

The **ASK-21** is known worldwide as the best sailplane available for initial flight training through solo to license, and for fun soaring. It has a fair glide ratio (34 to 1) and a low minimum sink rate (128 fpm @ 42 kts) that allows the "K-21" to climb in weak thermals.



It is required that all pilots read this document and familiarize themselves with the ASK-21 Pilot Operating Handbook (POH) before being checked out in this glider. Copies of the POH, Radio, & Vario manuals are available On-Line on the "Fleet Status and Manuals" link on the GBSC web site: [http://soargbsc.com/members/ac\\_status.php](http://soargbsc.com/members/ac_status.php)

Learn the location of the controls, trim, release, wheel brake, etc.

Learn how to close and lock the canopies – ***The rear canopy must close first.***

Use the Pre-Flight (and post-flight) Checklists.

***KNOW THE DIFFERENCES.*** The ASK-21 is obviously different than the Blanik L-23 or the Schweizer gliders. Every glider you will ever fly will likely have significant differences, especially in landing technique, canopy latching, location of wheel brake, trim and release levers.

***The Good:***

- Fair Glide Performance: 34 to 1 at 56 knots (dual) / 52 knots (solo)
- Lower Sink Rate Solo: 128 feet per minute at 42 knots
- Getting In and Out is easier as the glider dips down on its nose wheel.
- Harmonized Controls and easier to fly on tow.
- Wheel Brake with the Airbrake lever – activated aft with full airbrakes.
- Does Not Easily Spin (but it will dive out or spin in skidding turns.)

***The Differences. ( Not “bad”, just different from a Blanik or a Schweizer 2-33.):***

- **Canopies Must Always Be Closed.** Hinges can be damaged by wind.
- Rear Canopy **MUST BE** closes **and latched FIRST**, before closing and latching the front canopy. Both latches completely forward and “clicked.”
- **The Spoiler Detent takes much more force to close & open than the L-23. If you don't here hear and feel the solid lock when closing, you have not closed them.**
- Fuselage has three wheels. On takeoff or landing roll it is impossible to steer when not balanced on the main wheel.
- Ground Handling. Tailwheel does not swivel. Push down on nose to turn.
- Getting In and Out, it dips onto its nosewheel when loaded.
- Landing Technique. **Glider must be landed on main and tailwheel together.**
- P.I.O. on takeoff is prevented by never letting the nosewheel touch – balance on the main wheel as soon as aileron and rudder control is gained. Leave on the nose wheel longer on the ground in strong cross wind and tail wind situations that may initiate a ground loop.
- P.I.O. on landing is prevented by never letting the nosewheel touch touch – aim to execute a fully held-off, full stall, landed, **do not fly it onto the ground.**
- **8 knot max crosswind component**, so keep it straight on landing roll-out. (This is the strongest crosswind encountered during the certification, the ship has been flown in much stronger cross winds)
- Wheelbrake is activated by the airbrake handle – full back (airbrakes out.) **Do not touch down with full airbrake** or the wheel will be locked.

**ASK-21 CANOPIES.**

The front canopy opens forward, rear canopy opens back. All Glider Canopies are very susceptible to damage to the hinges or frames by wind and careless or rough handling by pilots and passengers. A canopy slamming down can crack the clear Plexiglas. Make sure the passenger never touches the canopies!



**Both canopies MUST BE CLOSED at all times**, except when getting in and out. Even walking a few feet away to hook up the ground or aero tow rope will leave the canopies exposed to damage.

When sitting in the glider on hot days waiting to launch, one hand must be constantly holding the canopy. Close the canopies in sequence (rear first) and slowly.

### **The Canopy Rules!**

- Canopies must be closed and locked at all times.
- **CLOSE AND LOCK THE REAR FIRST!!!**
- Always close and lock the canopies when ground towing.
- Never touch the clear plexiglas for any reason.
- Never lift a canopy by the plexiglas or the open vent window.
- Do not scratch the canopies with your (nor your passenger's) rings, watches, belt buckles, cellphones, hat buttons, cameras.

***The Rear Canopy Must Be Closed and Locked First.*** The front canopy rear pins slide into white plastic blocks which may assure the rear canopy is locked down before takeoff. Closing the front canopy first (with the rear canopy open) will damage the plastic blocks. Take a good look at the canopy hinges, levers and locking devices. Learn how they work and keep the canopies closed at all times, rear canopy first!

***Don't attempt to lock far-side locks when the glider is unoccupied.*** Reaching through the vent window to operate the right side locking levers has potential to cause cracking of the canopy around the vent window.

Before takeoff check the front canopy pins have engaged the white plastic blocks behind you on each side, so the rear canopy is locked down. This will assure it will not open in flight.

***Fire Danger: Open canopies have been known to focus the sunlight (like a magnifying glass) and create a hot spot on the interior, causing a fire. Really!***

### **GROUND HANDLING.**

The wingspan is 17 meters which is 56 feet. This leaves only 2 feet on each wingtip with our 50 foot hangar opening. The wings are longer than the Blanik. Always move the glider slowly in or out. Helpers giving a "thumbs up" at each wingtip is better than verbal OKs.

Since we must always keep both of the canopies fully closed, moving the ASK-21 means we will usually push it backwards by the nose or wing root. ***Do NOT push on the canopy.***

To push the glider forward, leave the canopies closed and push from behind the wing, palms flat on the top of the wing, near the spar. (Remove rings. Do not scratch the glider with your belt buckles, rings and watches.)

Pushing gently down on the nose lifts the tailwheel so you can turn the glider. ***Do NOT SKID the tailwheel sideways*** - you will damage the wheel rim. Do not try to turn the glider by the wingtip without having a helper push down on the nose or lift by the rear fuselage. ***NEVER lift a glider by the tip of the horizontal stabilizer / elevator!***

The ASK-21 may use a removable tail dolly. Always remove it before flight, and never leave the glider with the tail dolly still attached, as it may swing quickly in a wind gust.

**Getting In and Out.** The ASK-21 sits lightly on the tailwheel when empty. It dips down onto the large nosewheel when you get onboard. To keep the glider from banging down onto the nosewheel, push down on the cockpit side rail and then get in. Getting out, push down on the cockpit side rail to keep the tail from banging back down. Close the canopies immediately, rear canopy first.

If you or your passenger needs a handle, the fuselage “hoop” is strong but not to be grabbed at the very top – use the lower sides of the hoop by the fuselage.

**Pre-Takeoff Runway Alignment.** Before takeoff, the ASK-21 will be resting on its nose and main wheels. At the start of the takeoff roll, the glider will go in the direction it is pointed, so always align the glider towards the towplane before getting in. At low speeds without rudder and elevator authority, it will roll wherever it was pointed!

**Landing Alignment and Rollout.** Aim the glider to roundout (flare) at the very center of your landing zone. Try to hold the nose up at touchdown, but it will quickly slow and dip over onto the nosewheel. Apply wheelbrake by pulling full aft on the airbrake handle as needed.

**Crosswind landings.** With only an 8 knot max demonstrated crosswind, the ASK-21 will “weathervane” into the wind, even when on the nosewheel, as the rudder is small, and the tail is up in the crosswind when the nose is down on rollout. Be ready! Do not relax on rollout. Use the wheelbrake (full aft airbrake) as much as required. ***Continuous hard braking may overheat the brake pads***, reducing effectiveness.

## **AEROTOW**

The detent to lock the airbrakes closed is very stiff and well-defined. ***Make sure the airbrakes are locked in the detent before starting takeoff roll.*** There are no skid plates or wheels on the wing tips. be careful to avoid letting the wings drop during the take-off or landing rolls.

The ASK-21 flies well on aerotow. Typical aerotow speed is 60 knots. It is “slick” so rope slack may occur in rough air. Use the “yaw away from the rope” or ½ airbrake method to gently remove the slack. Release if slack is excessive.

- Fly just above the towplane wake.
- Match the bank of the towplane and keep the towplane just above the horizon.

## PATTERN PLANNING.

Keep the airspeed at no more than 55 knots, and check the variometer to see if you are flying in lift or sink. This is essential. 5 Knots down works well on the downwind leg and early base leg. **Remember: "55 and 5."** Glance at the trends of the airspeed and vario. Check your angles to the aim point, touchdown and stop points. Increase your sink with the airbrakes on final approach to over the end of the runway with  $\frac{3}{4}$  airbrakes.

The ASK-21 does exhibit mild, but noticeable pitch changes when deploying airbrakes. Nose down when opening, nose up when closing.



ASK-21 on final approach, before "roundout" or flare to land on main and tailwheel. Use about  $\frac{3}{4}$  Airbrake, 55 knots max. through the "mail slot" at the end of the runway.

## **LANDING TECHNIQUE.**

Unlike the Blanik, ***you WANT to touchdown on both the main wheel and tailwheel at the same time.*** At roundout / flare, hold the glider a bit nose up so you land only on the main and tailwheels. ***Never let the nosewheel touch*** until the glider slows and dips down on its own. Excess speed will also contribute to P.I.O.'s. Do not force the glider onto the runway.



**Correct landing attitude.** Main & tail wheel will touch simultaneously. Nose held up.



**Wrong!** Nosewheel may touch, rebound up, and start the three wheel P.I.O.!

## **P.I.O.'s.**

The “three wheel” gliders such as the ASK-21 or Grob 103 can get into very severe **Pilot Induced Oscillations** if the nosewheel is allowed to touch the runway soon after touchdown. If you have been flying a Blanik or Schweizer 2-33, you must change your landing technique to ***always land the ASK-21 on the main and tailwheel, and never let the nose dip onto the nosewheel*** until it slows down and dips on its own on rollout.

Landing on the tailwheel first is allowed! At 5 feet, hold the glider just off the ground with a bit of back pressure on the stick and let it settle to the runway, then open the airbrakes fully and hold the stick back. Do not loosen your grip and relax – do not let the stick go forward and do not allow the glider to dip onto the nosewheel.

If the nosewheel touches, the nose may bounce back up, the tailwheel hits, bounces and then the nosewheel hits and bounces . . . it will gallop like a wild rocking horse down the runway and may break the fuselage. Ugly.

Try to stop the P.I.O. by holding the stick firmly and steady in one position. It is not easy as your body is flung forward and back, and the P.I.O. may continue on its own. Applying full airbrakes which also applies the wheelbrake may help stop the P.I.O. but if bouncing high, closing the airbrakes may prevent a subsequent hard landing.

If a P.I.O. or hard landing occurs, you must immediately inspect the bottom of the fuselage for cracks, and the wheels for damage. Often the rims get flattened and the wheels will not turn. Ground the glider until the damage can be evaluated.

**Proper Landing Technique is Tailwheel and Main together** – Don't relax and let the stick move forward. Excess speed on touchdown may cause a P.I.O. so manage your landing energy on downwind and base legs to 50 to 55 knots and no more!  
The “yellow triangle” on the airspeed dial indicates minimum final approach speed.

## **SLIPS.**

A slip is defined as a method to lose altitude without gaining airspeed. A full slip will meet this goal if you do not let the nose drop. Hold the nose on the horizon in your normal glide “picture.” Slipping nose low will cause the airspeed to increase, and when you come out of the slip, you will be flying much too fast on final. It is best to set a pitch attitude prior to beginning the maneuver, as the airspeed indication goes to zero in a fully developed slip. A preset attitude is your only way of knowing that you have an acceptable airspeed.

A “Left Slip” is with the left wing down, right rudder. (*Right slip is the opposite.*)

**Note: The ASK-21 rudder in a slip will tend to stay full over until you actively push it back to neutral.** (In some gliders, the rudder returns to neutral on its own.)

## **WHEEL BRAKE.**

The ASK-21 main wheel disc brake is activated when you pull the blue airbrake handle fully back (full airbrakes). Touching down with the airbrakes held fully back (“on”) may cause the main wheel to lock and skid the tire. This may also cause the tube to slip around inside

the tire and break the air valve. Apply wheelbrake after touchdown and use it generously, especially in a crosswind.

Since the wheel brake is on the airbrakes, we cannot push or ground tow the ASK-21 with the airbrakes tied fully open. ***In a strong wind, put a pilot into the front cockpit.***

## **STALLS.**

The stall will usually occur in this order:

1. Back Pressure on the stick.
2. Nose pitches up, but not always above the horizon.
3. Airspeed drops, under 40 knots.
4. Quiet (wind noise is less.)
5. Sloppy Controls, especially the ailerons.
6. Buffet. The airflow is separating from the wing.

**Stall Recovery: Release Back Pressure *on the stick.***

Release back pressure on the stick if you notice any of the six items above.

Note that full forward stick may cause the glider to tuck inverted.

Stop any turning (yaw) during the stall with a small amount of rudder.

Stalls in turns, and with airbrakes open, will occur “sooner” (*higher airspeed.*)

Stall with airbrakes: Release back pressure and smoothly close the airbrakes.

Stalls and spins may occur on your skidding turn to final, a skidding turn back after a low “rope break”, or while thermaling in a skidding turn.

## **SPINS.**

The ASK-21 is advertised as being reluctant to spin, but that does not mean it will not spin!

Pilots who think the rudder is needed to turn a glider may find themselves in a spin. Banking with aileron turns a glider – never try to turn a glider with excess rudder. Excess rudder starts a dangerous skidding turn and can develop quickly into a spin.

***Remember . . . There are NO “Spin Proof” Gliders! (Make no skidding turns.)***

The ASK-21 Flight Manual describes the 3 step spin recovery technique, specifically in this order:

1. Opposite Rudder to the turn. “Stop the Turn.”
2. Pause. Yes, wait a moment before step 3.
3. Stick forward to neutral but not full forward.

Now you are in a dive. If in a turning / spiral dive, level the wings first, then gently pull back and pitch up to level flight. Pulling back in a spiral dive will only tighten the spiral and increase the wing loading.

**Spin Weights (if available)** . For spin training, the factory can provide optional spin weights that can be bolted to the rear of the fuselage. They move the Center of Gravity aft so the ASK-21 spins easily. These are to be attached only under the supervision of the Duty Instructor. Leaving the tail dolly on may also cause the glider to spin.

***Spin Weights must be removed immediately after the spin training flights.***

**Before every takeoff, confirm the spin weights and tail dolly are removed.**

## **ELECTRICAL SYSTEM.**

All components factory installed.

**BATTERIES.** Battery box was installed at the factory, secured in the wing roots, and accessible from the back seat.

A switch on the front panel turns the power on for the radio and instruments. Make sure it is turned off after last flight and remove the battery and put on charge.

**RADIO.** This ASK-21 is equipped with a Becker AR 6201 radio, flexible boom mic's with a push-to-talk button on the front and rear stick. Study the radio features to learn how to use it. It has a "flip-flop" feature to store a second inactive frequency. Make sure you transmit on the correct frequency. Battery voltage is shown on the face of the Becker by pressing the Mode button.

## **INSTRUMENTS.**

Factory installed in "English" unit (feet and knots).

**Two Variometers.** Both are nicely compensated to reduce "stick thermals" by a Total Energy venturi probe located on top of the fuselage, behind the wing.

The **Winter** Vario is "mechanical" . . . no electricity required.

The **Lxnav S-3** is an electric / audio variometer. A separate user manual is available to study to get the maximum benefit from this instrument.

## **SEATS / HEADREST / RUDDER PEDAL ADJUST.**

*See Flight Manual for details.*

## **BAGGAGE COMPARTMENT.**

***Do not place anything behind the rear seat.*** Jackets, hats, bottles, booklets can fall down into the flight controls in the fuselage! You can place some small NON-METAL items in the wing roots by the batteries.

## **FLIGHT CONTROLS.**

Standard Euro Colors.

Blue:	Airbrakes / combined Wheel Brake
Yellow:	Tow Release
Green:	Trim (by control stick)
Red:	Canopy Emergency Release ( <i>for bailout.</i> )
White:	Canopy Latches.



**ASK-21 N421GB Front Instrument Layout** (panel, from top left):

Airspeed (knots), FLARM (Future), Winter mechanical variometer,  
Electrical switch, Altimeter, Compass., S-3 Electric Variometer Ram Mount, 12V power outlet  
G -meter,  
Radio

(Not shown) Below: Becker Radio. Green Trim Lever by the stick. (Swiveling air vent on right.)

## **BECKER AR 6201 RADIO**

### **Quick Reference Data**

1. Turn on sailplane electric first.
2. Turn on the radio by the volume knob.
3. Press Squelch button to check speaker volume for back seat pilot.
4. Press Mode button to find mode for voltage check for batteries 1 & 2.
5. Press Mode button to go to the “flip-flop” frequencies and pre-set.
6. The “arrow” button switches the “flip-flop” frequencies.
7. Always keep the radio on while on the taxiway or runway to monitor traffic.

Low Voltage Warning: If the supply voltage drops below 10.5 volts, the LCD will flash.

In Mode 3, the supply voltage is displayed in the bottom line of the LCD.

### **Lxnav S-3 Electric / Audio Variometer**

The Vario will have a standard club configuration that should suit all instructional, intro, and other club flights. This configuration should not be changed.

NOTE: If you feel the need to change the configuration for your flight, YOU are responsible for reconfiguring the instrument back to the standard club settings.

Burt Compton, Modified for GBSC by G. Young, Andrew Watson, Bob Fletcher, David Fisichella, [Mike Long](#), [Tony Verhulst](#). Rev 2016-10-02

[Andrew Watson's comments 9/5/16](#)

I read the K21 pilot notes borrowed from Burt Compton at Marfa with interest:

[http://soargbasc.com/members/manuals/ASK\\_21\\_Pilot\\_Notes.pdf](http://soargbasc.com/members/manuals/ASK_21_Pilot_Notes.pdf)

Most of this seems to be excellent advice to me, but I do have a couple of observations, based on 200 hours / 1300 flights instructing in K21s in the UK, where the Cambridge club has operated two K21s daily in a seven-day-a-week operation for 15 years:

1. Fire danger. Yes, this is real. Most K21s I've seen have scorch marks on the rear headrest where the inside of the opened parabolic rear canopy has focused the sun. Simply keep the rear canopy closed to avoid this.
2. Crosswind limit. Page 12 of the POH does indeed say "The permissible crosswind component is about 15 km/h (8 knots)", but IMO that's very conservative. We'll happily operate our K21s with 90 degree cross-winds of 12 knots or so, alongside our Grob 103 (where the manual says the limit is 11 knots) and Puchacz (where the manual says 10 knots). However, be particularly careful getting in and out of the back seat in a high wind, as the rear canopy flails around on its struts. Under such conditions, I suggest waiting for a ground handler who can hold the rear canopy before opening it to get in or out.
3. Approach speeds. Burt says "55 knots max", but we use the conventional "50 knots plus half the wind speed" formula. If flying in a strong wind with a lot of wind gradient, we'll use 60 knots or more to ensure we have enough speed at all stages of the approach. I've done 70 knot approaches in a K21 on a rough day at a ridge site.
4. Landings and PIOs. We teach our students to land exactly as Burt describes from their very first flight, and as a result have never had PIO problems. Making anything other than a two-point (or tail-slightly-first) landing at Cambridge results in a mandatory check flight with an instructor, regardless of pilot qualification. I suggest you be similarly firm on this.
5. Spin weights. I don't know if you've ordered the spin kit with the GBSC K21. If you have, I suggest you do NOT use it, but instead do spin training in the Puchacz or L23.

BTW, we also use the clipped base pattern Burt describes on page 12.

Overall the K21 is a very good teaching glider, and very solidly built. I'm looking forward to visiting on 17/18 September and seeing the new machine