Mountain Fury
Mountain Search Flying
Course Syllabus

Goals

1. 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.
2. 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.
   a) Flight training should be conducted in the trainee's local area to the maximum extent possible.
   b) Paperwork should be limited to those items that are needed to confirm that the course material has been covered adequately, plus those items which will be useful to the participants for future reference.

Implementation

The flight training program consists of four sorties. The first two sorties cover basic and advanced techniques for flying an airplane to its maximum level of performance. Flight operations for the first two sorties will be conducted at high MSL altitudes but should be conducted **well away from terrain**. In keeping with goal 2a, these sorties may be flown in the trainee's local area. Trainees will fly these sorties with a **CAP check pilot** who has completed the Mountain Fury course.

The third and forth sorties cover high altitude airport operations and flight and search operations in high terrain areas. These sorties are intended to be flown from a high-altitude search base in conjunction with the final segment of a Mountain Fury training course.

The flying syllabus is presented in both detail and outline form. The detail form contains in depth descriptions of maneuvers and procedures. It is intended for detailed study on the ground so that course participants may clearly understand the course objectives and what is expected of them. The outline form is a concise description of the items in the detail form. It is intended to be used in flight as a checklist and data recording form as an aid to the instructor to help ensure that all training objectives are accomplished.

Aircraft to be Used

The same make and model aircraft should be used for each of the sorties and the Form 91 check ride for the Mountain Fury Program

<u>First Sortie</u>

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 aircraft handbook performance to actual performance.
3. Introduce and develop skills in executing maximum performance maneuvers.
4. Refresh skills in maximum performance takeoffs and landings.

Timeline

The Mountain Fury ground training course must be successfully completed prior to beginning the first sortie of this flight training program. Both the ground training course and sorties one and two must be successfully completed prior to attending a week-end Mountain Fury course for sorties three and four.

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.

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.

Weight and Balance

Obtain data on the aircraft needed to complete a weight and balance computation. Perform a weight and balance calculation including planned fuel load, weights of the trainee and instructor and their personal equipment. Enter the gross weight, CG, maximum allowable gross weight and percent difference of the operating weight from maximum gross weight on the outline/data form. Note that a **forward CG position produces a higher stall speed**. This should be considered in calculating stall speeds below.

Airspeed calculations

Calculate critical airspeeds at sea level (or the airport elevation) through 12,000 feet density altitude and fill these in on the outline/data form. These include Vx, Vy, Va, stall speeds for flaps up and normal search configuration (typically 10 to 20 degrees of flap), best glide speed, and stall speeds in a 45 degree and 60 degree bank turn. Also calculate and record the expected takeoff distance. Record this information on the outline / recording form.

Note: When calculating canyon turn diameter and entry speed, CALIBRATED stall speed must be used. The resulting entry speed in calibrated airspeed must be converted into INDICATED airspeed for use in flight. For most aircraft used by CAP, the difference between calibrated airspeed and indicated airspeed at stall speed is fairly large, but at the canyon turn entry airspeed it is very small. If INDICATED stall speed is used for the calculations, the calculated canyon turn entry speed will be about 15 knots too slow.

Weather Briefing

Obtain a standard briefing for the area in which the sortie will be flown. A DUAT briefing is preferred as it assures that all available weather information is obtained. Print out the briefing or record information from the briefing form on the outline/data form so that the briefing and conditions may be discussed with the instructor pilot. Prepare and file a flight plan for the sortie.

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. Complete the CAP personal safety matrix prior to the flight. Once again, if the score is high and unacceptable, postpone the flight for another day. 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. 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 should obtain an independent briefing so that the trainee's assessment can be evaluated.

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

Aircraft Preflight. If possible, the preflight inspection should be performed in the presence of the instructor. Any non-standard equipment (radios, oxygen, survival gear) should be should be discussed to ensure familiarity of both pilots with that equipment. Any inoperative equipment should be identified and assessed as to whether it is required for the flight. Review the weight and balance calculations performed by the trainee and verify that the aircraft is loaded within limits.

High altitude physiology. The instructor should asses the trainee pilot’s probable tolerance to high altitudes. Factors to consider are the altitude of the trainee's home, the trainee's physical condition and health, smoking, and recent time living at high altitude. Verify availability / non-availability of oxygen equipment and whether it is working properly before flight.

Aircraft Performance. Discuss power settings, maximum rates of climb (and associated airspeeds) estimated takeoff distance and takeoff abort point. The instructor should review the pre-flight data entered by the trainee on the outline / data form. Select an altitude at which to perform high altitude maneuvers. This should be between 8,000 and 12,000 feet depending on expected aircraft performance and availability of oxygen for the crew. Compare this to the density altitudes calculated from the winds aloft forecast during preflight preparation and note the indicated altitude that will be needed to achieve the desired density altitude.

Complete a CAP safety inspection form for the aircraft.

Takeoff and Climbout

If density altitude is 3,000 feet or higher, have pilot perform engine lean-out (normally aspirated engines only, in accordance with the POH) for takeoff, 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 difference on the recording form. To estimate the distance, count the number of seconds that liftoff occurs before or after reaching the predicted liftoff point. You may convert this time to distance during the postflight review by multiplying the rotation speed in knots true airspeed by the number of seconds from the expected takeoff point and multiply by 1.7 to get distance in feet.

Example: 5 seconds past the expected liftoff point with a rotation speed of 70 knots true -- 5 x 70 x 1.7 = 595 feet.

The trainee should establish a climb at Vy. Wait for the VSI to stabilize and record the initial rate of climb on the data form. Alternatively, you can time one minute of climb and record the altitude gained. This is a more accurate method than using the VSI.

Climb to at least 3,000 feet AGL or 5,000 feet DA (whichever is higher) for the first set of maneuvers.

Airplane Configurations and Power Setting vs Airspeed

The first set of maneuvers is intended to provide a performance baseline for comparison to these maneuvers when flown at mountain search altitudes.

Establish search airspeed (approximately 85 KIAS, as appropriate to the aircraft) with flaps up. Record the power setting required for this airspeed.

Perform medium bank turns (30° of bank) left and right.

Extend flaps to search setting (10-25° flap, as appropriate to the aircraft). Record power setting required for this airspeed.

Extend landing gear (for retracts) and full flaps, fly at normal speed for approach to landing and maintain level flight. Record power required.

Simulate a go-around by applying full power with gear/flaps down. Fly at the speed listed in the POH for Vy max gross weight with gear and flaps up. Record the rate of climb obtained.

Maintain the climb and slow down in 5 knot increments. Note the airspeed which produces the greatest rate of climb in this configuration, and record this airspeed and the rate of climb achieved.

Raise the gear and flaps. Perform a departure stall with full power. Resume level flight.

Slow flight: Decrease airspeed to just above stall speed — intermittent activation of the stall warning horn is OK. Perform turns left and right in a shallow bank (10-15°) with coordinated use of the rudder.

Perform an approach to landing stall with power off.

Resume level flight with flaps at search setting. Resume search airspeed.

Descents:
Reduce power to idle, extened full flaps at normal approach speed. Record rate of descent.
Increase speed to approach speed for flaps up. Raise flaps. Perform a maximum effort slip. Record the rate of descent.

Resume coordinated flight and transition to a climb with full power.

Operations at Search Ceilings

The goal of these maneuvers is to show how aircraft performance and handling change at high elevation search altitudes.

Climb to the altitude selected in preflight preparation to give the desired density altitude to simulate high altitude mountain search. Use the airspeed for Vy that you calculated for this altitude and weight. Record the rate of climb for comparison to POH figures.

Repeat the steps above to observe and record the power settings for level flight with flaps up, partial flaps, and full flaps with gear down. Apply full power and record the rate of climb. Resume level flight.

The following maneuvers are intended to simulate aircraft performance at the search ceiling (e.g., the altitude at which the aircraft climbs at 300 feet per minute with full power).

Retract the gear and flaps, and reduce power so that the rate of climb is 300 feet per minute. Record the power setting.

Perform a departure stall at this power setting.

Resume level flight. Reduce power to idle, perform an approach to landing stall.

Resume level flight at normal search speed.

Perform and time a canyon turn as described below. If you desire to add power during this maneuver, use as a maximum the power setting that was needed to maintain a 300 fpm climb at this altitude. Record the time required to complete this turn. If altitude is lost while performing this maneuver, record the altitude loss on the data form.

Perform a modified wing-over as described below and record the altitude lost, if any. Discuss the subjective results of this maneuver with those of the canyon turn.

Takeoffs and Landings

The goal of these maneuvers is to hone skills in maximum performance takeoffs and landings. Increased proficiency will be very useful for the high altitude airport operations conducted in sorties 3 and 4.

Perform at least 3 takeoffs and landings, including short and soft field takeoffs and landings, and power off approach / landing. Estimate and record actual landing distance for short and soft field landings.

Postflight Debrief

Review the data recorded during the flight for comparison to POH data. This provides the trainee with an objective look at how much of the book performance he or she can obtain. Compare estimated to actual values for takeoff and landing distances, rates of climb, and time to complete 180 degree turns. Time and airspeed can be used to calculate the turn diameter. Also review the power settings needed to maintain level flight with flaps and landing gear up and down, and the airspeed that produced the best rate of climb with flaps and gear down. This review should aid in the trainee in more fully understanding the performance capability of the airplane.

Fill out the Flying Gradesheet for maneuvers performed in this sortie. Mark an "S" for satisfactory performance, "T" or more training required, and "U" for unsatisfactory performance. The grade of "T" should be used when performance is marginally acceptable or the trainee shows signs of improvement but is not yet proficient. "U" should be used when the trainee is experiencing considerable difficulty and maneuvers are deemed unsafe or unacceptable.

Satisfactory performance is a judgment call on behalf of the Check Pilot. If the pilot understands the requirements and can execute those requirements in accordance with the FAA test standards for his rating in the judgment of the Check Pilot, the pilot’s records should be endorsed to move on to the next phase of the program.

The check pilot needs to endorse the Mountain Fury completion certificate when this first sortie section has been successfully completed.

Set up a schedule for more training as needed or for 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 can not outclimb 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**. The stall speed in a 60 degree bank is 1.4 times the stall speed in level flight. To calculate the entry speed, multiply the CALIBRATED stall speed for the amount of flaps you're using from the POH by 1.4 and add 5 to 10 knots (depending on your skill level). Here are some typical speeds for common CAP aircraft:

Cessna 182: 81 to 86 KIAS
Cessna 172: 75 to 80 KIAS
Cessna 206: 92 to 97 KIAS

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 in order 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. For a C-172, it'd be about 10 seconds, and for a C-206 about 12 seconds. 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

The modified wing-over is another emergency maneuver used to reverse course in a small amount of space. 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 before you have received dual instruction on it unless you have training and proficiency in spin recoveries.**

As with the canyon turn, this maneuver **should only be used to escape from emergency situations**. 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.

> Note: This technique does not work well with all airplanes used in search operations. Some, including the Cessna 182, have an overbanking tendency in the turn which will cause the bank angle to exceed 60 degrees of bank. These aircraft and some others with strong pitch stability will also tend to nose down rapidly after back pressure is released. This will produce excessive altitude loss and increase in speed before the turn is completed. To perform this maneuver in these aircraft you must use aileron opposite to the direction of turn as needed to avoid banking to an excessive bank angle. In addition, some back pressure will be necessary to prevent the nose from dropping to an excessively low pitch attitude. You should practice this maneuver in the aircraft in which you fly search to determine whether it works for you in that aircraft. If not, do not use this maneuver.

This maneuver produces a small radius turn with low g-force because turning occurs at a low airspeed while the nose is high. **Stalls are unlikely as 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 similar to 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. Still, this maneuver his some merits. You should practice both turn techniques until you are proficient at them, and then decide which you prefer to use under a variety of conditions.

MOUNTAIN FURY
SORTIE NUMBER ONE
OUTLINE / DATA RECORDING FORM

PILOT ____

CHECK PILOT ____

Check Pilot Number _________

Date of Sortie _______________ **Aircraft Type** __________

Location ___________________

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, including personal matrix, survival equipment and clothing
  - ❑ weather, including clouds, winds, temperatures and turbulence
  - ❑ flight plan, discussed and filed
  - ❑ aircraft preflight -- discuss non-standard equipment, oxygen, inop equipment
  - ❑ high altitude physiology -- discuss pilot's adaptation, health and condition, smoking
  - ❑ aircraft performance -- discuss and fill in recording form with performance predictions
  - ❑ safety inspection form -- verify completed

Fill in the blanks before the flight

Weights:

Aircraft Basic Empty Weight	__________
Trainee	__________
Trainee's Equipment	__________
Instructor	__________
Instructor's Equipment	__________
Other items in aircraft	__________
Fuel load	__________
Gross Weight	__________
Maximum Gross Weight	__________
Empty CG	__________
CG as loaded	__________
Within CG / Weight limits (Y/N)?	__________
CG in forward 30% of range (higher stall speed) ?	_______
Percent Difference from Max Gross Weight	__________

Airspeeds for max gross weight: --------------- density altitude -------------------

	sea level	6,000'	8000'	10,000'	12,000'
Vx	________	________	________	________	________
Vy	________	________	________	________	________
Vy ROC from POH	________	________	________	________	________

stall speed flaps up, KCAS ________
stall speed, search configuration (flaps), KCAS ________
stall speed, search config, 45° bank ↳ x 1.2 = ________
stall speed, search config, 60° bank ↳ x 1.4 = ________
canyon turn entry airspeed KCAS ↳ + 10 = _______
canyon turn entry airspeed KIAS (use table in POH/AFM) _______
Va ________
best glide ________

For actual takeoff weight, reduce airspeeds above by 1/2 percent difference from max gross weight): --------------- density altitude -------------------

	sea level	6,000'	8000'	10,000'	12,000'
Vx	________	________	________	________	________
Vy	________	________	________	________	________

stall speed flaps up, KCAS ________
stall speed, search configuration (weight, flaps), KCAS ________
stall speed, search config, 45° bank ↳ x 1.2 = ________
stall speed, search config, 60° bank ↳ x 1.4 = ________
canyon turn entry airspeed KCAS ↳ + 10 = _______
canyon turn entry airspeed KIAS (use table in POH/AFM) _______
Va ________
best glide ________

From Winds Aloft Forecast (FD)	3000'	6000'	9000'	12000'
wind / temperature	________	________	________	________
density altitude (calculate)	________	________	________	________

Desired density altitude for high altitude maneuvers (8-12,000 feet) ________
Indicated altitude (approximate) for above density altitude ________
(NOTE: this is the indicated altitude you will use for this sortie)

Altimeter setting ________
Field elevation ________
Temperature ________
Density Altitude ________

Expected takeoff distance (ground roll): ________
Expected landing distance (over 50' obstacle, short field technique): ________

Total time flown on this sortie: ________

EXAMPLE: C-182Q, @2612 lb, 2950 lb max gross weight

Airspeeds for max gross weight: --------------- density altitude -------------------

	sea level	6,000'	8000'	10,000'	12,000'
Vx	54	59	60	62	64
Vy	78	74	73	72	71
Vy ROC from POH	1010	680	570	460	350

stall speed flaps up, KCAS ______59
stall speed, search configuration (flaps), KCAS ______57 (10° flaps)
stall speed, search config, 45° bank ↳ x 1.2 = ______68
stall speed, search config, 60° bank ↳ x 1.4 = ______80
canyon turn entry airspeed KCAS ↳ + 10 = ______90
canyon turn entry airspeed KIAS (use table in POH/AFM) ______91

Va ______111
best glide ______70

For actual takeoff weight, reduce airspeeds above by 1/2 the percent difference from max gross weight): --------------- density altitude -------------------

	sea level	6,000'	8000'	10,000'	12,000'
Vx	51	56	56	58	60
Vy	73	70	69	68	67

search ceiling (altitude for 300 fpm ROC): _17,800 (from rules of thumb)
stall speed flaps up, KCAS ______56
stall speed, search configuration (weight, flaps), KCAS ______54
stall speed, search config, 45° bank ↳ x 1.2 = ______65
stall speed, search config, 60° bank ↳ x 1.4 = ______76
canyon turn entry airspeed KCAS ↳ + 10 = _____86
canyon turn entry airspeed KIAS (use table in POH/AFM) _____87

Va _____104
best glide ______66

From Winds Aloft Forecast (FD)	3000'	6000'	9000'	12000'
wind / temperature	0314 ~17	0618+19	0721+12	0624+04
density altitude (calculate)	3,926	7,820	10,700	13,471

Altimeter setting	29.85
Field elevation	1,531
Temperature	25 C
Density Altitude	3,035

Expected takeoff distance (ground roll): __1,000
Expected landing distance (over 50' obstacle, short field technique): __1,460

Total time flown on this sortie: ________

FLYING THE SORTIE
(Fill in the blanks in-flight)

Before engine start:
Altimeter error _______
(set altimeter to local setting if available, record difference to known field elevation)

Takeoff and Climbout

- ❑ if DA > 3000', lean engine before takeoff as per POH
- ❑ note estimated takeoff point before beginning takeoff roll.
- ❑ estimate distance (or time) of liftoff from expected point
  distance (or seconds) beyond expected liftoff point _______
- ❑ establish Vy, record actual ROC obtained after takeoff _______

Airplane Configurations and Power Setting vs Airspeed

- ❑ Level off at least 3000 AGL or 5,000 DA (whichever is higher)
- ❑ Fly at search airspeed with flaps up (~85 KIAS)
  record power settings: _________ MP _______ RPM
- ❑ Extend flaps to search setting (10-25°), maintain airspeed
  record power settings: _________ MP _______ RPM
- ❑ Extend gear and full flaps, fly at normal speed for approach to landing, maintain altitude.
  record power settings: _________ MP _______ RPM
- ❑ Apply full power and fly at Vy for max gross weight, gear and flaps down.
  record rate of climb obtained: ______
- ❑ Decrease speed in 5 knot increments (while staying above stall). Record the Rate of climb achieved to find actual Vy at this weight/altitude with gear/flaps down:
  Airspeed _______ ROC _______
  Airspeed _______ ROC _______
  Airspeed _______ ROC _______
- ❑ Raise the gear and flaps. Perform a departure stall with full power.
- ❑ Slow flight: Decrease airspeed to normal approach speed. Perform turns left and right.
- ❑ Perform an approach to landing stall with power off.
- ❑ Resume level flight with flaps at search setting. Resume search airspeed.

Descents:

- ❑ Reduce power to idle, extend full flaps at normal approach speed.
  record rate of descent: ______
- ❑ Increase speed to approach speed for flaps up. Raise flaps. Perform a maximum effort slip. record the rate of descent: _______
- ❑ Resume coordinated flight and transition to a climb with full power.

Operations at Search Ceilings

- ❑ Climb to the altitude selected in preflight preparation to give the desired density altitude to simulate high altitude mountain search. Use the Vy airspeed previously calculated for this altitude and weight. Record the rate of climb obtained: ________
- ❑ Level off at desired search altitude.
- ❑ Fly at search airspeed with flaps up (~85 KIAS)
  record power settings: _________ MP _______ RPM
- ❑ Extend flaps to search setting (10-25°), maintain airspeed
  record power settings: _________ MP _______ RPM

- ❑ Extend gear and full flaps, fly at normal speed for approach to landing, maintain altitude. record power settings: _________ MP _______ RPM
- ❑ Apply full power and fly at Vy for best climb as recorded above, gear and flaps down Record rate of climb obtained: ______
- ❑ Raise gear and flaps, reduce power so that the rate of climb is 300 feet per minute. Record the power setting: _________ MP _______ RPM
- ❑ Perform a departure stall at this power setting.
- ❑ Resume level flight. Reduce power to idle, perform an approach to landing stall.
- ❑ Resume level flight.
- ❑ Perform and time a canyon turn, using no more power than recorded above for the 300 fpm climb. Record the time to complete this turn: ________.
  Altitude lost, if any: _______
- ❑ Perform a modified wing-over, as described below. Compare results to the canyon turn. Record altitude lost, if any: _______

Takeoffs and Landings

Perform at least 3 takeoffs and landings, including:

- ❑ short field takeoffs / landing. Estimate and record distance over 50 foot obstacle:
  takeoff: _______ landing: _______
- ❑ soft field takeoff / landing. Estimate and record distance over 50 foot obstacle:
  takeoff: _______ landing: _______
- ❑ power off approach / landing. Estimate and record distance over 50 foot obstacle: _______

Postflight Debrief

Compare estimated performance to actual performance for:

- ❑ Takeoff and landing distances
- ❑ Rate of climb on takeoff and at search altitude
- ❑ Rate of climb difference from using Vy for max gross versus Vy adjusted for weight.
- ❑ Discuss results from practice of canyon turn and modified wingover
- ❑ Complete applicable portions of Flying Gradesheet
- ❑ Instructor Pilot: endorse trainee's records and completion certificate

END OF SORTIE NUMBER ONE