



CESSNA 150

STANDARD OPERATING PROCEDURES, SOP

INDEX

GENERAL.....	3
Checklists.....	3
Use of lights.....	3
Parking brake.....	3
Flaps.....	3
Engine priming.....	4
BEFORE ENGINE START.....	5
Engine fire during start.....	5
Proper actions in engine fire.....	5
Passenger briefing.....	6
Instrument check 1 (Before taxi).....	6
Emergency procedures.....	7
Rejected take-off.....	7
Ground emergency.....	7
Engine power loss in flight.....	8
Forced landing.....	8
TAXIING.....	9
Instrument check 2.....	10
Take-off briefing.....	11
TAKE-OFF AND CLIMB.....	12
CRUISE AND AIRWORK.....	12
Stalls.....	13
Slow flight.....	13
Recoveries from unusual attitudes.....	14
Nose up, decreasing airspeed.....	14
Nose down, increasing airspeed.....	14
Steep turns.....	14
APPROACH AND LANDING.....	15
Approach briefing.....	15
Final check.....	15
Missed approach / Go-around.....	16
After landing.....	16
FLIGHT PROFILES C150.....	17
Normal take-off.....	17
Short field take-off.....	17
Normal approach.....	18
Short field approach.....	18
Stall in clean configuration.....	19
Stall in landing configuration.....	19
Missed approach.....	20
Traffic circuit.....	21

GENERAL

The purpose of this SOP is to give outline for TTT-Aviation flight operations. All pilots flying TTT-Aviation flights, including staff and students shall use this SOP unless it comes necessary for safety of flight.

CHECKLISTS

Checklists are used to improve safety. All pilots shall use checklists in each and every flight executed in TTT- Aviation flight operations.

- Read checklist item out loud, and acknowledge.

"Beacon"....."ON"

- On items : "A/R" (As required), take sides to it.

"Pitot -heat".....Not needed....."OFF"

- Starred items "By heart". Confirm afterwards from checklist

- Read list out loud so your Instructor or "Copilot" knows what it going on.

USE OF LIGHTS

Beacon : Switch always ON before engine start and switch OFF after engine has stopped and propeller remains still.

Navigation lights: Switch ON before engine start and turn OFF after engine has stopped

Landing light: Used when visibility has lowered. (Weather, sun low in horizon, night...) or by decision of PIC.

PARKING BRAKE

Parking brake shall be released just before taxi and locked when aircraft is stopped. Parking brake shall never be used in runway. Parking brake should not be used for longterm parking if wheel blocks are available (brakes may jam)

FLAPS

"Speed xx, flaps yy" - Check IAS is on white arc and call out loud desired landing flap setting. Settings are "up, ten, two-zero, three-zero"

ENGINE PRIMING

Engine is primed by using manual pump on the left side of the left yoke. When priming, mixture is set rich (full forward) and throttle opened for 1 cm. Release pump, pull it full aft, let it fill with fuel (buzzing sound) and push in firmly.

Normally engine should be primed 2 or 3 times, in winter conditions 3 to 5. Engine starting should be committed immediately after priming to avoid fuel leakage and consequent intake manifold fire.

After priming, lock the pump piston by pushing it in and turning half a turn.

If engine becomes over-primed it will not start. Excess fuel is removed by locking the primer, setting the mixture lean (knob full aft), full throttle and cranking the engine. Usually engine starts up, runs for a couple of seconds and cuts off. After this, engine priming and starting should be done normal way.

BEFORE ENGINE START

When starting engine, observe that the propeller slipstream will not cause damage to the people or property nearby! If you have to start the engine in small space, taxi to a more spacious area immediately after starting and then continue with checklists.

ENGINE FIRE DURING START

Engine fire during start is the most common fire in single-engined piston aircraft. Usually this happens in cold weather after excessive engine priming when unvaporized fuel leaks out of intake manifold and ignites. Engine fire is usually very hard to observe from the cockpit.

Proper actions in engine fire

Continue starting

Crank the engine and try to suck flames into the engine

If engine starts, set 1700 rpm. If engine will not start, continue cranking. In both cases, continue with following actions

Mixture lean

Set mixture idle cut-off (knob fully aft)

Fuel valve OFF

Close fuel valve

Magnetos OFF

Turn magnetos OFF

Master switch OFF

Turn battery switch and alternator OFF

Extinguish fire if needed

Use the fire extinguisher

Inspect damage

After a fire aircraft must be checked by a qualified maintenance personnel

PASSENGER BRIEFING

Passenger briefing shall be performed whenever passengers are on board. It should include at least following items:

- Use of the seat belts
- Use of the doors
- Evacuation
- First aid kit
- Fire extinguisher
- Proper actions in emergency
- Engine & electrics shutdown
- Smoking ban
- Use of mobile phones
- Use of life vests, if applicable

INSTRUMENT CHECK 1 (BEFORE TAXI)

"Airspeed" - Air speed indicator should indicate zero

"Wings level" - Check artificial horizon is level

"QNH xxx, altitude xxx ft" - Set altimeter

"Slip & turn" - Check slip & turn indicator

"Heading xxx" - Set directional gyro according to magnetic compass

"Vertical speed" - Check vertical speed indicator (VSI)

EMERGENCY PROCEDURES

Emergencies and abnormal situations during flight are quite rare and surprising. In an emergency there's usually no time to use checklists or to think proper actions for a long time. Following by-heart items **Rejected take-off, Ground emergency, Engine power loss in flight and Forced landing** should be studied thoroughly and briefed before every flight.

In other emergencies, actions should be taken according to the aircraft flight manual and checklists.

Rejected take-off

Take-off run will be rejected in case of a tire failure, engine failure, traffic etc.

"STOP"	Call out aloud
"Throttle idle"	Retard the throttle to idle
"Brakes"	Keep the a/c on the runway centerline and apply brakes as required
"Inform ATC" or other traffic	Inform air traffic control about the rejected take-off, its reason and whether you vacate the runway or not.

Ground emergency

Fire or other situation, in which the aircraft must be evacuated rapidly on ground.

"Parking brake"	Set parking brake -> prevents a/c from moving
"Fuel selector OFF"	Close fuel selector -> shuts down the engine, prevents fire from spreading
"Mixture CUT-OFF"	Pull mixture knob full aft-> shuts down the engine, prevents fire from spreading
"Magnetos OFF"	Set magnetos OFF -> shuts down the engine, prevents accidental restart (propeller)
"Inform ATC"	Inform ATC about the evacuation and your situation
"Master switch OFF"	Turn off master switch and alternator -> reduces risk of fire
"Evacuate w/ fire extinguisher"	Evacuate people to the rear sector of the a/c, extinguish the fires if possible

Engine power loss in flight

A/c loses all or part of its engine power in flight due to icing, fuel problems or technical failure.

"Speed 70 mph (60 KIAS)"

Trim the plane to best glide ratio speed

"Choose landing spot"

Choose suitable spot for forced landing and fly towards it.

"Carb heat ON"

Pull carburettor heat fully aft (open) and leave it open

"Primer IN"

Check primer pump is in and locked

"Fuel selector OPEN"

Check fuel selector is open

"Mixture RICH"

Set mixture full rich (forward)

"Check magnetos, try to start"

Check magnetos are in BOTH position. If engine runs roughly/powerlessly, try LEFT or RIGHT position. If engine has stopped completely, try START.

"Inform ATC"

Inform ATC about your situation, location and intentions

Forced landing

Situation, in which a forced landing is imminent. These actions should be performed after "Engine power loss in flight".

"MAYDAY"

Send emergency message containing your situation, location and intentions.

"7700"

Squawk 7700

"Fuel selector OFF"

Close fuel selector to reduce the risk of fire and to ensure that the engine will not restart in wrong time/place

"Mixture CUT-OFF"

Set mixture lean (full aft) -> shuts down the engine, reduces the risk of fire

"Magnetos OFF"

Set magnetos OFF -> Shuts down the engine and prevents its restart in wrong time/place

"Flaps"

Set flaps as required. Recommended 30°

"Master switch OFF"

Set master switch and alternator OFF just before touchdown -> reduces the risk of fire

TAXIING

In single-pilot operations checklists shall not be read during the taxi. Checklist items are completed by heart and checked after the taxi. If checklist should be read or a clearance copied during taxi, aircraft shall be stopped in a suitable place.

In the beginning of taxi check that the propeller slipstream will not cause damage to the people or property, and the wingtips or tail section will not hit anything. Immediately after leaving parking lot, check brakes and steering and call out:

"Brakes"

"Steering"

If brakes or steering do not work properly, shut down the engine immediately and let the plane to stop.

Proper taxi speed at apron and on narrow taxiways is walking speed, slow running at normal taxiways. Airspeed indicator should indicate zero all the time. Control taxi speed with throttle: ca. 1000 rpm is usually good setting. If braking is needed, apply brakes firmly and release the brakes. Do not keep brakes pressed half way: brake pads and discs wear out faster, and in the winter snow may melt to brakes jamming them.

Avoid holes, ice and patches of water if possible. When taxiing on bumpy ground, keep the yoke pulled fully aft: this reduces load on nose wheel. In brisk crosswind, turn the yoke into the wind to reduce swinging of the aircraft and to improve steering.

Before crossing runways, observe carefully to your right and left. Call out:

"Right side clear, left side clear"

NordicFlite Oy Ltd.

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INSTRUMENT CHECK 2

Instrument check 2 is completed during taxi into a corner or a curve.

"Gyro"	Check proper action of the directional gyro against the magnetic compass (moves smoothly, reading increases or decreases properly)
"Slip & turn OK"	Check proper action of turn & slip indicator (when turning left, turn indicator indicates left turn and ball slips to the right)
"Wings level"	Check proper action of artificial horizon: wings should remain level during turns

TAKE-OFF BRIEFING

Take-off briefing is intended to make a clear picture of a take-off and actions during it. T/O briefing shall be performed before every flight, and it includes following items:

- Runway in use
- T/O procedure (normal / short field / cross wind, rotation speed)
- Safe turning altitude (normally 400 ft AGL rounded to next hundred feet, not before runway end)
- Heading/altitude after take-off
- Actions in case of engine failure during initial climb

Example:

“Runway 36, normal take-off, rotation 55 mph (50 kts), when passing 500 ft right turn to DEGER climbing to 1000 feet. In case of engine failure landing to front sector, head wind”

“Runway 08, cross wind take-off, rotation 55 mph (50 kts), when passing 600 ft right turn to SALPA climbing to 1000 ft. In case of engine failure landing to front sector, head wind”

TAKE-OFF AND CLIMB

Normal take-off is commenced without flaps. Initial climb to 1000 ft AGL shall be commenced at **75 mph** (65 kts) IAS. After that, use cruise climb speed **85 mph** (75 kts) IAS.

In short field take-off, when aircraft has passed obstacles and speed is at least **70 mph** (60 kts) IAS, flaps are selected in and climb continued.

Climbs shall be performed with max power and mixture full rich. After passing 3000 ft mixture should be leaned according to aircraft flight manual to achieve best performance.

During take-off following actions and call-outs shall be performed:

"Max power"	Open throttle fully and check mixture is full rich and carburator heat is closed
"Engine"	Check tachometer reading increases (min. 2150 rpm) and engine instruments are on green.
"Speed alive"	Check ASI reading increases
"55, rotation"	When reaching 55 mph (50 kts) IAS start rotation.

CRUISE AND AIRWORK

When reaching desired cruising altitude, accelerate to **100 mph** (90 kts) IAS, which after set 65% power according to the aircraft flight manual. Lean mixture as required. During cruise, monitor engine instruments and fuel consumption. When passing waypoints, mark remaining fuel to operational flight plan.

If conditions are favorable to engine carburator icing, monitor carburator temperature indicator, engine run and rpm. If engine starts to run roughly or rpm drops without reason, open carburator heat fully for one minute and then close it. Carburator heat shall not be kept fully or partially open continuously.

Before practising stalls, slow flight, unusual attitudes or steep turns, you shall

- Remove all loose objects and ensure seat belts are locked and tight
- Check airspace with S-turns to your right and left
- Set mixture rich
- Open carburator heat when reducing power

STALLS

Cessna 150 has normal stalling characteristics. Stall warning horn activates 5-10 mph (kts) before stall. Stall is recovered by lowering the aircraft's nose ca. 5° below horizon, applying max power and reducing flap setting. When airspeed starts to increase, aircraft is set to climb and flaps taken up. Altitude loss in correctly performed stall is less than 100 ft.

"Stall"	Call out aloud and release the yoke pressure
"Max power"	Apply full throttle, check carburator heat is closed
"Flaps 10"	If flaps are down, check airspeed is more than 65 mph (55 kts) IAS and set flaps to 10°. If flaps are up, they shall be kept up.
"Safe speed, safe altitude, flaps up"	When aircraft is climbing and airspeed more than 70 mph (60 kts) IAS, set flaps up.

SLOW FLIGHT

Speeds in slow flight

Without flaps	60 mph (55 kts) IAS
Flaps 30°	55 mph (50 kts) IAS

When recovering from slow flight, apply full throttle and close carburator heat. When airspeed is more than **65 mph** (55 kts) IAS, set flaps 10°. When accelerating through **70 mph** (60 kts) IAS, set flaps up. Call-outs are the same as with stalls, but "Stall" is omitted.

RECOVERIES FROM UNUSUAL ATTITUDES

Nose up, decreasing airspeed

Set max throttle and close carburetor heat. Lower the nose to the horizon and then level the wings. Let aircraft accelerate and select flaps up (if applicable). When passing **70 mph** (60 kts) IAS set aircraft to climb to safe altitude.

Nose down, increasing airspeed

Set throttle to idle. Level the wings (verify from horizon). Gently pull the nose above the horizon and check speed. Apply max power and climb to the safe altitude at Vy.

ATT! When practising nose down – attitudes, remember not to exceed highest allowed airspeed **162 mph** IAS (Vne) or engine rpm!

STEEP TURNS

Before turning set ~2500 RPM. Increase bank angle to 45 or 60° and monitor airspeed: it should remain at **100 – 90 mph** (90-80 kts) IAS all the time.

APPROACH AND LANDING

APPROACH BRIEFING

Approach briefing should answer the following questions: How to approach this airfield? How to land there? What to do in case of a go-around? Approach briefing should be performed 10-15 minutes before arrival and it shall contain following items:

Joining downwind/base/final

runway xxx,

via xxx

**xxx 1000 ft, traffic circuit 600 ft ,
field elevation 120 ft**

Section of a traffic circuit according to
clearance/approach chart

Runway in use

Reporting point

Altitude at reporting point /

traffic circuit / field elevation above/below
sea level

In case of missed approach....

What to do in case of a go-around

**“Joining right base runway 36 via DEGER. DEGER 1000 ft, traffic circuit 600 ft,
elevation 57 ft. In case of a missed approach right-hand traffic circuit 600 ft”**

**“Joining downwind 26 via MYLLY. MYLLY 1200 ft, traffic circuit 1000 ft, elevation
339 ft. In case of a go-around traffic circuit 1000 ft”**

FINAL CHECK

Final check is used to ensure that the aircraft is in landing configuration and also ready for go-around if needed. Final check is more important when flying heavier aircraft with retractable landing gear.

“Final check”

"Mixture rich"

“Carb heat”

“Flaps”

Check mixture is set full rich

Check carburetor heat is open

Check proper landing flap setting

MISSED APPROACH / GO-AROUND

In missed approach a landing must be cancelled due to other traffic, unstable approach, weather or technical problems. A go-around shall always be commenced firmly and without delay.

“Going around”	Call out aloud
“Max power”	Set max power, close carburator heating
“Flaps 10”	Select flaps 10° If flaps are up, they shall be kept up
“Safe speed, safe altitude, flaps up”	When passing 200 ft AGL OR clear of obstacles, and airspeed is 70 mph (60 kts) IAS or greater, select flaps up and continue climb at Vy

AFTER LANDING

After landing vacate runway without hurry or delay. After vacating runway, following items are completed by heart:

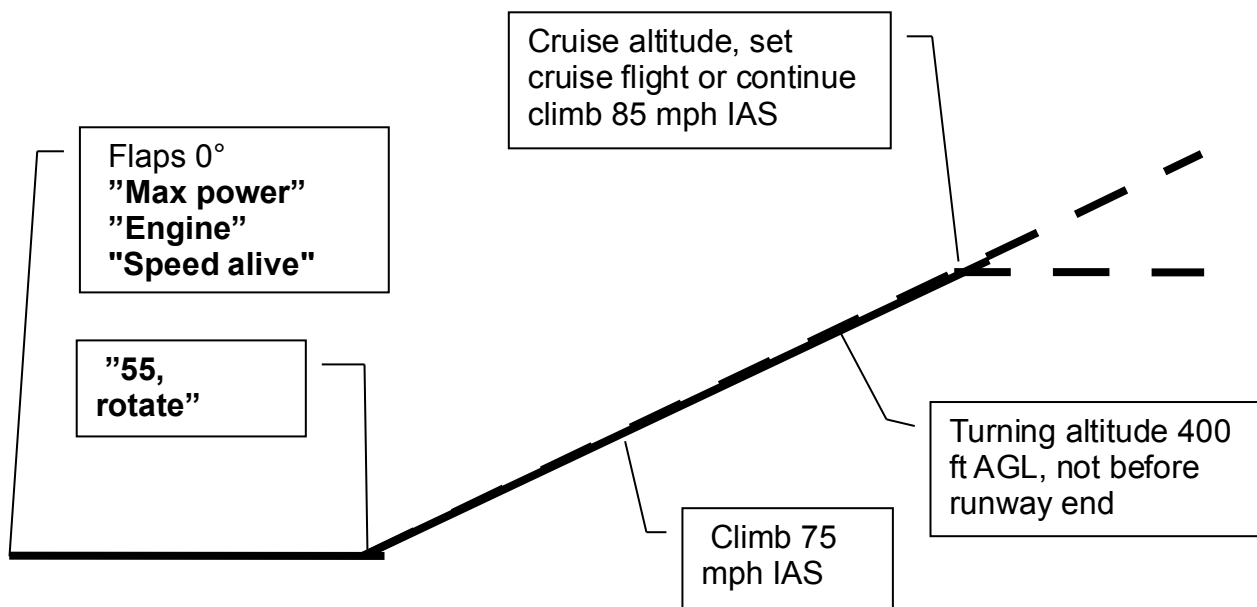
“Transponder”	Set transponder Standby
“Carb heat”	Close carburator heating
“Flaps”	Select flaps up
“Pitot heat”	Set pitot heat OFF

Taxi to a parking lot and complete "After landing" and "Parking" checklists. When leaving the aircraft, check following items:

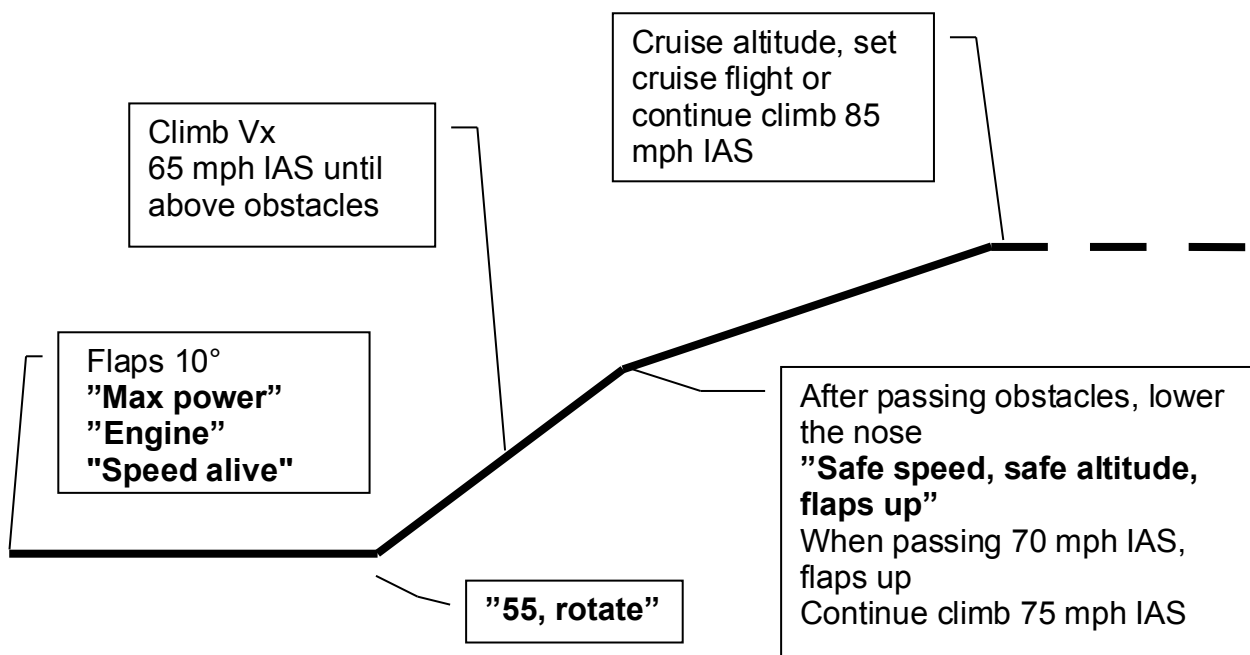
- Aircraft journey logbook is properly filled
- Control lock is set
- All electrical equipment is switched OFF
- Parking brake is released
- Your own things and trashes are taken away from the a/c
- Pitot cover and wing covers (if applicable) are properly set
- Aircraft is properly tied down
- Wheel blocks are set
- Flight plan is closed

FLIGHT PROFILES C150

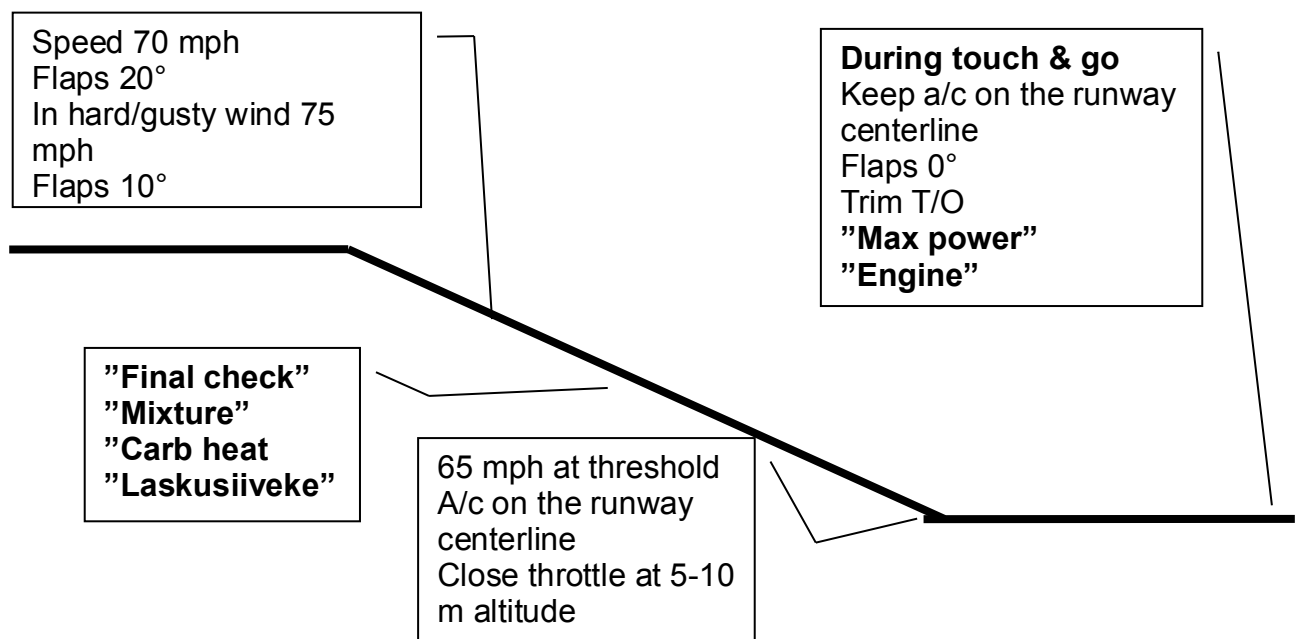
NORMAL TAKE-OFF



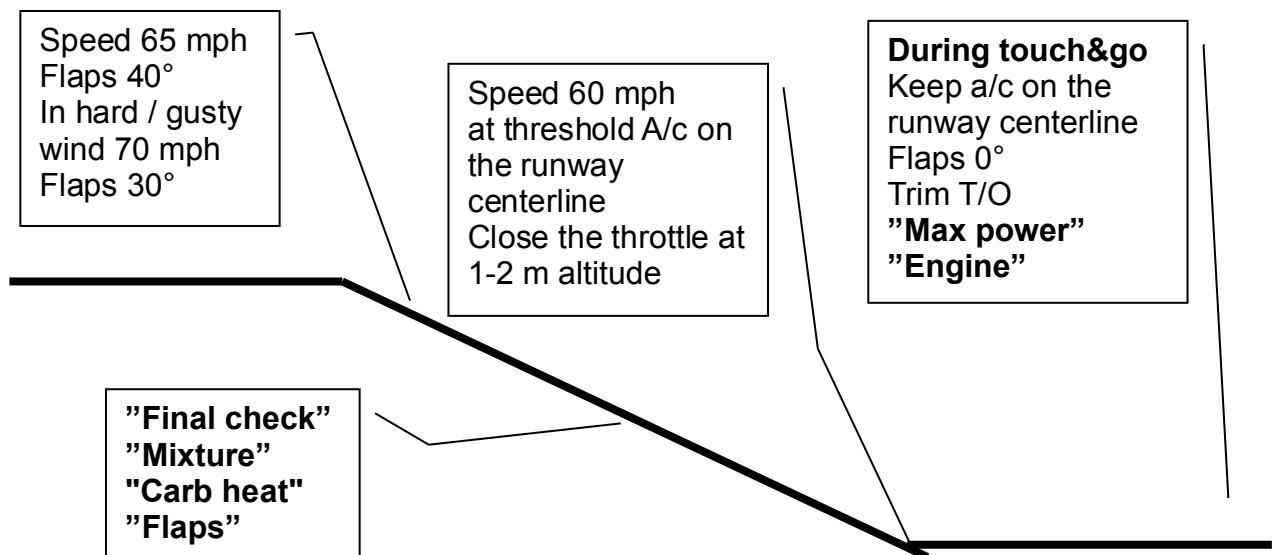
SHORT FIELD TAKE-OFF



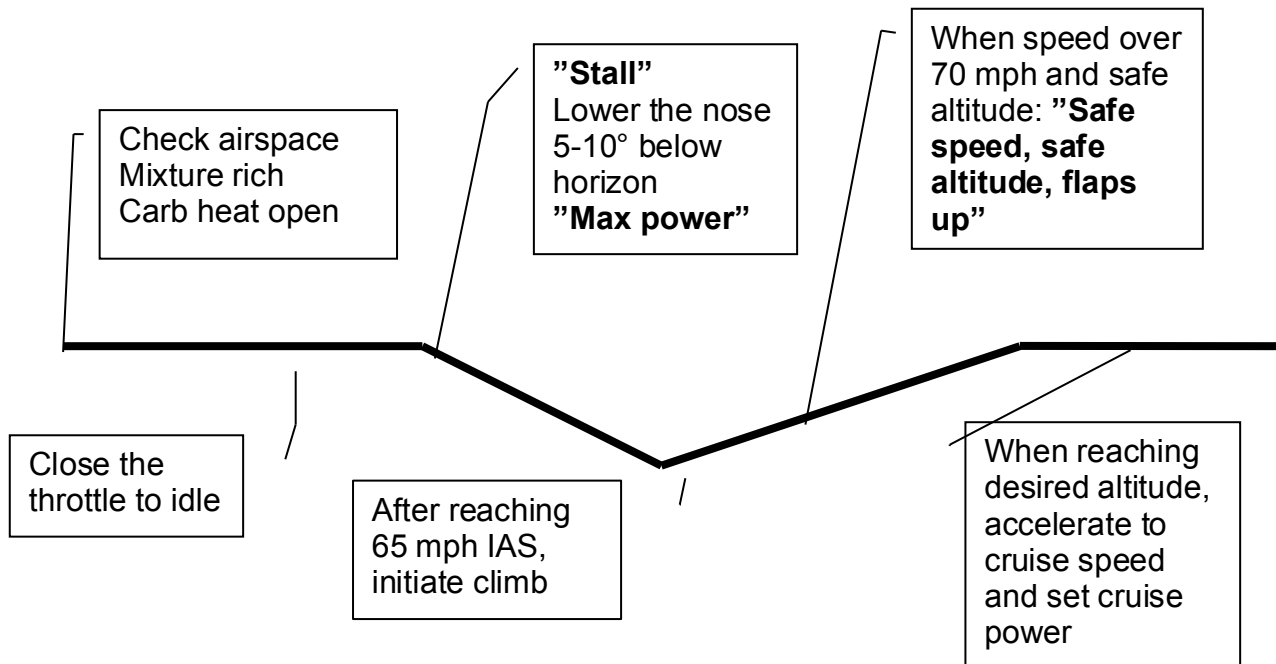
NORMAL APPROACH



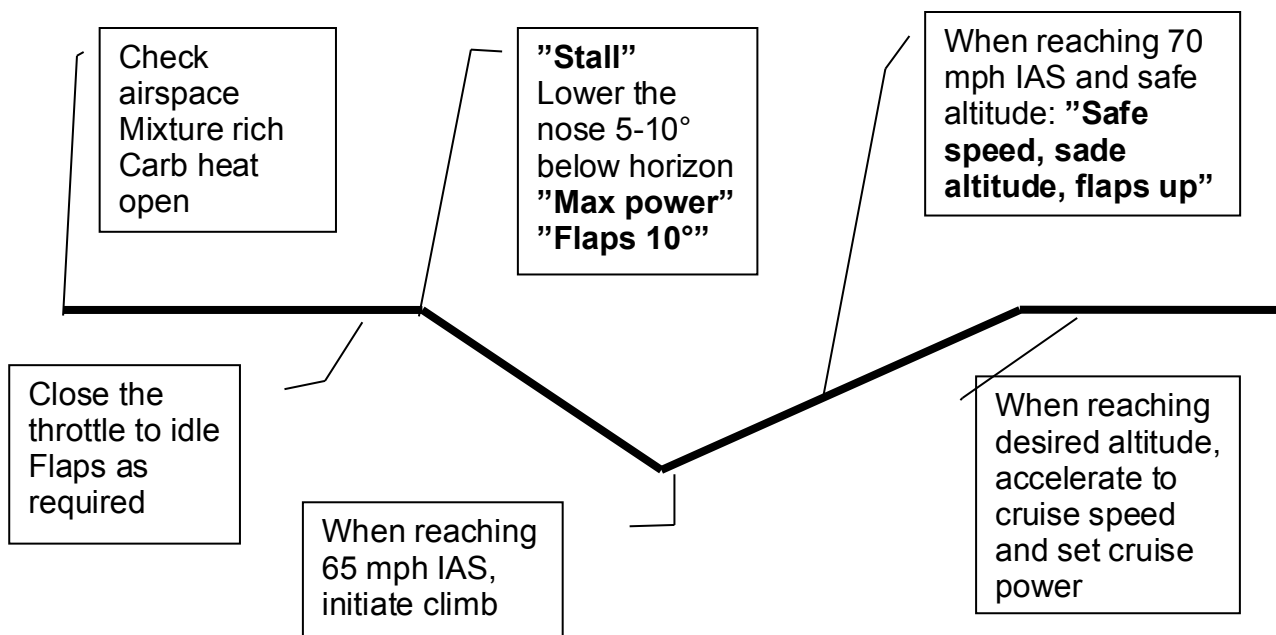
SHORT FIELD APPROACH



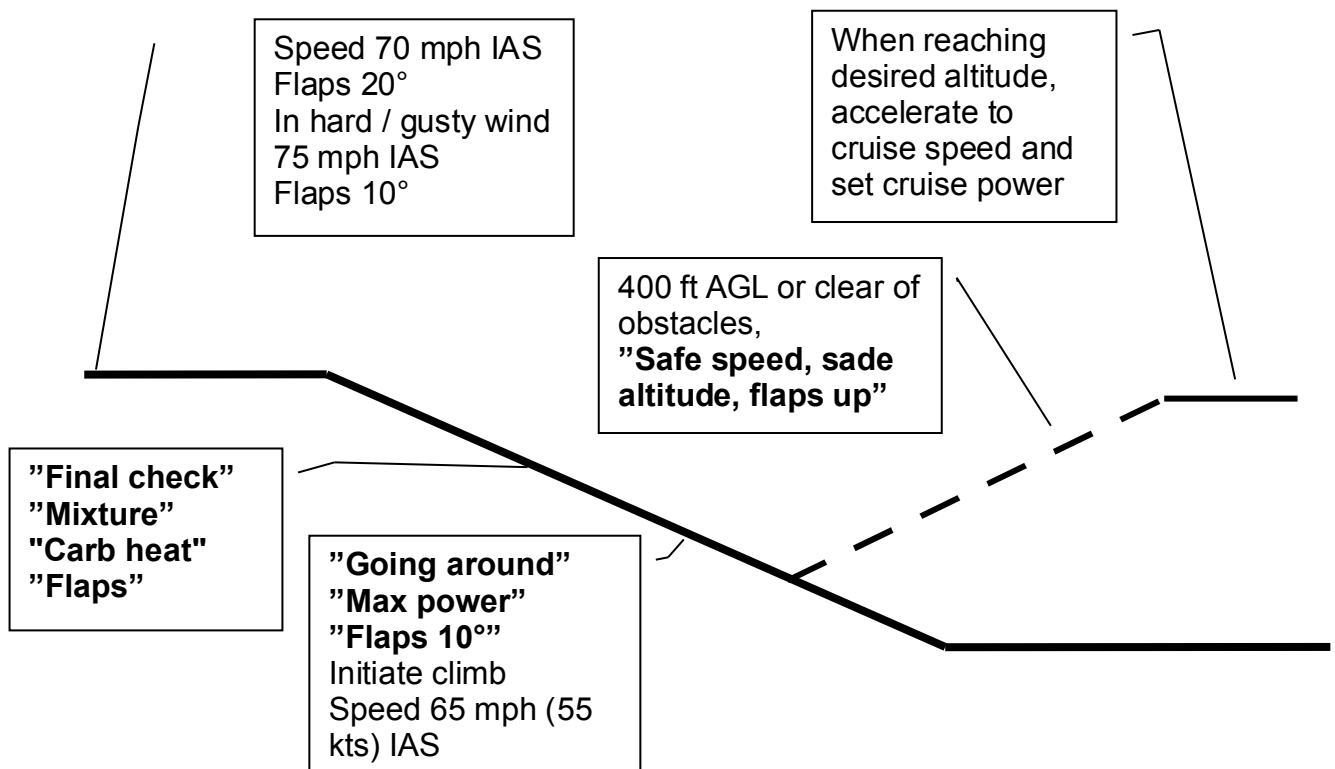
STALL IN CLEAN CONFIGURATION



STALL IN LANDING CONFIGURATION



MISSED APPROACH



TRAFFIC CIRCUIT

FINAL

80 mph / 70 KIAS (flaps 0°-10°)
70 mph (60 kts) (10°-20°)
65 mph (55 kts) (140°)
Glide 3°
Power ~1300-1500 rpm

BASE

Flaps 20°
75 mph (65 kts)
Initiate descent

THRESHOLD

65-75 mph
(55-65 kts)
50 ft

ABEAM THRESHOLD

Carb heat OPEN
Power ~1800 rpm
Flaps 10°
max 95 mph (85 kts)
Speed 85 mph (75 kts)

TDZ

Power idle
55-65 mph
(45-55 kts)

TAKE-OFF

Max power
Rotation 55-60 mph
(50 kts)
Climb 75 mph (65 kts)

DOWNWIND

Engine instruments
Fuel
Battery charging

CRUISE CLIMB

Max power
80-90 mph
(70-80 kts)

CRUISE

Power 2350 rpm
~100 mph (95 kts)
Lean as required

$V_x = 65 \text{ mph (55 kts)}$

$V_y = 76 \text{ mph (67 kts)}$

$V_{L/D \text{ max}} = 70 \text{ mph (60 kts)}$