

Bronze Badge

Blue Ridge Soaring Society

New Castle, Virginia

SSA Badges

- A badge
 - Solo flight.
- B badge
 - 1/2 hour flight from 2000' tow.
- C badge
 - Soaring instruction.
 - Knowledge of cross-country procedures.
 - 2 hours of solo flight.
 - 1 hour flight from 2000'tow.
 - Spot landing w/o reference to altimeter.
- Bronze badge
 - Log 15 solo hours including 30 solo flights, 10 in single place.
 - Log two 2 hour solo flights.
 - 3 solo spot landings witnessed by SSA Instructor.
 - 2 spot landings w/ instructor w/o reference to altimeter
 - Written exam.

FAI Badges

- Silver Badge
 - 1000 m (3280 ft) gain.
 - 5 hour duration.
 - 50 km (31.1 mi) flight.
- Gold Badge
 - 3000 m gain.
 - 5 hour duration.
 - 300 km distance flight.
- Diamond Badge
 - 5000 m gain.
 - 300 km goal flight
 - 500 km distance flight.
- Barographs
 - Altitude v. time
- Official Observers
 - Verify all FAI Badge flights
 - A voting member of the SSA who holds a “B” Badge, a “C” Badge or any leg of an FAI Badge.
 - An airport manager.
 - An appointee of the FAI Awards Secretary.

Training

- Basic flying skills.
 - Airspeed control.
 - Constant angle of bank.
 - String in the middle.
- Landout exercises
 - Spot landing practice.
 - Minimum energy landings.
 - Select fields: SCOWL
- *Being able to **climb** is the **most important** skill in cross-country soaring.*
- Climbing exercises:
 - Strive for constant vario, no windshield wiper needle.
 - Measure real average rate of climb
 - w/ barograph, do as many climbs in an hour as possible.
 - Read the sky.
 - Scratch.

Airspace

- Class A
 - Above 18,000' MSL.
 - IFR, transponders, radios.
- Class B
- Class C
 - Transponder
 - 2 way radio communication.
- Class D
 - 2 way radio communication.
- Class E
 - 3 miles visibility.
 - 500' below, 1000' to above, 2000' beside clouds
- Federal Airways
 - 1200' AGL to 18,000' MSL.
 - 8 nm wide.
 - To East
 - Odd thousands + 500'
 - To West
 - Even thousands + 500'
- MOA: Military Operations Area
 - use extreme caution.
- Military Training Routes.

Weather

- Thermals
 - Unstable airmass.
 - Indicated by cumulus clouds.
 - Dark, flat bottom.
 - Crisp edges.
 - Thermal Index.
 - More negative, more unstable.
- Thunderstorms
 - Cumulonimbus clouds.
 - Severe winds.
 - Lightning and hail.
 - Squall lines.
- Ridge Conditions
 - Post cold front.
 - Perpendicular to ridge
 - +/- 30 degrees.
 - Wind blowing +10 kts.
- Mountain Wave
 - Stable, dry air.
 - Wind blowing across mountains.
 - High altitudes.
 - Use oxygen.
 - 12,500' +30 min.
 - 14,000' always.

Speed-to-Fly

- Thermaling:
 - Minimum sink for the bank angle being used.
 - All gliders turn the same direction as the first glider.
- Climb straight ahead with no intention of stopping.
 - Minimum sink speed.
- Total energy compensation.
 - Accounts for airspeed changes and stick thermals.
- Best distance
 - Headwind (approximate)
 - Best L/D speed plus 1/2 wind.
 - Tailwind.
 - Slower than Best L/D.
- Best speed.
 - Depends on conditions.
 - Complicated calculations.
 - Faster in sink.
 - Slower in lift.

Calculating Glides

$$L/D = \frac{\text{distance flown}}{\text{altitude lost}}$$

Altitude-per-mile

$$\frac{30}{1} = \frac{1 \text{ sm}}{\text{altitude lost}} \Rightarrow \text{altitude lost} = \frac{5280 \text{ ft}}{30} = 176 \text{ ft}$$

Miles-per-1000'

$$\frac{30}{1} = \frac{\text{distance flown}}{1000 \text{ ft}} \Rightarrow \text{distance flown} = 30,000 \text{ ft} = 5.7 \text{ sm}$$

Calculating Glides

$$L / D = \frac{\text{ground speed}}{\text{sink rate}} = \frac{\text{airspeed} - \text{windspeed}}{\text{sink rate}}$$

Calm air

$$L / D = \frac{30}{1} \quad @ \quad 55 \text{ mph}$$

$$\frac{30}{1} = \frac{55 \text{ mph}}{\text{sink rate}} \Rightarrow \text{sink rate} = \frac{55 \text{ mph}}{30} = 1.83 \text{ mph} = 161 \text{ fpm}$$

Headwind: 10 mph

$$L / D = \frac{55 \text{ mph} - 10 \text{ mph}}{1.83 \text{ mph}} = \frac{45 \text{ mph}}{1.83 \text{ mph}} = \frac{24.5}{1}$$

Calculating Glides

- 30:1 @ 55 mph.
- 10 mph tailwind.
- 16 miles from NCI.
- Arrive 1000' AGL.
- How high MSL?

$$\text{sink rate} = \frac{55 \text{ mph}}{30} = 1.83 \text{ mph}$$

$$L/D = \frac{55 \text{ mph} + 10 \text{ mph}}{1.83 \text{ mph}} = \frac{65 \text{ mph}}{1.83 \text{ mph}} = \frac{35.5}{1}$$

$$\frac{35.5}{1} = \frac{16 \text{ sm}}{\text{altitude lost}}$$

$$\text{altitude lost} = \frac{16 \times 5280 \text{ ft}}{35.5} = 2380 \text{ ft}$$

$$\text{height req'd} = 2380 + 1000 + 1320 = 4700 \text{ ft MSL}$$

Decision Heights

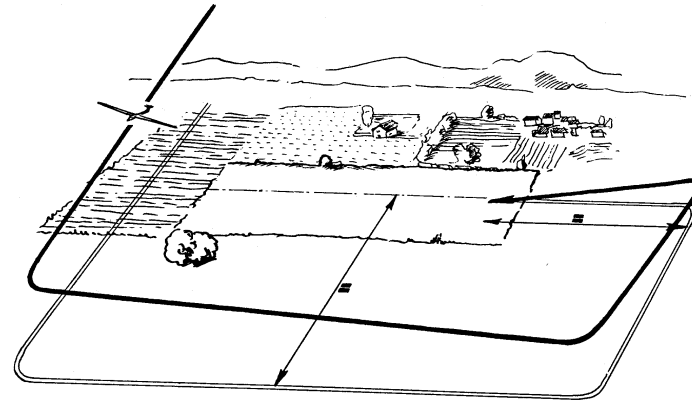
- Decision points.
 - Use 1/2 Best L/D for calculating go-ahead altitudes.
 - Use MSL altitudes.
- At 3000 ft:
 - Have a **general area** where the best possible fields are.
- At 2000 ft:
 - Select **specific fields** and search for lift within reach of those fields.
- At 1000 ft:
 - Be on the **upwind leg** of a **square pattern**.
Have an alternate field within easy reach in case of hazards.

Landing Away

- Plan landing at airport
 - Non-controlled (magenta).
 - Control tower (blue).
 - Paved shows runway heading.
- Preferred pattern shown by segmented circle.
- Plan to arrive over an airport at a minimum altitude of 1000' AGL.
- Common Traffic Advisory Frequency.
- Be aware of airplanes well outside your pattern.

Landing Out

- Judge height using angles:
TLAR
- Checklist.
- 360 degree pattern.
 - Same distance, same speed.
- Land in the middle.
 - *Touchdown at full stall, tail first.*
- Always land uphill.
- Keep spoilers closed in tall crops (grass, wheat, corn).
- Never land with gear retracted.

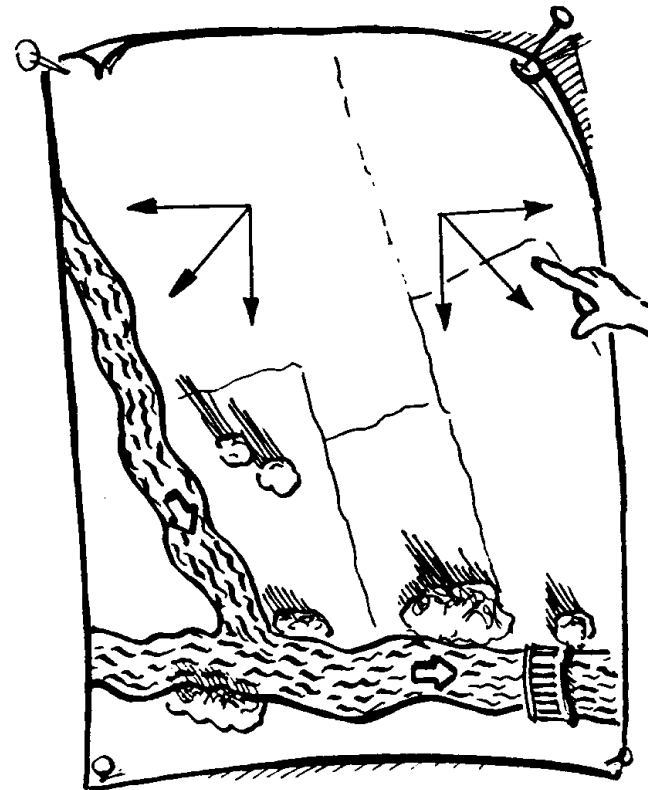


Field selection

- **S** Slope: level, up/downhill, undulating, sideslope.
- **C** Condition: smooth/rough, hard/soft, wet/dry, color, crops, furrows, rocks, stumps, holes, animals.
- **O** Obstacles: especially wires, antennas, fences which may be hard to see.
- **W** Wind: direction, strength, variability.
- **L** Length in favorable landing directions.

Slope

- At altitude:
 - Furrows: not straight, the field undulates.
 - Color: darker areas are probably wetter and lower.
- Fields are generally sloped to drain toward streams.
- **Always land upslope regardless of wind**



Condition

- Uneven textured or uneven colored: uneven rolling terrain.
- USEABLE fields.
 - Disked and cultivated fields, flat and bare of crops: **earth color**
 - Cereal grasses: wheat, barley, rye, etc., light green color, good in the spring (4-6 in), may be too long later in the season.
 - Plowed but undisked fields: if furrows are into the wind and not too deep.
 - Short crops: ground visible between plants.
 - Feed crops: clover, alfalfa, etc., dark green, can have holes.
 - Meadows: uneven ground, tramped by animals. Look for fences and ditches.

Condition

- UNUSEABLE
 - Unmown meadows or pastures: grass masks rocks and hazards, ground-loop risk
 - Crops with deep furrows: potatoes, asparagus, cotton.
 - All high crops: Eared cereals (brownish yellow) and corn.
 - Vineyards: hard stems, stakes and trailing wires.

Obstacles

- An obstacles shortens the field by 10 times its height.
- Locating obstacles:
 - Drainage ditches show up as changes in color of vegetation.
 - Irrigation pipes.
 - Avoid the edges of fields where farm equipment is often left.
 - Barbed-wire or electric fences surrounds pasture and grazing land.
- ***WIRES***
 - **Can be impossible to see.**
 - **Look for poles and houses.**
 - **Look for pole shadows.**

Wind

- Wind determines landing direction and for calculating approach speed.
 - Strong wind, steep approach.
 - Weak wind, shallow approach.
- Look for:
 - Columns of smoke or dust.
 - Motion of cloud shadows (wind at altitude).
 - Observe drift over ground in a spiral descent.
 - Waves in crop fields.
 - Waves and wind streaks seen in bodies of water.

Length

- Should be 700 ft or more in length to be considered useable.
- Truly comfortable, probably 1000-1500 ft long.

Bibliography

- *Glider Basics: First Flight to Solo*, Knauff.
- *Glider Basics: Solo to Licence*, Knauff.
- *The Joy of Soaring*, Conway
- *Gliding*, Piggott.
- *New Soaring Pilot*, Welch & Irving.
- *Off Field Landings*, Knauff.
- *Soaring Cross Country*, Byars & Holbrook.
- *Cross Country Soaring*, Reichman.