _____lbs.
Baggage: _____lbs. Fuel:_____gal x 6 lbs/gal = _____lbs.
Actual Gross Weight: _____lbs. Max GW: _____lbs.
GW / Max GW x 100 = Percent Max GW: _____% (Try for 90% max)

Airfield/Takeoff/Landing Performance:

Field Elevation (MSL): _____ft.
Pressure: _____in.hg. OAT: _____Winds: _____ Pressure Altitude: _____in. Density Altitude: ft.
Total Takeoff Distance (Flaps 20):_____ft. grnd roll / ft. to clear obs.
Departure Rate of Climb Vy: _____ft/min.
Total Landing Distance (Flaps 20):_____ft. grnd roll / _____ft. to clear obs.

Search Area Data:

Search Location: _____
Search Altitude (MSL): _____ft.
Pressure: _____in.hg. OAT: _____Winds: _____ Expected Aircraft Weight: _____lbs.
Pressure Altitude: _____ft. Density Altitude: _____ft.
Max Rate of Climb (Flaps Up, Max Power): _____ft/min. @ Vy _____KIAS
Maneuvering Speed Va: _____kts.

MFC Training Sortie #1

Calculations based on Expected Actual Gross Weight at Takeoff (_____ lbs.):

MSL Altitude	_____ ft.	6,000 ft.	10,000 ft.	12,000'ft.
Today's Temp	_____ °C	_____ °C	_____ °C	_____ °C
Today's Pressure Altitude	_____ ft.	_____ ft.	_____ ft.	_____ ft.
Today's Density Altitude	_____ ft.	_____ ft.	_____ ft.	_____ ft.
Vy Speed	_____ KIAS	_____ KIAS	_____ KIA	_____ KIAS
Max ROC from POH	_____ fpm	_____ fpm	_____ fpm	_____ fpm

Stall speed flaps up _____ KIAS
Best Glide Speed Vg _____ KIAS

Calculations based on Expected Actual Gross Weight in Search Area (_____ lbs.):

MSL Altitude	6,000 ft.	10,000 ft.	12,000'ft..
Today's Temp	_____ °C	_____ °C	_____ °C
Today's Pressure Altitude	_____ ft.	_____ ft.	_____ ft.
Today's Density Altitude	_____ ft.	_____ ft.	_____ ft.
Vy Speed	_____ KIAS	_____ KIA	_____ KIAS
Max ROC from POH	_____ fpm	_____ fpm	_____ fpm

Stall speed flaps up _____ KIAS
Stall speed, 10° flaps, 0° bank _____ KIAS
Stall speed, 10° flaps, 45° bank _____ KIAS
Stall speed, 10° flaps, 60° bank _____ KIAS
Maneuvering Speed Va _____ KIAS
Best Glide Speed Vg _____ KIAS

MFC Training Sortie #1

Before engine start:

☐ Airfield Temp.____Winds _____ Altimeter Setting _____DA _____

☐ Aircraft Preflight Inspection Checklist – Complete.

Takeoff and Climb:

☐ Disable NXi ESP, if desired.

☐ Perform lean engine procedure before takeoff as per POH.

☐ Note estimated takeoff point before beginning takeoff roll.

- Record actual takeoff roll distance _____ft.

☐ Establish Vy, record ROC obtained after takeoff _____fpm. (full power)

☐ Maintain Vy, climb to next target altitude.

Aircraft Performance at 6000 ft. DA (min 3000 ft. AGL):

☐ Maintain Vy, approaching 6,000 ft DA, record full power ROC _____fpm.

☐ Level off at approx. 6,000' DA. Record indicated altitude _____ft., actual DA _____ft.

☐ Fly at search airspeed with flaps up (~85 KIAS)

- Record TAS _____kts.
- Record power settings: _____MP _____RPM

☐ Extend flaps to search setting (10°), maintain 85 KIAS

- Record power settings: _____MP _____RPM

☐ Disable NXi ESP, if desired.

Search Configuration Stalls (10° Flaps – Wings Level):

☐ Maintain wings level, reduce power to start slowing to stall warning speed.

- Record stall warning speed _____KIAS and _____KTAS

☐ Recover from stall by adding power and leveling wings, set 85 KIAS.

☐ Reduce power to idle and slow to a full stall condition.

- Record Full Stall Speed _____KIAS _____KTAS

☐ Recover from stall.

Landing Configuration Performance:

☐ Set wings level and normal approach speed, then lower full flaps.

☐ Maintain altitude and slow to the first stall horn indication

- Record Stall Warning Speed _____KIAS _____KTAS

☐ Accelerate to stall warning speed + 5 kts and perform some slow flight turns.

- Record power settings to hold level flight: _____MP _____RPM

☐ Reduce power to idle and slow to a full landing config stall condition.

- Record Full Stall Speed _____KIAS _____KTAS

☐ Recover from stall.

☐ Set Flaps UP, perform After Takeoff-Climb Check and start a climb to next altitude.

☐ Maintain Vy, approaching 10,000 ft DA, record full power ROC _____fpm.

MFC Training Sortie #1 (cont.)

Aircraft Performance at 10,000 ft. DA

- ☐ Maintain Vy, approaching 10,000 ft DA, record full power ROC fpm.
- ☐ Level off at approx. 10,000' DA. Record indicated altitude _____ft. actual DA _____ft.
- ☐ Fly at search airspeed with flaps up (~85 KIAS)
- ☐ Record TAS _____kts.
- ☐ Record power settings: _____ MP _____RPM
- ☐ Extend flaps to search setting (10°), maintain 85 KIAS
- ☐ Record power settings: _____MP _____RPM
- ☐ Disable NXi ESP, if desired.

Search Config Stalls (10° Flaps):

- ☐ Maintain wings level, reduce power to start slowing to stall speed.
- ☐ Record stall warning speed _____ KIAS and _____KTAS
- ☐ Recover from stall by adding power and leveling wings, set 85 KIAS.
- ☐ Roll into 45° bank turn, reduce power to start slowing to stall speed.
- ☐ Record stall warning speed _____ KIAS and _____ KTAS
- ☐ Recover from stall by adding power and leveling wings, set 85 KIAS.
- ☐ Roll into 60° bank turn, reduce power to start slowing to stall speed.
- ☐ Record stall warning speed _____ KIAS and _____KTAS
- ☐ Recover from stall by adding power and leveling wings, set 85 KIAS.

Landing Config Performance:

- ☐ Set wings level and normal approach speed, then lower full flaps.
- ☐ Maintain altitude and slow to the first stall horn indication
- ☐ Record Stall Warning Speed _____ KIAS _____ KTAS
- ☐ Accelerate to stall warning speed + 5 kts and perform some slow flight turns.
- ☐ Record power settings to hold level flight: _____ MP _____ RPM
- ☐ Reduce power to idle and slow to a full landing config stall condition.
- ☐ Record Full Stall Speed _____ KIAS _____ KTAS
- ☐ Recover from stall.
- ☐ Perform a Cruise checklist and begin heading to destination airfield.

Note: for the following canyon turn maneuvers, the target entry airspeeds shown are intended to be just above stall for a C182. The training goal is to experiment with slowing to and staying just above the stall warning indication speed. In actual canyon turns, that is the best technique to use. Also note that variations of turns using other flap settings are an option and can be practiced in addition to 20° Flaps, if desired. 20° Flaps is best balance between stall speed and drag.

MFC Training Sortie #1 (cont.)

Canyon Turn Performance - 30° bank turn:

- ☐ Begin with wings level, flaps 10° and 85 KIAS.
- ☐ (Start Timer) – Reduce power, set 20° Flaps and slow towards 55 KIAS.
- ☐ Roll into a 30° bank turn, hold constant altitude, set power to hold just above stall warning.
- ☐ Roll Wings Level after 180° turn.
- ☐ Record time to make the turn _____ sec.

Canyon Turn Performance - 45° bank turn:

- ☐ Begin with wings level, flaps 10° and 85 KIAS.
- ☐ (Start Timer) – Reduce power and lower 20° Flaps and slow towards 60 KIAS.
- ☐ Roll into a 45° bank turn, hold constant altitude, set power to hold just above stall warning.
- ☐ Roll Wings Level after 180° turn.
- ☐ Record time to make the turn _____ sec.

Canyon Turn Performance - 60° bank turn:

- ☐ Begin with wings level, flaps 10° and 85 KIAS.
- ☐ (Start Timer) – Reduce power and lower 20° Flaps and slow towards 70 KIAS.
- ☐ Roll into a 60° bank turn, hold constant altitude, set power to hold just above stall warning.
- ☐ Roll Wings Level after 180° turn.
- ☐ Record time to make the turn _____sec.

Optional Maneuver -- Canyon Turn Modified Wingover Demo:

Only to be performed as a training demo with an experienced instructor and only if desired by both the instructor and student. Purpose of the demo is to let the student see what the modified wingover maneuver is like in a safe training environment and verify that it does not provide any significant turn performance benefits compared to a 60-degree bank canyon steep turn. Not a recommended technique in an actual canyon escape condition.

- ☐ Review proper recovery response to any inadvertent stall / spin entry.

(**P.A.R.E**. = Power idle, Ailerons neutral, Rudders opposite turn needle, Elevator forward to break stall)

- ☐ Begin with wings level, flaps 10° and 85 KIAS.
- ☐ Record starting altitude _____ ft.
- ☐ Leave power set for level flight.
- ☐ Begin an abrupt pull up towards 30 degrees nose high.
- ☐ Approaching 30 degrees nose high release back pressure and add firm rudder in the desired turn direction.
- ☐ Keep NO back pressure and ailerons neutral. (You can try releasing the yoke completely)

MFC Training Sortie #1 (cont.)

- ☐ Use rudder to keep bank angle between 45- and 60-degrees bank.
- ☐ Allow the plane's nose to drop as it tracks through the turn.
- ☐ As the airspeed begins increasing above 70 KIAS and nose is tracking toward the 180 degree turn heading, begin adding back pressure to bring the nose back to level flight at approximately 85 KIAS. Keep the "ball centered" and avoid abrupt pitch inputs to prevent stalling the plane.
- ☐ Record ending altitude _____ ft.

Aircraft Performance at arrival airfield.

- ☐ Get current weather at destination.
  - ☐ Record Temperature _____ deg. C, Winds , Airfield Altitude MSL _____ ft.
  - ☐ Current Gross Weight _____ lbs.
  - ☐ Calculate Airfield Pressure Altitude _____ ft., Density Altitude _____ ft.
  - ☐ Calculate Landing Roll Distance _____ ft., Distance to Clear 50' Obs. _____ ft.
  - ☐ Calculate Max ROC for Go-Around / Climb _____ fpm,
- ☐ Perform a Short Field Landing
  - ☐ Record Actual Landing Roll Distance _____ ft., Distance to Clear 50' Obs. _____ ft.

Post flight Debrief

Compare estimated performance to actual performance data recorded during flight.

- What are the noted differences noted between 6,000 ft. DA and 10,000 ft. DA
- If available – look at flight track data from flight and note actual turn radius distances for the canyon turns. What are the differences between the various bank angles and altitudes.
- Review calculated vs. actual takeoff and landing distances and discuss.
- What were the pilot's preferred canyon turn techniques?

Check Pilot signs off this sortie (top of sortie page).

Discuss and plan for Sortie #2

END OF SORTIE #1

Sortie #2 –Mountainous Terrain and High Elevation Airfields

Training Time Requirements

The trainee should expect to spend at least 45 minutes in preflight planning for this sortie prior to meeting with the instructor. The trainee and instructor should plan on an additional hour of discussions and briefing prior to the commencement of the flight. Sortie three will require one and one half to two hours of flight time. Finally, a debrief and completion of paperwork will require one additional hour.

Objectives

1. Introduce trainee to flying in actual high mountainous terrain.
2. Practice skills in assessing current weather and wind conditions when arriving over and navigating through high mountainous terrain.
3. Practice safe ridge crossing techniques.
4. Practice downdraft escape procedures.
5. Practice a safe simulated canyon turn procedure.
6. Practice identifying best emergency landing sites.
7. Practice simulated engine failure emergency descent.
8. (If Possible) Practice arrival and landing at high altitude airfield.

Detailed Description of Sortie #2

Preflight Preparation

A small amount of preparation is required of the trainee pilot prior to this sortie. The trainee should fill in the calculated aircraft performance data based on actual weather conditions for the flight. These items should be completed prior to meeting with the instructor pilot so that the sortie can be accomplished as expeditiously as possible.
Obtain the following information from the instructor pilot and enter it on the outline/data form:
The instructor's weight and the weight of his/her personal equipment
The location or locations in which the sortie will be flown.
Aircraft Information including basic weight and balance numbers.
Weather information.
Calculate expected aircraft performance numbers.

Weight and Balance

Trainee will complete a standard weight and balance data calculation based on the actual aircraft, crew and fuel load. A copy of the weight and balance data should be uploaded to the WIMRs sortie files.

Performance Calculations:

Calculate pressure altitudes, density altitudes and critical airspeeds at the airport elevation, 6,000 feet, 10,000 feet and 12,000 feet MSL altitudes and fill these in on the sortie data form. Also calculate and record the expected takeoff and landing performance data.

Preflight Briefing:

Safety. Safety is of paramount concern to everyone. If weather at the time of the sortie is of any concern postpone the sortie for another day. Ensure an accurate Operation Risk Management (ORM) has been completed and the overall risk for all crewmembers is LOW. This sortie will be flown in actual high mountainous terrain. It is the responsibility of both pilots thoroughly reviewing weather and wind forecasts for the intended route of flight to ensure there are no unnecessary additional risks taken. If there is any concern that conditions are less than ideal for a training flight, then either the route of flight should be change to a better location, or the sortie should be postponed. Extra altitude should be added above a typical normal search altitude to ensure that all practice maneuvers can be started and completed without descending below 1,500 ft. AGL. Do not fly into areas where winds more than 15 kts are forecast or observed and could cause unsafe downdrafts or turbulence. Verify that appropriate survival equipment is on board, and that both crewmembers have clothing suitable to spend the night in the open if an off- airport landing occurs.

Weather. The trainee should provide the instructor with his/her personal assessment of the weather conditions based on the contents of a standard weather briefing. Specific items needed include forecast clouds and weather, winds and temperatures aloft, and the presence of turbulence. The instructor will confirm and discuss the weather briefing data with the Trainee and a final decision will be made as to whether the conditions are good for safe training.

Flight Plan. The trainee should review the flight plan (filed earlier) with the instructor, and review route and airport departure procedures.

Aircraft Preflight. Perform standard preflight inspection and add discussions about options to reduce gross weight by adjusting crew size, fuel load, and removing unnecessary equipment, if needed.

High altitude physiology. Review the physiological impacts of flying at high density altitudes and typical signs of hypoxia. Discuss the possible use of and verify availability oxygen equipment and whether it is working properly before flight.

Aircraft Performance. The instructor should review the pre-flight performance data entered by the trainee on the sortie data form. Select a target area for performing mountainous terrain maneuvers where the highest elevations equate to approximately 10,000 ft. density altitude, if possible.

MFC Training Sortie #2 – Mountainous Terrain

PILOT _____ **CAP ID:** _____

INSTRUCTOR PILOT _____ **CAP ID:** _____

Date of Sortie _____ **Aircraft Tail# / Type** _____/ _____

Location _____

-- Instructor/Check Pilot Signature (when complete) _____

Preflight Preparation

Verify the following have been performed, and data entered on recording form. Discuss and review as necessary:

- ☐ Weight and balance
- ☐ Airspeed calculations
- ☐ Weather briefing
- ☐ Preflight briefing
  - ☐ Safety, ORM, survival equipment and clothing
  - ☐ Weather, including clouds, winds, temperatures and turbulence
  - ☐ Flight plan, discussed and filed
  - ☐ Discuss gross weight management and equipment needed
  - ☐ High altitude physiology – discuss signs of hypoxia and use of oxygen equipment
  - ☐ Aircraft performance – calculate all expected performance numbers below and discuss

Aircraft:

Aircraft Tail#: _____ Basic Wt.: _____ Crew Weights: MP: _____lbs. MO: _____lbs. MS: _____lbs. Baggage: _____lbs. Fuel: __gal x 6 lbs/gal = _lbs.

Actual Gross Weight: _____lbs. Max GW: _____lbs.

GW / Max GW x 100 = Percent Max GW: _____% (Try for 90% max)

Airfield/Takeoff/Landing Performance:

Field Elevation (MSL): _____ft.

Pressure: _____in.hg. OAT: _____ Winds: _____ Pressure Altitude: _____in. Density Altitude: ft.

Total Takeoff Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs. Departure Rate of Climb Vy: __ft/min. @ Vy _____KIAS

Total Landing Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs.

MFC Training Sortie #2 (cont.)

Search Area Data:

Search Location: _____ Search Altitude (MSL): _____ft.

Pressure: _____in.hg. OAT: _____Winds: _____ Expected Aircraft Weight: _____lbs.

Pressure Altitude: _____ft. Density Altitude: _____ft.

Max Rate of Climb (Flaps Up, Max Power): _____ft/min. @ Vy _____KIAS

Maneuvering Speed Va _____KIAS

Best Glide Speed Vg _____KIAS

Arrival (High Altitude) Airfield/Takeoff/Landing Performance;

Field Elevation (MSL): _____ft.

Pressure: _____OAT: _Winds: _____ Pressure Altitude: _____in. Density Altitude: _____ft.

Total Takeoff Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs. Departure Rate of Climb Vy: __ft/min. @ Vy _____KIAS

Total Landing Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs.

Calculations based on Expected Actual Gross Weight in Search Area (lbs.):

MSL Altitude Today's	6,000 ft.	10,000 ft.	12,000'ft..
Temp	_____°C	_____°C	_____°C
Today's Pressure Altitude	_____ft.	_____ft.	_____ft.
Today's Density Altitude	_____ft.	_____ft.	_____ft.
Vy Speed	_____KIAS	_____KIA	_____KIAS
Max ROC from POH	_____fpm	_____fpm	_____fpm

Stall speed flaps up	_____KIAS
Stall speed, 10° flaps, 0° bank	_____KIAS
Stall speed, 10° flaps, 45° bank	_____KIAS
Stall speed, 10° flaps, 60° bank	_____KIAS
Maneuvering Speed Va	_____KIAS
Best Glide Speed Vg	_____KIAS

Before engine start:

Airfield Temp._____Winds _____ Altimeter Setting _____DA _____

☐ Aircraft Preflight Inspection Checklist – Complete.

Takeoff and Climb:

☐ Disable NXi ESP, if desired.

☐ Perform lean engine procedure before takeoff as per POH.

☐ Note estimated takeoff point before beginning takeoff roll.

☐ Establish Vy, record ROC obtained after takeoff _____fpm. (full power)

☐ Maintain Vy, normal climb to next target cruise altitude.

MFC Training Sortie #2 (cont.)

Approaching High Mountainous Terrain Practice Area

- ☐ Approaching practice area, set a target initial approach altitude approx. 2,000 ft. above the highest terrain to be flown over.
- ☐ Disable NXi ESP, if desired.
- ☐ Record highest terrain altitude MSL _____ft. + 2,000 = target approach altitude _____ft
- ☐ Maintain Vy, approaching target level off altitude, record full power ROC _____fpm. Verify actual aircraft climb performance exceeds the minimum required 300 fpm.
- ☐ Level off. Record indicated altitude _____ft. and actual density altitude _____ft.

MFC Training Sortie #2 (cont.)

- ☐ Use visual cues, ground track and electronic tools (G1000) to determine actual winds.
- ☐ Record wind speed and direction _____ kts. and _____ degrees. Verify safe wind conditions for training. (Preferably 15kts or less).
- ☐ Survey the terrain and identify areas of potential updraft / downdraft across ridgelines.
- ☐ Identify areas of downward sloping terrain which would provide good flight paths to use in emergencies to glide away from higher terrain.
- ☐ Identify best potential emergency off field landing sites. Look for fields, roads and young growth forest areas for example.
- ☐ Extend flaps to search setting (10°), maintain 85 KIAS.
- ☐ Perform normal Cruise Checklist and verify normal engine and aircraft operational states.

High Mountainous Terrain Practice Maneuvers

Ridge Crossing Demonstrations:

- ☐ Select a ridgeline to cross and set up an approach towards the ridge from the windward (upwind) direction and at a 45-degree crossing angle ground track and 1,000 ft above the ridge high point.
- ☐ As you approach the ridge, watch for any indications of updrafts lifting the aircraft without changing your pitch or power settings.
- ☐ As you come over the top of the ridge, simulate detecting unfavorable turbulence/wind conditions, and demonstrate making a 45-degree bank turn with a 90-degree heading change back towards the windward side. This demonstrates how quickly you can turn to avoid unfavorable conditions.
- ☐ Set up another approach to the same ridge or similar one from the windward side and 1,000 above ridge height.
- ☐ This time, complete crossing the ridge and then make a turn to fly directly away from the ridgeline at a 90-degree course angle into the leeward (downwind) side of the ridge. Note any indication of a downdraft with no change to pitch and power setting as you pass over to the leeward side.

MFC Training Sortie #2 (cont.)

Downdraft Escape Demonstration:

- ☐ Note your calculated max ROC (Vy) Airspeed _____kts. and Maneuvering Speed (Va) _____ kts.
- ☐ Set up another similar approach to the same ridge or similar one from the windward side, but this time maintain 2,000 above ridge height. Maintain 85 KIAS.
- ☐ Cross the ridgeline to the leeward side and make your turn to a 90-degree heading perpendicular to the ridge.
- ☐ After passing the ridgeline, simulate a significant downdraft by pulling power enough to set up a 500 fpm. Rate of descent at 85 KIAS.
- ☐ Start a downdraft escape by raising the nose to set Vy speed. (Wait to add power, to help simulate downdraft effects).
- ☐ Complete downdraft escape by adding full power and pitch down for Va Speed.
- ☐ Using Va speed, climb back up to altitude well clear of surrounding terrain and establish level flight and 85 kts.

MFC Training Sortie #2 (cont.)

Canyon Turn Demonstration (45° bank turn):

- ☐ Note your calculated Stall speed, 10° flaps, 45° bank _____KIAS, + 10 kts. = _____KIAS.
- ☐ Identify a wide canyon like area with ridges on both sides. This should be wide enough that there is no question that a safe 180-degree turn can be made. There should be open descending terrain out of the canyon area guaranteeing good glide options in case of emergency.
- ☐ Begin with wings level, flaps 10° and 85 KIAS flying along one side of the canyon, favoring upwind side, and altitude at least 500 ft higher than the ridges to each side. Altitude above the ground below should be at least 1,500 ft. (AGL) at all times.
- ☐ Begin with wings level, flaps 10° and 85 KIAS.
- ☐ Reduce power and lower 20° Flaps to begin slowing to 10 kts above the noted 45° bank stall speed.
- ☐ Roll into a 45° bank turn, hold constant altitude, set power to hold airspeed. Saty just above stall warning speed at all times.
- ☐ Roll Wings Level after 180° turn.
- ☐ Note the achieved turn diameter across the ground.

MFC Training Sortie #2 (cont.)

Simulated Engine Failure and Emergency Descent:

- ☐ Note your calculated Best Glide Stall speed KIAS.
- ☐ Begin with wings level, flaps 10° and 85 KIAS flying 2,000 ft above a ridgeline with clearly identified downward sloping terrain available.
- ☐ Simulate an engine failure by reducing power to the bottom of the green arc on Manifold Pressure.
- ☐ Simultaneously pitch for best glide speed and turn towards descending terrain towards one of the previously identified best emergency landing locations.
- ☐ Perform appropriate emergency checklist memory items and then read remaining checklist items using good crew resource management.
- ☐ Continue to fly towards the best off-field landing site available and talk through all additional items than can be accomplished in the descent. May Day call, preparing crew, squawk 7700, etc.
- ☐ Never descend below 2,000 ft. AGL, adding some power if needed, while descending.
- ☐ Approaching the simulated emergency landing site, recover with full power and flaps up to a desired intermediate cruising altitude.
- ☐ Perform After Take Off / Climb and Cruise Checklists.
- ☐ Begin navigating to next location planned.

High Elevation Airfield Operations

Note: Use this section to fly to an actual high-altitude airport with a density altitude of at least 6,000 feet is preferred for effective training, if possible. If an actual airfield is not available, you can pick some visually identifiable field or other spot in the local area that could be used to simulate arrival at a high-altitude airfield and accomplish items other than actual final approach and landing.

- ☐ Approaching the airfield, use any means available to determine winds and temp information.
- ☐ Review / Update calculated Takeoff / Landing / Rate of climb data for the current aircraft weight and airfield pressure / density altitude.
- ☐ Airfield Pressure Alt.:_____ ft., Density Alt.: _____ ft.
- ☐ Airfield Landing Dist.: ft roll/ ft obstacle clearance
- ☐ Takeoff/Go Around Vy: KIAS and max ROC: fpm.
- ☐ Approach the airfield at a safe altitude to be at least 2,000 ft. above airfield elevation, or 1,000 ft. above highest surrounding terrain, whichever is highest.
- ☐ Use windsock and other visual cues to verify approximate wind speed and direction.
- ☐ Identify any ascending or descending terrain off both ends of intended runway, and discuss any potential risks associated with updrafts or downdrafts on either approach or departure legs.
- ☐ Look for safe missed approach / go around flight paths through the surrounding terrain.
- ☐ Ensure that runway length available is well above calculated landing and takeoff distance numbers.
- ☐ As you maneuver past the airfield and prepare to enter the landing traffic pattern, test a full power climb at Vy Speed and ensure actual aircraft climb performance matches or exceeds calculated values.

- ☐ Entering the traffic pattern, expect to fly wider downwind and base legs than normal due to higher True Air Speeds and corresponding Ground Speeds.
- ☐ Fly normal indicated airspeeds on final and in the flare but expect the speed across the ground to feel faster than normal.
- ☐ Try to note actual landing distance and compare to calculated numbers.
- ☐ After Landing, taxi back to the departure end and perform normal before takeoff checklists.
- ☐ Perform a thorough takeoff briefing to include expected lift off point on the runway, procedures for aborted takeoff and emergencies after airborne, expected climb rate and airspeed on departure, and planned departure path. Also review all surrounding terrain threats and best options for off field emergency landings or emergency return to the field.
- ☐ Perform a proper short field takeoff.
- ☐ If desired, perform additional landings / takeoffs for practice.
- ☐ Either stop for fuel / debrief prior to next sortie or depart airfield for planned route back to other destination airfield.

Post flight Debrief

- ☐ Debrief all maneuvers.
- ☐ Review the importance of vigilant situational awareness at all times when flying in high mountainous terrain, and the need to be comfortable and proficient at calculating and verifying aircraft performance for all stages of the flight.
- ☐ Discuss the importance of always having an emergency plan of action and maintain proficiency in performing associated emergency actions and maneuvers.
- ☐ Check Pilot signs off this sortie (top of sortie page). Discuss and plan for Sortie #3

END OF SORTIE #2

Sortie #3 –Mountain Search

Training Time Requirements

The trainee should expect to spend at least 45 minutes in preflight planning for this sortie prior to meeting with the instructor. The trainee and instructor should plan on an additional hour of discussions and briefing prior to the commencement of the flight. Sortie three will require one and one half to two hours of flight time. Finally, a debrief and completion of paperwork will require one additional hour.

Objectives

1. Introduce trainee to conducting searches in actual high mountainous terrain.
2. Practice skills in assessing current weather and wind conditions when arriving over search area in mountainous terrain.
3. Practice developing a search plan based on terrain, weather, winds and lighting.
4. Practice identifying escape routes and emergency landing options.
5. Practice contour search techniques.
6. Practice canyon search techniques.
7. Practice drainage search techniques.
8. Practice simulated engine failure emergency descent.

Detailed Description of Sortie #2

Preflight Preparation

A small amount of preparation is required of the trainee pilot prior to this sortie. The trainee should fill in the calculated aircraft performance data based on actual weather conditions for the flight. These items should be completed prior to meeting with the instructor pilot so that the sortie can be accomplished as expeditiously as possible.

Obtain the following information from the instructor pilot and enter it on the outline/data form:

- ☐ The instructor's weight and the weight of his/her personal equipment
- ☐ The location or locations in which the sortie will be flown.
- ☐ Aircraft Information including basic weight and balance numbers.
- ☐ Weather information.
- ☐ Calculate expected aircraft performance numbers.

Weight and Balance

Trainee will complete a standard weight and balance data calculation based on the actual aircraft, crew and fuel load. A copy of the weight and balance data should be uploaded to the WIMRs sortie files.

Performance Calculations:

Calculate pressure altitudes, density altitudes and critical airspeeds at the airport elevation, 6,000 feet, 10,000 feet and 12,000 feet MSL altitudes and fill these in on the sortie data form. Also calculate and record the expected takeoff and landing performance data.

Preflight Briefing:

- **Safety**. Safety is of paramount concern to everyone. If weather at the time of the sortie is of any concern postpone the sortie for another day. Ensure an accurate Operation Risk Management (ORM) has been completed and the overall risk for all It is the responsibility of both pilots to thoroughly review weather and wind forecasts for the intended route of flight to ensure there are no unnecessary additional risks taken. If there is any concern that conditions are less than ideal for a training flight, then either the route of flight should be change to a better

location, or the sortie should be postponed. Extra altitude should be added above a typical normal search altitude to ensure that all practice maneuvers can be started and completed without descending below 1,500 ft. AGL. Do not fly into areas where winds more than 15 kts are forecast or observed and could cause unsafe downdrafts or turbulence. Verify that appropriate survival equipment is on board, and that both crewmembers have clothing suitable to spend the night in the open if an off- airport landing occurs.

- **Weather**. The trainee should provide the instructor with his/her personal assessment of the weather conditions based on the contents of a standard weather briefing. Specific items needed include forecast clouds and weather, winds and temperatures aloft, and the presence of turbulence. The instructor will confirm and discuss the weather briefing data with the Trainee and a final decision will be made as to whether the conditions are good for safe training.

- **Flight Plan**. The trainee should review the flight plan (filed earlier) with the instructor, and review route and airport departure procedures.

- **Aircraft Preflight**. Perform standard preflight inspection and add discussions about options to reduce gross weight by adjusting crew size, fuel load, and removing unnecessary equipment, if needed.

- **High altitude physiology**. Review the physiological impacts of flying at high density altitudes and typical signs of hypoxia. Discuss the possible use of and verify availability oxygen equipment and whether it is working properly before flight.

- **Aircraft Performance**. The instructor should review the pre-flight performance data entered by the trainee on the sortie data form. Select a target area for performing mountainous terrain maneuvers where the highest elevations equate to approximately 10,000 ft. density altitude, if possible.

Sortie #3 – High Mountain Search

PILOT _____ **CAP ID:** _____

INSTRUCTOR PILOT _____ **CAP ID:** _____

Date of Sortie _____ **Aircraft Tail# / Type** _____/ _____

Location _____

-- Instructor/Check Pilot Signature (when complete) _____

Preflight Preparation

Verify the following have been performed, and data entered on recording form.
Discuss and review as necessary:

- ☐ Weight and balance
- ☐ Airspeed calculations
- ☐ Weather briefing
- ☐ Preflight briefing
  - ☐ Safety, ORM, survival equipment and clothing
  - ☐ Weather, including clouds, winds, temperatures and turbulence
  - ☐ Flight plan, discussed and filed
  - ☐ Discuss gross weight management and equipment needed
  - ☐ High altitude physiology – discuss signs of hypoxia and use of oxygen equipment
  - ☐ Performance – calculate and discuss all expected performance numbers below and discuss

Aircraft:

Aircraft Tail#: _____ Basic Wt.: _____
Crew Weights: MP: _____lbs. MO: _____lbs. MS: _____lbs.
Baggage: _____lbs. Fuel: __gal x 6 lbs/gal = _lbs. Actual
Gross Weight: _____lbs. Max GW: _____lbs.
GW / Max GW x 100 = Percent Max GW: _____% (Try for 90% max)

Airfield/Takeoff/Landing Performance:

Field Elevation (MSL): _____ft.
Pressure: _____in.hg. OAT: _____ Winds: _____
Pressure Altitude: _____in. Density Altitude: ft.
Total Takeoff Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs.
Departure Rate of Climb Vy: _____ft/min. @ Vy _____KIAS
Total Landing Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs.

Sortie #3 – High Mountain Search (cont.)

Search Area Data:

Search Location: _____

Search Altitude (MSL): _____ft.

Pressure: _____in.hg. OAT: _____Winds: _____

Expected Aircraft Weight: _____lbs.

Pressure Altitude: _____ft.

Density Altitude: _____ft.

Max Rate of Climb (Flaps Up, Max Power): _____ft/min. @ Vy _____KIAS

Maneuvering Speed Va _____KIAS

Best Glide Speed Vg _____KIAS

Pressure and Density Altitude Data:

	Airfield;			
MSL Altitude Today's	_____ft.	6,000 ft.	10,000 ft.	12,000'ft.
Temp	_____	_____	_____	_____
Today's Pressure Altitude	_____ft.	_____ ft.	_____ft.	_____ft.
Today's Density Altitude	_____ft.	_____ ft.	_____ft.	_____ft.

Calculations based on Expected Actual Gross Weight:

Gross Weights - Takeoff_____lbs. / Search Area_____lbs.

Vx Speed	_____KIAS	_____ KIAS	_____KIAS	_____KIAS
Vy Speed	_____KIAS	_____ KIAS	_____KIAS	_____KIAS
Vy ROC from POH	_____KIAS	_____ KIAS	_____KIAS	_____KIAS
Stall speed flaps up	_____KIAS			
Stall speed, 10° flaps, 0° bank	_____KIAS			
Stall speed, 10° flaps, 45° bank	_____KIAS			
Stall speed, 10° flaps, 60° bank	_____KIAS			
Maneuvering Speed Va	_____KIAS			
Best Glide Speed Vg	_____KIAS			

Before engine start:

- ☐ Airfield Temp: _____ Winds _____ Altimeter Setting _____ DA _____
- ☐ Aircraft Preflight Inspection Checklist – Complete.

Takeoff and Climb:

- ☐ Disable NXi ESP, if desired.
- ☐ Perform lean engine procedure before takeoff as per POH.
- ☐ Note estimated takeoff point before beginning takeoff roll.
- ☐ Maintain Vy, normal climb to target cruise altitude.

Approaching High Mountainous Terrain Practice Area

- ☐ Approaching search area, set a target initial approach altitude approx. 2,000 ft. above the highest terrain to be flown over.
- ☐ Disable NXi ESP, if desired.
- ☐ Maintain Vy, approaching target level off altitude, record full power ROC _____fpm. Verify actual aircraft climb performance exceeds the minimum required 300 fpm.
- ☐ Level off. Record indicated altitude _____ ft. and actual density altitude _____ ft.
- ☐ Perform normal Cruise Checklist and verify normal engine and aircraft operational states.

Sortie #3 – High Mountain Search (cont.)

High Mountainous Terrain Search

- ☐ Use visual cues, ground track and electronic tools (G1000) do determine actual winds.
- ☐ Record wind speed and direction _____kts. _____ degrees. Verify safe wind conditions for training. (Preferably 15kts or less).
- ☐ Use visual ground references to identify / verify boundaries of search area.
- ☐ Record highest search area terrain altitude MSL _____ ft.
- ☐ Survey the terrain and identify areas of potential updraft / downdraft across ridgelines.
- ☐ Identify areas of downward sloping terrain which would provide good flight paths to use in emergencies to glide away from higher terrain.
- ☐ Identify best potential emergency off field landing sites. Look for fields, roads and young growth forest areas for example.
- ☐ Using a "High to Low" methodology, identify the strategy for how the search will be conducted to effectively maximize search coverage with the given time and fuel available.
- ☐ Discuss the effects of sun angle and terrain lighting on search effectiveness.
- ☐ Extend flaps to search setting (10°), maintain 85 KIAS.
- ☐ Find an area suitable for contour search and demonstrate proper technique.
- ☐ Find an area suitable for a safe demonstration of canyon search proper technique. Do Not try to fly into any canyons that do not have excess margins for safe turns and escape paths towards descending terrain.
- ☐ If desired, practice another canyon escape turn. Always ensure safe margins are preserved in distances to ridges and altitudes AGL.
- ☐ Find a suitable ridge with clear descending terrain escape options to demonstrate a "Drainage Search" or "Canyon Dive". Use Full Flaps, or use partial flaps and forward slip, to maintain search airspeed in the dive.
- ☐ Find an open area in the terrain where a modified parallel search pattern can be used. Work the parallel routes from higher to lower terrain.
- ☐ Discuss methods that can be used to keep track of searched sections of the assigned search grid, using paper or electronic methods.
- ☐ Set up the aircraft at a safe altitude and location over the terrain to simulate an emergency situation resulting in a descent to the best possible off field landing location. Maintain 2,000 ft AGL at all times.
- ☐ Recover to cruise configuration and return to base.

Post flight Debrief

- ☐ Debrief all maneuvers.
- ☐ Review the importance of vigilant situational awareness at all times when flying in high mountainous terrain, and the need to be comfortable and proficient at calculating and verifying aircraft performance for all stages of the flight.
- ☐ Discuss the importance of always having an emergency plan of action at all times and maintain proficiency in performing associated emergency actions and maneuvers.
- ☐ Discuss ways to maximize crew resource management on mountain search missions.
- ☐ Discuss importance of monitoring other crew members for signs of fatigue or hypoxia and be prepared to terminate the mission at any time, if needed.
- ☐ Discuss ways to maximize search effectiveness when searching high mountainous terrain.
- ☐ Check Pilot signs off this sortie (top of sortie page). Discuss and plan for Final Check Flight.

END OF SORTIE #3

MFC Qualification - Flight #4 – EVALUATION SORTIE

PILOT _____ **CAP ID:** _____

CHECK PILOT _____ **CAP ID:** _____

Date of Sortie _____ **Aircraft Tail# / Type** _____/ _____

Location _____

-- Check Pilot Signature (when complete) _____

The trainee mission pilot will demonstrate, at a minimum, the following items with an MFC SET qualified Check Pilot. Addition items may be accomplished at the discretion of the trainee and check pilot and pre-briefed accordingly.

Preflight Data Calculations:

Aircraft;

Aircraft Tail#: _____ Basic Wt.: _____
Crew Weights: MP: _____lbs. MO: ____lbs. MS: _____lbs.
Baggage: _____lbs. Fuel:____gal x 6 lbs/gal = _____lbs.
Actual Gross Weight: _____lbs. Max GW: _____lbs.
GW / Max GW x 100 = Percent Max GW: _____% (Try for 90% max)

Airfield/Takeoff/Landing Performance;

Field Elevation (MSL): _____ft.
Pressure: _____in.hg. OAT: _____ Winds: _____
Pressure Altitude: _____in. Density Altitude: ft.
Total Takeoff Distance (Flaps 20):_____ft. ground roll /_____ft. to clear obs.
Departure Rate of Climb Vy: _____ft/min. @ Vy _____KIAS
Total Landing Distance (Flaps 20):_____ft. ground roll / _____ft. to clear obs.

Search Area Data;

Search Location: _____
Search Altitude (MSL): _____ft.
Pressure: _____in.hg. OAT: _____ Winds: _____
Expected Aircraft Weight: _____lbs.
Pressure Altitude: _____ft.
Density Altitude: _____ft.
Max Rate of Climb (Flaps Up, Max Power): _____ft/min. @ Vy _____KIAS
Maneuvering Speed Va _____KIAS
Best Glide Speed Vg _____KIAS
Stall speed, 10° flaps, 0° bank _____ KIAS
Stall speed, 10° flaps, 45° bank _____ KIAS
Stall speed, 10° flaps, 60° bank _____KIAS

Sortie #4 - MFC Qualification – EVALUATION SORTIE

Preflight:

- ☐ Calculate Density Altitude for the departure airfield and for the highest altitude in the planned search area.
- ☐ Determine Max Rate of Climb Performance at the departure airfield and at the search altitude.
- ☐ Determine Va and Stall Speeds for Flaps up and Flaps 10 for 0, 45 and 60-degree bank turns at the search altitude.
- ☐ If a high altitude / mountain terrain airfield is available, calculate Density altitude, and then the Landing, Takeoff, and Climb performance data for the actual conditions. If none are available, do this for a simulated airfield.
- ☐ Conduct a Mission Brief covering the simulated mission search grids and flight/mission goals and plans.

In-flight:

- ☐ Disable NXi ESP, if desired.
- ☐ Fly a standard departure and route towards the planned search area.
- ☐ While enroute, climb to an altitude that results in a Density Altitude of approximately 10,000 ft. (and at least 3,000 ft. MSL)
- ☐ Perform slow flight and a stall with Full flaps.
- ☐ Recover and Set 10° flaps, 85 KIAS.
- ☐ Demonstrate a 60 Degree Bank simulated canyon escape turn.
- ☐ Proceed to the actual search area and complete the following;
- ☐ Identify the boundaries of the designated search grid.
- ☐ Identify emergency escape routes and landing options.
- ☐ Verify the actual Density Altitudes match the preflight calculations and adjust performance numbers if different.
- ☐ Demonstrate actual ROC performance matches expected values and meets minimum allowed.
- ☐ Verify the actual winds and explain how they will affect the search plans.
- ☐ Discuss the search patterns to be used to effectively search the given grid.
- ☐ Demonstrate a ridge crossing.
- ☐ Demonstrate a contour search.
- ☐ Demonstrate a canyon search.
- ☐ Demonstrate a canyon dive (drainage search).
- ☐ Demonstrate a simulated downdraft escape (maintain safe altitude and terrain clearance).
- ☐ Demonstrate a simulated emergency that involves turning to a planned escape route and flying towards a best landing spot available (maintain safe altitude and terrain clearance).
- ☐ Assuming this flight is also a Form 70-91 check, then add the additional evaluation items required.
- ☐ Proceed to a mountain airfield (If none available, simulate one in or near the search area);
- ☐ Verify that the actual pressure altitude and performance data planned match the actual conditions and adjust as necessary.
- ☐ Discuss the terrain and winds and define a safe approach path and safe go-around and departure path.
- ☐ If conditions permit, fly an approach and landing, then taxi back for a takeoff.
- ☐ Demonstrate briefing takeoff distance markers, abort decisions and procedures and normal and emergency departure plans and routes.
- ☐ Return to base and debrief. Check Pilot to upload qualification in eServices.

END OF SORTIE #4