Sling
PILOT ACADEMY

Maneuver Guide

Private and Commercial Pilot - ASEL

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List Of Revisions:
Version 1 - 02/2024

Preamble

Document Information

The Sling Pilot Academy ASEL Maneuvers Guide provides students and instructors the standard/expected method for completing all ACS listed maneuvers in the Sling NGT.

Slight deviations may be made from the listed profiles at the pilot's discretion.

Caution: This guide is to be used for familiarization and maneuver standardization. It will not replace any official aircraft documentation or procedures as written in the latest version of the Pilots Operating Handbook.

Note: Designated Pilot Examiners (DPEs) used at Sling Pilot Academy are familiar with the profiles in this guide and expect maneuvers to be completed as such during FAA Checkrides.

Prior To Each Maneuver

Prior to starting any maneuver, pilot's must perform a flow to ensure the maneuver can be performed safely by checking the status of the aircraft, environment, and close proximity traffic. SPA recommends the IP3C flow:

I	Instruments (Check)
P	Position (Pick Emergency Landing Spot)
C	Clear (Clearing turn to scan for traffic)
C	Call (Radio call to practice area of intentions)
C	Configure (Prepare aircraft for maneuver)

Maneuvers Information

Although this guide provides brief descriptions of each maneuver, pilots are expected to read the information about each maneuver written in the Airplane Flying Handbook (FAA-H-8083-3C). The procedures in the AFH may not align with the ones in this guide due to aircraft differences, but the basic objectives of the maneuver remain the same.

Standards of Completion

While following the maneuver procedures in this guide, pilots are expected to comply with the standards and limitations listed in the Airman Certification Standards for the application rating.

Feedback

This document was written by the Chief Instructors and modified based on feedback from instructors. For any suggestions and/or recommended corrections, send an email to *andrew@slingpilotacademy.com*

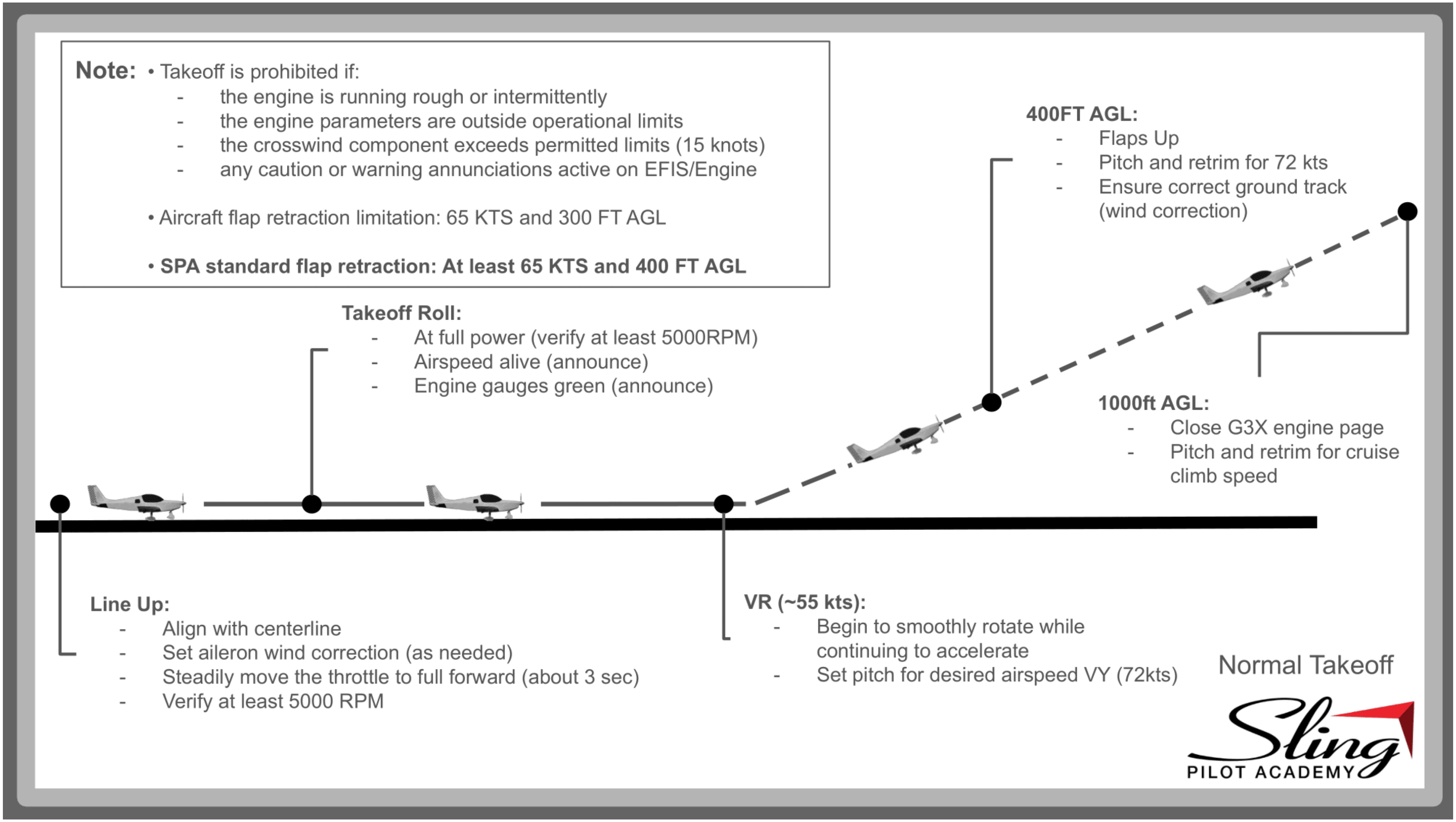
Early Version Feedback

During the early stages of the SPA Maneuver Guide rollout, we request that any student or CFI submit feedback/corrections to the following link: https://bit.ly/maneuvers-guide-feedback

Happy flying!

Normal Takeoff and Climb

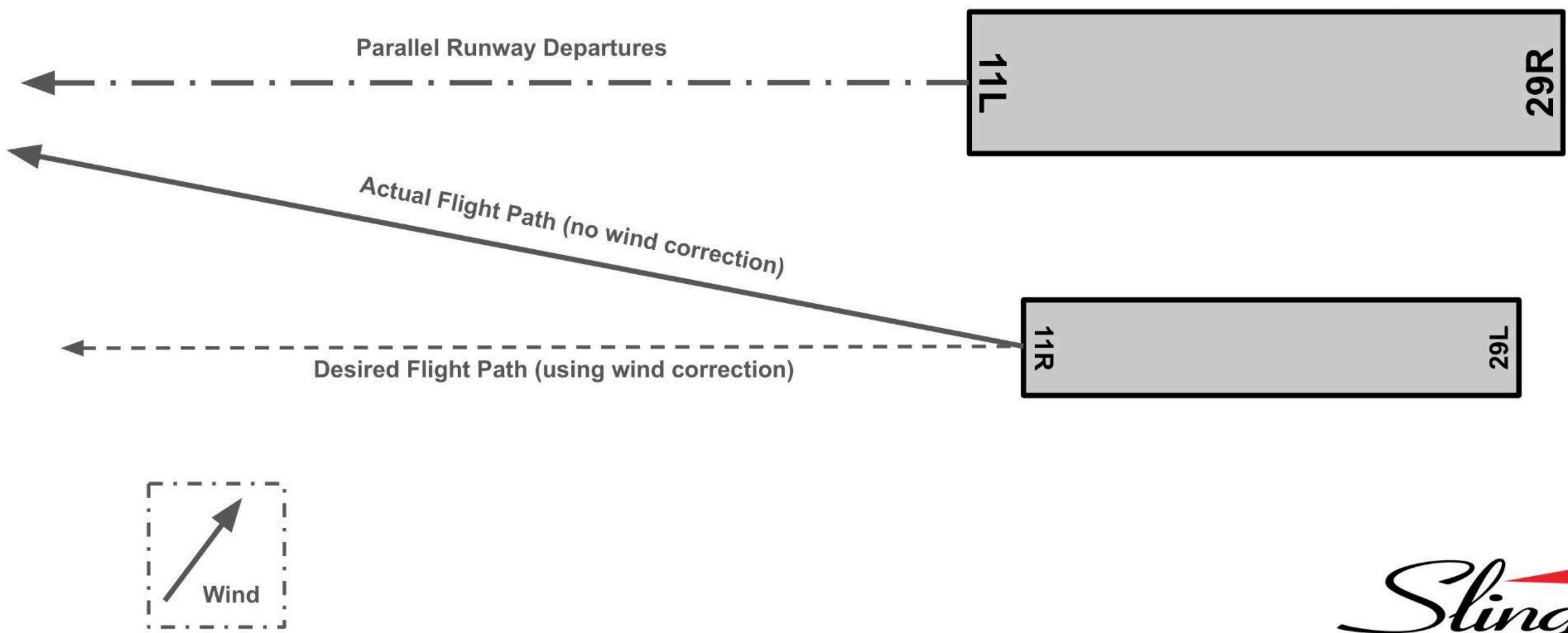
Normal Takeoff and Climb Profile



Normal Takeoff and Climb

Wind-Drift Correction Profile

Note: • Failure to make adequate wind correction can lead to loss of separation from departing traffic on parallel runways
• IFR Departures must fly runway heading (not ground track) if prescribed by the DP.



Sling PILOT ACADEMY

Normal Takeoff and Climb

Introduction

A normal takeoff and climb will be used at all airports where the runway is NOT constrained by surrounding terrain and/or obstacles. Each takeoff should be completed with maximum situational awareness as many factors play an important role in the procedure.

Note: All takeoffs and climbs are a critical phase of flight. Any conversation not pertaining to the safety of flight must be held until at least 1000 FT AGL.

Note: Review noise abatement procedures and information on the A/FD before departing any new airport.

When taking off, pilots must be aware of the *aircraft state, engine status, weather, traffic, and any/all other factors*. It is common for pilots to become fixated on a few, or just a single factor while departing an airport. Fixation during this phase of flight will create a hazardous environment. Pilots should view the takeoff and climb as a big picture, and always prepare, and expect to reject the takeoff or have to turn back after liftoff.

Aircraft State

Pilots must be in-sync and aware of what their aircraft is doing at all times during flight. During the takeoff and climb, the pilot must check and know the aircraft's configuration. This covers items like fuel pumps, lights, flap setting, etc. Failure to confirm/set proper aircraft configuration leads to the pilot being behind the aircraft.

Engine Status

The largest threat during takeoff is an engine abnormality. While pilots cannot predict when an abnormality may occur, they can mitigate the chances by performing an in-depth and high quality preflight and engine run up. During the takeoff and climb, the pilot should be constantly checking the engine's gauges while at low altitudes (1500 FT AGL and below). While on the takeoff roll, the pilot must ensure all the gauges are within their normal operating limits (green) and that the engine is producing sufficient power for takeoff (5000 RPM - POH.4.6). If any abnormal reading is noticed, the takeoff must be rejected, and an SMS report should be filed immediately.

Weather

During takeoff with cross wind conditions, pilots must apply aileron correction during the takeoff roll until shortly after liftoff. This prevents the windward wing from being lifted up prior to rotation, causing a non-wings level attitude while on, or close to the ground. The amount of aileron correction must be adjusted based on the velocity and direction of the winds.

Traffic

While departing from any airport, controlled or uncontrolled, pilots must be ultra aware of where all other aircraft are in reference to their position at all times. Special consideration must be used when operating at airports with paralleling runways, as wind-drift caused by winds aloft and now correction by the pilot will lead to the aircraft to drift into the extended centerline of the paralleling runway causing a loss of separation.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Takeoff Flow -	
Parking Brake -	OFF
Fuel Selector -	Highest Tank
Flaps -	Set (1)
Lights -	ON (Takeoff/Taxi)
Fuel Pumps -	Both ON
Engine Page (G3X) -	Open
Heading Bug -	Rwy Heading
Flaps/Trim Indicator -	Check
Lanes Switches -	ON (No lights)
Canopy -	Closed/Latched
Final -	Clear
Runway -	Clear

Takeoff -

A. Progressively set throttle to full power (~3 seconds from IDLE to FULL)
B. Check for at least 5000 RPM
C. Check all gauges green (announce)
D. Check airspeed alive (announce)
E. Begin to smoothly rotate at approximately 55kts
F. Accelerate to VY (72kts)

Climb -

G. Maintain VY (72kts)
H. 400ft AGL - flaps up
I. 1500ft - Transition to cruise climb speed (75-90kts)
J. Scan for traffic
K. Climb checklist

Supplemental: Takeoff and Climb from a Touch and Go (after landing) -

L. Progressively add full power
M. Flaps 1
N. Begin to smoothly rotate at approximately 55kts or when aircraft is ready to fly
O. Accelerate to VY (72kts)
P. 400ft AGL - flaps up

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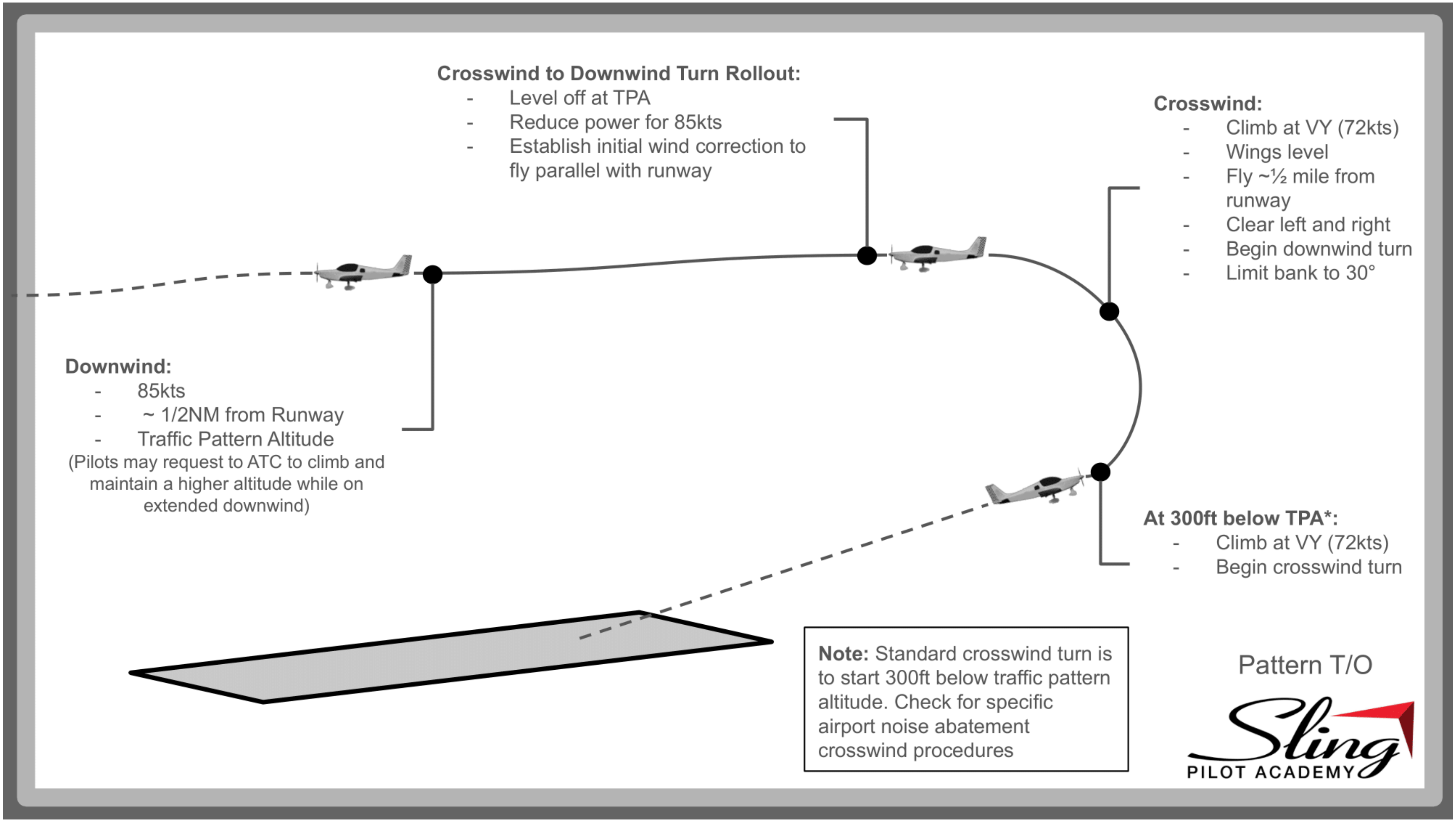
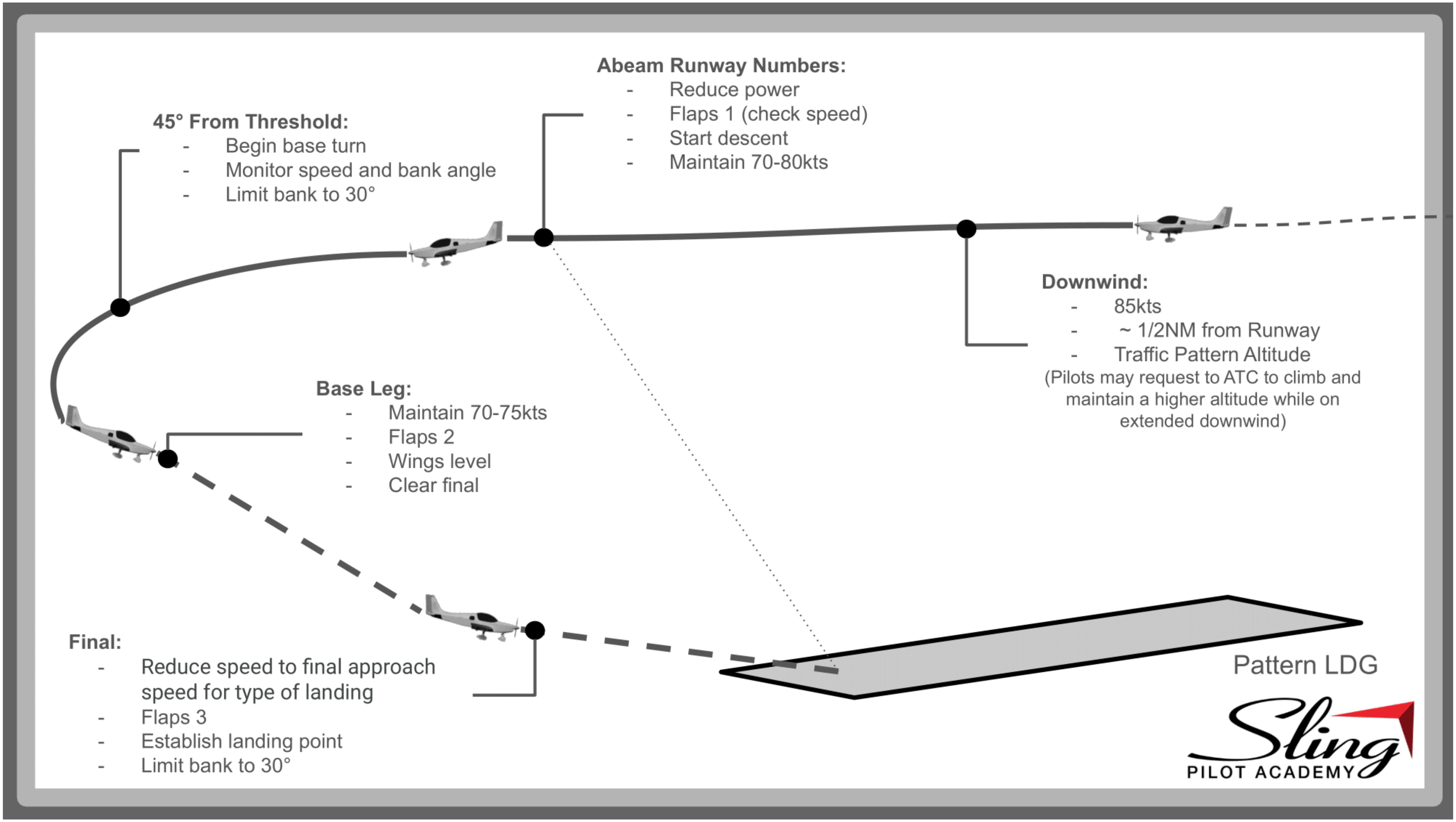
Traffic Pattern

Takeoff to Downwind Profile



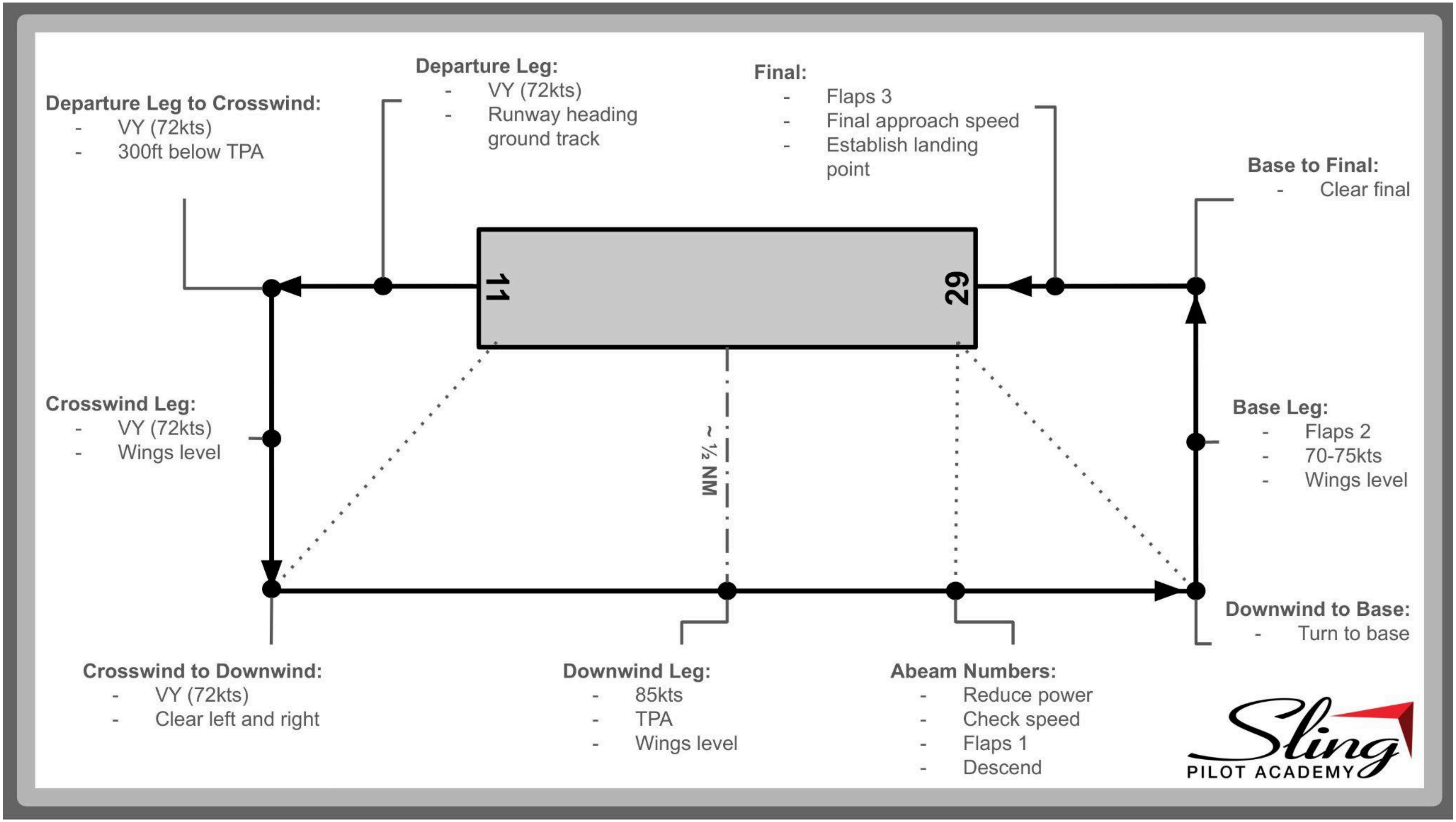
Traffic Pattern

Downwind to Landing Profile



Traffic Pattern

Traffic Pattern Profile



Traffic Pattern

Introduction

Airport traffic patterns play a crucial role in facilitating the safe movement of air traffic both arriving at and departing from an airport. The orientation, altitude specifications, and entry/exit procedures of these patterns are often influenced by local conditions. Just as roads and streets are essential for operating automobiles, airports or airstrips are essential for operating airplanes. Since flight begins and ends at an airport or other suitable landing field, pilots need to learn the traffic rules, traffic procedures, and traffic pattern layouts in use at various airports.

Pattern Entry

The entry point depends on the pilot's approach direction and runway in use. Commonly, pilots enter the pattern at a 45-degree angle to the downwind leg, smoothly integrating into the flow of air traffic. Proper communication, adherence to established procedures, and vigilance for other aircraft contribute to safe and efficient traffic pattern entries.

Standard Airport Traffic Patterns

An airport traffic pattern includes the direction and altitude of the pattern and procedures for entering and leaving the pattern. Unless the airport displays approved visual markings indicating that turns should be made to the right, the pilot should make all turns in the pattern to the left. The traffic pattern altitude is usually 1,000 feet above the elevation of the airport surface. The use of a common altitude at a given airport is the key factor in minimizing the risk of collisions at airports without operating control towers.

Noise Abatement

Reading noise abatement rules for every airport before flying is crucial as it helps pilots understand and comply with specific procedures aimed at minimizing noise impact on surrounding communities. Adhering to these rules demonstrates responsible and considerate flying, fostering positive relationships with local residents and authorities. Each airport may have unique noise abatement guidelines, and awareness of these regulations contributes to overall aviation community goodwill and environmental consciousness.

Sling Pilot Academy is a proud member/founder of Fly Friendly LA, a consortium of flight schools and aircraft operators who have committed to the "Fly Friendly" Pledge. The website hosts an abundance of noise abatement information that is vital to ensuring pilots comply with local rules and restrictions. Prior to any flight to another airport, pilots are expected to review the chart supplement and should review the Fly Friendly LA website.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Climb

A. Maintain Vy (72kts)
B. 400ft AGL - flaps up
C. 300ft Below TPA - begin crosswind turn*

Crosswind

D. Maintain Vy (72kts) until reaching TPA
E. After x-wind turn - level wings, clear downwind
F. Start downwind turn

Downwind

G. Maintain 85kts and TPA
H. Fly parallel to runway (make wind corrections as needed)
I. Abeam runway numbers - reduce power, check speed, flaps 1, descend
J. Maintain 75-80kts
K. Continue parallel to runway until 45° from threshold
L. Start base turn

Base

M. Maintain 70-75kts
N. Flaps 2
O. Level wings, clear final
P. Start turn to final

Final

Q. Refer to 'Normal Approach and Landing' page

*** Early crosswind turns can be made with ATC approval/pilot discretion (do not turn crosswind below 500ft MSL unless directed by ATC)***

Note: When on an extended downwind, the pilot may request with ATC for a climb in the downwind for glide safety

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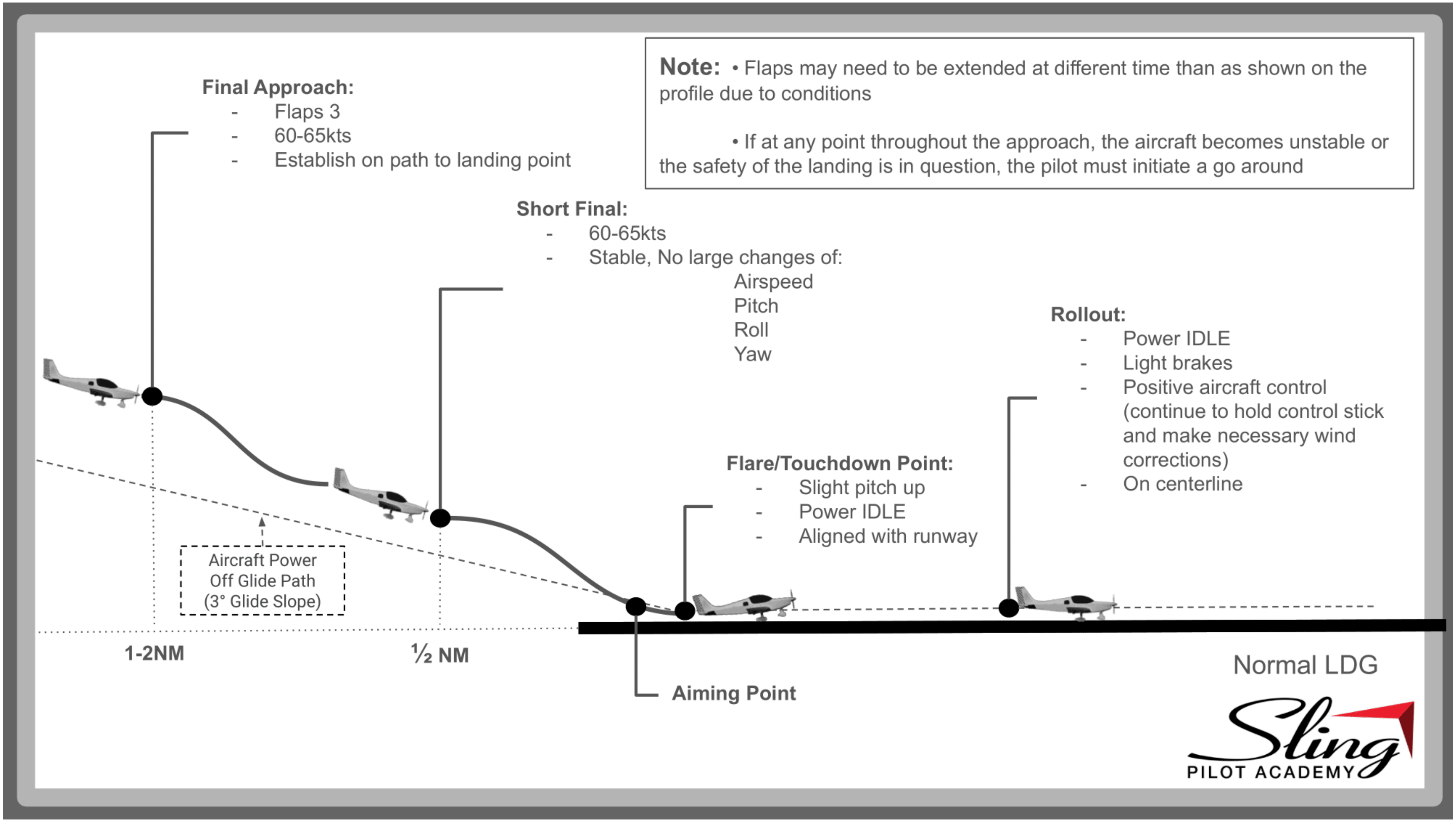
Normal Approach and Landing

Normal Approach and Landing Profile



Normal Approach and Landing

Introduction

Mastering the art of approaching and landing an aircraft is a critical skill for pilots, requiring precision, judgment, and a deep understanding of aerodynamics. As an aircraft descends and enters the traffic pattern or aligns for an approach, pilots meticulously manage altitude, configure the aircraft for landing, and engage in real-time adjustments for a stabilized approach. The traffic pattern provides a structured framework for alignment, altitude adjustment, and coordination with other air traffic. A successful landing involves a well-executed flare just above the runway, ensuring a smooth transition to level flight for a gentle touchdown. Pilots then guide the aircraft through the post-landing rollout, maintaining directional control and gradually reducing speed. Continuous learning and adaptation to factors like aircraft type, weight, and weather conditions underscore the importance of ongoing training for pilots, enhancing their skills and ensuring safe and effective landings in diverse flight scenarios.

Final Approach

The base leg leads to the final approach leg, during which the pilot completes the turn to align with the runway. The aircraft should be stabilized on the final approach at a constant airspeed and descent rate. The pilot uses pitch and power adjustments to maintain the desired glide path and approach airspeed.

Flare

As the aircraft approaches the runway landing spot/aiming point, the pilot initiates the flare, raising the nose slightly to arrest the descent rate. This transition is smooth, and it helps to establish a shallow descent just above the runway. The roundout is the phase where the pilot levels the aircraft just before the main wheels touch down.

Touchdown

The main wheels make contact with the runway first, followed by the nose wheel. The pilot maintains a proper landing attitude and ensures that the aircraft lands on the main wheels. After touchdown, the pilot gradually reduces back pressure on the stick to bring the nose wheel down gently.

Rollout

Once on the runway, the pilot begins the rollout phase. This involves maintaining directional control using the rudder pedals and aerodynamic controls. No configuration changes should be made to the aircraft until it is clear of the runway.

Clearing the Runway

After landing and exiting the runway, the pilot communicates with air traffic control (if applicable) and clears the runway. This may involve taxiing to a designated parking area or back to the beginning of the runway for another takeoff.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach and Landing (Straight in)

A. Determine a aiming point and touchdown point
B. Achieve a stabilized nose down pitch towards aiming point
C. Maintain 70-80 kts
   *2 Mile final - flaps 1
D. Re-trim and reduce power
E. Maintain 65-70 kts
   *1.5 Mile final - flaps 2
F. Re-trim and reduce power
G. Maintain 60-65 kts
   *1 Mile final - flaps 3
H. Re-trim
I. Maintain 60-65 kts down to runway
J. Flare by slightly pitching the nose up
K. Power IDLE
L. Land on main gear, hold back pressure to let nose gear lightly touchdown
M. Gently apply brakes after all gear have touched down

Approach and Landing (pattern; after turning base to final)

N. Flaps 3
O. Maintain 60-65 kts
P. Flare by slightly pitching the nose up
Q. Power IDLE
R. Land on main gear, hold back pressure to let nose gear lightly touchdown
S. Gently apply brakes after all gear have touched down

***Flaps may need to be extended at different time than as shown on the profile**

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Crosswind Takeoff and Climb

Introduction

Crosswinds occur when the wind blows across the runway rather than directly along it, creating a lateral force that can affect the aircraft's control during takeoff. Pilots must employ specific techniques to maintain control and ensure a safe departure.

Preparation

Before initiating a crosswind takeoff, pilots assess current wind conditions and consider the crosswind strength and direction. This information determines the appropriate control inputs during takeoff and whether the takeoff can be safely accomplished.

Aircraft Configuration

To counter the effects of crosswinds, pilots typically apply aileron and rudder inputs in the direction opposite to the crosswind. During actual operation, the pilot must anticipate the need for rudder as the plane begins to generate lift. This helps prevent the aircraft from weathervaning into the wind or drifting off the runway.

Takeoff Roll

As the aircraft accelerates down the runway, the pilot maintains a straight path by actively countering any tendency for the aircraft to weathervane or drift. It's essential to smoothly apply control inputs and avoid abrupt movements to prevent loss of control.

Lift-Off

During the lift-off phase, the pilot continues to manage control inputs, adjusting as needed to counter crosswind forces. A coordinated transition to the climb phase ensures a smooth departure from the runway environment.

Post-Takeoff

After becoming airborne, the pilot maintains vigilance in monitoring and adjusting for crosswind effects as the aircraft climbs.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Takeoff Flow -	
Parking Brake -	OFF
Fuel Selector -	Highest Tank
Flaps -	Set (1)
Lights -	ON (Takeoff/Taxi)
Fuel Pumps -	Both ON
Engine Page (G3X) -	Open
Heading Bug -	Rwy Heading
Flaps/Trim Indicator -	Check
Lanes Switches -	ON (No lights)
Canopy -	Closed/Latched
Final -	Clear
Runway -	Clear

Takeoff

A. Set aileron into direction of wind (left cross wind, set stick to the left; vice versa)
B. Progressively set throttle to full power (~3 seconds from IDLE to FULL)
C. Keep adequate rudder pressure for centerline
D. Check RPM (at least 5000 RPM)
E. Check all gauges green (announce)
F. Check airspeed alive (announce)
G. Begin to smoothly rotate at about 55kts
H. During rotation keep aileron into the wind
I. After lift off, aileron neutral
J. Accelerate to Vy (72kts)
K. Crab into wind (reduce rudder input to maintain coordination)

Climb

L. Refer to “Normal Takeoff and Climb’

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Crosswind Approach and Landing

Introduction

Crosswinds, where the wind blows perpendicular to the runway, present challenges in maintaining alignment and control as the aircraft descends. Pilots must employ specific techniques to counteract the lateral forces and execute a safe and controlled landing.

Assessment of Crosswind Component

Prior to initiating an approach and landing, pilots assess current wind conditions and consider the crosswind strength and direction. This information determines the appropriate control inputs during landing sequence and whether the landing can be safely accomplished.

Alignment on Final Approach

During the final approach phase, pilots use a combination of aileron and rudder inputs to maintain alignment with the runway centerline despite crosswind forces. Ailerons are used to bank to counteract crosswind drift and maintain position on the extended runway centerline while rudders use yaw to align the nose with the direction of travel (rudder to point at the centerline). Proper coordination is essential to prevent the aircraft from drifting off course or becoming misaligned.

Stabilized Approach

Maintaining a stabilized approach is critical, especially in crosswind conditions. The pilot must focus on a consistent descent rate, airspeed, and alignment with the runway to ensure a smooth and controlled landing.

Crosswind Flare and Touchdown

As the aircraft descends to the runway, the pilot executes a crosswind flare—modulating pitch and applying aileron and rudder inputs to counter the crosswind forces. As the plane slows, the effectiveness of the control surfaces is lower, requiring more control input. Typically in the last 10ft above the ground, the wind actually reduces, so you may need less control input. The goal is to achieve a gradual transition to level flight just above the runway. The main wheels make contact first, followed by the nose wheel.

Post-Touchdown Rollout

After landing, the pilot continues to manage crosswind effects during the rollout phase. Using aileron and rudder inputs, the pilot maintains directional control and prevents weathercocking into the wind. Careful management of controls helps avoid lateral drift and ensures a straight rollout on the runway

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

A. Maintain a higher than normal approach airspeed (speed depends on wind conditions)
B. Set fuel selector opposite of crosswind
C. Set flaps to a maximum of 2 (depending on wind speed, land with flaps 1 or up)
D. Dip wing into wind (ie. left crosswind = left wing down)
E. Apply opposite rudder of the lowered wing to maintain centerline alignment (amount of pressure needed will constantly change)
F. Make corrections to both aileron and rudder as necessary

Flare/Landing

G. Power idle
H. Level wings
I. Adjust rudder pressure to remain alignment with runway
J. After touchdown:
    1. Set aileron into wind (left cross wind, set stick to the left)
K. Apply light brake pressure
L. Clear runway at appropriate speed
M. Adjust aileron and elevator position to relative wind direction
N. Refer to “Normal Takeoff and **Climb’**

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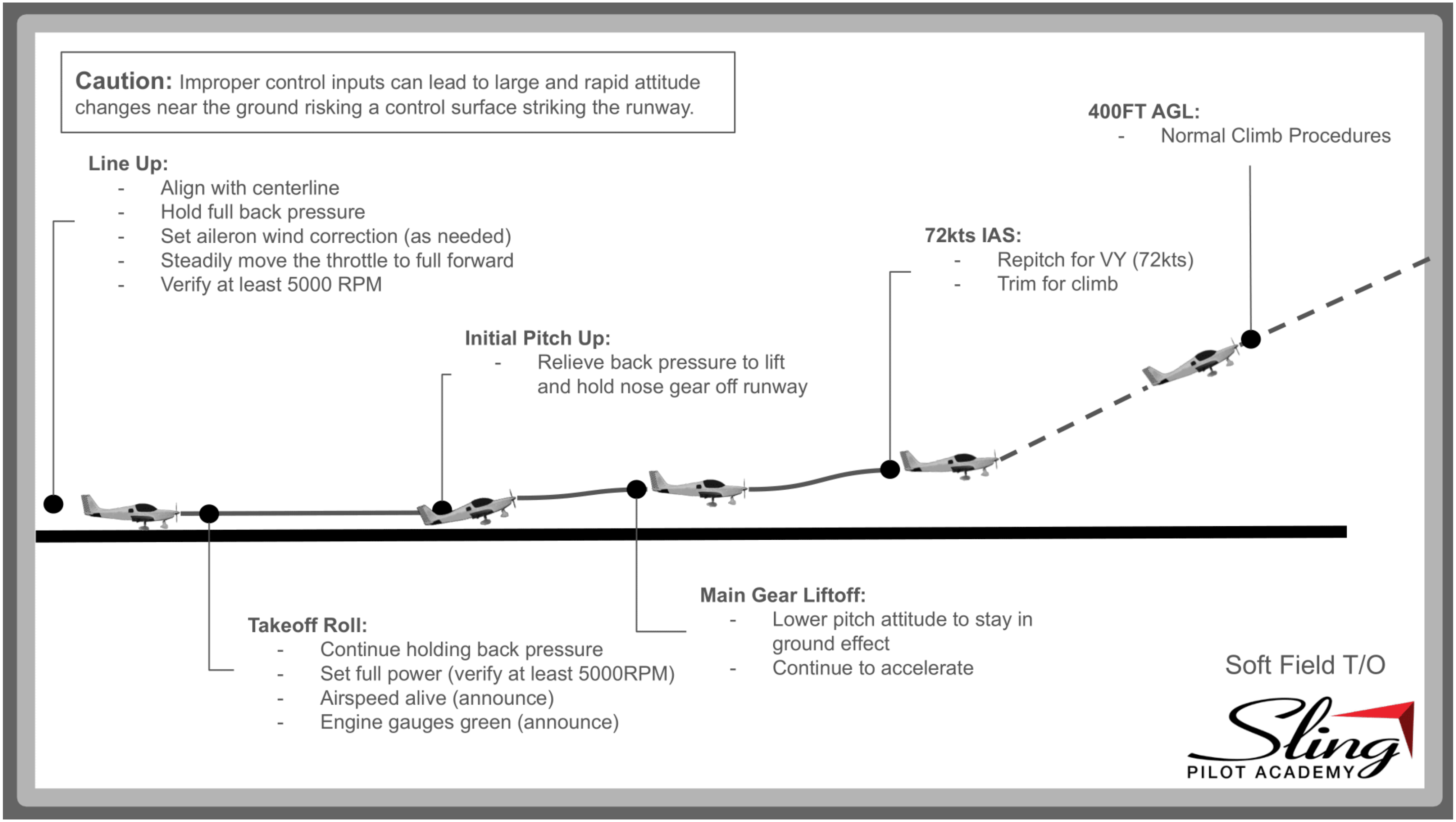
Soft Field Takeoff and Climb

Soft Field Takeoff Profile



Soft Field Takeoff and Climb

Introduction

Soft fields, such as grass or dirt runways, pose unique challenges during takeoff due to increased drag and the potential for the aircraft's wheels to sink into the surface. Pilots must employ specific techniques to maximize performance and minimize the risk of getting stuck.

Preparation and Configuration

Before initiating a soft field takeoff, pilots conduct a thorough pre-flight assessment, considering factors such as runway condition, aircraft weight, and prevailing weather. The configuration of the aircraft should be done as recommended by the POH.

Taxiing on the Soft Field

Taxiing on a soft field requires careful control inputs to avoid unnecessary drag and sinking of the wheels into the surface. The pilot must use minimal to no braking in order to prevent the aircraft from becoming bogged down while taxiing.

Smooth Takeoff Roll

During the takeoff roll, the pilot aims for a smooth and gradual acceleration. The objective is to minimize the time spent on the soft surface, reducing the risk of sinking. The Pilot must keep the aircraft's nose wheel off the ground for as long as possible to decrease drag and enhance lift.

Rotation and Climbout

Once the airplane naturally lifts off the ground, the pilot should smoothly rotate the aircraft, lifting off gently to avoid a sudden jolt. After becoming airborne, the aircraft is gradually pitched down to remain in ground effect. The pilot keeps the plane in ground effect until reaching VY (72kts), where a normal climb will then be commenced.

Retracting Flaps and Continued Vigilance

After a positive rate of climb is established, pilots retract the flaps incrementally in accordance with the aircraft's operating procedures. Continued vigilance is essential during the climbout phase, as soft field conditions may persist until reaching a safe altitude.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Takeoff Flow -	
Parking Brake -	OFF
Fuel Selector -	Highest Tank
Flaps -	Set (1)
Lights -	ON (Takeoff/Taxi)
Fuel Pumps -	Both ON
Engine Page (G3X) -	Open
Heading Bug -	Rwy Heading
Flaps/Trim Indicator -	Check
Lanes Switches -	ON (No lights)
Canopy -	Closed/Latched
Final -	Clear
Runway -	Clear

Roll onto runway

A. Keep full back pressure

B. Use minimal brake pressure (perform a rolling takeoff)

Takeoff

C. Keep back pressure

D. Apply full throttle

E. Adjust back pressure to control pitch attitude as needed

F. Lift off at lowest possible airspeed

G. Adjust rudder pressure to stay aligned with center line

H. Hold nose gear up until main gear lifts off

I. Reduce back pressure to stay over the runway in ground effect

J. Accelerate over the runway to Vy (72kts)

K. Refer to “Normal Takeoff and **Climb’**

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Soft Field Approach and Landing

Introduction

Soft fields, such as grass or dirt runways, present unique challenges during descent and landing due to increased drag and the potential for the aircraft's wheels to sink into the surface.

Preparation and Configuration

Before initiating a soft field approach and landing, the pilot must have completed a thorough assessment of the planned and actual landing conditions.

Stabilized Approach

Maintaining a stabilized approach is crucial for soft field landings. Pilots focus on a consistent descent rate, airspeed, and alignment with the runway to ensure a smooth and controlled landing. A gradual descent helps minimize the risk of the aircraft sinking into the soft surface.

Flare and Touchdown

During the flare and touchdown phase, pilots execute a gentle pitch-up maneuver to arrest the descent rate and ensure a smooth transition to level flight just above the soft surface. The goal is to touch down as softly as possible to prevent the aircraft's wheels from digging into the ground. The pilot must aim to land on the main wheels first, while holding the pressure off the nose wheel until coming to a complete stop.

Minimizing Rollout Distances

After touchdown, pilots work to minimize rollout distances on the soft field. This involves maintaining directional control using aileron and rudder inputs to prevent the aircraft from veering off course. The use of aerodynamic controls, such as flaps and elevator, can further assist in slowing the aircraft and reducing ground roll.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

A. Follow normal approach procedures until 2 mile final
B. Maintain 60-65 kts
C. Flaps 3
D. Above runway, remain in ground effect until minimum flyable airspeed

Landing

E. Power IDLE
F. Using pitch control, gently land on main gear
G. After touchdown continue to hold full back pressure on stick to reduce load on nose gear
H. Gently apply brakes (while holding back pressure)
I. Continue to hold back pressure during rollout to reduce load on nose gear

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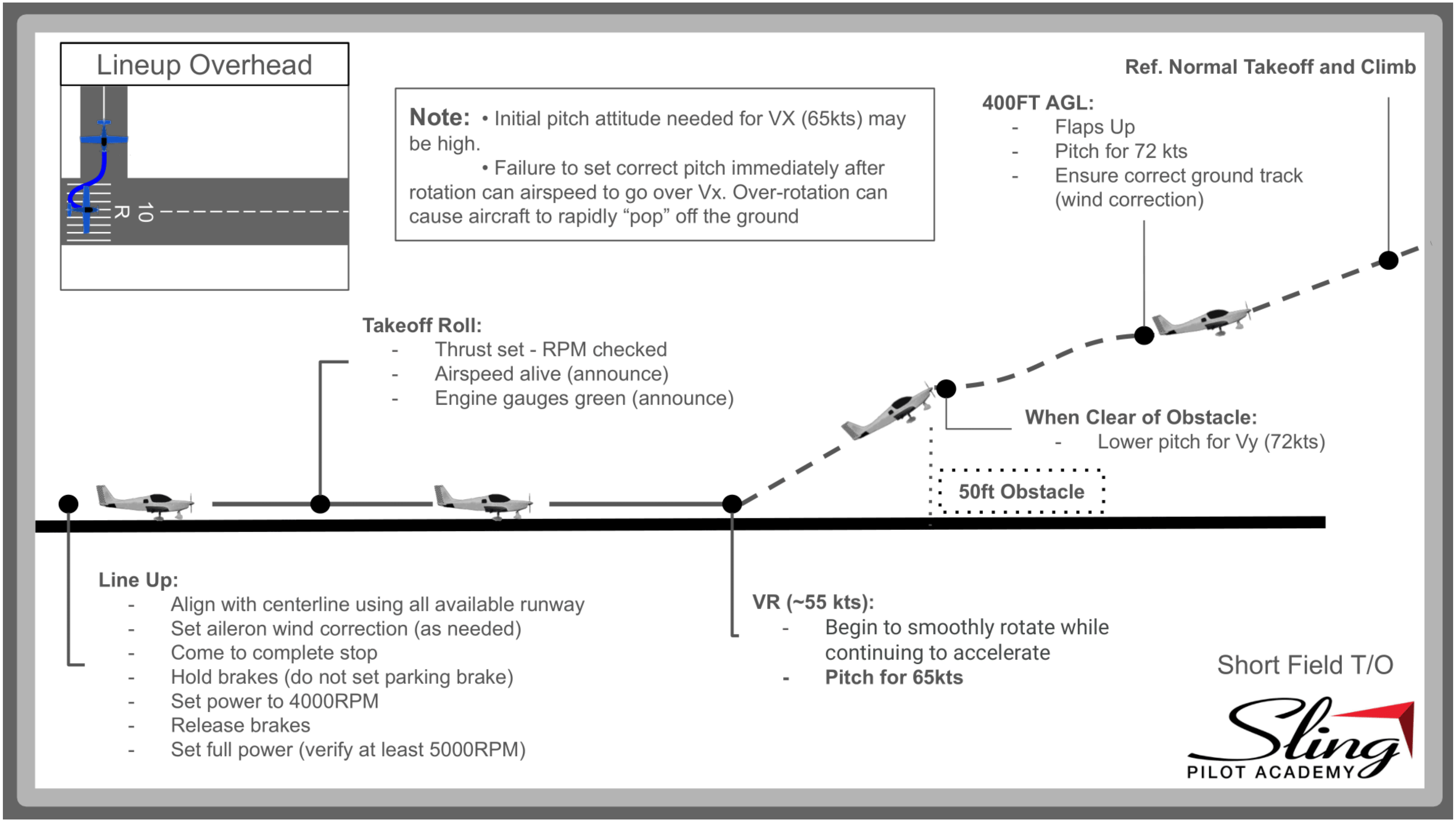
Short Field Takeoff and Climb

Short Field Takeoff Profile



Short Field Takeoff and Climb

Introduction

Short field takeoffs demand precise planning and precise execution to achieve the necessary lift and climb performance in a restricted distance.

Preparation and Configuration

Before initiating a short field takeoff, pilots thoroughly assess the runway length, obstacles, and aircraft weight.

Utilizing the Full Runway Length

Pilots aim to use the entire available runway length for the takeoff roll. This ensures the aircraft reaches the optimal takeoff speed before the runway end. Full power is applied smoothly, and the pilot maintains directional control using rudder inputs.

Lift-Off at Minimum Groundspeed

During the takeoff roll, pilots aim to achieve lift-off at the minimum groundspeed necessary for safe flight. A precise rotation and pitch-up maneuver are executed to establish a positive climb attitude as quickly as possible.

Climbout and Obstacle Clearance

After lift-off, the aircraft enters a steep climb to clear any obstacles beyond the runway. Pilots maintain a best angle of climb speed, retract flaps as recommended, and adhere to any obstacle clearance procedures outlined in the aircraft's performance charts.

Aerodynamic Efficiency

Pilots focus on maximizing aerodynamic efficiency to minimize ground roll. Retracting flaps incrementally (if applicable) and maintaining a climb attitude optimize the aircraft's climb performance, allowing for a quicker transition from ground to air.

Procedure

<u>Note</u>: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Takeoff Flow -

Parking Brake -	OFF
Fuel Selector -	Highest Tank
Flaps -	Set (1)
Lights -	ON (Takeoff/Taxi)
Fuel Pumps -	Both ON
Engine Page (G3X) -	Open
Heading Bug -	Rwy Heading
Flaps/Trim Indicator -	Check
Lanes Switches -	ON (No lights)
Canopy -	Closed/Latched
Final -	Clear
Runway -	Clear

<u>Takeoff</u>

A. Roll onto runway giving maximum takeoff run distance available
B. Line up with the centerline
C. Apply brakes, come to a complete stop (do not set parking brake)
D. Hold brake pressure (do not set parking brake)
E. Throttle to ~4000 RPM
F. Release brakes
G. Smoothly apply full throttle
H. Begin to smoothly rotate at about 55kts
I. Accelerate and pitch for Vx (65kts)

<u>Climb</u>

J. Maintain pitch attitude for Vx (65kts)
K. Return to normal climb once clear of obstacle(s)
L. Retract flaps at 400ft AGL
M. Pitch for Vy (72kts)
N. Refer to "Normal Takeoff and **Climb'**

<u>Note</u>: Continue to climb at VX speed until clear of obstacle (wait for instructor to call clear before returning to normal climbout)

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Short Field Approach and Landing

Introduction

Short fields demand precise planning and execution to safely decelerate and bring the aircraft to a stop within a restricted space.

Preparation and Configuration

Before initiating a short field approach and landing, pilots conduct a thorough pre-flight assessment, considering factors such as runway length, obstacles, and aircraft weight. The aircraft is configured as recommended by the aircraft's operating manual, typically involving the use of full flaps to generate maximum lift and increase drag.

Stabilized Approach

A stabilized approach is key to a successful short field landing. A constant descent rate, airspeed, and alignment with the runway must be accomplished to ensure accuracy and control. Precise energy management is crucial to touch down at the desired point on the runway.

Flare and Touchdown

During the flare and touchdown phase, pilots execute a well-timed pitch-up maneuver to reduce the descent rate and ensure a smooth transition to level flight just above the runway. The goal is to touch down as close to the intended landing point as possible to optimize the available runway length.

Maximizing Aerodynamic Efficiency

After touchdown, the pilot must work to maximize aerodynamic efficiency to decelerate rapidly. This may include the use of aerodynamic controls, such as flaps and elevator, to increase drag and shorten the ground roll.

Minimizing Rollout Distances

To further minimize rollout distances on a short field, effective (not stressful) braking should be used. Maintaining directional control is crucial, and proper rudder and braking inputs help prevent veering off the runway.

Retracting Flaps and Post-Landing Procedures

Once safely on the ground and under control, retract flaps incrementally in accordance with the aircraft's operating procedures.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

A. Establish final approach speed of 55-60 kts (no further than 2 miles out; 58kt approach speed recommended)
B. Determine landing spot and aiming point
C. Pitch nose down towards aiming point on runway
D. Adjust throttle and pitch to maintain airspeed while keeping nose on aiming point

Landing

E. When approaching runway, keep nose down and continue to maintain set airspeed
F. 10ft above the ground, begin flare
G. Power IDLE
H. Pitch for minimal float and quick/firm touchdown on landing spot

Rollout

I. After touchdown - flaps up
J. Apply brakes

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Forward Slip to Landing

Introduction

A forward slip to landing is a maneuver used to increase the descent angle and lose altitude rapidly while maintaining proper alignment with the runway. By employing a forward slip, pilots can control their descent while keeping the aircraft's longitudinal axis aligned with the runway.

Initiating the Forward Slip

The forward slip begins by lowering one wing while applying opposite rudder, creating a controlled sideslip. The lowered wing increases the aircraft's drag, and the opposite rudder counters the yaw induced by the slip. This configuration allows the aircraft to descend rapidly without gaining excessive airspeed.

Maintaining Alignment

Throughout the forward slip, the pilot must carefully manage control inputs to ensure the aircraft remains aligned with the runway. The slip should be coordinated to prevent side slipping into the wind and losing alignment with the desired landing path.

Adjusting Descent Rate

The degree of slip can be adjusted to control the descent rate. The steeper the slip, the faster the descent. Pilots monitor their altitude and adjust the slip as needed to ensure they reach the desired landing point on the runway.

Transition to Normal Approach

As the aircraft approaches the desired altitude and landing point, the pilot smoothly transitions out of the slip and aligns the aircraft with the runway centerline. This transition can involve leveling the wings and coordinating rudder inputs to eliminate the sideslip.

Flare and Touchdown

The final phase of the landing involves a flare to arrest the descent rate and ensure a smooth touchdown.

Safety Considerations

While a forward slip is a valuable technique, pilots must be mindful of their aircraft's operating limitations and adhere to recommended procedures.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

A. Determine wind direction and velocity*
B. Both fuel pumps ON
C. Reduce throttle
D. Set fuel to high tank**
E. Dip wing into wind (left x-wind; left wing down; vice versa)
F. Apply opposite rudder
G. Adjust bank to maintain position over the extended centerline.
H. Adjust rudder to maintain desired glide path to aim point.
I. Apply and hold back pressure to lower airspeed (below 80kts to reduce strain on empennage)

Landing

J. Simultaneously remove aileron inputs, and
K. Reduce rudder input to align aircraft with runway
L. Adjust pitch for specified approach/landing airspeed
M. Continue with applicable landing procedure (normal/crosswind/performance)

**** Determine the direction of slip based off the wind; not the fuel selector or whichever feels more comfortable***

***** Do not slip based on the current fuel tank; if a slip is performed with the low wing selected, the pilot will NOT have engine issues/concerns even with low fuel indications. Starvation will only occur after ~5 minutes of a continuous slip.***

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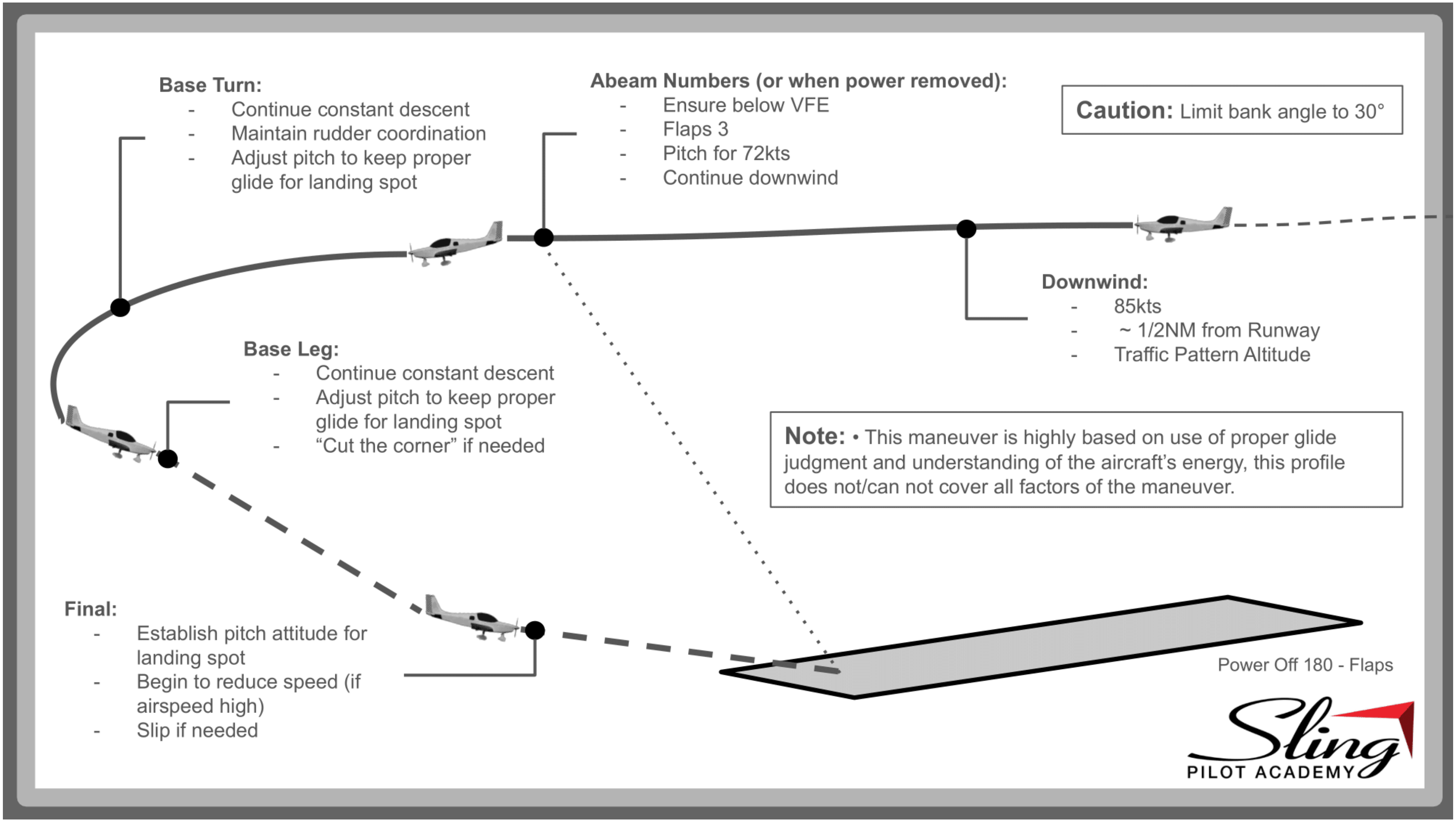
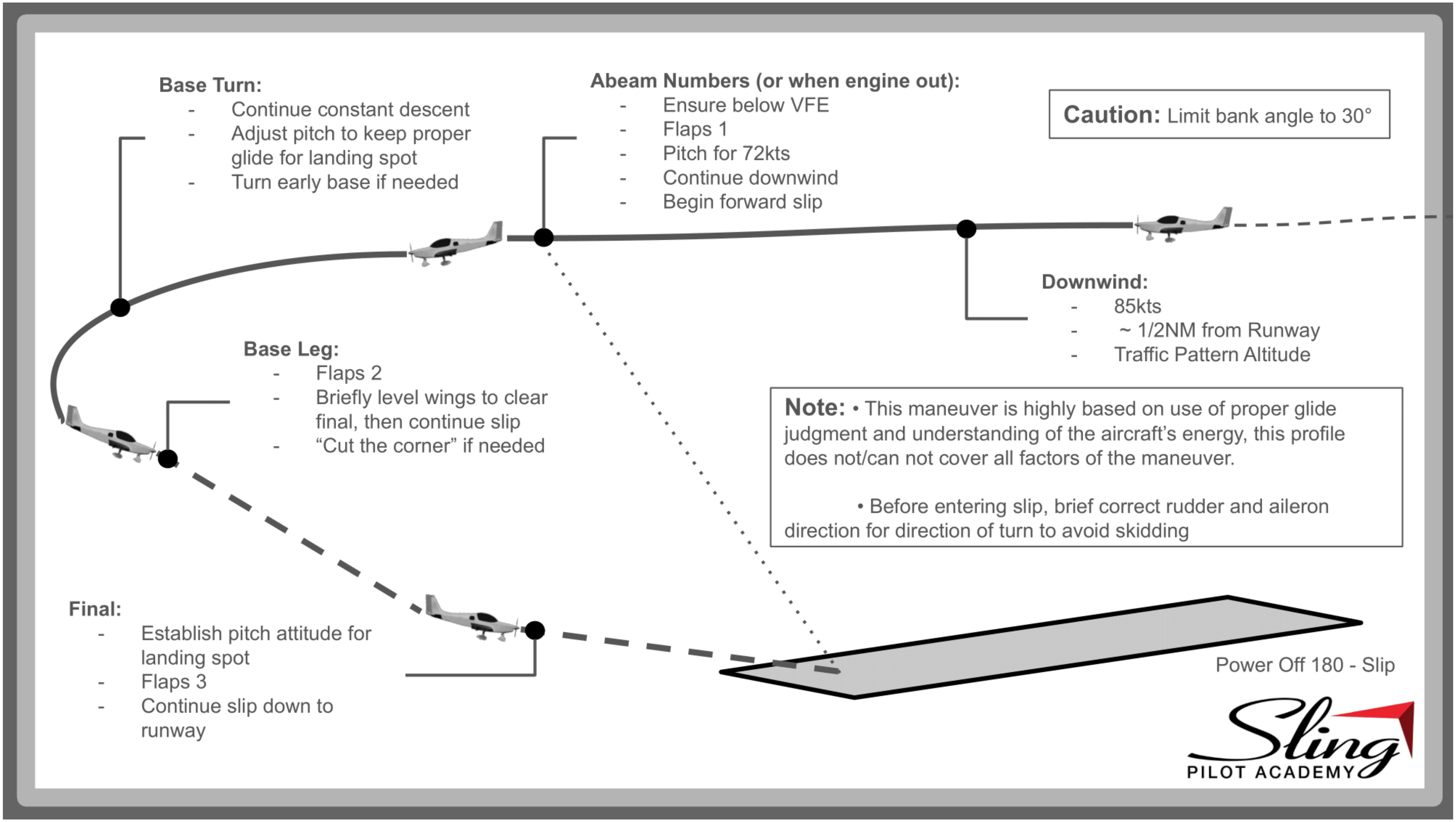
Power Off 180

Power Off 180 (Using Flaps) Profile



Power Off 180

Power Off 180 (Using Forward Slip) Profile



Power Off 180

Introduction

Power-off 180s, often referred to as accuracy landings or spot landings, constitute a precision landing maneuver that assesses a pilot's ability to execute a controlled landing within a designated target area under simulated engine failure conditions. This maneuver involves a deliberate engine power reduction, simulating an engine failure, followed by a 180-degree turn to align the aircraft with a predetermined landing spot on the runway. Pilots are tasked with maximizing glide distance and managing altitude effectively during the turn, aiming to touch down as close as possible to the selected spot.

Judgment of Aircraft Energy

The significance of power-off 180s lies in their capacity to evaluate a pilot's proficiency in several key areas. Precision and judgment are critical as the pilot must accurately assess the aircraft's glide distance, judge the appropriate point to initiate the turn, and execute the maneuver with precision. Additionally, effective energy management is essential, requiring the pilot to maintain the proper airspeed and descent rate throughout the maneuver.

Purpose

Beyond skill evaluation, power-off 180s contribute to a pilot's overall competence in various flight scenarios. The maneuver enhances a pilot's ability to make accurate judgments during simulated emergency situations and reinforces the importance of precise control inputs in the critical phase of landing. Practicing power-off 180s fosters confidence in managing the aircraft's performance in scenarios that demand heightened accuracy and decision-making.

Rundown

The power off 180 is heavily influenced by a number of factors including position of simulated engine out, wind conditions, and runway length. The maneuver truly tests the pilot's ability to quickly assess the current factors needed to complete a safe landing without an engine. Unlike most maneuvers, the power off 180 will never be performed with the exact same conditions and results. Successful completion of the maneuver solely relies on the pilot's ability to judge where the aircraft will be at a minimal energy state and need to touchdown.

Safety

When performing the maneuver, it is important to remember that the engine is supposed to be failed. In a real world situation, a go around would not be possible. During training and checking events, pilots must try to complete the maneuver without the need for a go around. If the aircraft does not have the energy to make it to the runway, or any other condition arises that raises any question to the safety of the landing, the pilot must go around.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Downwind:

A. Fly a normal downwind leg at 85kts and applicable altitude
B. When simulated engine failure occurs (normally abeam numbers)
C. Ensure airspeed is at or below VFE
*D. If using **flaps** profile,*
  a. Flaps 3
*E. If using **slip** profile,*
  a. Flaps 1
  b. Enter slip
F. Pitch for 72kts
G. Continue downwind
H. Using judgment of aircraft energy and current winds, start base turn
I. On base, continue descent, clear final
*J. If using **flaps** profile,*
  a. Adjust pitch for glide to selected landing spot
*K. If using **slip** profile,*
  a. Flaps 2
  b. After clearing final, re-enter slip
L. If needed, cut the corner (don’t square out base to final)
M. On final, establish pitch attitude for landing spot
*N. If using **flaps** profile,*
  a. Reduce speed (if airspeed high)
  b. Slip if needed
*O. If using **slip** profile,*
  a. Flaps 3
  b. Continue slip to landing
P. Adjust flare based on amount of energy to have minimal float

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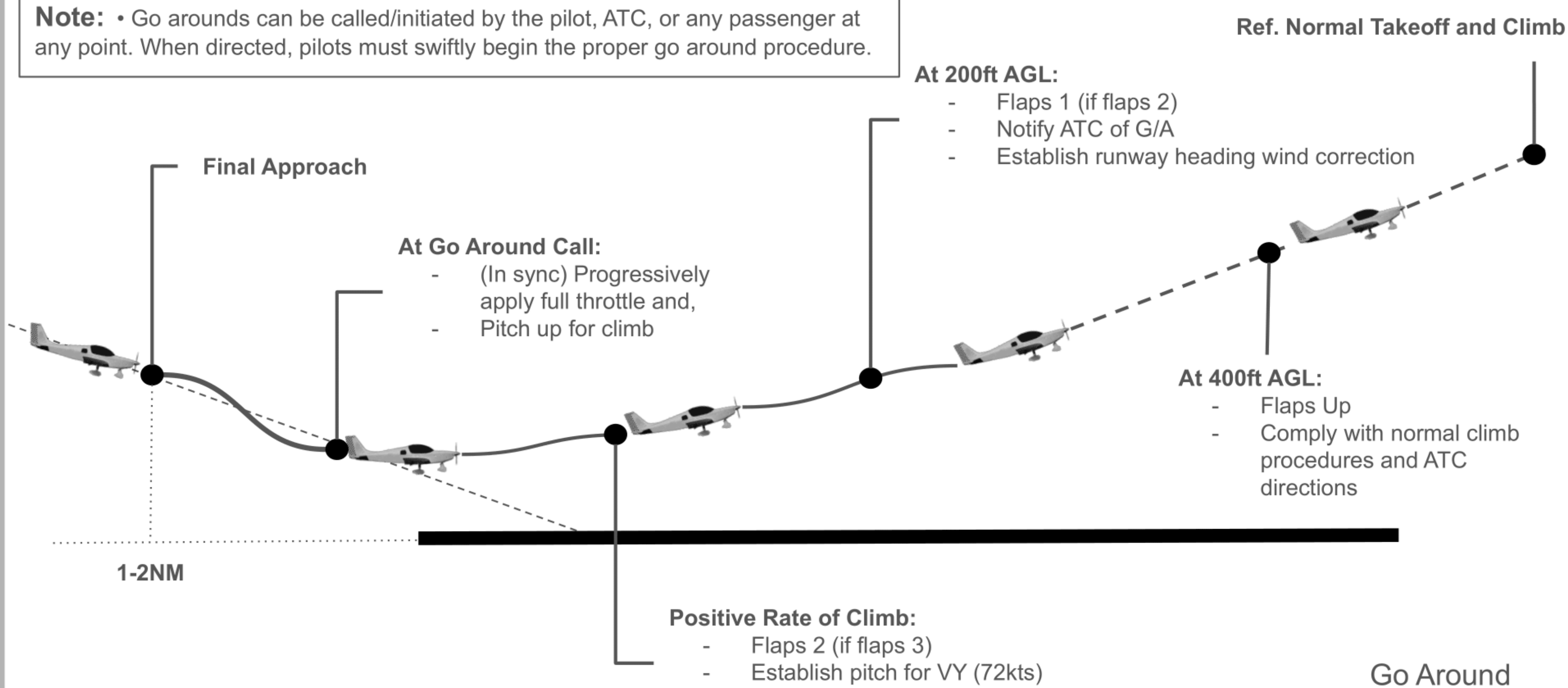
Go Around/Rejected Landing

Go Around Profile

Note: • Go arounds can be called/initiated by the pilot, ATC, or any passenger at any point. When directed, pilots must swiftly begin the proper go around procedure.



Caution: • Upon initiation, the pilot must ensure the plane has enough energy to begin climbing before pitching the nose up. The flap drag penalty must be noted during this procedure.

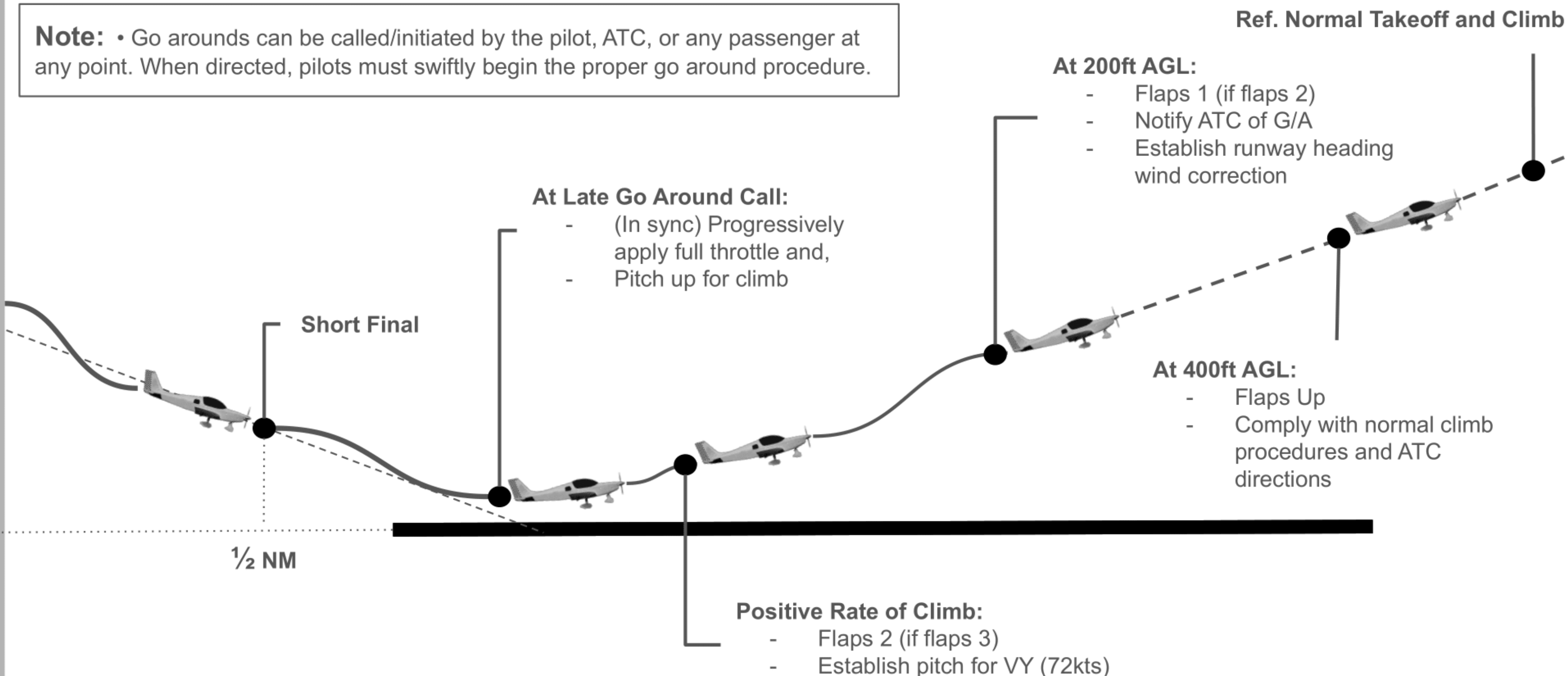
Go Around

Sling PILOT ACADEMY

Go Around/Rejected Landing

Rejected Landing (Low Altitude/Energy Go Around) Profile

Note: • Go arounds can be called/initiated by the pilot, ATC, or any passenger at any point. When directed, pilots must swiftly begin the proper go around procedure.



Rejected LDG

Caution: • Upon initiation, the pilot must ensure the plane has enough energy to begin climbing before pitching the nose up. The flap drag penalty must be noted during this procedure.

Go Around/Rejected Landing

Introduction

Go arounds are a common, but dangerous maneuver in aviation where an aircraft is configured for landings and must quickly reconfigure for an unexpected climb while at a low altitude and airspeed. Proper execution of a go around consists of quickly moving the aircraft away from ground and establishing a positive climb rate with lateral control. Go arounds can be called by either pilot or ATC at any time. Some go arounds may be called as low as 10 feet off the ground. When a go around is called, the pilot must immediately and correctly react to avoid entering a possibly hazardous situation.

Initiating a Go-Around

The decision to go around can be made at any point during the landing phase, from final approach to the flare. Pilots initiate a go-around by smoothly applying full power, and adjusting the pitch to establish a positive climb attitude. Simultaneously, the pilot applies coordinated rudder input to maintain directional control.

Common Reasons for Go-Arounds

Go-arounds may be prompted by factors such as an unstable approach, inadequate runway alignment, wind shear, conflicting traffic on the runway, or a runway incursion.

Maintaining Positive Rate of Climb

Once full power is applied, the aircraft should promptly climb away from the runway environment. Pilots monitor airspeed, altitude, and climb performance to ensure a positive rate of climb. The climb helps the aircraft clear any potential obstacles or conflicts.

Reassessing the Situation

During the climb, pilots reassess the factors that led to the decision to go around. This may involve communication with air traffic control, checking for traffic in the vicinity, and addressing any issues that prompted the go-around. Pilots may then choose to re-enter the traffic pattern for another landing attempt.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Go around

A. Simultaneously -
   a. Add full power
   b. Pitch for positive rate of speed, once achieved,
   c. Pitch for Climb (VY)
B. Positive rate of climb - flaps 2 (if flaps 3)
C. Adjust pitch for VY (72kts)
D. At 200ft AGL - flaps 1 (if flaps 2)
E. Notify ATC of go around
F. Establish runway heading wind correction ground track
G. At 400ft AGL - flaps up
H. Refer to “Normal Takeoff and **Climb’** and ‘Traffic Pattern’

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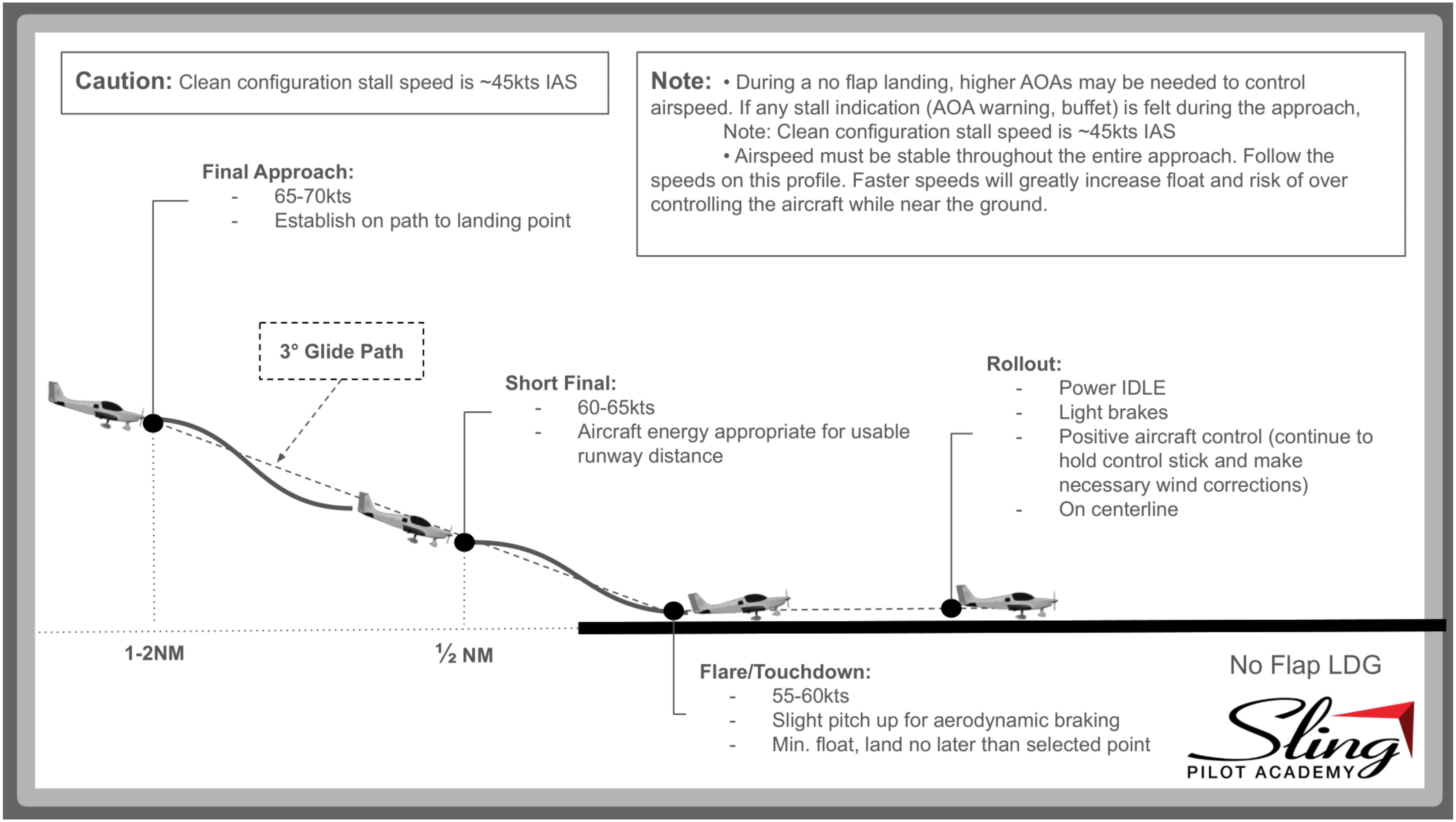
Landing with Failed Equipment

No Flap Landing Profile



Landing with Failed Equipment

Introduction

No-flap landings, also known as flapless landings, are a type of landing maneuver performed without extending the aircraft's flaps. Flaps are aerodynamic devices located on the wings that are typically extended during approach and landing to increase lift and drag, aiding in a controlled descent.

Identification

During all approaches, pilots should be hyper aware of the response of the flight controls when flaps are introduced. When extending any flaps, the newly increased lift and drag should create a force on the flight controls and require the plane to be re-trimmed. If flaps are set to extend and no change is felt on the controls, the pilot should visually check both flaps to confirm extension.

Response

Once a flap failure, or asymmetry is noticed by the pilot(s), ATC should be notified and the pilot operating handbook/airplane flying manual must be consulted for the expanded checklist located in Chapter 3. Once the checklist has been completed, the pilot must re-brief the approach and landing as the aircraft's speeds and approach profile has changed.

Procedure

During a no-flap landing, pilots rely solely on adjustments to pitch attitude, airspeed, and power settings to control the aircraft's descent rate and touchdown point. Without the added lift from flaps, pilots must carefully manage the aircraft's energy and descent profile to achieve a safe landing. This often involves maintaining a slightly higher approach speed and utilizing additional runway for landing.

Approach Stability

Due to the higher approach speeds during a no flap landing, the pilot must initiate a go around if any confidence is lost in the approach/landing phase of flight. If the pilot feels and or notices the plane is excessively floating, a go around must be initiated as the lack of flaps will greatly increase the landing distance and rollout. A late landing with no flaps may cause a runway overrun.

Landing with Failed Equipment

Procedure (Straight In)

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

A. Initiate go around
B. Notify ATC of go around and flap failure
C. Start flying normal pattern
D. While on downwind, refer to POH Ch. 3 Checklist
E. After checklist complete, re-brief the approach
F. After briefing, notify ATC when ready to land
G. Establish an extended final
H. Descend at a faster than normal rate while gaining minimal excess airspeed
I. Approach runway at a lower altitude and higher than normal pitch attitude*
J. Adjust pitch and power for a speed at or below 75kts

Landing

K. Hold nose up in ground effect for aerodynamic braking
L. Touchdown normally
M. Apply brakes as necessary (do not overuse brakes unless needed)

*** Without flaps, stall speed rises. Pitch should be used to help control airspeed, ensure proper adjustments are made so that the pitch does not raise up to the point that visual of the runway is lost**

Procedure (Pattern)

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Approach

N. Notify ATC of flap failure and need for extended downwind
O. While on downwind, refer to POH Ch. 3 Checklist
P. After checklist complete, re-brief the approach
Q. After briefing, notify ATC when ready to land
R. Establish an extended final
S. Descend at a faster than normal rate while gaining minimal excess airspeed
T. Approach runway at a lower altitude and higher than normal pitch attitude*
U. Adjust pitch and power for a speed at or below 75kts

Landing

V. Hold nose up in ground effect for aerodynamic braking
W. Touchdown normally
X. Apply brakes as necessary (do not overuse brakes unless needed)

*** Without flaps, stall speed rises. Pitch should be used to help control airspeed, ensure proper adjustments are made so that the pitch does not raise up to the point that visual of the runway is lost**

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Steep Turns

Introduction

This maneuver involves executing a level turn with a bank angle of 45 degrees or more, simulating the need to quickly change the aircraft's direction while maintaining altitude and airspeed. Steep turns are valuable for developing a pilot's skills in bank management, control coordination, and overall aircraft handling.

Execution and Technique

During a steep turn, the pilot smoothly increases the bank angle, reaching 45 degrees or more (COM), while maintaining a constant airspeed and altitude. Proper coordination of aileron, elevator, and rudder controls is essential to prevent slips or skids during the turn. The pilot uses outside references, such as the horizon, to maintain a consistent bank angle.

Load Factor and G-Forces

As the bank angle increases, the load factor on the aircraft also increases. Pilots experience increased gravitational forces, or G-forces, during steep turns. Managing these forces is crucial to avoid excessive strain on the aircraft structure and to ensure a smooth and controlled maneuver.

Visual Scanning

Steep turns require effective visual scanning to maintain orientation and prevent disorientation. Pilots continuously scan the flight instruments, outside references, and the horizon to ensure proper bank angle, altitude, and airspeed are maintained throughout the maneuver.

Coordination Exercises

Steep turns serve as coordination exercises, challenging pilots to manage the aircraft's controls smoothly and simultaneously. Proper rudder input is particularly critical to counteract adverse yaw and maintain coordinated flight.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup

A. Find outside start/end visual reference (ie. mountain)
B. Establish straight and level, unaccelerated flight
C. Maintain desired altitude
D. Maintain 91 kts (Va)
E. Bug altitude and heading

Turn

F. Begin a moderate-paced bank to the chosen side to 45°
G. When passing 30°of bank, begin to apply slight back pressure*
H. Stop roll movement upon reaching desired bank angle (45° PPL, 50° COM)
I. Airspeed - make slight adjustments to maintain 91kts
J. Altimeter - make slight adjustments to maintain selected altitude
K. Roll indicator - make slight adjustments to maintain desired bank angle

Note: Use of trim during this maneuver is not recommended as it increases the chance of ballooning during the rollout phase

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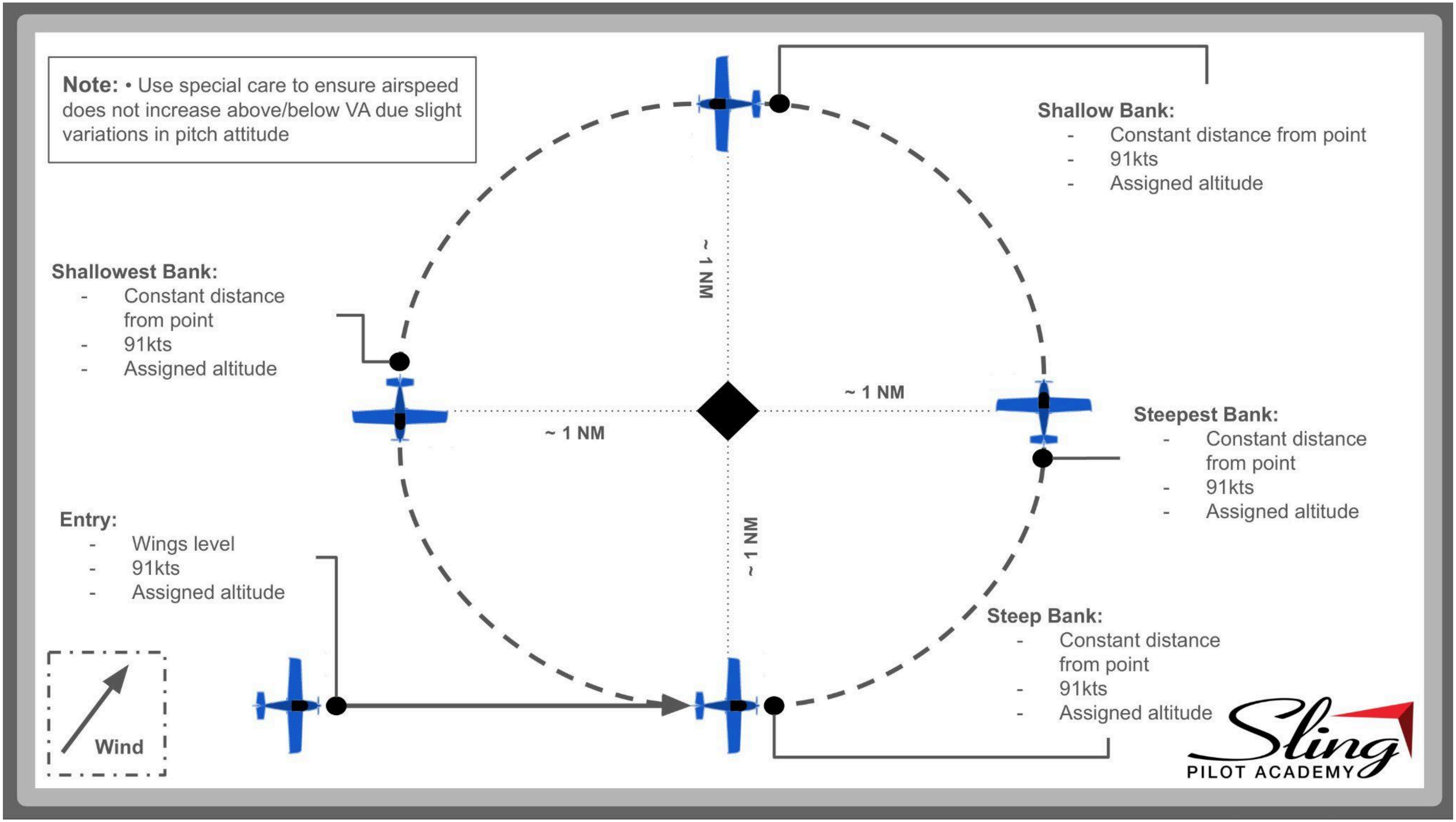
Turns Around A Point

Turns Around A Point Profile



Turns Around A Point

Introduction

Turns around a point is a flight maneuver that involves flying the aircraft in a circular path around a specific ground reference point. This maneuver is designed to enhance a pilot's ability to maintain altitude, airspeed, and coordinated turns while navigating a consistent circular track.

Selection of Ground Reference Point

Before initiating turns around a point, the pilot selects a prominent ground reference point, such as a road intersection, field, or any distinguishable feature. The chosen point serves as the center of the circular path around which the aircraft will turn.

Entry and Configuration

To enter turns around a point, the pilot establishes a desired altitude and airspeed. Typically, the maneuver is initiated downwind of the selected point to compensate for wind drift. The pilot then enters a coordinated turn, adjusting the bank angle to maintain a constant radius around the point.

Maintaining Altitude and Airspeed

Precision is crucial during turns around a point. The pilot focuses on maintaining a consistent altitude and airspeed throughout the maneuver. Proper coordination of aileron, elevator, and rudder controls is essential to avoid altitude variations and ensure a smooth circular path.

Compensating for Wind Drift

Wind can influence the aircraft's ground track during turns around a point. Pilots make continuous adjustments to counteract wind drift, allowing the aircraft to maintain the desired circular path. This requires anticipation and proactive control inputs to prevent the aircraft from drifting too far from the reference point.

Visual Scanning and Orientation

Effective visual scanning is a key element of turns around a point. Pilots continuously monitor the ground reference point, the horizon, and the aircraft's instruments to maintain proper orientation and prevent disorientation during the turns.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup

A. Determine a clearly visible ground reference point (if possible, locate a point with four reference points surrounding the main reference point)
B. Determine surface wind direction (and velocity if possible)
C. Enter a downwind leg to reference point based on wind direction
D. Establish straight and level, unaccelerated flight at 1000 FT AGL
E. Maintain VA (91kts)
F. Using wind correction techniques, maintain a set distance from ground reference point while holding altitude and airspeed
G. Distance from point should be no closer than ½ nm and no further than 1nm
H. Anticipate required flight control inputs to correct for constantly changing reference wind direction
I. When directed to exit,
    a. Fly assigned heading
    b. Climb to assigned altitude at cruise-climb speed

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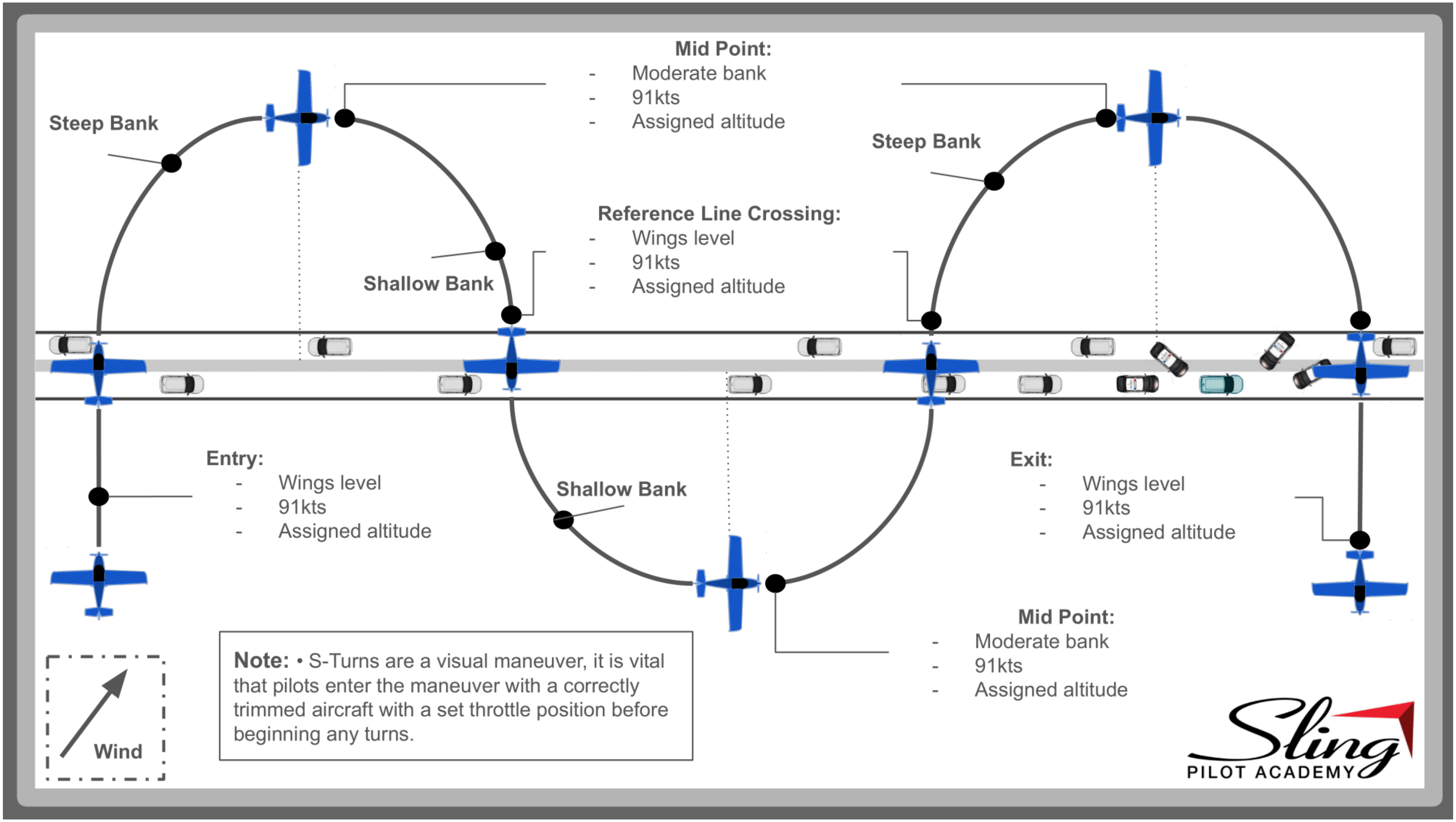
S-Turns

S-Turns Profile



S-Turns

Introduction

S-turns are a fundamental flight maneuver designed to enhance a pilot's ability to maintain a consistent ground track while flying a series of alternating turns. This maneuver involves smoothly transitioning the aircraft in a zigzag pattern over a selected ground reference line, often a road or other linear feature. S-turns provide pilots with valuable practice in bank management, coordination, and precise control.

Selection of Ground Reference Line

Before initiating S-turns, the pilot chooses a prominent ground reference line that extends straight and level across the landscape. This can be a road, field boundary, or any other linear feature. The selected line serves as the reference for maintaining the ground track during the maneuver.

Entry and Configuration

To begin S-turns, the pilot establishes a desired altitude and airspeed, typically flying parallel to and upwind of the selected ground reference line. The maneuver is initiated by entering a coordinated turn, changing the aircraft's heading approximately 90 degrees from the original heading.

Execution of S-Turns

During each turn, the pilot maintains a constant bank angle and airspeed while smoothly transitioning from one direction to the other. The objective is to create a series of S-shaped patterns over the ground reference line. Proper coordination of aileron, elevator, and rudder controls is crucial to ensure the aircraft follows a consistent track.

Compensating for Wind Drift

Wind can influence the ground track of the aircraft during S-turns. Pilots actively compensate for wind drift, adjusting the bank angle and timing of turns to counteract any lateral displacement from the chosen ground reference line.

Visual Scanning and Orientation

Effective visual scanning is essential during S-turns. Pilots continuously monitor the ground reference line, the horizon, and the aircraft's instruments to maintain proper orientation and prevent disorientation during the alternating turns.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup

A. Determine ground reference line (road/sea wall; at least 2 miles long)
B. Determine surface wind direction (and velocity if possible)
C. Fly parallel to reference line while configuring airplane
D. Establish straight and level, unaccelerated flight at 1000 FT AGL
E. Maintain VA (91kts)
F. Once desired altitude and airspeed are established, make a 90° turn to fly perpendicular to ground line (reference profile above)
G. Establish a heading to cross with wings perpendicular to the reference line
H. Once overtop the reference line, begin turn to desired side of maneuver
I. Using wind correction techniques, maintain a constant radius from the reference line while completing a 180° turn
J. Roll out of the 180° turn while approaching reference line
K. Ensure wings are perpendicular to the reference line
L. Once overtop the reference line, begin a turn opposite to the first one
M. Make appropriate flight control inputs to correct for wind drift
N. When directed to exit,
    a. Fly assigned heading
    b. Climb to assigned altitude at cruise-climb speed

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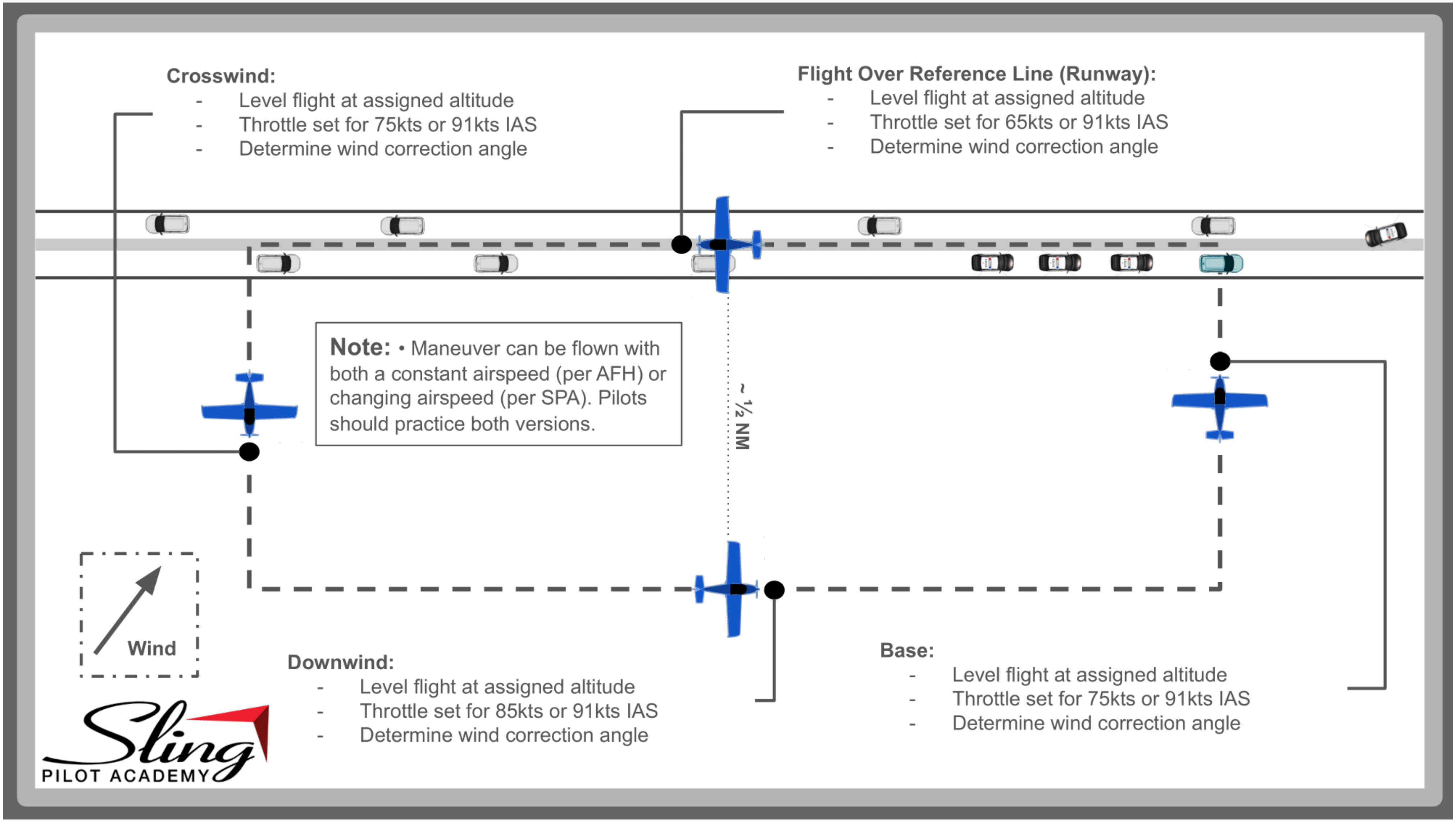
Rectangular Course

Rectangular Course Profile



Rectangular Course

Introduction

The rectangular course is a fundamental flight maneuver that involves flying an aircraft along the four legs of a rectangular pattern while maintaining a constant altitude and airspeed. The rectangular course provides a structured framework for pilots to practice coordinated turns, maintain consistent ground tracks, and refine the ability to manage the aircraft in different phases of flight.

Configuration and Entry

The rectangular course is typically initiated in level flight at a specified altitude. The pilot selects a prominent ground reference point, such as a road intersection or field, to serve as the center of the rectangle.

Upwind Leg

The upwind leg is the initial leg of the rectangular course, where the aircraft is flown over one side of the rectangle. During this leg, pilots practice maintaining a constant altitude and airspeed while dealing with wind drift.

Crosswind Leg

At the end of the upwind leg, the pilot initiates a coordinated turn to enter the crosswind leg. This leg is flown perpendicular to the upwind leg, and the pilot focuses on maintaining a consistent altitude and airspeed while adjusting for wind drift.

Downwind Leg

The downwind leg is parallel to the opposite side of the rectangle. Pilots continue to manage altitude and airspeed, and they may also adjust power and trim settings as needed.

Base Leg

The base leg is the final turn before aligning with the original upwind leg. Pilots execute a coordinated turn to establish the aircraft on the base leg while maintaining precise control and anticipating the final turn to align with the upwind leg.

Procedure

<u>Note</u>: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

<u>Before Maneuver</u>

A. Perform IPCCC (ref. Preamble)

<u>Setup</u>

A. Determine ground reference line (road/sea wall)
B. Determine surface wind direction (and velocity if possible)
C. Make appropriate pattern entry to reference point (picked by student or instructor)
D. Establish straight and level, unaccelerated flight at 1000 FT AGL
E. Maintain VA (91kts)*
F. Fly a visual traffic pattern at a constant altitude
G. Use the ground reference line as a simulated runway
H. Make appropriate wind corrections for different phases of rectangular course

* Note: The FAA Airplane Flying Handbook states this maneuver should be flown at a constant airspeed for all phases of the course. SPA suggests pilots perform the maneuver multiple times; one with a constant airspeed, and one with airspeed changes based on actual traffic pattern flight.

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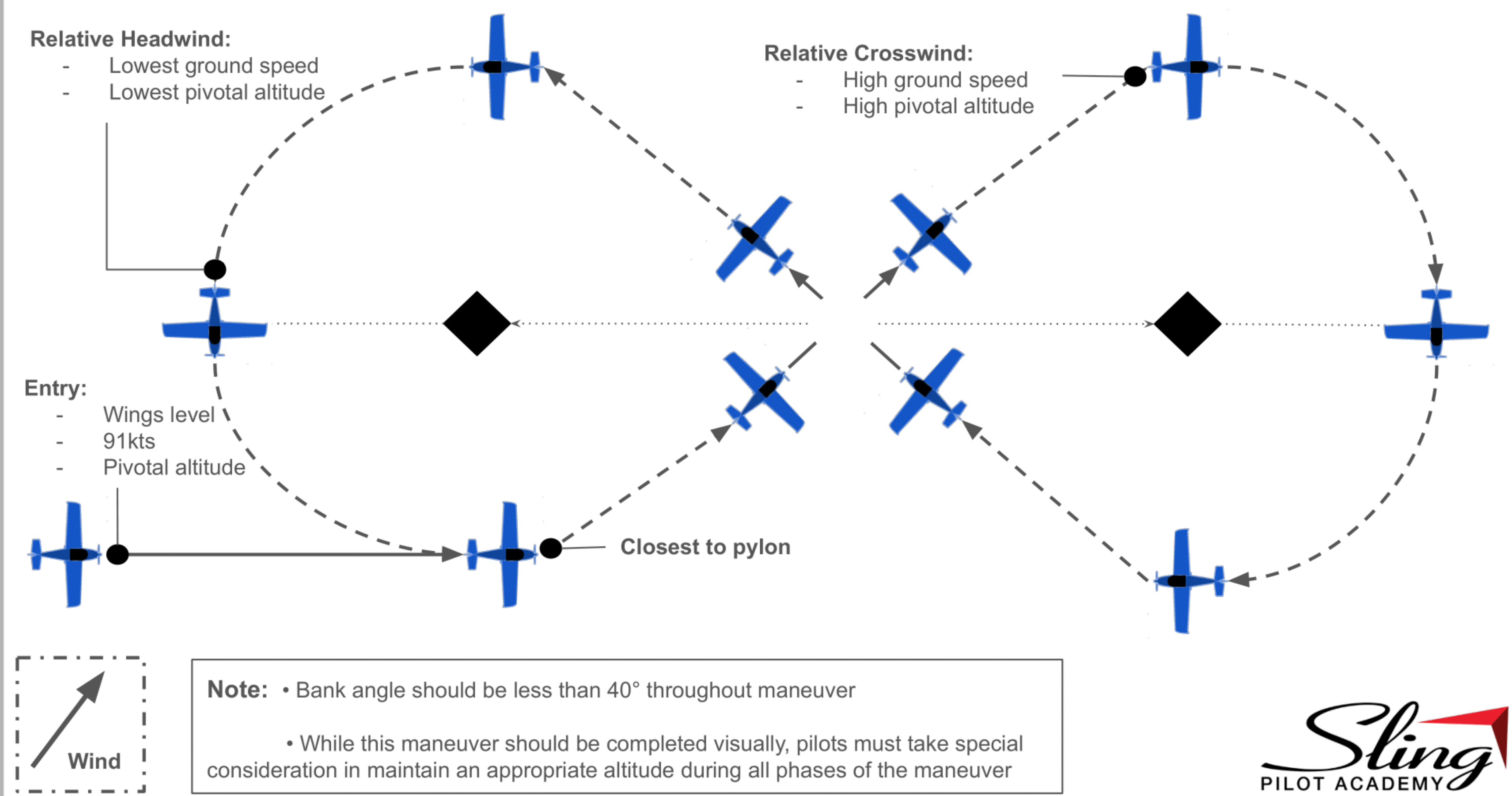
Eights On Pylons

Eights On Pylons Profile



Note: • Bank angle should be less than 40° throughout maneuver

• While this maneuver should be completed visually, pilots must take special consideration in maintain an appropriate altitude during all phases of the maneuver

Eights On Pylons

Introduction

Eights on pylons is an advanced flight maneuver that challenges a pilot's ability to maintain precise control, coordination, and orientation while flying a figure-eight pattern around two specified ground reference points.

Setup and Entry

The eights on pylons maneuver begins with the pilot selecting two distinct ground reference points, typically pylons or other prominent features. The aircraft is positioned upwind and at a sufficient altitude to allow for a safe and controlled execution of the maneuver.

Key Elements and Challenges

Eights on pylons demand precise control of the aircraft's bank, pitch, and rudder inputs to maintain a consistent ground track and altitude throughout the maneuver. Coordination between aileron and rudder controls is crucial to prevent slips or skids during the turns. The pilot's ability to judge wind drift and adjust ground track accordingly is also a key element of success in this maneuver.

Pivotal Altitude

Pivotal Altitude is a crucial concept in aviation navigation that refers to the specific altitude above ground level (AGL) at which a visual reference point, such as a prominent landmark or intersection, remains constant in size during a turn. Pilots use Pivotal Altitude to establish a consistent sight picture for navigating turns around fixed points. By maintaining the chosen reference point at a constant size throughout the turn, pilots can ensure accurate ground track control and enhance navigation precision, especially during ground reference maneuvers.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup

A. Determine ground reference points (at 1NM apart)
B. Determine surface wind direction (and velocity if possible)
C. Enter on downwind at VA and pivotal altitude (800-1100FT AGL)
D. When wing is abeam first point, begin turn to cross in the middle of the two reference points
E. Keep wing abeam/tracking first reference point until reaching middle of two reference points
F. Transfer turn to have other wing track the second reference point
G. Slightly adjust pitch attitude and power setting to maintain wing align with point while compensating for new wind direction
H. Monitor altitude and airspeed to ensure ACS standard compliance
I. Keep wing on point for the entirety of the turn until back at the middle of the two reference points.
J. Transfer turn to have other wing track the second reference point
K. Slightly adjust pitch attitude and power setting to maintain wing align with point while compensating for new wind direction
L. Monitor altitude and airspeed to ensure ACS standard compliance
M. Continue flying the figure 8 while maintaining pitch and power adjustments where needed until told by the instructor that the maneuver is over.
N. When directed to exit,
    a. Fly assigned heading
    b. Climb to assigned altitude at cruise-climb speed

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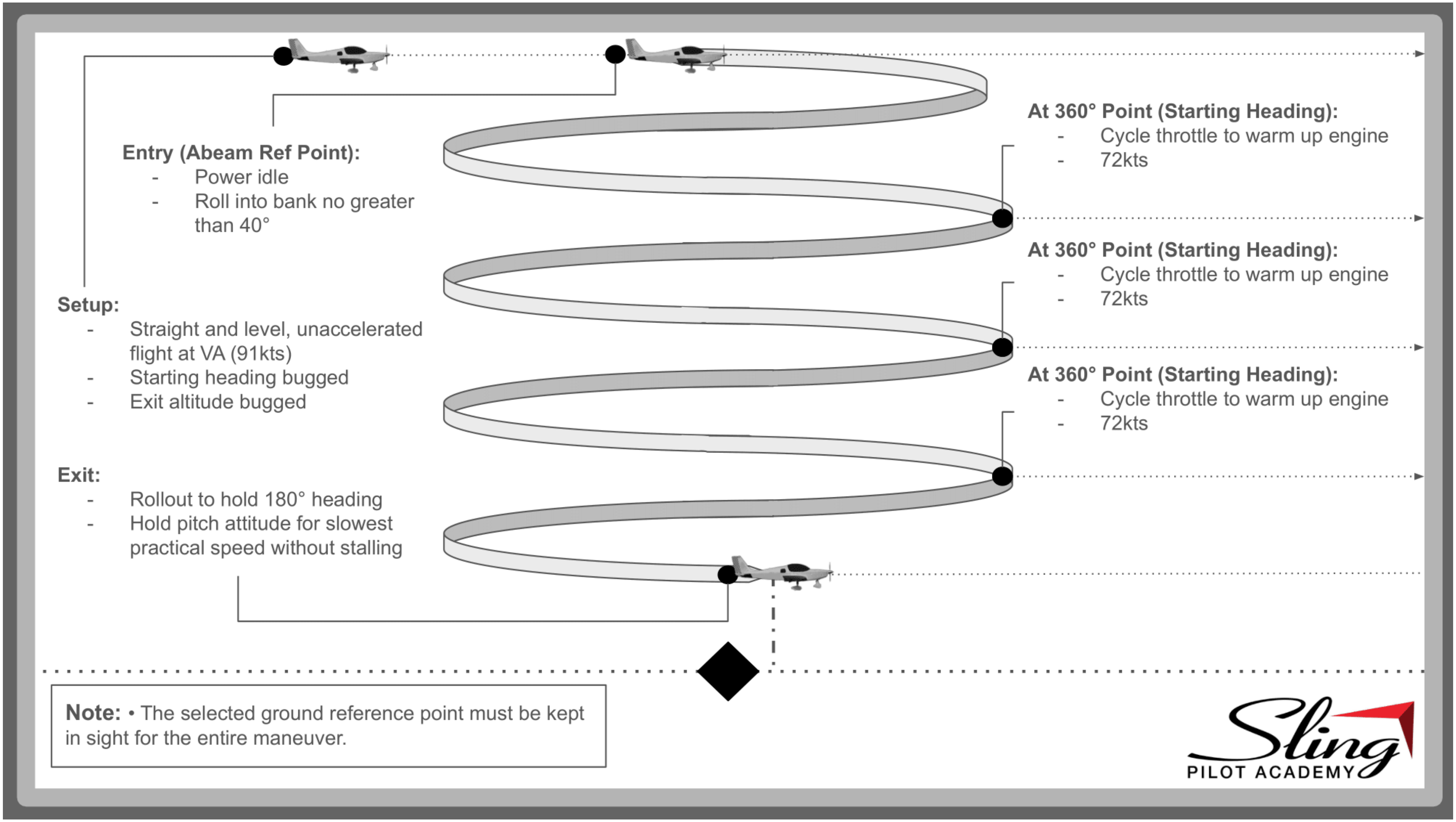
Steep Spiral

Steep Spiral Profile



Steep Spiral

Introduction

Steep spirals are an advanced flight maneuver that challenges a pilot's ability to maintain precise control and altitude awareness while executing a descending turn around a specific point on the ground.

Setup and Entry

The steep spiral maneuver begins with the pilot selecting a ground reference point, often a prominent feature on the surface. The aircraft is positioned upwind and at a sufficient altitude to allow for the execution of the maneuver without compromising safety. The entry into the steep spiral involves initiating a descending turn toward the selected ground reference point.

Initiate the Descent

The pilot starts the maneuver by descending while establishing a steep bank angle. The goal is to maintain a constant radius turn around the selected point on the ground.

Controlled Descent

Throughout the maneuver, the pilot must carefully manage the rate of descent, airspeed, and bank angle to ensure a controlled spiral. Attention to pitch control is crucial to prevent an uncontrolled descent.

Coordination

Coordination between aileron and rudder controls is essential to maintain a coordinated turn and prevent slipping or skidding. Proper use of rudder helps the aircraft maintain a consistent bank angle and heading.

Ground Track Awareness

The pilot continuously monitors the ground track to ensure that the aircraft remains centered on the selected point. Adjustments to the bank angle and pitch may be necessary to correct for any deviations.

Altitude Control

Altitude awareness is critical throughout the steep spiral. The pilot must carefully manage the descent rate to maintain a controlled, safe descent while avoiding excessive loss of altitude.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup

A. Determine ground reference point (do not fly directly overtop point*)
B. Determine surface wind direction (and velocity if possible)
C. Climb to appropriate altitude for maneuver (~3000FT) note the maneuver must be completed no lower than 1500FT AGL
D. In a clean configuration, slow to 72kts
E. Bug starting heading
F. Bug target descent altitude
G. Begin a bank not to exceed 60° at the steepest point to the left or right (direction of turn is based on which side of aircraft the reference point is located)
H. Reduce power to idle
I. Using pitch attitude, maintain 72kts while continuing to hold bank angle
J. Change bank angle as appropriate to keep reference point in sight at all times while descending towards point
K. Upon reaching bugged heading, momentarily move throttle to ~50% power then back to idle (this stops the engine from shock cooling during descent)
L. Continue spiral until at least three complete 360° turns around point have been completed
M. Level off at target altitude and return to normal speed/cruise configuration

Note: During this maneuver, the pilot must keep the reference point in sight at all times. Establish a comfortable radius from the point so as it is not lost during the maneuver.

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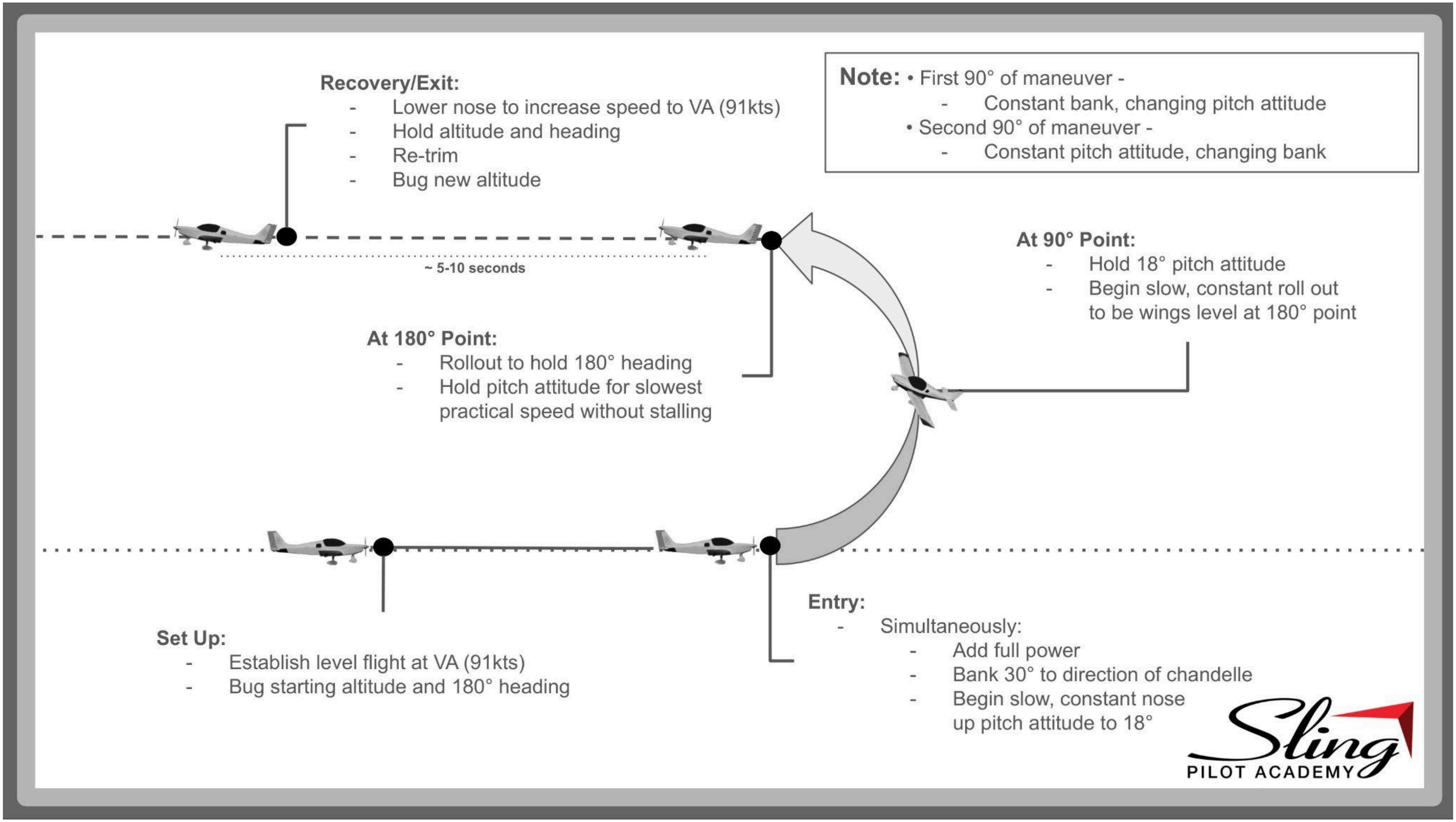
Chandelles

Chandelle Profile



Chandelles

Introduction

A chandelle is an advanced flight maneuver that combines both a climbing turn and a significant change in heading. This maneuver involves executing a 180-degree climbing turn while simultaneously increasing the pitch attitude, resulting in a climbing, climbing turn, and roll combination.

Setup and Entry

Chandelles begin from straight and level flight. The pilot selects a prominent ground reference point or uses the horizon as a reference. The aircraft is brought to a safe entry airspeed, and the maneuver is initiated by smoothly applying back elevator pressure to increase the pitch attitude.

Initiate the Climb

The pilot begins the maneuver by smoothly applying back pressure on the elevator control to increase the pitch attitude. This action initiates a climb while maintaining coordinated aileron and rudder control inputs.

Simultaneous Turn

As the aircraft starts to climb, a coordinated turn is introduced to achieve a 180-degree change in heading. The pilot uses aileron and rudder inputs to establish a smooth bank and turn. The goal is to maintain a constant rate of climb and turn throughout the maneuver.

Maximum Pitch Attitude

During the chandelle, the aircraft reaches its maximum pitch attitude as it completes the climbing turn. The pilot must manage the pitch control to ensure a smooth transition and avoid exceeding the aircraft's critical angle of attack.

Completion of Turn

The pilot completes the 180-degree turn while maintaining the climb. The heading should now be approximately 180 degrees from the original entry heading.

Key Elements and Challenges

Chandelles require precise coordination between pitch, bank, and rudder inputs. Pilots must manage the aircraft's energy to ensure a consistent rate of climb while avoiding excessive altitude loss during the turn.

Procedure

<u>Note</u>: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

<u>Before Maneuver</u>

A. Perform IPCCC (ref. Preamble)

<u>Steep Spiral:</u>

A. Straight and level, unaccelerated flight at VA (91kts)
B. Visual point selected and placed off left or right wing (depending on direction of maneuver)
C. Once established on entry heading and altitude
D. Bug ending heading (180° from start heading)
E. Bug starting altitude
F. When ready, simultaneously:
    a. Progressively increase throttle to full:
    b. Smoothly roll into a 30° bank to the desired direction
G. Slowly and smoothly increase pitch attitude so that nose is at about 18° up when reaching the 90° point of the turn
H. When passing 90° point, maintain the 18° nose up attitude and slowly begin to roll out of bank at a rate so that the wings will be level upon reaching the ending heading (180° point).
I. Upon reaching ending heading (180° point), hold wings level, maintain pitch attitude to just below critical AOA (~55kts)
J. Hold pitch, airspeed, and heading for ~5 seconds
K. Lower nose, increase speed to VA (91kts)
L. Hold altitude and heading
M. Bug final altitude

Lazy Eights

Introduction

Lazy eights are an advanced maneuver that combines a climbing turn with a descending turn, resulting in a figure-eight pattern flown along a specific flightpath. This intricate maneuver challenges a pilot's precision in control inputs and requires the coordination of pitch, roll, and yaw to achieve smooth transitions between climb and descent.

Setup and Entry

The pilot selects a reference point on the horizon or the ground and establishes the entry airspeed. The entry is initiated by smoothly applying elevator back pressure to start the climb.

Initiate the Climb

The pilot begins the maneuver by applying back pressure on the elevator control to initiate a smooth climb. The goal is to reach the maximum pitch attitude gradually.

Roll to the Left or Right

As the aircraft climbs, the pilot introduces a coordinated roll to the left or right, creating the first half of the figure-eight pattern. The bank angle increases gradually to achieve a constant rate of roll.

Complete the First Half

The aircraft completes the first half of the lazy eight, transitioning from a climb to level flight and then into a descent while maintaining the rolling turn.

Initiate the Descent

The pilot initiates a controlled descent while continuing the coordinated roll to complete the second half of the figure-eight ∞

Mirror the First Half

The second half of the maneuver mirrors the first, with the pilot gradually rolling out of the bank to return to straight and level flight. The goal is to maintain a symmetrical and smooth pattern throughout the maneuver.

Key Elements and Challenges

Lazy eights demand precise coordination between pitch, roll, and yaw inputs. Pilots must carefully manage energy throughout the maneuver to avoid altitude deviations and ensure a smooth transition between climb and descent.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Lazy Eight:

A. Establish level flight at VA (91kts)
B. Bug starting altitude and heading
C. Establish visual references on both wings
D. Ensure power is set for VA (91kts)
E. Bank to 5°
F. At 5° bank, slowly increase pitch attitude and bank angle
G. Set pitch attitude to a max of 25° (pitch will be variable)
H. Bank to approximately 20°-30° bank (allow plane to naturally bank, manually control so roll does not pass 30°)
I. At 90° point
   a. Maintain minimum airspeed
   b. Lower nose to horizon (level)
J. Continue rolling to 180° point
K. Lower pitch attitude
L. Use pitch to control airspeed while returning to starting altitude
M. At 180° point:
   a. Wings level
   b. At starting altitude
   c. At starting airspeed
N. Start maneuver again starting from step E of this checklist to the opposite side

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Unusual Attitudes

Introduction

Unusual attitudes refer to unexpected or unintended orientations of an aircraft, often characterized by abnormal pitch, roll, or yaw attitudes. Pilots must be proficient in recognizing and recovering from unusual attitudes, as they can result from various factors such as turbulence, wake turbulence encounters, spatial disorientation, or pilot disorientation.

Recognition of Unusual Attitudes

The first step in recovering from unusual attitudes is recognizing that the aircraft is not in the expected attitude. This recognition is often achieved through a combination of visual cues, instrument indications, and a pilot's spatial awareness.

Instrument Scan and Verification

The attitude indicator, airspeed indicator, altimeter, and turn coordinator are key instruments used to verify the aircraft's orientation. A quick and accurate assessment of the instruments aids in determining the appropriate recovery action.

Prompt and Positive Recovery Actions

Once an unusual attitude is recognized and verified, pilots must take prompt and positive actions to return the aircraft to normal flight. The specific recovery actions depend on the nature of the unusual attitude but often involve reducing or increasing pitch, rolling wings level, and coordinating rudder inputs to establish straight and level flight.

Spatial Disorientation Awareness

Pilots are also trained to be aware of spatial disorientation, a phenomenon where a pilot's perception of aircraft attitude conflicts with the actual attitude. Recognizing and mitigating spatial disorientation is crucial in preventing the onset of unusual attitudes and facilitating a timely recovery.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Start/Entry

A. Bug altitude and heading prior to starting maneuver
B. Give controls to the other pilot/instructor
C. Close eyes, head down, hands off controls, and feet off rudders
D. When other pilot/instructor calls "You have controls"
E. Use attitude indicator to determine pitch attitude and bank, then:

If Nose High

(Without delay)

A. Begin pitching down (towards horizon)
B. Simultaneously:
  a. Add full throttle
  b. Correct bank to wings level
  c. Watch/adjust airspeed and engine RPM (engine can/will overspeed at full power with pitch attitude level/down)
C. Return to starting altitude/heading/airspeed (91kts)

If Nose Low

(Without delay)

A. Being to roll wings level
B. When bank is less than 20°:
  a. Slowly pitch nose up (do not rush raising the nose; pulling up too fast will result in stress on airframe)
C. Power idle until airspeed ~VA (91kts)
D. When wings level, nose on horizon and airspeed corrected,
E. Return to starting altitude/heading/airspeed (91kts)

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Slow Flight

Introduction

Slow flight is a flight maneuver in which an aircraft is intentionally flown at an airspeed near or just above its stall speed while maintaining controlled flight. This maneuver is a fundamental aspect of pilot training, providing valuable experience in managing an aircraft's control surfaces and maintaining stability at low airspeeds. Slow flight is typically practiced in a controlled environment, allowing pilots to develop the necessary skills for safe and precise control in situations where reduced airspeed may be required.

Configuration and Entry

Slow flight is often practiced with the aircraft configured for a landing approach. This typically involves extending flaps and establishing a nose-high attitude. Pilots reduce power to maintain a specific airspeed just above the stall while still maintaining controlled flight.

Control Inputs and Coordination

Pilots must delicately manage control inputs during slow flight. Elevator control is crucial for maintaining the desired pitch attitude and airspeed, and coordinated aileron and rudder inputs are necessary to prevent slips or skids.

Instrument Scan and Reference

During slow flight, pilots rely on outside visual cues and their instrument scan to monitor key parameters such as airspeed, altitude, and vertical speed. Maintaining a consistent pitch attitude and controlling the aircraft's descent rate are critical elements of successful slow flight.

Stall Recognition and Recovery

While slow flight brings the aircraft close to the stall speed, pilots are trained to recognize the onset of a stall through cues such as buffeting, uncommanded roll, or pitch changes. Immediate recovery involves lowering the aircraft's nose to reduce the angle of attack, adding power if necessary, and smoothly leveling the wings to return to controlled flight.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Setup/Entry

A. Establish straight and level, unaccelerated flight
B. Bug starting attitude and heading
C. Slow to at/below VFE (85kts)
D. *When below VFE*, flaps 1
E. Retrim to maintain altitude and heading
F. Flaps 2
G. Retrim to maintain altitude and heading
H. Flaps 3
I. Retrim to maintain altitude and heading
J. Slow to 55kts (or speed assigned by instructor)

Slow Flight

A. Use a mixture of power and pitch attitude to maintain speed and altitude
B. Make appropriate flight control inputs to maintain coordinated flight
C. When conducting turns to headings, limit bank to half standard rate
D. Make small, precise control inputs when climbing/descending in slow flight

Exit/Recovery

A. Begin to incrementally increase power while retrimming to maintain altitude and heading
B. *When speed starts to build*, flaps 2
C. Retrim to maintain altitude and heading
D. Flaps 1
E. Retrim to maintain altitude and heading
F. Flaps up
G. Return to flight at VA (91kts) or assigned airspeed

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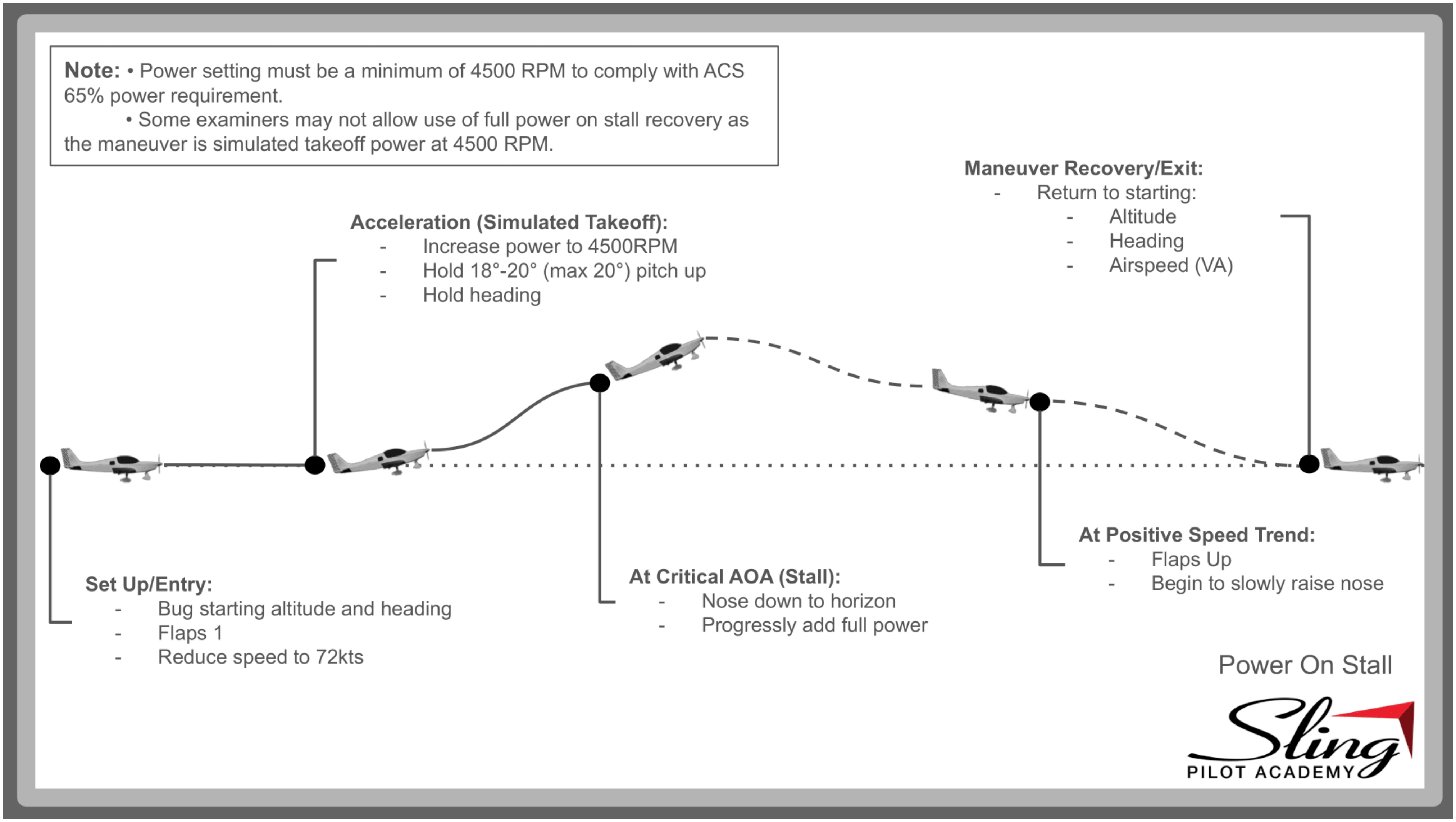
Power On Stall

Power On Stall Profile



Power On Stall

Introduction

A power-on stall is a flight maneuver where an aircraft is intentionally brought into a stall condition while adding power. This maneuver is an essential part of pilot training, designed to familiarize pilots with the aerodynamic characteristics of an aircraft during takeoff and climb scenarios. Power-on stalls typically occur when a pilot increases power while the aircraft is in a climbing attitude, and the maneuver helps pilots recognize and recover from stalls in these critical phases of flight.

Configuration and Entry

Power-on stalls are often initiated with the aircraft in a climbing configuration, typically with takeoff flaps set and power increased for a climb. The pilot then increases the pitch attitude to maintain a climb while maintaining simulated takeoff power (4500RPM).

Stall Recognition and Characteristics

As the aircraft climbs at an angle close to the critical angle of attack, the stall may occur. Indications of an impending stall include a buffet or shudder, unresponsive controls, and an increase in the angle of attack. The stall occurs due to the wing exceeding its critical angle of attack, leading to a loss of lift.

Recovery Procedure

Recovery from a power-on stall involves reducing the angle of attack by lowering the nose, leveling the wings, and applying full power to regain airspeed. The goal is to restore lift and airflow over the wings to exit the stall condition. Coordination of control inputs is crucial to avoid secondary stalls or other undesirable consequences.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Maneuver

A. Establish straight and level unaccelerated flight at/below VFE (85kts)
B. Bug starting altitude and heading
C. *When below VFE (85kts)*, flaps 1
D. Slow to ~60kts
E. Set throttle for 4500 RPM while maintaining a level pitch attitude
F. At 4500 RPM (while level), begin pitching up to 18-20° nose up (no higher than 20)
G. Maintain pitch attitude and heading until first sign of impending stall
H. Verbally call out/acknowledge first stall indication
I. When buffet or stall warning occurs;
   a. nose down to horizon (or slightly below)
      *Increase power to max continuous (do not overspeed engine)
J. When speed begins to increase, flaps up
K. Raise nose horizon (arrest descent)
L. Return to starting altitude, heading, and VA (91kts)

***Increasing power with a nose level/low attitude can cause the engine to overspeed.**

Note: The ACS requires the pilot to use no less than 65% power. This equates to approximately 4500RPM in the Sling 2.

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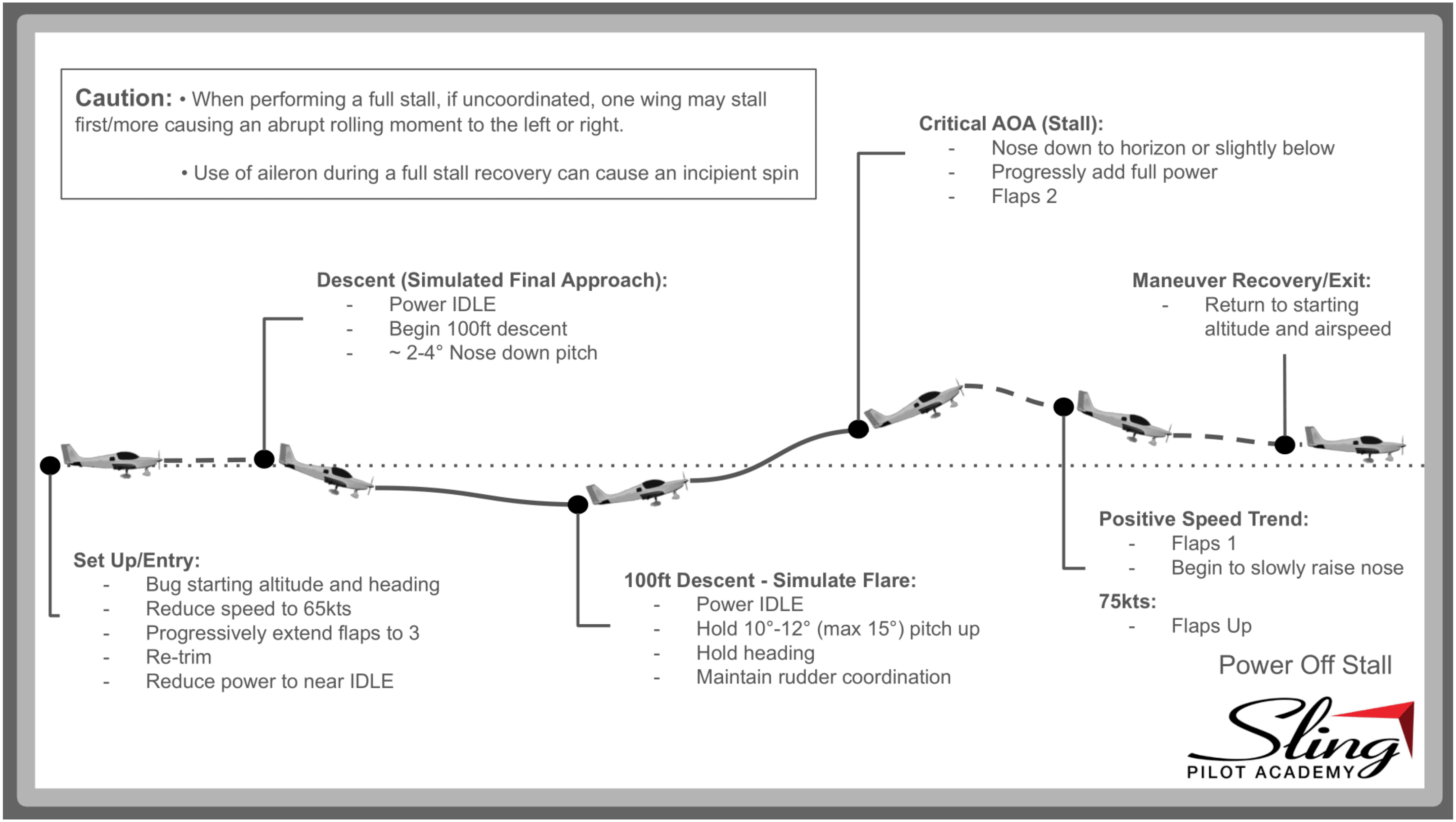
Power Off Stall

Power Off Stall Profile



Power Off Stall

Introduction

A power-off stall is a flight maneuver where an aircraft is intentionally brought into a stall condition while reducing or eliminating engine power. This maneuver is a fundamental component of pilot training, designed to teach pilots about the aerodynamic characteristics of an aircraft during approaches to landing or during the landing phase. Power-off stalls typically occur when the pilot reduces power and increases the pitch attitude, and the maneuver helps pilots recognize and recover from stalls in these critical phases of flight.

Configuration and Entry

Power-off stalls are often initiated with the aircraft in an approach or landing configuration. This involves reducing power to idle, configuring the aircraft with landing flaps, and initiating a descent while maintaining a pitch attitude that simulates an approach to landing.

Stall Recognition and Characteristics

As the aircraft descends at a higher angle of attack, the stall may occur. Indications of an impending stall include a buffet or shudder, unresponsive controls, and an increase in the angle of attack. The stall occurs due to the wing exceeding its critical angle of attack, leading to a loss of lift.

Recovery Procedure

Recovery from a power-off stall involves lowering the nose to decrease the angle of attack, leveling the wings, and applying full power to regain airspeed. The goal is to restore lift and airflow over the wings to exit the stall condition. Proper coordination of control inputs is crucial to avoid secondary stalls or other undesirable consequences.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Maneuver:

A. Establish straight and level unaccelerated flight at/below VFE (85kts)
B. Bug starting altitude and heading
C. *When below VFE (85kts)*, flaps 1
D. Retrim to maintain altitude and heading
E. Flaps 2
F. Retrim to maintain altitude and heading
G. Flaps 3
H. Retrim to maintain altitude and heading
I. Maintain 60-65kts
J. When stable, reduce power to near idle
K. Begin a slight descent to 100ft below starting altitude
L. At 100ft descent point, power IDLE
M. Pitch nose up to 10-12° (max 15°) and hold attitude
N. Maintain rudder coordination with high pitch attitude
O. Maintain pitch attitude and heading until first sign of impending stall
P. When buffet or stall warning occurs;
    a. nose down to horizon (or slightly below)
    *Increase power to max continuous (do not overspeed engine)
Q. Flaps 2
R. When speed begins to increase, flaps 1
S. Raise nose horizon (arrest descent)
T. At 75kts, flaps up
U. Return to starting altitude, heading, and VA (91kts)

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Turning Stall

Introduction

Turning stalls are a specific type of stall that occurs when an aircraft is in a banked turn. Stalls happen when the angle of attack on the wings becomes too high, causing a disruption in the smooth airflow over the wings, leading to a loss of lift. In a turning stall, the aircraft is not only in a stall condition but is also in a banked or turning attitude.

Factors Contributing to Turning Stalls

Turning stalls are influenced by factors such as the angle of bank, load factor, and airspeed. As the pilot initiates a turn, the effective weight of the aircraft increases, placing additional load on the wings. If the pilot maintains a constant back pressure on the controls without increasing airspeed, the angle of attack may exceed the critical angle, resulting in a turning stall.

Recognition and Characteristics

Recognition of an impending turning stall involves cues such as a buffet, unresponsive controls, and the potential for one wing to stall before the other. The characteristics of a turning stall include a roll-off to the stalled wing and a tendency for the aircraft to enter a spin if the stall is not promptly addressed.

Recovery Procedure

Recovery from a turning stall involves reducing the angle of bank by leveling the wings and applying coordinated aileron and rudder inputs. The pilot should simultaneously release back pressure on the elevator to decrease the angle of attack and allow the wings to regain lift. Once the stall is recovered, the aircraft can be returned to level flight.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Maneuver:

A. Establish straight and level unaccelerated flight at/below VFE (85kts)
B. Bug starting altitude and heading
C. When below VFE (85kts), flaps 1
D. Slow to ~60kts
E. Set throttle for 4500 RPM while maintaining a level pitch attitude
F. At 4500 RPM (while level), begin pitching up to 18-20° nose up (no higher than 20)
G. While increasing pitch, slowly bank to 15-20°
H. Maintain pitch attitude, bank, and heading until first sign of impending stall
I. Verbally call out/acknowledge first stall indication
J. When buffet or stall warning occurs;
   a. nose down to horizon (or slightly below)
      *Increase power to max continuous (do not overspeed engine)
   b. While correcting pitch attitude, return bank to wings level
K. When speed begins to increase, flaps up
L. Raise nose horizon (arrest descent)
M. Return to starting altitude, heading, and VA (91kts)

***Increasing power with a nose level/low attitude can cause the engine to overspeed.**

Note: The ACS requires the pilot to use no less than 65% power. This equates to approximately 4500RPM in the Sling 2.

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Accelerated Stall

Introduction

An accelerated stall is a flight maneuver in which an aircraft enters a stall condition while subjected to an increased load factor, often caused by a rapid or abrupt change in pitch or bank. Accelerated stalls occur when an aircraft is flown at an angle of attack and bank that exceeds its critical angle of attack, resulting in a loss of lift and a stall.

Cause of Accelerated Stalls

The primary cause of an accelerated stall is an increase in the load factor, which occurs when the aircraft is subjected to a higher-than-normal g-force. This can happen during aggressive or abrupt pitch changes, steep turns, or other maneuvers that increase the angle of attack and bank simultaneously.

Stall Recognition and Characteristics

Accelerated stalls share many characteristics with other stalls, including a buffet or shudder, unresponsive controls, and an increase in the angle of attack. However, in accelerated stalls, these characteristics are often more pronounced due to the increased load factor. Pilots must be vigilant in recognizing the onset of a stall and responding promptly to recover.

Recovery Procedure

Recovery from an accelerated stall involves reducing the angle of attack by lowering the nose, leveling the wings, and applying coordinated control inputs. The application of power may also be necessary to regain airspeed and recover from the stall. Pilots must avoid exacerbating the stall by abrupt control movements during the recovery.

Training Objectives

Accelerated stalls are introduced in pilot training to familiarize aviators with the effects of increased load factor on stall behavior. The maneuver teaches pilots to recognize the signs of an accelerated stall, understand its causes, and practice recovery techniques to restore controlled flight.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Before Maneuver

A. Perform IPCCC (ref. Preamble)

Maneuver:

A. Bug start heading and altitude
B. Reduce speed to 72kts
C. Reduce power to IDLE
D. Begin a bank to 35°-45° to the desired side of the maneuver
E. At 30° bank, increase back pressure on stick to induce stall
F. Hold back pressure on stick to maintain a tight turn radius
G. At first indication of stall, simultaneously
    a. Reduce angle of attack
    b. Increase to full power
    c. Return to wings level
H. Maintain ending heading
I. Set thrust to maintain VA (91kts)

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Engine Failure

Introduction

AVIATE, NAVIGATE, COMMUNICATE

Engine issues in a single engine aircraft pose one of, if not the biggest threat to pilots. While simulated failures are often practiced, nothing can prepare a pilot for the real thing. Piloting skill, immediate action, decision making, clear communication, and execution are just some of the important qualities pilots must utilize when an engine shuts down in flight.

Piloting Skill

When handling an engine failure, it is vital that the pilot is in-sync with the state of the aircraft (configuration, energy, position, and altitude). Having the ability to understand and anticipate the aircraft's potential energy gives the pilot the highest chance of successfully navigating the plane safely to the ground. Pilot's can better their skill by placing themselves in a simulated engine failure position, keeping current on all maneuvers, and practicing challenging landings.

Immediate Actions

Having a strong understanding of the aircraft's systems will allow the pilot to make quick, correct, and efficient decisions when handling an engine failure. If time allows, the pilot must follow the aircraft's emergency checklist that outlines the proper handling of the engine failure and possible restart. In the case that the failure occurs at a low, critical altitude, the pilot's best course of action is to attempt to troubleshoot the failure from memory while navigation towards the selected landing spot.

Decision-Making

During an engine out, the available margin of error is minimal. The pilot must make a series of critical decisions without any hesitation. To simplify and influence safe/optimal decisions, pilots are encouraged to use the ABCDE checklist (listed in the procedures section below).

Communication

One of the last steps in handling an engine failure is the pilot's ability to communicate with other pilots, passengers, ATC, and any other persons. Once the pilot declares an emergency, ATC will prioritize the distressed aircraft and provide the pilot with all available assistance. During the engine failure, pilots should communicate their intentions as clearly as possible so that ATC can better coordinate with emergency services. If more than one person is in the aircraft during an engine failure, the pilot must take charge of the aircraft and direct the passenger to complete any appropriate tasks.

Execution

The final piece of the puzzle is the execution of an emergency landing. Whether the landing is on a runway or off-field, the pilot's primary responsibility is to put the plane safely on the ground. This maneuver should be executed using the ditching checklist if time allows.

Procedure

<u>Note</u>: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

<u>Immediate Action Items (FLOW)</u>

Memory Items

A. Fuel pumps, both ON
B. Fuel selector, change position
C. Throttle, set middle position
D. Electrical switches, all ON
E. Lanes A/B, both ON
F. Starter, engage

If Engine Restarts

G. Plan to land ASAP
H. Transponder, squawk 7700
I. Radio, 121.5
J. Seatbelts, secure

If Engine Doesn't Restart

K. Repeat with ECU Batt Backup ON

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Engine Fire

Introduction

AVIATE, NAVIGATE, COMMUNICATE

Engine fires pose multiple threats that require a pilot to take swift action in order to assure smoke inhalation, fire damage, and a possible forced landing from the engine stoppage. When an engine fire occurs, the pilot must take immediate action to suppress the fire, and safely land the aircraft.

Immediate Actions

Fires in any aircraft can directly harm the pilot by smoke and flame, or cause structural damage to the aircraft that ends in a loss of control. Knowing and performing the proper engine fire flow gives the pilot the highest chance of success.

Identification

It is vital that pilots confirm/are confident that an engine fire is actually occurring before completing the memory flow/checklist. Expected signs of an engine fire are; flames, smoke with heat, and black smoke.

Communication

One of the last steps in handling an engine fire is the pilot's ability to communicate with other pilots, passengers, ATC, and any other persons. Once the pilot declares an emergency, ATC will prioritize the distressed aircraft and provide the pilot with all available assistance. During the engine fire, pilots should communicate their intentions as clearly as possible so that ATC can better coordinate with emergency services. If more than one person is in the aircraft during an engine fire, the pilot must take charge of the aircraft and direct the passenger to complete any appropriate tasks.

Execution

The final piece of the puzzle is the execution of an emergency landing. Whether the landing is on a runway or off-field, the pilot's primary responsibility is to put the plane safely on the ground. This maneuver should be executed using the ditching checklist if time allows.

Procedure

Note: The following steps are for maneuver familiarization only and do not replace the aircraft checklist or cover all possible scenarios for the procedure.

Immediate Action Items (FLOW)

Memory Items

A. Fuel selector, OFF
B. Full Power
C. Cabin heat, Close
D. Fuel pumps, OFF
E. Lanes, OFF
F. ELT, ON
G. Master and other electrical items, OFF BEFORE LANDING