

This document is provided as-is and as-available, and the author makes no representations or warranties of any kind, whether express, implied, statutory, or other. This includes, without limitation, warranties of title, merchantability, fitness for a particular purpose, non-infringement, absence of latent or other defects, accuracy, or the presence or absence of errors, whether or not known or discoverable.

Remember: FAR Part 91 §91.3 (a) The pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft.

### Pre-Takeoff

1. Trim – TAKEOFF
2. Cowl Flaps – OPEN
3. Flaps – 10°
4. Mixture – RICH  
(above 3000ft lean for MAX RPM)
5. Prop – 2400 RPM (FULL IN)
6. Lights – ALL ON
7. Record Time

### Normal Takeoff

1. Throttle – FULL IN
2. Rotate – 55 KIAS
3. Airspeed – 70 KIAS
4. Flaps – 10° until 100-200 AGL
5. Airspeed – 80 KIAS
6. Flaps – UP

### Enroute Climb

1. Airspeed – 90 KIAS (85 - 95 KIAS)
2. Throttle – 23" or FULL if < 23"
3. Propeller – 2400 RPM
4. Mixture – 15 GPH or RICH if < 15 GPH
5. Cowl Flaps – OPEN

### Cruise

1. Power – LESS THAN 80%  
RPM 2300  

Alt	-20°C	ISA	+20°C
3000	23.0	23.5	24.3
3500	22.9	23.4	24.1
5500	22.3	22.9	23.3
7500	21.3	21.5	21.5
9500	21.0	21.0	21.0
11500	18.8	18.8	18.8
2. Elevator Trim – SET
3. Rudder Trim – SET
4. Heading – CHECKED
5. Cowl Flaps – CLOSED
6. Lights – AS NEEDED
7. Time – RECORD
8. Mixture – MAX CYL TEMP minus 50

### Before Descent

1. Altimeter – SET
2. Fuel Selector Valve – BOTH
3. Runway and Taxi Diagram – READY
4. Lights – ALL ON
5. Seat Backs – UPRIGHT
6. Belts, Harnesses – SECURE

### Descent

1. Power – AS DESIRED
2. Mixture – SMOOTH (idle = full rich)
3. Cowl Flaps – CLOSED

### Before Landing

1. Autopilot – OFF
2. Fuel Selector Valve – BOTH
3. Mixture – RICH
4. Prop – FULL IN (high RPM)

### Normal Landing

1. Flaps – DOWN 30°
2. Airspeed – 68 KIAS on short final

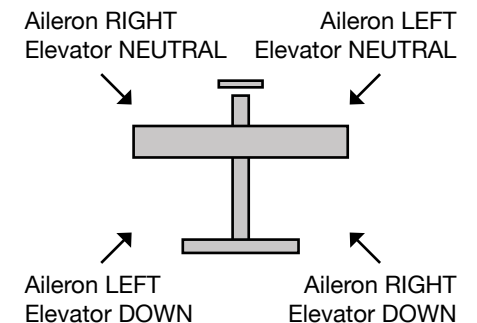
### No Flaps Landing

1. Airspeed – 75 KIAS on short final

### Go Around

1. Throttle – FULL
2. Prop – FULL IN
3. Flaps – 20°
4. Climb Speed – 55 KIAS
5. Flaps – 20° until stabilized
6. Climb Speed – 70 KIAS
7. Flaps – 10° until obstacles cleared  
or 100-200 AGL
8. Climb Speed – 80 KIAS
9. Flaps – UP
10. Cowl Flaps – OPEN

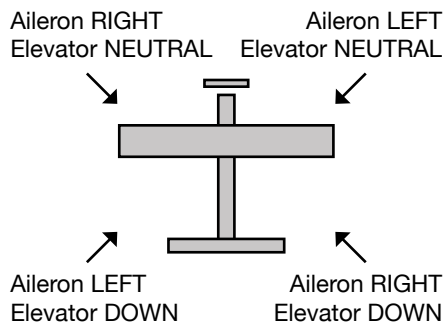
### Crosswind Taxi



## Before Starting Engine

1. Preflight Inspection – COMPLETE
2. IMSAFE
3. Weight & Balance – CHECK
4. Fuel Required – CHECK
5. Weather – CHECK
6. Departure Procedure – PLANNED
7. Route – PLANNED
8. Charts – AVAILABLE
9. Destination Airports – RWY & FREQ
10. Passenger Briefing
  - a. No smoking
  - b. Seatbelt
  - c. Fire extinguisher
  - d. Exits – door, windows, baggage
  - e. Don't touch the controls including pedals
  - f. Distractions during taxi, takeoff & landing
  - g. Exchange of controls
  - h. Help me look for traffic
  - i. Connect your headset
  - j. Air Vents
11. Headsets – CONNECTED
12. Seats, Belts, Shoulder Belt – ADJUST
13. Fuel Selector Valve – BOTH
14. Cowl Flaps – OPEN
15. Avionics Power – OFF
16. Circuit Breakers – CHECK IN
17. STBY BATT Switch – TEST  
(hold for 10 seconds and verify green lamp remains lit)
18. STBY BATT Switch – ARM
19. PFD – WAIT FOR BOOT
20. Engine Indicators – NO RED X
21. BUS E Volts – MINIMUM 24 VOLTS
22. M BUS Volts – MAXIMUM 1.5 VOLTS
23. BATT S Amps – DISCHARGE (negative)
24. STBY BATT Annunciator – VISIBLE
25. Brakes – HOLD

## Crosswind Taxi



## Starting Engine

1. Throttle – OPEN 1/4 inch
2. Mixture – IDLE CUTOFF
3. Master Power - ON
4. Beacon – ON
5. Prime (if engine cold)
  - a. Fuel Pump – ON
  - b. Mixture – RICH
  - c. Stabilize Fuel Flow – 5 gph for 3 sec
  - d. Mixture – IDLE CUTOFF
  - e. Fuel Pump – OFF
6. Brakes - HOLD
7. Propeller Area – CLEAR, SHOUT
8. Start
  - a. Ignition Switch – START
  - b. Mixture – SMOOTHLY TO RICH
  - c. Throttle – 1000 RPM
9. Oil Pressure – CHECK GREEN
10. Battery and Voltage –  
NO RED OR YELLOW
11. Avionics Power Switch – ON
12. Headsets – ON
13. Transponder – 1200 VFR, GND
14. Multifunction Display – INITIALIZED
15. Fuel Totalizer – INITIALIZED  
(Engine > System)
16. Lights – AS REQUIRED
17. Flaps – UP
18. Mixture – LEAN
19. Autopilot Self Check – PASS
20. Parking Brake – OFF
21. Current Time – RECORD

## Fire During Start

1. Ignition Switch – CONTINUE CRANKING  
so it sucks the fire into the engine.
2. If engine starts
  - a. Power – 1800 RPM
  - b. Wait – for a few minutes
  - c. Mixture – IDLE CUT OFF
3. If engine fails to start
  - a. Throttle – FULL POWER FORWARD
  - b. Mixture – IDLE CUT OFF
  - c. Cranking – CONTINUE
  - d. Fuel Selector – PUSH & TURN to OFF
  - e. Aux Fuel Pump Switch – OFF
  - f. Fire Extinguisher – ACTIVATE
  - g. Master Switch – OFF
  - h. Ignition Switch – OFF
4. EVACUATE & EXTINGUISH fire

## Fuel

Left Wing Sump Ports – NO WATER, NO SEDIMENT, 100LL  
Nose Sump Ports or Drain – NO WATER, NO SEDIMENT, 100LL  
Right Wing Sump Ports – NO WATER, NO SEDIMENT, 100LL

## Right Wing Tank

Test Fuel – RETURN TO TANK  
Fuel Level – CHECK  
Fuel Filler Cap – SECURE

## Left Wing Tank

Fuel Level – CHECK  
Fuel Filler Cap – SECURE

## Tires

Roll forward & back – TIRES INFLATED & UNDEMANAGED

## Cabin – After

Baggage Compartment – CONTENTS SECURE  
Baggage Door – CLOSED AND LOCKED

## After Shutdown

Tie Downs – INSTALLED  
Avionics Switch – OFF  
Master Switch – OFF  
STBY BATT Switch – OFF  
Ignition Switch – OFF  
Fuel Selector – LEFT  
Cowl Flaps – CLOSED  
Control Lock – INSTALLED  
Pitot Cover – INSTALLED  
Passenger Door – LATCHED  
Log Book – HOBBS & TACH

## Speeds

Rotation	55	KIAS
Vy – Best Rate of Climb		
Sea Level	80	KIAS
10,000	74	KIAS
Vx – Best Angle of Climb		
Sea Level	65	KIAS
10,000	68	KIAS
Va – Maneuvering Speed		
3100 lbs	110	KIAS
2600 lbs	101	KIAS
2100 lbs	91	KIAS
Vglide – Best Glide Speed	68	KIAS
Final Approach Speed		
Flaps 30°	68	KIAS
Flaps Up	70	KIAS
Short Field (flaps 30°)	60	KIAS
Max Flaps Extended Speed		
0° – 10°	140	KIAS
10° – 20°	120	KIAS
20° – FULL	100	KIAS

## Aborted Takeoff

1. Throttle – IDLE
2. Brakes – APPLY
3. Flaps – RETRACT for improved braking
4. Mixture – IDLE CUTOFF if necessary

## Engine Failure After Takeoff

### Pitch for Landing speed

1. Airspeed – 75 KIAS (flaps UP)  
70 KIAS (flaps 10°-FULL)
2. Flaps – AS REQUIRED

### Before Landing

1. Mixture – IDLE CUT OFF
2. Fuel Selector – PUSH & TURN to OFF
3. Ignition Switch – OFF
4. Master Switch – OFF
5. Cabin Door – UNLATCH

## Run up

1. Radios – SET to TOWER / CTAF
2. Brakes – SET
3. Seat Backs – UPRIGHT
4. Seats & Seat Belts – CHECK SECURE
5. Doors & Windows – CLOSED & LOCKED
6. Flight Controls – FREE & CORRECT
  - a. Aileron
  - b. Elevator
  - c. Rudder
7. Flight Instruments - SET
  - a. Horizon – CALIBRATE (Standby)
  - b. Heading & Compass – SAME
  - c. Altimeter – SET (PFD, Standby, AP)
  - d. PFD – NO RED X
8. Autopilot Check
  - a. Autopilot AP Button – ENGAGE
  - b. Flight Controls – OVERPOWER AP
  - c. AP Disconnect – OPERATIONAL
  - d. Autopilot – OFF
9. Fuel Selector Valve – RECHECK BOTH
10. Fuel Quantity - CHECK
11. Elevator & Rudder Trim – TAKEOFF
12. Engine Check
  - a. Mixture – RICH (below 3000ft)
  - b. Throttle – 1800 RPM
  - c. Magnetos – DROP < 175 RPM on either or 50 RPM difference
  - d. Oil Pressure – GREEN
  - e. Oil Temperature - GREEN
  - f. Ammeter – CHECK (no discharge w/ load)
  - g. Vacuum (Engine > System) – GREEN
  - h. Annunciators – NO WARNINGS
  - i. Prop Check – RPM, POWER, OIL PRESSURE drop
  - j. Throttle IDLE – ENGINE SMOOTH
  - k. Throttle – 1000 RPM
13. Throttle Friction Lock – ADJUST
14. Air Conditioner (if installed) – OFF
15. Parking Brake – CHECK RELEASED
16. Squawk Code – SET
17. PFD Settings – DCLTR-1, TOPO, TERRAIN, ZOOM 2 nm, WIND-1
18. MFD Map – DCLTR-1, NEXRAD
19. Flight Plan – SET
20. CDI - GPS / VOR1 / VOR2
21. Autopilot (if installed) – OFF
22. Review Takeoff Procedures
23. Review Departure Procedure
24. Lights – AS REQUIRED
25. Flaps – 10° for takeoff
26. Current Time - RECORD
27. Review Takeoff & Departure Procedures



## Engine Failure During Flight

### Pitch for Best Glide

1. Airspeed – 76 KIAS
2. Look for Landing Site

### Fuel / Engine Controls

3. **Fuel Selector** Valve – BOTH
4. **Mixture** – RICH FULL IN (if necessary)
5. **Prop** – FULL IN
6. **Throttle** – CHECK
7. **Master Switch** – ON
8. **Magneto Switch** – BOTH

### Restart Engine

9. Aux Fuel Pump Switch – ON
10. Propeller not windmilling
  - a. Throttle – IDLE
  - b. Ignition Switch – START
  - c. Throttle – ADVANCE

### If Engine Restarts

- Aux Fuel Pump Switch – OFF  
(If fuel flow goes to 0, turn Aux Fuel Pump back ON)

### If Not Restart → Give up on Engine

11. Mixture – IDLE CUT OFF
12. Fuel Selector – PUSH & TURN to OFF
13. Ignition Switch – OFF

### Perform Landing or Ditching Checklist

## Excessive Fuel Vapor

Fuel flow fluctuations of 1 GPH or more, or power surges.

### Stabilize Fuel Flow

1. Fuel Pump Switch – ON
2. Mixture – ADJUST for SMOOTH operation
3. Fuel Selector Valve – SELECT OPPOSITE TANK (if problems continue)
4. Fuel Pump Switch – OFF  
(after fuel flow has stabilized)



## Engine Fire in Flight

### Put out Fire

1. Mixture – IDLE CUT OFF
2. Fuel Selector – PUSH & TURN to OFF
3. Aux Fuel Pump Switch – OFF
4. Master Switch – OFF
5. Cabin Heat and Air – OFF  
(overhead vents ok)
6. Airspeed – 100 KIAS  
(increase speed to starve flames within Vno=140 and Vne=175, watch altitude)

### Perform Landing or Ditching Checklist

## Electrical Fire in Flight

### Put out Fire

1. STBY BATT Switch – OFF
2. Master Switch – OFF
3. Vent, Cabin Air, Heat – CLOSED
4. Fire Extinguisher – ACTIVATE
5. Avionics Switch – OFF
6. All Switches except ignition – OFF

### After Fire is Out

7. Vents / Cabin Air / Windows – OPEN

### If necessary, restart electronics slowly

8. Circuit Breakers – CHECK but do not reset
9. Master Switch – ON
10. STBY BATT Switch – ON
11. Radio Switches – OFF
12. Avionics Bus 1 – ON
13. Avionics Bus 2 – ON

### Perform Landing or Ditching Checklist

## Cabin Fire

### Put out Fire

1. STBY BATT Switch – OFF
2. Master Switch – OFF
3. Vent, Cabin Air, Heat – CLOSED
4. Fire Extinguisher – ACTIVATE

### After Fire is Out

5. Vents / Cabin Air / Windows – OPEN
6. Land safely as soon as possible

## Wing Fire

1. Switches: Landing, Taxi, Nav, Strobe, Pitot Heat – OFF
2. Perform SIDESLIP to keep flames away from tank and cabin.
3. Land using flaps only as required

## Empennage

Rudder Gust Lock – REMOVE

Tail Tie-Down – DISCONNECT

Rudder – CHECK FOR FREEDOM OF MOVEMENT

Elevator – CHECK FOR FREEDOM OF MOVEMENT

Elevator Trim Tab – CHECK FOR SECURITY

## Right Wing Trailing Edge

Flaps – SECURE, NO DAMAGE

Aileron – FREEDOM OF MOVEMENT, YOKE TURNS TOO, NO DAMAGE

Aileron – CONTROL ROD NOT BOUND

Aileron – HINGES AND BOLTS SECURE

## Right Wing

Wing Tip – NO DAMAGE

Wing Leading Edge – NO DAMAGE

Fuel Tank Vent – CLEAR OF OBSTRUCTIONS

Tie Down – DISCONNECT

## Nose

Right Static Pressure Source – CLEAR OF OBSTRUCTIONS

Air Filter – CLEAN

Nose Wheel Strut – 4 FINGERS

Nose Tie Down – DISCONNECT

Spinner – SOLIDLY ATTACHED

Propeller – SOLIDLY ATTACHED, NO NICKS OR CRACKS

Left Static Pressure Source – CLEAR OF OBSTRUCTIONS

Cowl Flaps – OPEN

Engine Oil Level – BETWEEN 4 AND 9 QUARTS (9 for long flight)

## Left Wing

Wing Leading Edge – NO DAMAGE

Wing Tip – NO DAMAGE

Pitot Tube – CLEAR OF OBSTRUCTIONS

Fuel Tank Vent – CLEAR OF OBSTRUCTIONS

Tie Down – DISCONNECT

## Left Wing Trailing Edge

Flaps – SECURE, NO DAMAGE

Aileron – FREEDOM OF MOVEMENT, YOKE TURNS TOO, NO DAMAGE

Aileron – CONTROL ROD NOT BOUND

Aileron – HINGES AND BOLTS SECURE

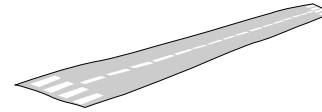
# Preflight Checklist

## Cabin – Before

- Pitot Tube Cover – REMOVE
- Hobbs – RECORD TIME
- Pilot's Operating Handbook – PRESENT
- G1000 Cockpit Reference Guide – PRESENT
- Registration & Airworthiness Certificates – CURRENT & PRESENT
- Fire Extinguisher – CHARGED
- Control Wheel Lock – REMOVE
- Static Pressure Alternate Source Valve – OFF
- Cowl Flaps Lever – OPEN
- Ignition Switch – OFF
- Avionics Power Switch (BUS1 & BUS2)– OFF
- Master Switch (ALT & BAT) – ON
- Flaps – DOWN
- Primary Flight Display – ON
- Fuel Quantity Indicators – CHECK LEVEL
- Low Fuel L & Low Fuel R Annunciators – NOT VISIBLE
- Oil Pressure Annunciator – VISIBLE
- Low Vacuum Annunciator – VISIBLE
- Low Volts Annunciator – VISIBLE
- Avionics Bus 1 Switch – ON
- Forward Avionics Cooling Fan – AUDIBLE
- Avionics Bus 1 Switch – OFF
- Avionics Bus 2 Switch – ON
- Aft Avionics Cooling Fan – AUDIBLE
- Avionics Bus 2 Switch – OFF

## Lights & Pitot Heat & Stall Warning

- Switches for Beacon, Landing, Taxi, Nav, Strobe, Pitot – ON
- Beacon Light – ON
- Tail White Light – ON
- Right Wing Green – ON
- Landing, Taxi Lights – ON AND CLEAN
- Left Wing Red – ON
- Stall Warning – CHECK FOR OPERATION
- Pitot Tube – WARM
- Lights and Pitot Heat – OFF
- Master Switch (ALT & BAT) – OFF



## Forced Landing

### Radio

1. Squawk 7700
2. 121.5 or ATC
3. MAYDAY MAYDAY MAYDAY / Callsign
4. Position / Altitude
5. Problem: "Engine Failure" "Fire" etc.
6. Intended landing site

### Prepare

7. Seats and Seat Belts – SECURE
8. Seat Backs – UPRIGHT POSITION
9. Loose or Heavy Objects incl baggage – SECURE or JETTISON

### Site Check (if engine running)

10. Airspeed – 75 KIAS
11. Wing Flaps – 20°
12. Selected Field – FLY OVER, noting terrain and obstructions. Retract flaps when at a safe altitude and airspeed

### Approach

13. Wing Flaps – AS REQUIRED (DOWN early if power loss expected)
14. Airspeed Flaps 0° 75 KIAS  
Flaps 10° - FULL 70 KIAS

### On Short Final

15. Master Switch – OFF
16. STBY BATT Switch – OFF
17. Doors – UNLATCH
18. E.L.T. – ACTIVATE IF NECESSARY

### After Landing

19. Mixture – IDLE CUT OFF
20. Ignition Switch – OFF
21. E.L.T. – DEACTIVATE IF NECESSARY



## Ditching

### Radio

1. Squawk 7700
2. 121.5 or ATC
3. MAYDAY MAYDAY MAYDAY / Callsign
4. Position / Altitude
5. Problem: "Engine Failure" "Fire" etc.
6. Intended landing site

### Prepare

7. Seats and Seat Belts – SECURE
8. Seat Backs – UPRIGHT POSITION
9. Loose or Heavy Objects incl baggage – SECURE or JETTISON

### Approach

10. Direction
  - a. Light Winds – PARALLEL to WAVES
  - b. High Winds – INTO WIND
11. Airspeed
  - a. Power – 65 KIAS  
300 ft/min DESCENT
  - b. Flaps 10° - FULL – 65 KIAS
  - c. Flaps Up – 70 KIAS
12. Flaps – 20° to 40°

### On Short Final

13. Master Switch – OFF
14. STBY BATT Switch – OFF
15. Doors – UNLATCH
16. E.L.T. – ACTIVATE IF NECESSARY

### Touchdown

17. Level Attitude at established rate of descent. Wings level.
18. Face – CUSHION

### After Landing

19. Mixture – IDLE CUT OFF
20. Evacuate – If needed, open windows to flood cabin and equalize pressure.



### LOW VOLTS Annunciator

#### Alternator Circuit Breaker

1. Master Switch **ALT ONLY** – OFF
2. Alternator Circuit Breaker (ALT FIELD) – CHECK IN
3. Master Switch **ALT & BAT** – ON
4. LOW VOLTS Annunciator – CHECK off
5. M BUS Volts – CHECK 27.5V min
6. M BAT Amps – CHECK charging (+)

If still **LOW VOLTS** perform

**Reduce Electrical Load Checklist below**

### HIGH VOLTS Annunciator or M BAT AMPS > 40

Perform **Reduce Electrical Load Checklist below**

#### Reduce Electrical Load

1. Master Switch **ALT ONLY** – OFF
2. Electrical Load – REDUCE IMMEDIATELY
  - a. Avionics Bus 1 – OFF
  - b. Pitot Heat – OFF
  - c. Beacon – OFF
  - d. Landing Light – OFF (unless needed for landing)
  - e. Taxi Light – OFF
  - f. Nav Lights – OFF
  - g. Strobe Lights – OFF
  - h. Cabin Power 12V – OFF
3. COM1 – SELECT FREQ. & ACTIVATE
4. NAV1 – SELECT FREQ. & ACTIVATE if necessary
5. Avionics Bus 2 – OFF
6. Land as soon as practical.  
CAUTION: Make sure landing is possible before extending flaps, they are a large load and might deplete the battery.

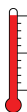
With Avionics Bus 2 off, the following are inoperative:

- KAP140 Autopilot
- COM2
- NAV 2
- GTX33 Transponder
- GMA 1347 Audio Panel
- GDU 1040 MFD



### Red X – PFD Airspeed, Attitude, Altitude, HSI

1. ADC/AHRS Circuit Breaker – CHECK IN (ESS BUS and AVN BUS 1). If open, reset one time. If breaker trips again, do not reset. If LOW VACUUM annunciator comes on, do not use standby attitude indicator
2. Use standby instrument (non-stabilized compass for HSI)



### PFD1 COOLING Annunciator or MFD1 COOLING Annunciator

1. Cabin Heat (CABIN HT) – REDUCE
2. Forward Avionics Fan – CHECK (feel for airflow from screen on glareshield)

If forward avionics fan has failed

3. STBY BATT Switch – OFF unless needed for emergency power

If PFD1 cooling or MFD1 cooling annunciator does not go off within 3 minutes or if both PFD1 and MFD1 cooling annunciators come on

4. Land as soon as practical

## Visibility & Cloud Clearance Requirements

Airspace	Vis	Distance from Clouds
B	3 sm	clear of clouds
C	3 sm	1,000 above 500 below 2,000 horiz
D	3 sm	1,000 above 500 below 2,000 horiz
E	<10,000 MSL	3 sm 1,000 above 500 below 2,000 horiz
E	≥10,000 MSL	5 sm 1,000 below 1,000 below 1 sm horiz
G Day	≤1,200 AGL	1 sm clear of clouds
G Day	>1,200 AGL & <10,000 MSL	3 sm 1,000 above 500 below 2,000 horiz
G Day	≥10,000 MSL	5 sm 1,000 below 1,000 below 1 sm horiz
G Night	≤1,200 AGL	3 sm 1,000 above 500 below 2,000 horiz
G Night	>1,200 AGL & <10,000 MSL	3 sm 1,000 above 500 below 2,000 horiz
G Night	>1,200 AGL & ≥10,000 MSL	5 sm 1,000 below 1,000 below 1 sm horiz

### Minimum Altitudes

#### Congested

1,000 feet above obstacle within 2,000 feet

#### Non-congested

500 feet AGL

#### Water / sparsely populated

500 feet from person, vessel, vehicle or structure

### SVFR Minimum

- ATC clearance
- Clear of clouds
- 1 sm visibility
- If night, pilot and plane IFR certified
- To take off or land – 1 sm ground visibility if measured, otherwise 1 sm in-flight visibility.

### Supplemental Oxygen

#### >12,500 MSL ≤14,000 MSL

Crew for flight segments > 30 min

#### >14,000 MSL ≤ 15,000 MSL

Crew

#### > 15,000 MSL

All occupants

### Night Operations

#### Sunset – Sunrise

*Required:* Nav Lights (position lights)  
Beacon (anti-collision)

*When safe:* Strobes

*Suggested:* Landing / Taxi Lights

#### 1hr after Sunset – 1 hr before Sunrise

Carry passengers w/o 3 full stop landings

## Short Field Takeoff

- Flaps – 20°
- Prop – 2400 RPM (full in)
- Mixture – RICH (lean above 5000 for max RPM)
- Use Full Length of Runway

### Takeoff

1. Brakes – FULL
2. Throttle – FULL IN
3. Brakes – RELEASE
4. Rotate – 55 KIAS
5. Airspeed – 58 KIAS

### After Obstacle

6. Airspeed – 70 KIAS
7. Flaps – 10° until 100-200 AGL
8. Airspeed – 80 KIAS
9. Flaps – UP

## Soft Field Takeoff

- Flaps – 20°
- Prop – 2400 RPM (full in)
- Mixture – RICH (lean above 5000 for max RPM)
- Don't Stop
- Minimal Brakes

### Takeoff

1. Yoke – FULL BACK (to keep weight off nose wheel)
2. Add FULL POWER SMOOTHLY
3. Hold nose just off ground (don't stall)
4. Until 70 KIAS – NOSE DOWN (to stay in ground effect)

### After positive rate of climb

5. Flaps – 10° until 100-200 AGL
6. Airspeed – 80 KIAS
7. Flaps – UP

## Short Field Landing

1. Flaps – DOWN FULL
2. Airspeed – 60 KIAS
3. Power – IDLE after obstacle
4. Touchdown – STEEP ANGLE
5. Brakes – HEAVY BRAKING
6. Flaps – RETRACT

## Soft Field Landing

1. Flaps – DOWN FULL
2. Airspeed – 60 KIAS
3. Power – SLIGHT POWER UNTIL TOUCHDOWN
4. Flare – GENTLY BLEED OFF SPEED
5. Touchdown – KEEP FRONT WHEEL UP
6. Brakes – NO / MINIMUM BRAKES

## Steep Turns

1. Clear the Area
  2. Roll out  $\pm 10^\circ$  of entry heading
- Maintain altitude  $\pm 100'$
  - Maintain airspeed  $\pm 10kt$
  - Maintain bank  $\pm 5^\circ$

## Ground Reference Maneuvers

1. Clear the Area
  2. Choose altitude 600-1000' AGL
- Maintain altitude  $\pm 100'$
  - Maintain airspeed  $\pm 10kt$

## Slow Flight

1. Clear the Area
  2. Power idle, pitch up, flaps to slow
  3. Flaps – FULL
  4. Full power, pitch down, flaps to recover
- Always at least  $>1500'$  AGL
  - Maintain altitude  $\pm 100'$
  - Maintain airspeed  $+10kt/-0kt$
  - Maintain bank  $\pm 10^\circ$

## Power Off Stall

1. Clear the Area
  2. Configure for landing
  3. Perform Stall
  4. Pitch down, full power to recover
  5. Perform go-around. After positive rate of climb, full power and reduce flaps
- Always at least  $>1500'$  AGL
  - Straight: Heading  $\pm 10^\circ$
  - Turning: Specified bank  $<20^\circ \pm 10^\circ$

## Power On Stall

1. Clear the Area
  2. Configure for takeoff (Slow to  $\sim 55$  kt)
  3. Perform Stall
  4. Recover
- Always at least  $>1500'$  AGL
  - Straight: Heading  $\pm 10^\circ$
  - Turning: Specified bank  $<20^\circ \pm 10^\circ$

## Hypoxia

### Symptoms

- Blue fingernails & lips
- Headache
- Decreased reaction time
- Impaired judgement
- Euphoria
- Visual impairment
- Drowsiness
- Lightheadedness or dizziness
- Tingling in fingers & toes
- Numbness

### Actions

- Descend
- Supplemental oxygen

## Dehydration

### Symptoms

- Thirst
- Fatigue
- Headaches
- Cramps
- Dizziness
- Weakness
- Nausea
- Tingling of hands & feet

### Actions

- Drink water

## Hyperventilation

### Symptoms

- Anxiety
- Rapid breathing
- Visual impairment
- Lightheadedness or dizziness
- Tingling sensations
- Hot & cold sensations
- Muscle spasms

### Actions

- Slow breathing
- Re-breathe from bag

## Carbon Monoxide Poisoning

### Symptoms

- Exhaust odor
- Headache
- Blurred vision
- Dizziness
- Drowsiness
- Loss of muscle power

### Actions

- Turn off heater
- Open air vents & windows
- Supplemental oxygen



## Lost Communications VFR

1. Radio volume
2. Radio frequency
3. Headset connection
4. Handheld radio
5. Alt frequency
  - a. Ground
  - b. TRACON / ARTCC
  - c. Nearby airport
  - d. 121.5
6. Squawk 7600
7. Land at untowered if possible
8. Enter pattern and expect light signal
9. Monitor and squawk 7700 and emergency land if necessary
  - a. Fuel level
  - b. Battery voltage (24V)
  - c. Amp meter (discharge = no alternator)

## Light Gun Signals

	Steady Green	Cleared to Land
	Flashing Green	Return for Landing
	Steady Red	Give way and Circle
	Flashing Red	Unsafe - Do not land
	Alt. Red/Green	Extreme Caution

## Diversion

1. Slow Down to 100 KIAS or less
2. Circle if necessary
3. Airport info
  - a. Elevation
  - b. TPA
  - c. Runway Length & Layout
  - d. Pattern direction
  - e. Frequencies
4. Get current location
5. Locate destination airport on charts
6. Plan Route (iPad, GPS, VOR, paper)
  - a. Distance
  - b. Course / heading
  - c. (Cross radials)
7. Calculate time & fuel burn
8. Get the weather (ATIS / AWOS)
9. Plan Approach & Landing
  - a. Choose Runway
  - b. Pattern Entry
10. Radio Calls
11. Cruise, Descent, Landing checklists

## Time & Fuel

Speed	100 kt	Fuel Burn	13 gph
Dist (nm)	Time (min)	Fuel (gal)	
3	2	0.4	
5	3	0.7	
8	5	1.1	
10	6	1.4	
13	8	1.8	
15	9	2.1	
18	11	2.5	
20	12	2.8	
23	14	3.2	
25	15	3.5	
28	17	3.9	
30	18	4.2	
35	21	4.9	
40	24	5.6	
45	27	6.3	
50	30	7.0	

## Pressure Altitude

Indicated Altitude	Altimeter Range								
	27.75-28.24	28.25-28.74	28.75-29.24	29.25-29.74	29.75-30.24	30.25-30.74	30.75-31.24	31.25-31.74	
	0	-2000	-1500	-1000	-500	0	500	1000	1500
1000	-1000	-500	0	500	1000	1500	2000	2500	
2000	0	500	1000	1500	2000	2500	3000	3500	
3000	1000	1500	2000	2500	3000	3500	4000	4500	
3500	1500	2000	2500	3000	3500	4000	4500	5000	
4500	2500	3000	3500	4000	4500	5000	5500	6000	
5500	3500	4000	4500	5000	5500	6000	6500	7000	
6500	4500	5000	5500	6000	6500	7000	7500	8000	
7500	5500	6000	6500	7000	7500	8000	8500	9000	
8500	6500	7000	7500	8000	8500	9000	9500	10000	
9500	7500	8000	8500	9000	9500	10000	10500	11000	
10500	8500	9000	9500	10000	10500	11000	11500	12000	

## Cruise Performance

2300 RPM

Press

Alt	OAT	Hg	KTAS	GPH	OAT	Hg	KTAS	GPH	OAT	Hg	KTAS	GPH
2000	-9	23.3	132	13.0	11	23.8	135	13.0	31	24.5	139	13.1
2500	-10	23.1	132	13.0	10	23.7	136	13.0	30	24.4	139	13.1
3000	-11	23.0	133	13.0	9	23.5	137	13.0	29	24.3	140	13.1
3500	-12	22.9	134	13.0	8	23.4	137	13.0	28	24.1	140	13.1
4000	-13	22.8	134	13.0	7	23.3	138	13.0	27	24.0	141	13.1
4500	-14	22.6	135	13.0	6	23.1	138	13.0	26	23.8	141	13.0
5000	-15	22.5	136	13.0	5	23.0	139	13.0	25	23.5	141	12.9
5500	-16	22.3	136	13.0	4	22.9	140	13.0	24	23.3	141	12.8
6000	-17	22.2	137	13.0	3	22.8	140	13.0	23	23.0	141	12.7
6500	-18	21.9	137	12.8	2	22.4	139	12.7	22	22.5	140	12.5
7000	-19	21.6	136	12.7	1	21.9	139	12.5	21	22.0	139	12.2
7500	-20	21.3	136	12.6	0	21.5	138	12.2	20	21.5	138	12.0
8000	-21	21.0	136	12.5	-1	21.0	137	12.0	19	21.0	137	11.7
8500	-22	21.0	137	12.6	-2	21.0	138	12.1	18	21.0	138	11.8
9000	-23	21.0	139	12.7	-3	21.0	139	12.2	17	21.0	140	11.9
9500	-24	21.0	140	12.7	-4	21.0	140	12.3	16	21.0	141	11.9
10000	-25	21.0	141	12.8	-5	21.0	141	12.4	15	21.0	142	12.0
10500	-26	20.3	139	12.3	-6	20.3	138	12.0	14	20.3	139	11.6
11000	-27	19.5	136	11.9	-7	19.5	136	11.5	13	19.5	136	11.2
11500	-28	18.8	134	11.4	-8	18.8	133	11.1	12	18.8	133	10.7
12000	-29	18.0	131	10.9	-9	18.0	130	10.6	11	18.0	130	10.3
12500	-30	17.5	129	10.6	-10	17.5	128	10.4	10	17.5	128	10.1
13000	-31	17.0	127	10.4	-11	17.0	126	10.1	9	17.0	126	9.8
13500	-32	16.5	125	10.1	-12	16.5	124	9.9	8	16.5	123	9.6
14000	-33	16.0	123	9.8	-13	16.0	122	9.6	7	16.0	121	9.3

## Max Rate of Climb Performance

Press Alt	Speed (KIAS)	Time (min)	Fuel (gal)	Dist (nm)
0	80	0.0	0.0	0.0
500	80	0.5	0.2	0.8
1000	80	1.0	0.4	1.5
1500	79	1.5	0.6	2.3
2000	79	2.0	0.8	3.0
2500	79	2.8	1.0	4.0
3000	79	3.5	1.2	5.0
3500	78	4.3	1.3	6.0
4000	78	5.0	1.5	7.0
4500	78	5.8	1.7	8.0
5000	78	6.5	1.9	9.0
5500	77	7.3	2.1	10.0
6000	77	8.0	2.3	11.0
6500	77	8.8	2.5	12.3
7000	76	9.5	2.8	13.5
7500	76	10.3	3.0	14.8
8000	75	11.0	3.2	16.0
8500	75	12.0	3.5	17.3
9000	75	13.0	3.7	18.5
9500	74	14.0	4.0	19.8
10000	74	15.0	4.2	21.0
10500	74	16.3	4.5	23.0
11000	74	17.5	4.7	25.0
11500	73	18.8	5.0	27.0
12000	73	20.0	5.2	29.0
12500	73	21.5	5.5	31.3
13000	73	23.0	5.9	33.5
13500	72	24.5	6.2	35.8
14000	72	26.0	6.5	38.0

## Normal Climb Performance

Press Alt	Speed (KIAS)	Time (min)	Fuel (gal)	Dist (nm)
0	90	0.0	0.0	0.0
500	90	0.8	0.2	1.3
1000	90	1.5	0.4	2.5
1500	90	2.3	0.6	3.8
2000	90	3.0	0.8	5.0
2500	90	3.8	1.0	6.3
3000	90	4.5	1.2	7.5
3500	90	5.3	1.4	8.8
4000	90	6.0	1.6	10.0
4500	90	7.0	1.8	11.5
5000	90	8.0	2.1	13.0
5500	90	9.0	2.3	14.5
6000	90	10.0	2.5	16.0
6500	90	11.0	2.8	17.8
7000	90	12.0	3.0	19.5
7500	90	13.0	3.3	21.3
8000	90	14.0	3.5	23.0
8500	90	15.3	3.8	25.0
9000	90	16.5	4.1	27.0
9500	90	17.8	4.3	29.0
10000	90	19.0	4.6	31.0