Sky Arrow
Standard Operating Procedures and Maneuvers Supplement

June 4, 2015

Normal Takeoff

Fuel pump on
Flaps 0°
Trim set - slightly above the midline
Check for traffic
Line up on white stripe
Full power
Stick should be located in the middle of the travel space
Steer with feet only
Gradually apply back pressure to lift the nose off ground but leave the mains on the ground
Rotate 50kts
Climb out 65kts
Set trim to hold 65kts
Fan off
Fuel pump off - over dry land
Follow noise abatement procedures

Level Off From Climb

Lower nose to achieve level flight
Reduce power to 5100RPM
Reset trim to remain in level flight - start with the orange indicator line about 1/3 from the bottom
Verify: flaps up, fans off, fuel pump off, engine instruments green

Note: Start level off approximately 100ft before desired altitude to avoid overshooting.

Straight and Level Flight

Use outside references to establish and maintain the desired pitch attitude and wings level position.

Note: use instrument panel glareshield position with respect to the horizon

Check the ball of the slip/skid indicator.

Note: Ball to the left of center requires left rudder for balanced flight, ball to right of center requires right rudder for balanced flight. Keep the ball in the middle by "stepping on the ball."

Trim as required.

Note: Use trim to minimize the stick force required to hold the desired pitch attitude not to change the attitude.

Check the altimeter.

Make small pitch corrections necessary to maintain desired altitude.

Do not fixate on any one instrument.

Turns (Level Flight)

Look in the direction of turn before banking!
Use rudder and aileron together to establish the desired bank angle.
Simultaneous apply back pressure to elevator.
Once the desired bank angle is established, neutralize the rudder and aileron inputs. Keep in elevator.

Note: Level altitude turns require some elevator force (back stick) to maintain a constant altitude (more bank, more elevator back stick.)

Use rudder and aileron together to roll out of the bank to wings level.
Release any back stick elevator pressure.
Neutralize the rudder and aileron.
Check that the ball is centered.

Note: To roll out on a specific heading, lead the heading by one third the bank angle (example: 30 degrees bank angle, lead rollout by 10 degrees.)

Climbs

Apply full power
Raise the nose to the desired climb pitch attitude
Refine pitch attitude to maintain desired airspeed

Note: Vx = 60kts (best angle)
Vy (best rate) = 65kts
cruise climb = 70-80kts

Set trim to hold desired attitude and airspeed

Descents

Reduce power to desired RPM and lower nose to the pitch attitude for desired airspeed.

Note: For a cruise descent, reduce power to maintain a descent rate of approximately 500 ft/min. and maintain cruise speed.

Trim as required to minimize elevator force.

Keep the ball centered.

Level Off From Descent

Simultaneously add desired power and raise the nose.
Trim to eliminate stick pressure.

Note: To level off from a descent, lead the level off by approximately 100 feet

Note: To level off in cruise flight bring power to 5100RPMs. To level off for the traffic pattern bring power to approximately 3800 rpms.

Normal Landing

10nm from airport, listen to AWOS and/or request Airport advisory
5nm from airport begin self announcing position
Enter traffic pattern following noise abatement procedures
As you enter the pattern power back to 3,800 rpms to get the aircraft slowed down
Fuel pump on
Downwind leg approximately 3,800 RPM, 65kts level flight, retrim
Abeam of numbers, reduce power to approximately 2,8000 rpms, add first notch of flaps, retrim for 60kt decent
Base, add second notch of flaps, adjust power/ power if need be for appropriate decent altitude and to maintain 60kt decent
Final, add third notch of flaps, adjust power if need be for appropriate decent altitude and to maintain 55-60kt decent
Airspeed should be 55 kts over the runway, 50 kts at the beginning of the flare, 45 kts at touch down
Once the runway is made, reduce power to idle
20 feet above runway, begin transition from maintaining airspeed to maintaining attitude. Focus eyes at far end of the runway. Gradually increase back pressure on stick to try and hold aircraft 2 feet off the runway as long as possible. Use your feet to point airplane down the runway and hands to maintain altitude and keep it over the centerline.
Once main wheels touch the ground, steer with feet. Gradually lower the nose wheel and begin applying brakes as needed
Clear runway
Make radio call
Reset trim, turn off fuel pump, and adjust fans and baffles as needed to maintain water temperature.

Note: If fast, raise nose; if slow, lower nose.
Summary: ***PITCH CONTROLS AIRSPEED, POWER CONTROLS ALTITUDE****.*

Slow Flight

2 clearing turns
Reduce power to 3,500
Increase pitch attitude and trim to maintain altitude
Once within the white arc, bleed in flaps
Adjust pitch and power to maintain altitude at 46kts

Recovery
Full power
Pitch for level attitude
Bleed out flaps while in the white arc
Retrim

Power Off Stall

2 clearing turns
Reduce power to 3500 rpm
Increase pitch attitude and trim to maintain altitude
Once within the white arc, add all flaps
Reduce power to idle
Adjust pitch to establish 60kt glide
Descend approximately 300 feet and then gradually pitch back to maintain altitude and induce a stall.
Watch coordination and maintain heading unless performing "turning stall."

Note: For turning stall maintain shallow bank angle and keep plane coordinated.

Recovery
Simultaneously apply full power, pitch for level attitude, and remove first notch of flap.
Once airspeed has increased to 60kts, establish 60kt climb
Bleed out flaps and climb to desired altitude.
Return to cruise flight

Power On Stall

2 clearing turns
Reduce power to 3000 rpm
Increase pitch attitude and trim to maintain altitude
Once within the white arc, add 1 notch of flaps
Adjust pitch and power to maintain altitude until 45kts
At 45kts, apply full power, and immediately pitch back to further reduce airspeed until stall
Watch coordination and maintain heading unless performing "turning stall."

Note: For turning stall maintain shallow bank angle and keep plane coordinated.

Recovery
Pitch for level attitude
Once airspeed has increased to 60kts, establish 60kt climb
Remove flaps and climb to desired altitude.
Return to cruise flight.

Steep Turns

Establish cruise flight at or below 93kts approx 4500 rpm
2 clearing turns
Choose landmark for entry heading
Begin roll to 45° bank
At 30°, add 100rpm and continue roll to 45° adjusting back pressure as needed
Maintain altitude
10° prior to roll-out heading, begin roll out and reduce power 100rpm.
Roll out at entry altitude and heading.

Turns Around a Point

Determine wind direction
Select a suitable site. Should have emergency landing areas, no towers, and not disturb the neighbors.
Establish cruise flight at or below 93kts 4500 rpm
Select four points around the point that are equidistance from the center. These four points are your targets.
Enter maneuver at 1000 feet
Steepest turn should be downwind. Shallowest upwind.
Keep object same distance from aircraft by adjusting bank angle. Steeper brings it closer. Shallower takes it further away.

S-Turns Across a Road

Determine wind direction
Select either Rt 50, Rt 404, or Rt 301. Winds should be perpendicular to road. (Talk to ESN tower for 50)
Establish cruise flight at or below 90kts 4500 rpm
Select target distance from road
Enter maneuver at 1000 feet, perpendicular to road
When over the road begin turn
Steepest turn should be downwind. Shallowest upwind.
Airplane should be wings level only when crossing the road. Adjust bank angle accordingly.

Loss of Engine

Establish and trim for best glide speed 60kts
Select emergency landing site and head that way

IF there is time, try to restart engine
Work left to right
Emergency Shutoff - verify it is closed
Carburetor Heat - On
Throttle - Open half way
Ignitions - Check
Fuel Pump - On
Attempt re-start

IF there is time, call for help giving position
Radio 121.5 MHz
Transponder 7700

Secure Engine
If engine will not restart - Fuel Shutoff Up
Flaps - as necessary
Master off after final flaps
Unlock canopy immediately upon touchdown

Go-Arounds

Apply full power
Reduce flaps to 20°
Pitch for level attitude until 60kts and then begin climb
Fuel pump off
Bleed out flaps

Short Field Takeoff

Fuel pump on
10° flaps
Stop aircraft at the very end of the runway
Hold brakes and apply full power
Release brakes
Climb out at 60kts
Above obstacle height, pitch for 65kts
Flaps up
Fuel pump off

Short Field Landing

Set up final approach at 55kts
Establish aim point prior to actual touch down point
After touch down, retract flaps, apply brakes but do not skid!

Soft Field Takeoff

Inspect field condition checking for grass height, holes, debris, and wetness
Flaps 10°
Fuel pump on
Fans on
Full aft pressure during taxi continuing through takeoff
Apply full power
As soon as main wheels leave the ground, lower nose to level attitude and fly aircraft 5 feet off the ground until 60kts
Climb out at 60-70kts
Fuel pump off - above dry land
Fans off

Soft Field Landings

Perform low pass to inspect field condition for grass height, holes, debris, and wetness
Set up normal approach to landing
Keep nose wheel off the ground as long as possible holding aft pressure as long as possible
Use minimal braking and keep aircraft moving until parked
Open baffles and use fans for extended taxi

Note: Be sure to check NOTAMS that runway is open! Kentmorr closes when it is muddy.

Crosswind Takeoff

Modify appropriate takeoff procedures as such:
Begin ground roll with full aileron into the wind
Gradually take out most of the aileron as aircraft accelerates
Upon lift-off, establish coordinated crab into the wind

Crosswind Landing

Modify appropriate landing procedures as such

Add 5kts approach speed if runway length allows, especially in gusts
Apply rudder to point nose down the runway
Apply aileron to hold aircraft over the centerline
Do not use more than 20° flap

Note: Net effect should be the aircraft slightly cross controlled with the wing down into the wind

Note: Control input should be increased as aircraft decelerates and maintained until landing

Forward Slips

Apply almost full rudder
Simultaneously, apply opposite aileron, such that the track across the ground is maintained.
Pitch to maintain airspeed.

More wing down and more opposite rudder will steepen the angle of descent.
Less wing down and less opposite rudder will shallow the angle of descent.

This is most effective with no power, full flaps, wing down into the crosswind.

Emergency Descent

Reduce power to idle.
Flaps up.
Lower the pitch attitude to increase airspeed until desired rate of descent is obtained. If air is smooth $\leq$132kts if turbulent $\leq$ 104 kts
Banking bank to 45 degrees.
Trim.
Approaching desired altitude, level the wings and gradually raise the nose.
Add power and trim to level off, if available.

Flat Tire Upon Landing

Stop aircraft
Radio call - Notify UNICOM and landing traffic of runway situation
If able, push aircraft off of runway while keeping as much weight off of that wheel as possible
If unable to reach UNICOM - Call CSP emergency numbers for assistance

Aborted Takeoff

Retard throttle
Apply full braking
Steer as appropriate
Note: Grass can be used to slow the airplane down

Loss of Engine Immediately After Takeoff

Pitch DOWN for 60kts
Make shallow turns right or left
Do NOT attempt to return to runway below 1000 feet
Off runway 29 - prepare for ditching

Ditching

Pitch or 60 KIAS
Head towards a boat or shoreline
Radio - Transmit MAYDAY on 121.5 Mhz and 7700
Wing flaps - DOWN
Approach - Into the wind
Seatbelt - Secure
Eyeglasses - Remove
Face - Cushion is possible
Touchdown - Minimum airspeed, right wing down
Canopy and windows - Open
Airplane -Evacuate

Engine Fire - Emergency Decent

Emergency fuel shut off - OFF
Full throttle
Pitch for highest possible to try and snuff out flames. If air is smooth $\leq$132kts if turbulent $\leq$ 104 kts
Select emergency field
Mayday 121.5 and 7700
Ignition switch off after fuel is consumed (30 seconds)
Prepare for forced landing (use loss of engine checklist)

Spin Recovery

From the FAA Airplane Flying Handbook

Reduce the power to idle
Position the ailerons to neutral
Apply full opposite rudder against the rotation
After spin rotation stops, neutralize the rudder
Begin applying back-elevator pressure to raise the nose to level flight (Maintain airspeed $\leq$ 93kts)

Overheating Cylinders/Water (In-Flight)

Reduce RPMs to lowest possible to maintain safe flight
Check baffle open
Land as soon as practicable

Overheating Oil Without Loss of Oil Pressure

Reduce RPMs
Lower angle of attack
Check baffles open
If oil temperature continues to climb, land

Overheating Oil With Loss of Oil Pressure

Select and head towards emergency landing spot
Declare an emergency 121.5 and 7700
Prepare for loss of engine and use of appropriate checklist

Loss of Radio

If in a pattern at a towered field, look for light gun signals.
If under flight following or in towered airspace with radar, squawk 7600
Otherwise return home or to nearest appropriate airport
Overfly and observe airport traffic pattern
Carefully merge with traffic
Execute normal landing

Loss of Flap Control

If flaps are down, maintain airspeed below 68 kts when returning to airport
If flaps are up, return home and execute normal flaps-up landing

Loss of Trim Control

Fly the aircraft paying special attention to airspeed in the pattern

Loss of Brakes

If you are fast and have half or more of the runway remaining, go-around and re-approach using short field landing technique or go to longer runway
Land with minimum airspeed
Roll into the grass on the side of the runway if needed to stop the plane

Electrical Fire

Master switch - OFF
Vent fumes from cabin
Land as soon as practical
Remember, you will have no flaps, radio, or trim control

Loss of Generator

Turn off all unneeded electrical equipment
Land as soon as practical
Use no-flap landing

Canopy Opening in Flight

Fly the plane!
Slow the plane down or maintain a low airspeed and carefully pull the canopy shut