

Soaring

MARCH 2013

\$5.00



LAK-17B FES Flight Impression

The LAK-17B FES Has Arrived in the U.S.

By Renny Rozzoni

Leaving Albuquerque and heading west on I-40 in February of 2012, I had a lot on my mind. Robert Mudd and I were on our way to the SSA Convention in Reno with a brand new LAK-17B FES, aka "3R," in tow. Thanks to the great efforts of the folks at the LAK factory in Lithuania and the support of the U.S. LAK dealer, Vitek Siroky, the glider and trailer arrived in Albuquerque in a shipping container just four days earlier.

As passed through the high desert country of western New Mexico, we could only be very pleased and thankful that those four days



gave Robert and I just enough time to install instruments and trailer the ship the 1,020 miles from Albuquerque to Reno to arrive in time for the start of the SSA Convention. This was the first LAK-17B FES imported into the United States, and it was going to make its debut at the February SSA Convention in Reno.

The LAK-17B FES is manufactured by JSC Sportine Aviacija ir Ko, located in the Prienai region of Lithuania. The 17B is an updated version of the 17A, and made its first flight in April of 2009. The difference in the 17B versus the 17A includes a redesigned wing, bigger fin area, improved winglets and a new horizontal stabilizer design. The new horizontal stabilizer was literally shipped to Uvalde from Lithuania for use on 3R just a few days before the World's. The maximum gross weight of the 17B was also increased to 1,320 lbs (18m version) versus 1,102 lbs in the 17A. Both ships are available in 15m and 18m configuration.

FES stands for Front Electric Sustainer. The FES is an electric sustainer designed and invented by Luka Znidarsic and Matija Znidarsic from Slovenia. Both are experienced glider pilots, engineers and are LAK sailplane dealers. They developed the system in 2009, and it was installed in Luka's

personal LAK-17A and flew for the first time on October 30, 2009. As of August 2012, Luka had completed a total of 18 FES installations, including the installation of the FES in: four LAK-17As and seven LAK-17Bs.

The FES system consists of a DC brushless, synchronous permanent magnet motor, a prop in the nose of the glider, a controller behind the pilot's seat, and two, 58-volt lithium polymer batteries stored in the fuselage behind the wings. Each battery contains 14 lithium polymer cells, and each cell has a rated capacity of 41 amp-hours. This yields a total rated capacity of 1,148 amp-hours for both batteries.

The weight of the motor is 16 lbs (7.3 kg) and the two battery boxes each weighs approximately 34 lbs (15.5 kg). The propeller is 1 meter in diameter, and each blade weighs only 230 grams. As a result, the entire FES system weighs approximately 85 lbs (38.8 kg).

Starting the FES is very simple. The pilot first turns on the FCU and then the master switch is turned on. When the master switch is flipped to the "On" position, the three small battery cooling fans behind the pilot, and the one motor cooling fan in the nose are turned on. The one knob at the bottom of the FCU is turned clockwise to start the motor and control the RPM. All three actions can be done in literally 3-4 seconds. Power is immediate, and there is no need to raise an engine mast or take any other actions. The simplicity and reliability of the FES are one of the primary reasons I purchased the FES option.

The FES is used strictly a sustainer. With a full charge and



Mindaugas Zaliukas maneuvers 3R, Renny Rozzoni's LAK-17B FES, to a landing on Day 4 the 2012 World Gliding Championships in Uvalde, Texas. Photo by Paul Remde



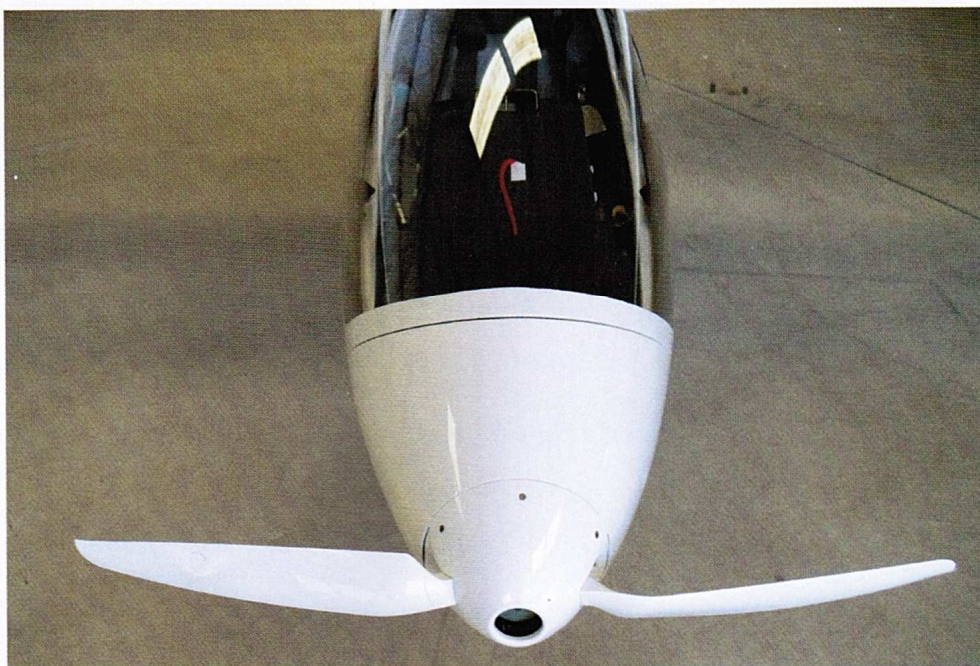
operating in level cruise, which requires 4-5kw (5-7HP) of power, the endurance is approximately one hour. This would yield a maximum range of approximately 62 miles. Running the motor for the full hour would be a rare event, as the FES would primarily be used to get to the next thermal. Once in a thermal power can be reduced, and then the FES can be easily shut down.

If a climb is needed, testing has shown that with 12-17kw (16-23HP) of power and a full battery charge, the glider (dry) can climb at an average of 300ft/min (1.5 m/). Under these conditions, a total gain of just over 4,000 feet (1,250 meters) has been achieved. Obviously, there are many variables that would impact a climb, including: air temperature, altitude, available battery power, etc. Peak power is 22-24kw (29-32HP), but as the motor runs and voltage drops, the climb rate will decrease.

I have only used the FES in flight at Moriarty on one occasion, and it worked perfectly. With close to a full charge and flying dry, the motor ran for 6 minutes at a beginning altitude of approximately 8,500 feet and I could sustain my altitude and then climb to 9,000 feet. During the climb portion of the motor's operation, the average climb rate was 230 fpm, which was very good given that the temperature at Moriarty had reached 96 deg F. The density altitude at that time of day was estimated at 9,900 feet. The manufacturer has quite a bit of successful experience operating the FES at lower elevations in Europe. It also performed very well at Uvalde, so it was great to see the FES performing well in the thin air over Moriarty.

So, how does the LAK- 17B FES fly?

After flying the ship 30 hours at Moriarty, my overall impression is that the LAK-17B handles very well and has excellent performance. The controls are well-harmonized, and its roll rate is very good for an 18m ship. It is very stable on tow, even as one has to deal with strong New Mexico thermals. Flying at 52-54 knots dry, the ship thermals amazingly well with the flaps set at +2. I have found it very well behaved, even in roughest of our very strong western thermals. Stalls are very docile, and as soon as the nose



The propeller is 1 meter in diameter, each blade weighs only 230 grams. Prop folds into molded recess when not in use.



drops a bit the ship is flying again with a minimal loss of altitude. I noticed no wing drop in the stalls, and stalls are, in many ways, a nonevent.

In the cruise, the ship is also very stable and the trim works extremely well. The extra 85 lbs from the FES no doubt contributes to the very solid feel. When flying dry over 97 knots, the -1 flap position is recommended. Making the flap change from 0 to -1 is fairly smooth, and you can immediately tell that the LAK wants to fly fast. The flaps are very easy to operate, but there are almost too many flap posi-

tions. The ship has 10 different flap positions, and that is more than I will ever need, but perhaps other pilots many find them all useful.

I have not done any formalized performance testing, but I do believe that the factory numbers are probably pretty close. Flight-test data from the factory indicate an L/D of 50.2 to 1 at 56.2 knots at 968lbs (440kg) in the 18m configuration. At max gross weight of 1,320lbs (600kg) the max L/D equals 50.2 at 65.6 knots. With an empty weight of 752 lbs and a pilot and para-



chute weighing 200 lbs, the minimum wing loading comes in at 8.6 lb/sq ft. Maximum wing loading is 11.9 lb/sq ft.

For landing, the manual recommends a flap setting of "L," but at Moriarty with our 7,700-foot runway, I normally set the flaps to the +2 position. I have found that during the approach, the spoilers are very effective, and I rarely need to use more than 1/2 of the airbrake for landing. The landing gear mechanism is robust, and it is extremely easy to retract and extend the gear. The Beringer hydraulic brake is activated using the spoiler handle, and it does provide very powerful braking action. It comes in very handy, if needed, when landing at high-altitude airports like at Moriarty (elevation 6,200 feet).

Competition performance may be another indicator of the LAK's performance. Last summer, the WGC in Uvalde included "3R" and "17B," two LAK-17B FES gliders that competed in the 18-Meter class.

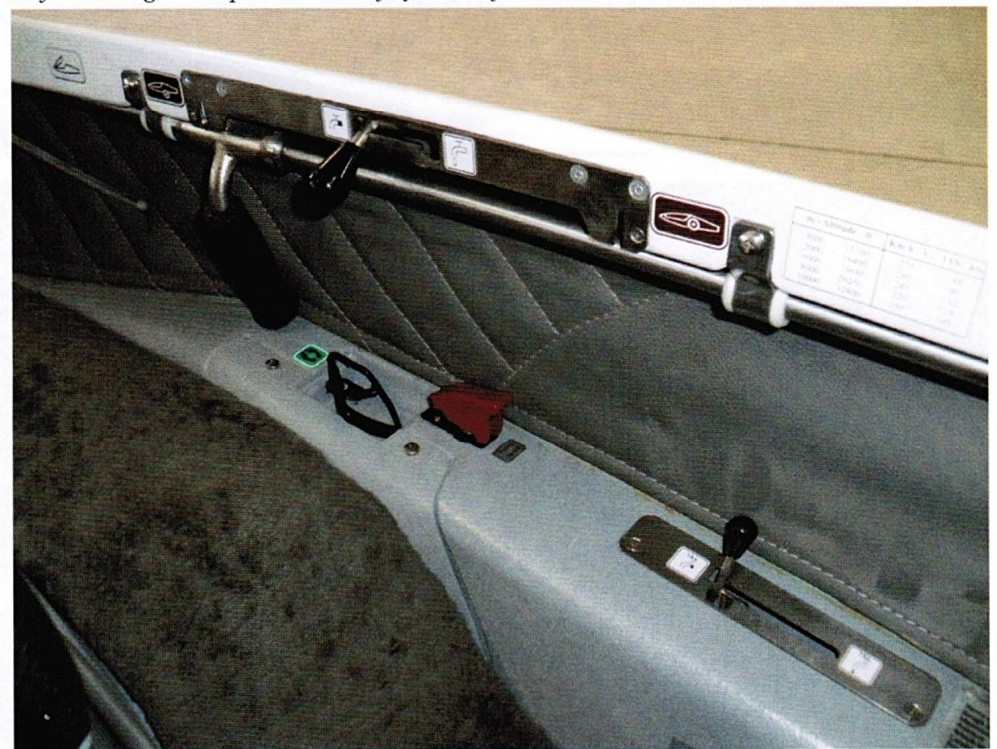
One LAK (17B), destined for Canada after the WGC, was literally picked up at the Port of Houston just before the contest and was flown by Vytas Maciulis. My ship (3R) was flown by Mindaugas Zaliukas. These two excellent pilots from Lithuania competed against 33 outstanding pilots flying state-of-the-art 18 meter ships.

Out of a total of 35 competitors that flew in the 18-Meter class, the two LAK-17B FES gliders finished at the bottom of the final standings. Despite this disappointing finish, they held their own on many days against: JS1-Bs, ASG-29-18s, and Ventus 2cx-18s. For example, on day 7, they finished 21st and 31st out of the 35 ships competing, and on the final day, they finished in 18th and 30th place. In fact, if one were to have simply averaged where they placed over the 13 days of competition they would have finished in 30th and 31st place. Out of the 26 competition days, 23 tasks were completed, and there were three task days where the two pilots had to start their FES and only received distance points. Those three distance days really hurt their overall scores and dropped each pilot several positions in the final standings.

Some of the observations from Vytas and Mindaugas on the LAK-17B FES



Fairly standard placement of controls for flaps, trim, water management and rudder pedal adjustments are found along the cockpit sides. Red safety cover is for the Power Switch.



and the WGC include the following:

Zaliukas: In comparing the LAK-17B FES to the other gliders in the 18m class at the WGC, he felt it was extremely competitive, and that it seemed to have a slight advantage at very high speeds. He also felt that the FES offered a "very big advantage" as he could push on to lower altitudes to find good thermals, knowing that he had a very reliable back-up

sustainer available if needed. The FES came in very handy as Mindaugas did use the FES on two occasions to get back to Uvalde.

Vytas: He felt that the 17B was competitive in all speed ranges, and he also felt it had a slight advantage over 200km/hr when fully ballasted. The FES was very helpful to Vytas on the one day it was needed due to his course to Uvalde



being blocked by thunderstorms. On that day, Vytautas got low and started the motor just a few hundred feet above the ground. He used the FES to reach some clouds and then shut it down. He got low again and used it to find another thermal. He repeated this procedure 4 or five times and ended up running the motor for a total of approximately 45 minutes until he safely arrived at an alternate airport.

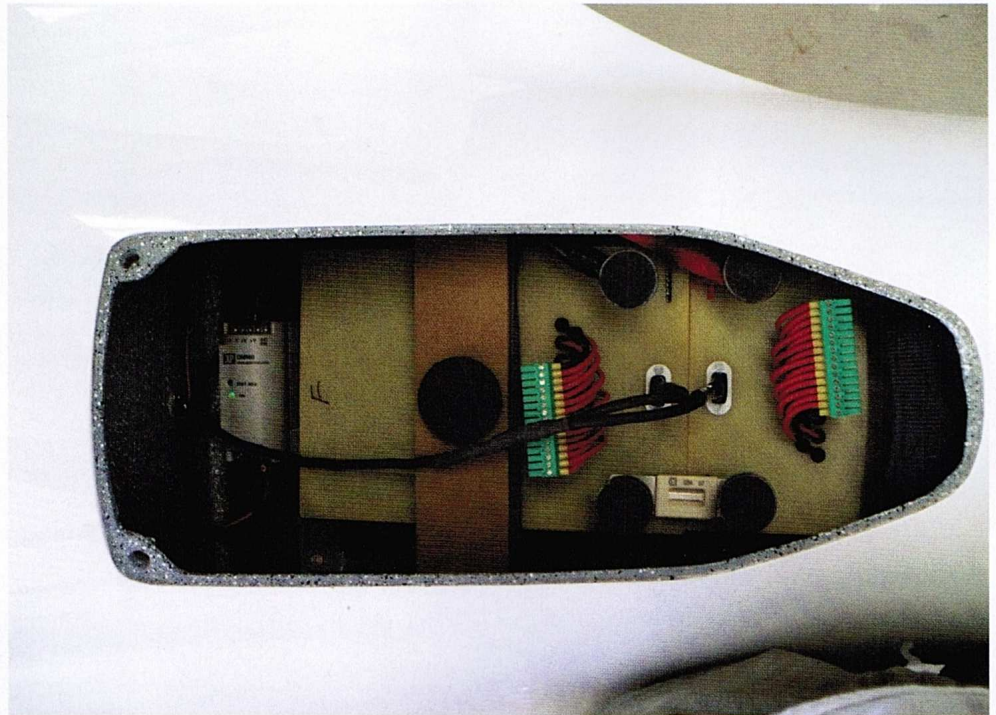
On the ground, assembly and disassembly of the ship is fairly straightforward. The four-piece wing makes the handling and lifting of the wing sections fairly easy for an 18 meter ship. Several rigging tools are required for assembly and disassembly, and they all work very well. As in any new ship, it takes a few assemblies to get the procedure down, and the LAK is no exception.

The future looks bright for the LAK-17B FES. Planned developments include a modified outer wing with a 3 degree upward bend, and the factory is also carefully evaluating the changes required for an electric self-launcher. Due to improvements in motor cooling, the FES motor cooling fan forward of the rudder pedals has already been eliminated for new FES installations. The cooling fans behind the pilot remain. In addition, motor control has been enhanced so that when the motor is shut down the FCU software ensures that the prop always stops in the horizontal position. On my ship, this is currently not the case, and the motor has to be restarted and stopped as needed to position the prop horizontally.

In today's world of expensive super



Above: Panel detail shows the FCU in the lower, center section of the panel. Below: Two lithium polymer batteries are mounted in the fuselage behind the wings. The batteries yield a total rated capacity of 1,148 amp-hours.



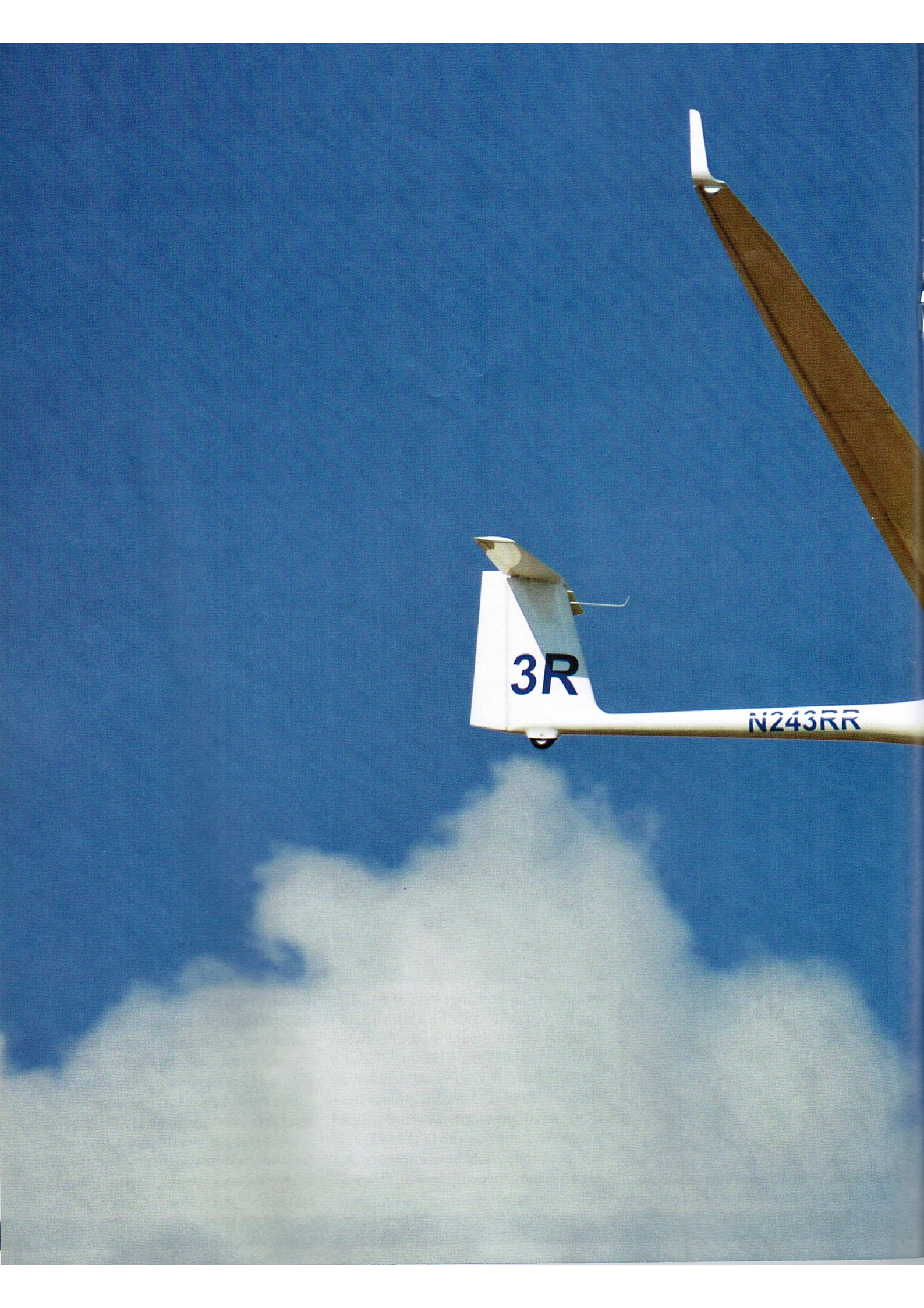
ships, the LAK-17B FES is reasonably priced. At an exchange rate of \$1.31 to the Euro, a LAK-17B FES with 18 meter wings, can be purchased at between \$140K and \$150K. This price would include: East or Gulf coast delivery, an excellent LAK T-5 trailer, ground handling equipment and a well-equipped panel. At that price, the LAK-17B FES is a great choice for those interested in a high-performance sailplane with a very reliable sustainer.

In summary, the LAK-17B FES is an outstanding glider that can compete with the world's best. It has an electric sustainer that is simple and very reliable for use and more importantly; the FES can definitely get you home if needed.

For more information be sure to visit the LAK factory website at: <http://www.lak.lt>, the FES website at: <http://www.front-electric-sustainer.com/> and the US LAK dealer's website at: <http://home.nwi.net/~blanikam/ba/lak.htm> ✈



The motor is controlled by a FES Control Unit instrument (FCU), located in the instrument panel. It was designed to simplify FES operation.



3R

N243RR

Soaring

LAK-17B-FES-18
2012 FAI World Gliding Championships
Uvalde, Texas
Photo by Paul Remde

