



# Stick & Rudder Redux: The Fundamentals of Flight



Stick and rudder skills are one of the very first things we learned (or did we) as pilots and yet a quick review of accident data suggests that a lack of these same basic flying skills are responsible for a disproportionate number of accidents. All flying comes back to the basics from that gusty crosswind short-field approach to a leisurely flight along the coast to the most extreme aerobatics. This clinic will get your feet moving by taking a refreshed look at some basic flight maneuvers, controlled and coordinated flight, and how to get that kinesthetic feeling back for flight

Trainees will arrive at this breakout session at different points within the clinic schedule. Those who fly the scenario after participating in the breakout sessions will have the benefit of that current and relevant knowledge for the simulation mission. Some clinic trainees will start with the flight simulation component and can use the subsequent knowledge sessions as a vehicle for further understanding of their actions flying the scenario.

No matter the order of the sessions the aim of the clinic syllabus is to deliver a correlative experience with the knowledge breakouts supporting the flight simulation.



## Keynote

### **Perpetual Learning and Practice**

Why is it that so many pilots lack the basic foundational skills needed to meet the challenges of common general aviation activities? Despite advances in aircraft technology we seem to keep experiencing the same “loss of control” events. We’ll explore why stick and rudder skills are the key to make flying more enjoyable, safer and rewarding. Presenter: Michael Goulian

## Breakout Sessions

### **The Beginner’s Mind**

How to become a stick and rudder pilot? We’ll step back and take a deep dive into the maneuvers, aerodynamic concepts and skills needed in straight and level flight, during turns, while climbing and descending and being coordinated vs. being un-coordinated. This breakout session will help you See flight with a beginner’s mind.

Presenter: Jason Archer

### **Total Control**

The basics are the components and foundation for all of flight. Through a scenario based discussion we’ll look at how and where stick and rudder skills apply in the operational environment. Presenter: Ken Wittekiend



## Scenario

### *Down the Cape*



Your friend just purchased a house out in Woods Hole, MA and has invited you and your family for a visit over the long Memorial Day weekend. You're based at KBED about 62 miles to the North. A nice but typical spring day of variable winds with the occasional gust is on deck for your flight out. Your plan is to meet him at Falmouth Airpark (5B6). Your flying doesn't end just yet. You'll depart Falmouth for a sight seeing flight with your friend for a photo mission of the new home and if you are lucky some whale spotting just off the coast. You'll return to Falmouth for a weekend of family fun. Don't let the apparent simplicity of this flight make you complacent. Stick and rudder skills are needed even on the most simplest of missions. This mission is broken into two parts - the Arrival and the Departure.



## Part 1: The Arrival

### Mission Summary:

A good friend of yours just purchased a house out in Woods Hole, MA and has invited you and your family (spouse and one child, 12) for a visit over the long Memorial Day weekend. You're based at KBED about 62 miles to the North. It's a nice, typical spring day with variable winds and the occasional gust. Your plan is to meet him at Falmouth Airpark (5B6).

Your VFR route from KBED to 5B6 included a salute to the pilgrims by flying over Plymouth Rock. You've continued your flight down the coast and are now presently located 12.5 miles north of the Cape Cod Coast Guard Station. You've been monitoring Boston on 118.2 but have not requested flight following and are squawking 1200.

### Starting Conditions:

Enroute to 5B6 from KBED via Plymouth Rock at  $41.87^{\circ}$  /  $-70.59$ ; about 12.5 north of KFMH.

Heading  $170^{\circ}$ ; following Rt 3, the Plymouth highway.

Speed: 1000 kts

Altitude:



## Part 2: The Departure

### Mission Summary:

Your flying doesn't end just yet. You'll depart Falmouth (5B6) after lunch for a sight-seeing flight with your friend for a photo mission of the new home and if you are lucky some whale spotting just off the coast. You'll return to Falmouth for a weekend of family fun. Don't let the apparent simplicity of this flight make you complacent. Stick and rudder skills are needed even on the most simplest of missions.

### Starting Conditions:

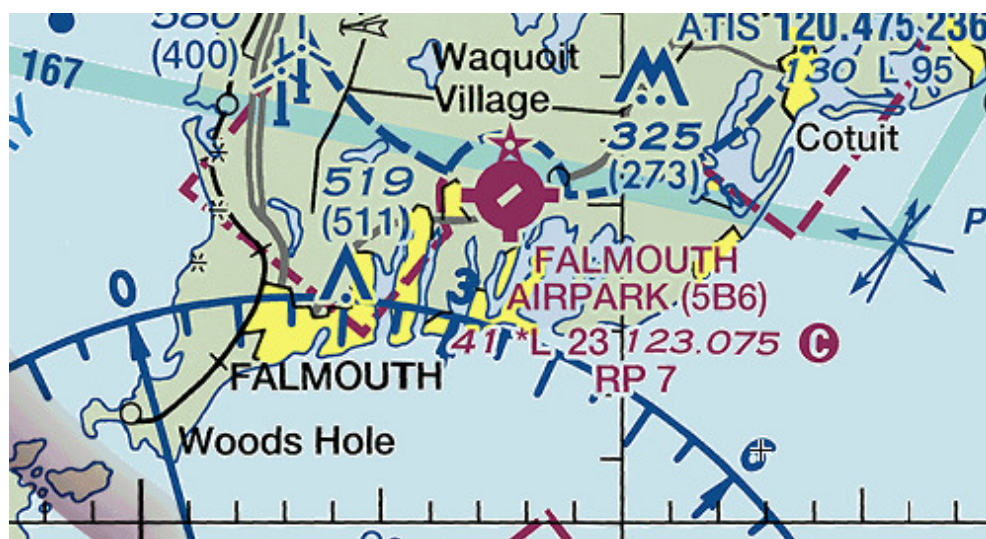
Departure end of Rwy 25 at Falmouth.

Cruise ship placement at 41.5° / -70.66° heading NE at 05 KTS.

### Weather:

At Departure from 5B6: KFMH 1555 20010 A3000 10SM SK SCT019 21/15

Winds Aloft: 30 22020 & 60 20030







**5B6: FALMOUTH AIRPARK**  
FALMOUTH, MASSACHUSETTS, UNITED STATES





## MASSACHUSETTS

127

### EDGARTOWN

**KATAMA AIRPARK** (1B2) 2 S UTC-5(-4DT) N41°21.51' W70°31.47'

NEW YORK

18 NOTAM FILE BDR

**RWY 03-21:** 3700X50 (TURF)

**RWY 03:** Thld dsplcd 245'. Road.

**RWY 21:** Thld dsplcd 300'. Pole.

**RWY 06-24:** 2700X50 (TURF)

**RWY 06:** Thld dsplcd 300'. Road.

**RWY 24:** Road.

**RWY 17-35:** 2600X50 (TURF)

**RWY 17:** Thld dsplcd 200'. Bldg.

**SERVICE:** S2 FUEL 100LL

**AIRPORT REMARKS:** Attended May 15-Oct 15 SR-SS. Wildlife on and invof arpt. Be aware of hi-speed mil jet and heavy helicopter tfc vicinity Cape Cod CGAS. Rwy 03-21, Rwy 06-24, and Rwy 17-35 dsplcd thlds marked with flush white paving blocks. Arpt tiedown fee, beach tiedown fee, cash/check only. Ctc arpt mgr.

**AIRPORT MANAGER:** (508) 627-0421

**COMMUNICATIONS:** CTAF/UNICOM 122.8

® BOSTON APP/DEP CON 119.7

**CLEARANCE DELIVERY PHONE:** For CD ctc Boston Apch at 603-594-5554.

**Not for Navigational  
Purposes**

**FALMOUTH AIRPARK** (5B6) 4 NE UTC-5(-4DT) N41°35.14' W70°32.42'

NEW YORK

41 B NOTAM FILE BDR

L-33D

**RWY 07-25:** H2298X40 (ASPH) S-4 LIRL

IAP

**RWY 07:** Trees. Rgt tfc.

**RWY 25:** Trees.

**SERVICE:** FUEL 100LL, UL94 LGT Actvt LIRL Rwy 07-25-122.7. Actvt rwy lgts with 5 clicks on Freq 122.7.

**AIRPORT REMARKS:** Attended 1300-2100Z. Wildlife invof arpt. Watch for pedestrians or animals invof rwy. Turf around Rwy 07-25 soft after rain. Be aware of hi-speed mil jet and heavy helicopter tfc invof Cape Cod CGAS. Airport clsd to acft exceeding 5000 lbs published maximum gross weight. Tsnt ops daytime only. No night tsnt tkofs or Indgs. No tran student activities, solo or dual at Falmouth Airpark. Full stops only. TGL ops prohibited. Prop-locks rqrd for all acft remaining overnight.

**AIRPORT MANAGER:** 508-548-9617

**COMMUNICATIONS:** CTAF/UNICOM 123.075

® BOSTON APP/DEP CON 118.2

**CLEARANCE DELIVERY PHONE:** For CD ctc Boston Apch at 603-594-5554.

**RADIO AIDS TO NAVIGATION:** NOTAM FILE MVY.

**MARTHAS VINEYARD (L) (L) VOR/DME** 114.5 MVY Chan 92 N41°23.77' W70°36.76' 031° 11.8 NM to fld. 62/15W.

**FITCHBURG MUNI** (FIT)(KFIT) 3 SE UTC-5(-4DT) N42°33.23' W71°45.55'

NEW YORK

345 B TPA-1347(1002) NOTAM FILE FIT

H-11D, 12K, L-33C, 34J

**RWY 14-32:** H5001X100 (ASPH) S-30, D-41 MIRL 0.3% up NW

IAP

**RWY 14:** REIL. PAPI(P4L)-GA 3.0° TCH 40'. Thld dsplcd 163'. Trees.

**RWY 32:** REIL. PAPI(P4L)-GA 3.5° TCH 46'. Thld dsplcd 300'. Trees.

#### RUNWAY DECLARED DISTANCE INFORMATION

**RWY 14:** TORA-5001 TODA-5001 ASDA-4701 LDA-4538

**RWY 32:** TORA-5001 TODA-5001 ASDA-4838 LDA-4538

**SERVICE:** S4 FUEL 100LL, JET A, A+ LGT Actvt REIL Rwy 14 and 32; PAPI Rwy 14 and 32; MIRL Rwy 14-32-123.0. Rotg bcn not avbl during dalgt IFR conds. Rwy 14 PAPI unusbl byd 5 degs L and R of cntrln.

**AIRPORT REMARKS:** Attended 1300-2200Z. Wildlife on and invof arpt. Ldg fee for corporate and commercial flts only.

**AIRPORT MANAGER:** 978-345-9580

**WEATHER DATA SOURCES:** ASOS 135.175 (978) 343-9121.

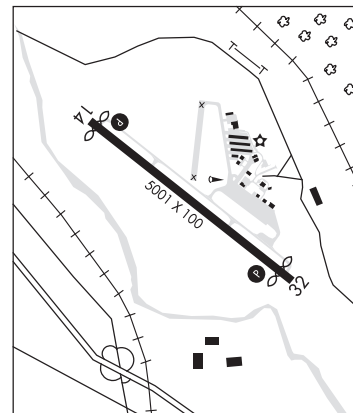
**COMMUNICATIONS:** CTAF/UNICOM 122.7

RCO 122.15 (BRIDGEPORT RADIO)

® BOSTON APP/DEP CON 124.4

**RADIO AIDS TO NAVIGATION:** NOTAM FILE BDR.

**GARDNER (L) (L) VOR/DME** 110.6 GDM Chan 43 N42°32.76' W72°03.49' 102° 13.3 NM to fld. 1280/14W.





## FALMOUTH AIRPARK OPERATIONS GUIDELINES

CTAF: 122.8 PCL: 122.7 (3X) ATIS: 120.475(Coast Guard) APPROACH: 118.2

CLEARANCE: (603) 594-5554 (BOSTON APPROACH)

OPERATIONS: Refer to Northeast Supplement/AFD

Runway 25 LEFT TRAFFIC Runway 7 RIGHT TRAFFIC

TPA: 1043 Feet. All Traffic to SOUTH SIDE of Airport

### Not for Navigational Purposes

Straight out departures and/or straight in arrivals are discouraged.  
Follow traffic pattern and noise abatement procedures.

On departure, climb on runway heading to 750 feet consistent with safe operation. Turn left (RWY 25) or right (RWY 7) for noise abatement. Reduce RPM as soon as possible.

Radio use, for position reports in the pattern and on the ground, is essential for safe operations.

**Touch & Go Landings prohibited. No night operations between 11 PM and 5 AM. No nighttime transient operations. Fly-bys are discouraged. Repeat offenders will be asked not to return.**

Weight limit is 5,000 pounds published max gross weight.  
Offenders are subject to a \$100 overweight penalty.

Helicopters must fly normal traffic pattern. No hover or taxi practice.  
No prolonged parking with rotor under power. Taxi well clear of all fixed wing aircraft in tiedown area.

Propeller locks or equivalent disabling device required for outside overnight parking. All unattended aircraft must be tied down in designated tie-down areas. Transients must sign in.

All runups are to be performed parallel to the runway and clear of all structures. Runups are not to be performed between hangars or in close proximity to homes or other airport structures. Designated runup areas are at ends of runways.

Grass taxiways, tiedown areas, and other areas adjacent to the runway may be very soft after precipitation or thawing. Use common sense when taxing on the grass. Stay on paved areas whenever possible.

**No primary flight instruction.**

THESE GUIDELINES ARE DESIGNED TO HELP US BE GOOD NEIGHBORS WITH OUR SURROUNDING COMMUNITY AND AVOID NOISE COMPLAINTS. PLEASE ABIDE BY THEM.



KHYA/HYA

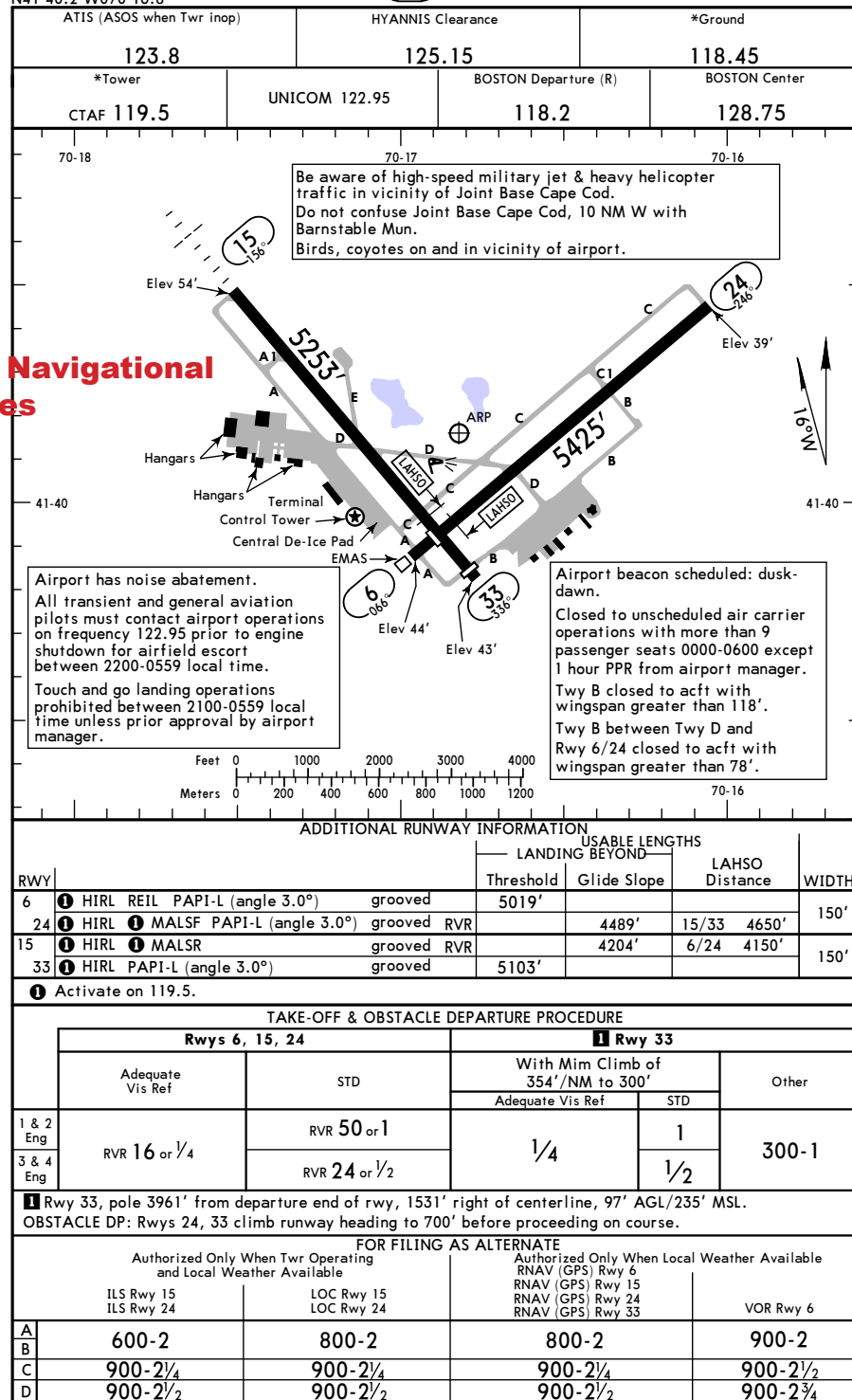
Apt Elev 54'  
N41 40.2 W070 16.8

JEPPESSEN

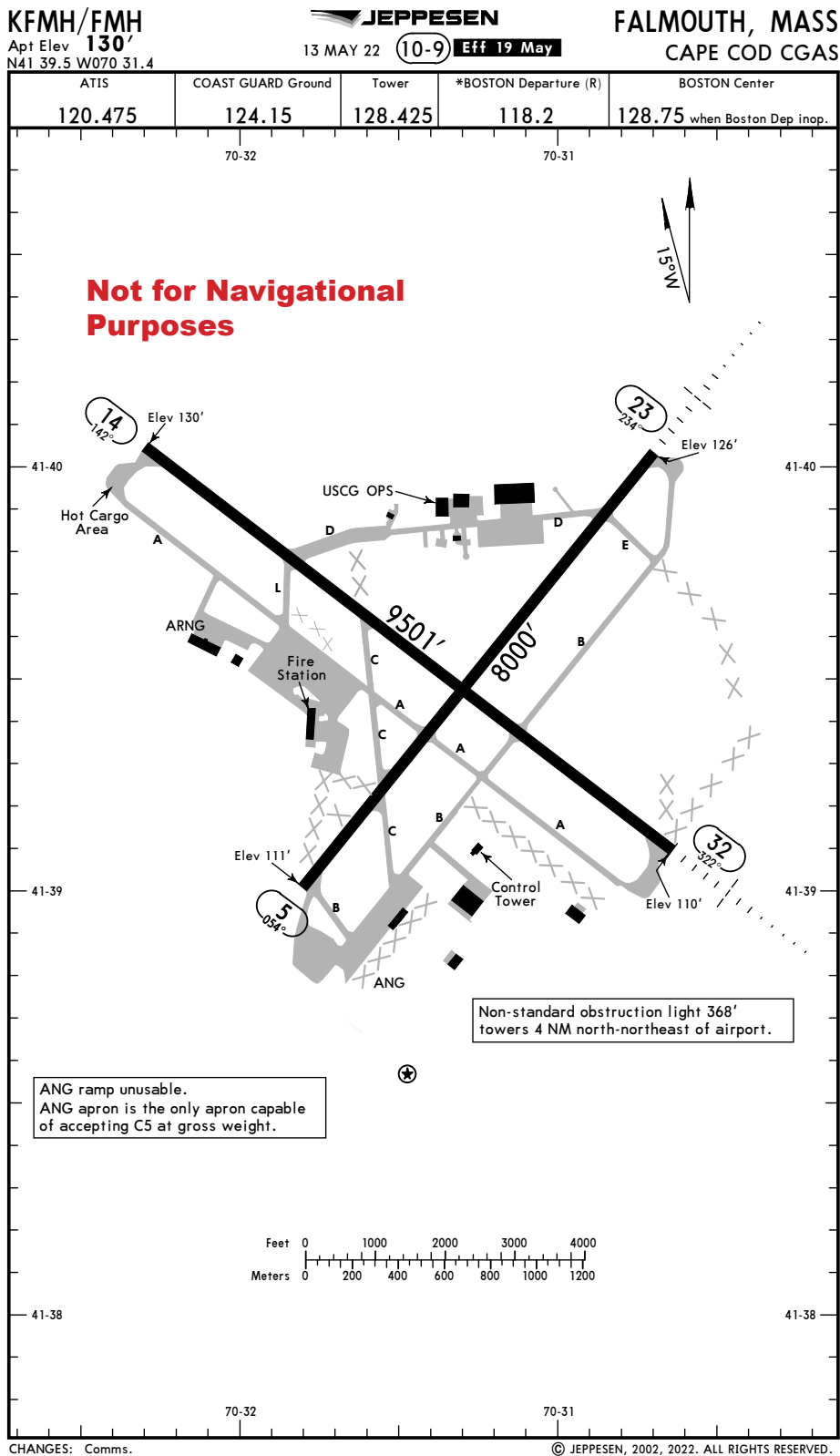
25 DEC 20 11-1 Eff 31 Dec

HYANNIS, MASS

CAPE COD GATEWAY



Not for Navigational  
Purposes





## PERFORMANCE - SPECIFICATIONS

### \*SPEED:

Maximum at Sea Level ..... 126 KNOTS

Cruise, 75% Power at 8500 Feet..... 124 KNOTS

CRUISE: Recommended lean mixture with fuel allowance for engine start, taxi, takeoff, climb and 45 minutes reserve.

75% Power at 8500 Feet..... Range - 518 NM

53 Gallons Usable Fuel ..... Time - 4.26 HOURS

Range at 10,000 Feet, 45% Power..... Range - 638 NM

53 Gallons Usable Fuel ..... Time - 6.72 HOURS

RATE-OF-CLIMB AT SEA LEVEL ..... 730 FPM

SERVICE CEILING ..... 14,000 FEET

### TAKEOFF PERFORMANCE:

Ground Roll ..... 960 FEET

Total Distance Over 50 Foot Obstacle ..... 1630 FEET

### LANDING PERFORMANCE:

Ground Roll ..... 575 FEET

Total Distance Over 50 Foot Obstacle ..... 1335 FEET

### STALL SPEED:

Flaps Up, Power Off ..... 53 KCAS

Flaps Down, Power Off ..... 48 KCAS

### MAXIMUM WEIGHT:

Ramp ..... 2558 POUNDS

Takeoff ..... 2550 POUNDS

Landing ..... 2550 POUNDS



## AIRSPEEDS

### AIRSPEEDS FOR NORMAL OPERATION

Unless otherwise noted, the following speeds are based on a maximum weight of 2550 pounds and may be used for any lesser weight.

#### TAKEOFF:

Normal Climb Out .....	75 - 85 KIAS
Short Field Takeoff, Flaps 10°, Speed at 50 Feet .....	56 KIAS

#### ENROUTE CLIMB, FLAPS UP:

Normal, Sea Level .....	75 - 85 KIAS
Normal, 10,000 Feet .....	70 - 80 KIAS
Best Rate-of-Climb, Sea Level .....	74 KIAS
Best Rate-of-Climb, 10,000 Feet .....	72 KIAS
Best Angle-of-Climb, Sea Level .....	62 KIAS
Best Angle-of-Climb, 10,000 Feet .....	67 KIAS

#### LANDING APPROACH:

Normal Approach, Flaps UP .....	65 - 75 KIAS
Normal Approach, Flaps FULL .....	60 - 70 KIAS
Short Field Approach, Flaps FULL .....	61 KIAS

#### BALKED LANDING:

Maximum Power, Flaps 20° .....	60 KIAS
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#### MAXIMUM RECOMMENDED TURBULENT AIR PENETRATION SPEED:

2550 POUNDS .....	105 KIAS
2200 POUNDS .....	98 KIAS
1900 POUNDS .....	90 KIAS

#### MAXIMUM DEMONSTRATED CROSSWIND VELOCITY:

Takeoff or Landing .....	15 KNOTS
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## TAKEOFF

### NORMAL TAKEOFF

1. Wing Flaps - UP - 10° (10° preferred)
2. Throttle Control - FULL (push full in)
3. Mixture Control - RICH  
(Above 3000 feet pressure altitude, lean for maximum RPM)
4. Elevator Control - LIFT NOSEWHEEL AT 55 KIAS
5. Climb Speed - 70 - 80 KIAS
6. Wing Flaps - RETRACT at safe altitude

### SHORT FIELD TAKEOFF

1. Wing Flaps - 10°
2. Brakes - APPLY
3. Throttle Control - FULL (push full in)
4. Mixture Control - RICH  
(Above 3000 feet pressure altitude, lean for maximum RPM)
5. Brakes - RELEASE
6. Elevator Control - SLIGHTLY TAIL LOW
7. Climb Speed - 56 KIAS (Until all obstacles are cleared)
8. Wing Flaps - RETRACT SLOWLY (When airspeed is more than 60 KIAS)

### ENROUTE CLIMB

1. Airspeed - 70 - 85 KIAS
2. Throttle Control - FULL (push full in)
3. Mixture Control - RICH  
(Above 3000 feet pressure altitude, lean for maximum RPM)

## TAKEOFF

### POWER CHECK

It is important to check full throttle engine operation early in the takeoff roll. Any sign of rough engine operation or sluggish engine acceleration is good cause for discontinuing the takeoff. The engine should run smoothly and turn approximately 2300 - 2400 RPM with mixture leaned to provide maximum RPM.



Prior to takeoff from fields above 3000 feet pressure elevation, the mixture should be leaned to give maximum RPM at full throttle with the airplane not moving.

After full throttle is applied, adjust the throttle friction lock clockwise to prevent the throttle from moving back from the maximum power position. Similar friction lock adjustments should be made as required in other flight conditions to hold the throttle setting.

## WING FLAP SETTINGS

Normal takeoffs use wing flaps UP - 10°. Using 10° wing flaps reduces the ground roll and total distance over an obstacle by approximately 10 percent. **Flap deflections greater than 10° are not approved for takeoff.** If 10° wing flaps are used for takeoff, the flaps should stay at 10° until all obstacles are cleared and a safe flap retraction speed of 60 KIAS is reached. For a short field, 10° wing flaps and an obstacle clearance speed of 56 KIAS should be used.

## LANDING

### NORMAL LANDING

1. Airspeed - 65 - 75 KIAS (Flaps UP)
2. Wing Flaps - AS DESIRED (UP - 10° below 110 KIAS,  
10° - FULL below 85 KIAS)
3. Airspeed - 60 - 70 KIAS (Flaps FULL)
4. Elevator Trim Control - ADJUST
5. Touchdown - MAIN WHEELS FIRST
6. Landing Roll - LOWER NOSEWHEEL GENTLY
7. Braking - MINIMUM REQUIRED

### SHORT FIELD LANDING

1. Airspeed - 65 - 75 KIAS (Flaps UP)
2. Wing Flaps - FULL
3. Airspeed - 61 KIAS (until flare)
4. Elevator Trim Control - ADJUST
5. Power - REDUCE to idle after clearing obstacle
6. Touchdown - MAIN WHEELS FIRST
7. Brakes - APPLY HEAVILY
8. Wing Flaps - UP



## **BALKED LANDING**

1. Throttle Control - FULL (push full in)
2. Wing Flaps - RETRACT to 20°
3. Climb Speed - 60 KIAS
4. Wing Flaps - 10° (until obstacles are cleared), then UP (after reaching a safe altitude and 65 KIAS)

## **SHORT FIELD LANDING**

For a short field landing in smooth air conditions, approach at 61 KIAS with FULL flaps using enough power to control the glide path. (Slightly higher approach speeds should be used in turbulent air conditions.) After all approach obstacles are cleared, smoothly reduce power and hold the approach speed by lowering the nose of the airplane. The main wheels must touch the ground before the nose wheel with power at idle. Immediately after the main wheels touch the ground, carefully lower the nose wheel and apply heavy braking as required. For maximum brake performance, retract the flaps, hold the control wheel full back, and apply maximum brake pressure without skidding the tires.

## **CROSSWIND LANDING**

When landing in a strong crosswind, use the minimum flap setting required for the field length. If flap settings greater than 20° are used in sideslips with full rudder deflection, some elevator oscillation may be felt at normal approach speeds. However, this does not affect control of the airplane. Although the crab or combination method of drift correction may be used, the wing low method gives the best control. After touchdown, hold a straight course with the steerable nosewheel, with aileron deflection as applicable, and occasional braking if necessary.

The maximum allowable crosswind velocity is dependent upon pilot capability as well as airplane limitations. Operation in direct crosswinds of 15 knots has been demonstrated (not an operating limitation).

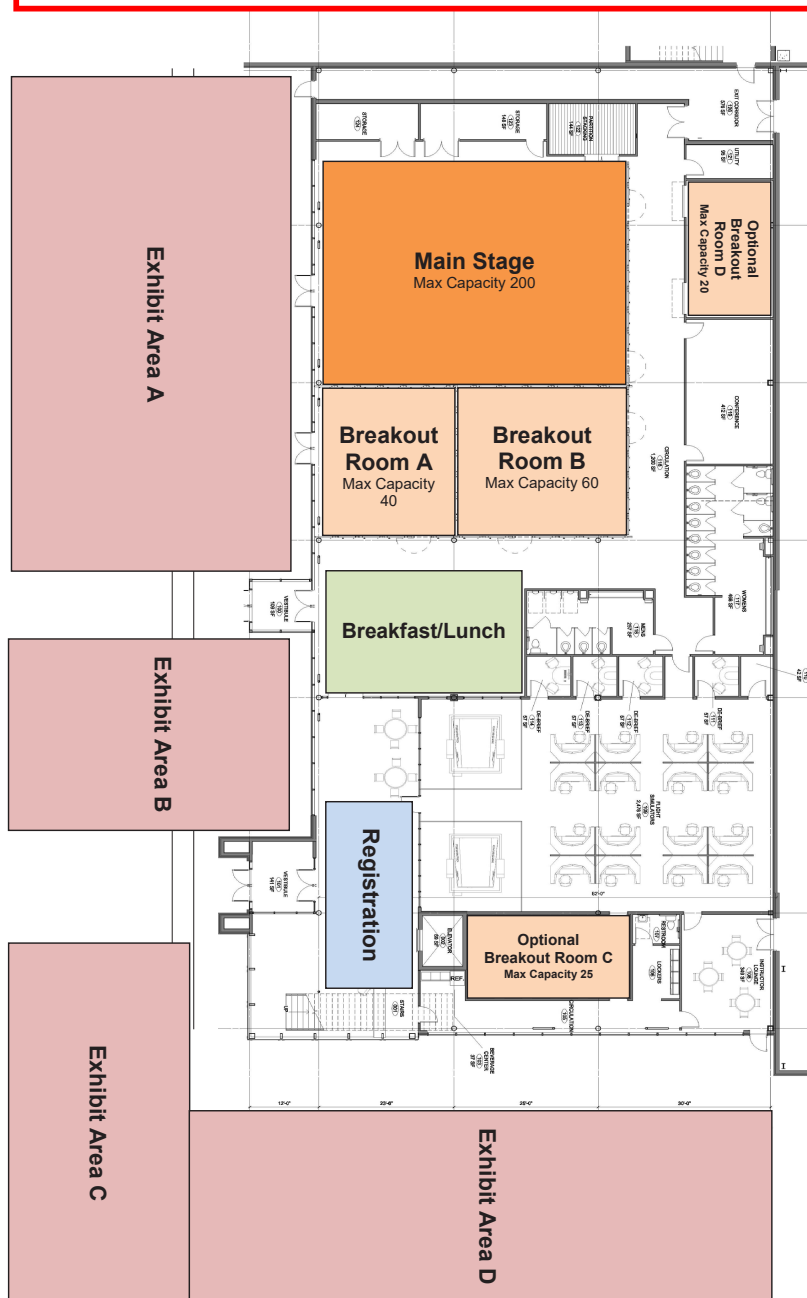
## **BALKED LANDING**

In a bailed landing (go-around) climb, reduce the flap setting to 20° immediately after full power is applied and climb at 60 KIAS. If obstacles must be cleared during the go-around climb, reduce the wing flap setting to 10° and maintain a safe airspeed until the obstacles are cleared. Above 3000 feet pressure altitude, lean the mixture to obtain maximum RPM. After clearing any obstacles, carefully retract the flaps and allow the airplane to accelerate to normal climb airspeed.



# PPC Map

## Notional PPC AV22 Layout





## Presented by:



## Supported by:



MINDSTAR AVIATION



# Notes