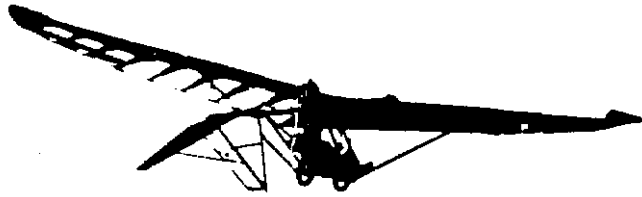


Learning to Fly the

LAZAIR



Peter J. Lawrence

Learning to Fly the LAZAIR

by Peter J. Lawrence, B.Sc., P.Eng.

Printed in Canada



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FROM THE AUTHOR

I own a Lazair. I built it. I fly it every chance I get. I love it.

A year ago I knew virtually nothing about flying. I'll be the first to admit that I still have a lot to learn – but that's one of the things that makes flying so fascinating – you never stop learning. Before my first flight in the Lazair I had a grand total of two and a half hours dual instruction in a Cessna 150.

Right now you're probably asking yourself "who does this guy think he is – writing a booklet on flying the Lazair? – he's no expert!" Well, you're partly right – I'm not an expert on flying the Lazair. Dale Kramer and Peter Corley are experts on flying the Lazair. If you ever have the opportunity to see them perform at one of the many air shows they visit each year you're in for a real treat. But this booklet is not about flying the Lazair – it's about learning to fly the Lazair. On that subject I do feel qualified to offer a few suggestions.

Starting with a minimum of knowledge about the world of flight, I have progressed to the level where I can fly my Lazair where I want it to go (rather than where it and the wind mutually decide we should go). I have logged over 30 hours flying time and over 200 landings – all of which were successful. You may think that's not much of an accomplishment, but several relatively high-time pilots who were less than successful in their first attempt to fly the Lazair might disagree with you.

This is not a book of rigid rules. It is a collection of observations, ideas and suggestions from someone who can still remember his first flight and can appreciate how you will feel the first time you shove the throttles forward and say to yourself "This is it!". Because the Lazair has no room for an onboard instructor, your first flight will also be your first solo flight, so the more you know about your Lazair before you lift it off the ground, the better. Although this booklet was written primarily for the novice, I'm sure, even if you're a high timer, you can find a few helpful suggestions in it.

Oakville, Ontario
November, 1980

Peter J. Lawrence

FROM THE DESIGNER

As designer, builder and test pilot of the Lazair, I feel sufficiently qualified to comment on the relative merit of the following words of advice from one Lazair pilot who virtually taught himself to fly.

Since I've known Peter, I have found him to be a very meticulous craftsman. This attitude has also been evidenced in his methodical approach in learning to fly. I had no doubts in my mind about his ability to teach himself. This, however, is not the case for everyone and the required number of hours of instruction in conventional powered aircraft will vary tremendously from one individual to another.

Peter's techniques for flying the Lazair have worked out quite well for him, but are, however, not the only techniques possible. But, like Peter says, "Use the technique that works best for you" and go fun flying in a Lazair.

Dale Kramer
President, Ultraflight Inc.,
Designer of the Lazair

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The Lazair feeling is epitomized by a bumper sticker seen recently at Oshkosh. It reads . . .

"FLYIN'S FUNNER"

FIRST

LET'S CLEAR UP A FEW MISCONCEPTIONS

The Lazair is unique. In concept, in design, and most important of all – in performance—there is nothing else like it. Because of this it is sometimes difficult to know what to call it. It can be a hang glider, a powered hang glider, a sailplane or glider, all depending on how you use it, but it is—above all—an airplane. If you can't fly an airplane, you can't fly a Lazair. Statements such as “if I can build it I can fly it” and “if I can drive a car I can fly a Lazair” are not only incorrect but potentially dangerous. But don't be discouraged—if you can drive a car you can LEARN to fly a Lazair. The key word is learn and that's what this booklet is all about.

PREREQUISITES

If you have a pilot's licence, then you're ready to learn how to fly a Lazair. If you're not a licenced pilot or if you have not had any flying instruction—get some. You spent several thousand dollars and many hours of your valuable time to build your Lazair. Protect that investment by spending another one or two hundred dollars for flying lessons. You won't regret it, and a hundred dollars is a lot less than the two thousand or so it would cost to get licenced. Go to your local flying school and tell the Chief Instructor what you want to do. Since some instructors may not be familiar with the Lazair, take along this booklet and a copy of “Here is Lazair” from Ultraflight. You'll probably be pleasantly surprised at how interested and helpful most instructors will be, and they can help you decide how much air and ground work you will need. Your dual instruction should include all the *fundamentals such as taxiing, take-off and landing*, straight-and-level flight, climbing and descending, shallow and steep turns, slow flight, stalls and spins. For most neophytes this will probably take two to four hours at a

cost of about \$40 per hour. How many hours of air time you will require will depend on many things but will be mainly a function of your ability and your attitude. Most qualified instructors are highly skilled in judging both these qualities. Your instructor will know when you're ready to reach for the sky in your own Lazair—and so will you.

A complete ground school program is probably not necessary to become a competent Lazair pilot, but some knowledge of theory-of-flight and air regulations is absolutely essential. Your instructor may be able to make arrangements for you to sit in on applicable sections of an existing ground school or he may suggest some reading followed by a question-and-answer discussion. Regardless of what else you do, buy some basic flight training books and read them. The "Transport Canada Flight Training Manual" published by MacMillan and "From The Ground Up" written by Sandy MacDonald and published by Aviation Publishers are both excellent books for both study and reference purposes, and are available at most small airports and flying schools in Canada. Similar books are available throughout the United States and other countries. And don't forget a very important source of free information—other pilots. All pilots love to talk about flying and can go on for hours about their exploits in the air, their feats of superhuman daring and endurance, and the stupid mistakes that almost resulted in disaster. Their stories (whether you believe them or not) can be both entertaining and educational.

A WORD ABOUT LOG BOOKS

The keeping of both a pilot's log book and an airframe (and/or journey) log book is highly recommended. Pick up a pilot's log the first time you visit your flying school and keep an accurate record of all your flights—those at the flying school and in your own Lazair. At present, neither the MOT nor the FAA require a Lazair pilot to

have a licence, but this may not always be true. If at some future date, the powers that be decide to impose more stringent licencing requirements, your log book may allow you to qualify under a "grandfather" clause.

An airframe log will allow you to keep track of airframe and engine time for routine maintenance purposes, and a record of all modifications can be extremely valuable should you ever decide to sell your airplane. The airframe and journey logs which you can buy at your local airport are designed to comply with MOT or FAA requirements. They have columns for all kinds of information, most of which is irrelevant for the average Lazair owner, and the books are big and awkward. Get a small blank book from a stationery store and put in your own columns and headings to record the information you want to record. This might include such things as flight number, from, to, time up, time down, flight time, total time, name of pilot, and all maintenance actions such as replacing spark plugs or fuel filters.

GETTING STARTED IN YOUR LAZAIR

Even if you haven't completed your dual instruction, you can still get lots of fun and excitement from your new toy. Driving the Lazair on the ground is actually more difficult than flying it, so you can do most of your learning without leaving the ground.

ENGINE CONTROLS

If you've finished building your Lazair, you've probably noticed that it has two engines on it. The aircraft on which you took your instruction probably had only one, so you will now have one extra throttle to look after. Since the engines are not mounted on the centre line of the aircraft, any difference in the thrust of the two engines will cause the aircraft to yaw. If the right engine is

running faster than the left, the aircraft will yaw to the left. This phenomenon is noticeable in the air, and much more noticeable while taxiing. The Lazair can be flown with one engine at full power and the other shut down by holding the stick about two inches off centre, but taxiing on one engine is virtually impossible. Even small differences in engine speed can make taxiing difficult, so before you start serpentineing down the runway, spend some time learning how to synchronize the engines. This can be done most easily with the aircraft securely tied down. (Use one rope from the outboard end of each wing strut, one rope around the fuselage tube ahead of the tail, and wheel chocks in front of the main gear.)

Follow the instructions included with your Lazair kit to adjust the carburettor mixture and idle screws, and the throttle cables. Put on your helmet (this helps reduce the noise and makes you feel more like Buck Rogers), and climb into the cockpit. Start the engines and run the throttles up and down a few times. Set one throttle, then adjust the other until the engines are running at the same speed and you can hear a very pronounced **very slow** beat note. When the sound is just right and you have the feeling you're in the middle of a bombing mission in a B17, you'll know you have it right. Try synching the engines at several power settings from idle to full power. If you're lucky (or very talented and adjusted the throttle cables properly) you'll find that at both idle and full power, the engines will be very nearly synchronized when the two throttle levers are parallel. But even if your engines are synched at these two limiting positions, you may have to feel around quite a bit to achieve synchronism at cruise power. Spend the time necessary to get the feel of proper throttle control. It may take a few minutes or an hour but whatever it takes, it's worth the time.

Occasionally, and especially during your first few taxi runs, you may find it necessary to shut down the engines quickly. If this happens, it will probably happen when you're very busy trying to avoid decapitating a runway

marker or fence post. This is no time to be fumbling around trying to find the magneto switch. While you're practising throttle control, try shutting down the engines a few times until you can find the magneto switch easily without looking at it.

THE CONTROL STICK

All flight controls on the Lazair – ailerons, elevator and rudder functions – are coordinated through a single control stick. This has one obvious advantage – you don't have to control the rudder with rudder pedals, and one *almost as obvious disadvantage* – you **can't** control the rudder with rudder pedals. The consequences of this will be discussed later in the sections on taxiing and flying.

There is one other rather unique feature of the Lazair control system which requires comment. The control stick in the Lazair is pivoted from above rather than from below as in more conventional stick-controlled fixed-wing airplanes. If you spend the time to get used to this type of stick configuration on the ground, it will feel quite natural when you make your first flight. However, a few people (the author included) have had difficulty during the first few minutes of taxiing. This difficulty can be easily overcome if you remember one simple rule: push and pull – don't pivot. If you want to go left – **PUSH** the stick left, to go right – **PUSH** the stick right, to go down – **PUSH** the stick ahead and to go up – **PULL** the stick back. If, for any reason, you should consciously or unconsciously think of the stick as a spoke in a steering wheel with your hand resting on the bottom of it, you will quickly find yourself going the wrong way. This phenomenon, which has prematurely terminated at least one maiden flight, can be avoided very easily by just spending the necessary taxi time to become familiar with the controls.

With a few hours of dual instruction in a Cessna, Piper or

whatever, you will develop a feel for the control response of a conventional light airplane. When you transition to the Lazair, you will find two distinct differences. The roll response of the Lazair, because of its relatively long sailplane-like wing, is quite slow. There is no lack of effective aileron control (as evidenced by Peter Corley's spectacular 90 degrees-plus banks) but it does take a while for the desired roll to develop after you move the stick. Pitch response is entirely different. The slightest back pressure on the control column will have you hurtling toward the sky at an unbelievable rate. Keep this in mind and make all fore and aft movements of the stick small and gentle — at least until you get used to the quick response. It would be relatively easy to de-sensitize the pitch control, and this would probably make your first flight a bit easier, but don't do it. Once you get used to the fast pitch response you'll think it's great.

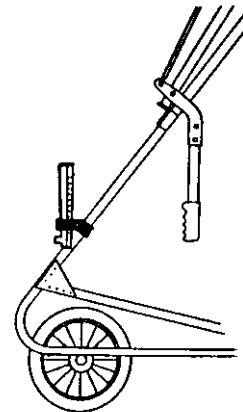
ABOUT AIRSPEED INDICATORS

Your Lazair kit came equipped with a Hall Brothers airspeed indicator. This ingenious little device indicates airspeed by the position of a small plastic disc which is suspended in a tapered vertical tube and forced upward by ram air pressure. Designed initially for use on hang gliders, it can be used on a powered craft such as the Lazair, but there are a few things you should know about it before you go merrily winging your way over the countryside.

First, it doesn't read correctly. Fortunately this isn't as serious as it may sound. Even though the reading you see on the indicator will not be correct in miles per hour it is a good relative indication of airspeed and, if the instrument is properly maintained, the readings will be repeatable. Tests using a strut-mounted calibrated airscrew type airspeed indicator as a reference show that the Hall instrument, when mounted on the Lazair, reads approximately 30 MPH when the actual airspeed is 40 MPH. But before

you fire off a nasty letter to the Brothers Hall (with a copy to Ralph Nader of course) read on. This inaccuracy is not due to the instrument itself, but to the location in which it is mounted. It appears that the two propellers on the Lazair tend to suck the air away from the cockpit area and this reduces the effect of the ram air on which the indicator relies to make its readings. This effect is very noticeable when you shut down the engines in flight and feel the increased wind in your face. Another problem arises because the little disc which indicates airspeed depends on the downward pull of gravity to balance the upward force of ram air. In a high g manoeuvre (such as a steep turn or quick pull-up) the disc will be pulled down and indicate a lower-than-actual airspeed. In spite of these faults, however, it is still a very useful instrument and has been used as a standard for airspeed information in this booklet.

All airspeed figures quoted in this booklet, unless specifically stated otherwise, refer to airspeed as read on the Hall airspeed indicator when mounted as shown in the Figure.



To ensure that your airspeed indicator will continue to work reliably, you must maintain it properly. The rod on which the disc slides must be kept clean, dry and free of corrosion. It should be removed periodically and wiped with a clean cloth. Do not use sandpaper or any other abrasive as this would reduce the diameter of the rod and do not oil it. Before you disassemble the instrument, note the orientation of the disc so you don't reinstall it upside down. Before each flight, you can check the operation of the airspeed indicator by blowing into it gently

from at least 6 inches away (this reduces the possibility of blowing moist air into it). One last suggestion – check your airspeed indicator frequently for stowaways. On several occasions spiders and other creepy-crawly-critters have climbed through the inlet port with the intention of taking up residence. Needless to say, a bug which weighs as much as the disc can influence the reading considerably if he decides to go for a ride.

YOUR FIRST TAXI

If you have never taxied an airplane before, be prepared for a surprise. An airplane on the ground does not respond to your commands the way an automobile does. When you steer a car you have a relatively solid mechanical link from your hands to the front wheels, and from there to the road. When you turn the steering wheel, the front wheels turn and the vehicle follows – almost instantly. When you steer your Lazair on the ground using the control stick, the solid mechanical linkage ends at the rudder (or ruddervator if you wish). The rudder then pushes against a compressible substance called air. Because of this, there is a noticeable time lag between the movement of the control stick and the response of the airplane. At high speeds, there is more airflow over the control surfaces so the controls are much more effective and the time lag is not a serious problem. However, at low speeds you may find that you can shove the stick all the way to one side, count to ten, eat lunch, and still have time for a cigarette before the airplane acknowledges your command. All of this will become very obvious the first time you try to taxi in a straight line and you will probably feel rather detached and perhaps even somewhat uncoordinated for a short while. It's a commonly held belief that a taildragger is more difficult to taxi than an airplane with a nosewheel, and it's no secret that the Lazair is trickier to control on the ground than the average taildragger, so don't be alarmed if your first attempt falls a bit short of a performance by Duane Cole. With a

bit of practice you'll soon be driving around with all the dexterity of a ballerina in a minefield.

For your first taxi trials, you should have a relatively flat smooth grass field with a length of at least 300 feet (you'll want more than this for your first flight, but 300 feet is enough for taxiing). A paved strip is fine for 747s and other rockets, but grass is a lot more forgiving if you happen to drag a wingtip. Besides, whoever heard of asphalt roots flying? An aerodrome which is used for conventional airplanes makes a great place to practice taxiing if you can get permission to use it and if it's not too busy, but don't forget to keep a constant watch on the sky and get well off the runway when you see an approaching aircraft.

Your first taxi run should be made in zero or very near zero wind. Before you fire up the engines, walk your Lazair to the runway by picking up the fuselage tube just ahead of the tail. Then climb aboard, start the engines and pull the throttles back to idle. Slowly increase power until you start to move, then reduce it to maintain a comfortable speed. You'll find that it takes a lot more power to start moving than it does to sustain speed. Pull back slightly on the stick to keep the tail on the ground for the first few hundred feet and use the stick to maintain directional control.

When you think you have the feel of the stick, push it forward slowly to raise the tail off the ground. Remember that even though the Lazair has a nosewheel, it is designed to be taxied and flown like a taildragger. In fact, it was originally designed without a nosewheel and the wheel was added later to help those of us who would tend to fall over without it. **Do not taxi with the nosewheel on the ground.** If you do, and you hit a hole or bump in the runway, you can bend the nosewheel, or the front axle, or both. As your confidence and speed increase, you'll find that directional control will become easier. **Remember to keep the engines synchronized.** If you find you

have to keep the stick way off centre to drive in a straight line, it's probably because one engine is running faster than the other. When you want to turn around at the end of the runway, use differential engine thrust. Cut one throttle right back to idle and ram the other one to the firewall (I know there's no firewall, but that's the way pilots talk). If you hold the stick just right (with the tail and the nosewheel both off the ground) you can spin around in the length of the fuselage.

Oh yes – one more thing – don't forget to glance at the airspeed indicator once in a while. An indicated airspeed of 10 to 12 MPH is good for taxiing. If you get up to 15 you're in imminent danger of flying. And remember, this is airspeed not ground speed. If you're taxiing upwind at a comfortable 12 MPH, a gentle little 5 MPH gust can instantly increase your airspeed to 17 and lift you up, up, and away.

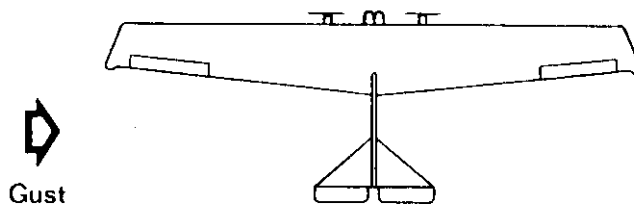
Now comes the real challenge. Try to taxi the full length of the runway while balancing on the main gear. When you can do this consistently with neither the tail nor the nosewheel touching the ground, you're ready for the next step. . . .

TAXIING IN A CROSSWIND

By now you have a couple of hours or so taxiing your Lazair and your ego has recovered from those harrowing near disasters at the horrendous speed of twelve miles an hour. Now it's time to turn up the wind generator.

This is one time the Lazair's coordinated aileron and rudder control requires a different technique than the one you would use in an airplane equipped with rudder pedals. First, we'll examine the problem, then we'll have a look at the solution.

If you're taxiing along, minding your own business and



you suddenly get slapped by a crosswind gust from the left side like the one shown in the figure, two things happen: the left wing will be lifted up by the wind, and the airplane will yaw to the left. This upwind yaw (or weathercocking) is caused by the force of the wind on the tail and is more pronounced on the ground than in the air because the airplane tends to pivot around the wheels. You are now faced with a paradox. You have to move the stick to the left so the ailerons will force the left wing back down again, but you have to move the stick to the right so the rudder can correct the yaw and prevent you from driving off the left side of the runway. Recovering from this situation is not as difficult as it may seem if you react properly and quickly.

First, push the stick to the left as far as it will go, as fast as you can. This will start the left wing moving down. Once it gets started, the inertia will bring it down the rest of the way. So as soon as you feel the wing start to come down, return the stick to neutral, then move it slightly to the right to overcome the yaw and get you back on course. Believe it or not, this works. Try it. Practice it until it becomes a natural response. If you suddenly need it sometime, there may not be time to think about it.

So much for gusts. What if there's a steady crosswind? You can't beetle down the runway slamming the stick from side to side like a cow's tail at fly time! Sure you

can — and this works too. If you're just making a normal take-off or landing and your roll is no more than 50 or 75 feet, this is fine. If you want to taxi a few hundred feet to get to the opposite end of the runway, there is another technique. Use as much aileron as necessary to keep the wings level, then increase power on the **upwind** engine as necessary to counteract the weathercocking and the effect of the rudder. This method can also be used in the air when you're landing in a crosswind.

A FEW SHORT HOPS

Now that you're an accomplished taxi pilot, it's time to get your feet off the ground. Since this is another new experience, try it only in very calm wind conditions. Start with a few fast taxi runs, limiting your airspeed to about 12 MPH. Then, making sure you have plenty of runway ahead of you, let the airspeed build up (at about half throttle) until the aircraft just lifts off the ground. It's important that you **do not** try to **make it fly** by pulling back on the stick. Just let the speed increase until it flies itself off in a level attitude. As soon as the wheels are off the ground, reduce the power to idle and gently but immediately push the stick ahead and fly the aircraft back onto the ground. The object of this first hop is to keep it as **low** and as **short** as you possibly can. Getting the Lazair to fly is easy. The Lazair loves to fly. It's convincing it **not** to fly that requires practice. Try a few more hops, increasing the length a bit each time if you wish, but **do not** let the wheels come off the ground more than two feet. After a few of these, the difficult part is finished. You're ready to go flying. But before you do, make sure your Lazair is ready too.

THE WALK-AROUND

Assuming you've had some dual instruction, you're probably quite familiar with the pre-flight walk-around. The

walk-around on the Lazair isn't much different than on most light airplanes. Some of the items you should check are listed below. This is basically a visual inspection with a bit of poking and prodding. No tools are required.

AILERONS

- Check for free movement
- Check that inboard hinge pin is properly seated
- Check that nut on outboard hinge is properly tightened.

AILERON LINKAGE

- Check all nuts
- Check for free movement without sloppiness.

WINGS

- Check mounting nuts
- Check skin for loose tape or holes.

WING STRUTS

- Check all nuts
- Check fittings (both ends) for fatigue cracks
- Check outboard fitting for loose rivets.

CONTROL COLUMN

- Check for free movement in all directions with no sloppiness
- Check limiting stops.

MIXER (View from below)

- Check for free movement in all directions and in all limiting positions
- Check all nuts
- Check all linkages and ensure nothing is bent.

RUDDERVATORS

- Check for free movement
- Check hinge pins
- Check all nuts
- Check horns and linkage
- Check skin.

STABILIZER

- Check front and rear mounts for cracks
- Check skin.

ENGINES

- Check rubber motor-mounts for cracks
- Check propeller bolts
- Check ignition wiring
- Check throttle operation
- Check choke operation
- Check fuel lines
- Check ground wires.

WHEELS

- Check for loose or bent spokes
- Check tire inflation.

AIRSPED INDICATOR

- Check for free movement.

FUEL TANK

- Check that it's full.

YOUR FIRST TAKE-OFF

For your first real flight you'll need lots of runway –

more than you did for taxiing and more than you'll need for flying after you have a *bit of experience*. Be sure there's at least 600 feet (much more if there are obstacles at the upwind end). To avoid surprises, don't make your first flight unless the wind velocity is nearly zero.

Here we go! Check your helmet and seatbelt. Start the engines, let them warm up for a minute or two and taxi to the downwind end of the runway. Just before you're ready to blast off, make one *last check* for bubbles in the fuel lines. If everything looks good, ram the throttles to the firewall. With all that propwash and just a bit of groundspeed, you'll notice that the controls are much more responsive than they were when you were practicing taxiing. Try to maintain a level attitude with the nose-wheel almost touching the ground and keep an eye on the airspeed indicator. At about 15 to 18 MPH, you should begin to lift off. As you did in your first hop, let the aircraft fly itself off. **Don't haul the stick back in an attempt to rotate.** If you do, you'll probably over-rotate and create a stall. As soon as the wheels leave the ground there will be a noticeable increase in acceleration. Allow the aircraft to gain airspeed and altitude. Because of the high wing and inverted V tail, the tail will remain in ground effect longer than the wing. *When the tail leaves the ground* effect the nose will tend to pitch upward, increasing the angle of attack. When this happens, you should react quickly and push the stick ahead slightly. Watch your airspeed and **do not let it drop below 25 MPH.** This is not the best-rate-of-climb airspeed but it's a good **safe** airspeed for your first flight. Remember – any time you see the airspeed drop below 25, just poke the nose down a bit to regain airspeed. Continue climbing until you reach your desired circuit altitude, then level off and reduce power. Adjust the power as required to maintain level flight at an indicated airspeed of about 30 MPH. This is a bit above a normal cruise speed, but it will ensure that you have an adequate margin above stall.

When you make your first turn, you may notice a bit of

adverse yaw. In case you haven't heard of adverse yaw before, this is a tendency for the aircraft to yaw in a direction opposite to the direction of the desired turn. Needless to say, it can be a bit disconcerting if you push the stick to the left and the first reaction is a yaw to the right. This does not have to be a problem if you **know** that you moved the stick the right way and you either wait for the proper turn to develop, or if you feed in a bit more stick. It **can** become a problem however, if you lack confidence and try to correct a non-existent mistake by pushing the stick the other way. The amount of adverse yaw will vary, depending on the way you enter the turn, the way you rigged your Lazair and the wind. Most of the time you probably won't even notice it, but it is important to know that adverse yaw can (and does) exist. Be prepared. Be sure you have enough taxi time to be completely familiar with the control stick so you **know** you're right when you initiate a turn. As the turn develops it will be almost perfectly coordinated. If you're used to an airplane that tends to drop its nose in a turn, you'll be pleasantly surprised by the Lazair. It just hangs right in all the way around. Carry on through your downwind, base, and turn onto final.

YOUR FIRST LANDING . . .

(Read this before you make your first take-off)

You got it up here and now you have to get it back down. As you gain experience in the Lazair, you'll probably fly very short finals, but for the first one, give yourself lots of room for a gentle descent. Throttle back to a speed just above the speed at which the engines begin to 4-stroke (you can detect 4-stroking by a severe increase in vibration). If you make your approach just right, you should cross the end of the runway with an indicated airspeed of about 30 MPH. If you're going much faster than this, or if you come in too high, you may have a bit of difficulty getting down (remember, the Lazair loves to fly), but

don't let it bother you, just pour on the power, go around, and try it again. Don't try to force the Lazair out of the sky by pointing the nose down – it goes too fast.

If it looks like you're going to make the landing, throttle back to idle, let the airplane sink until you're about four feet off the runway and start your flare. With a high wing and a low tail you have to create the flare – this is one thing the Lazair won't do by itself.

You'll find that with its wing-mounted engines (even at idle) the Lazair will float for what seems like an eternity. But have patience, eventually it will come down. Just before you touch down, remind yourself that you're flying a taildragger. Pull the nose up just enough to allow the tail skids to contact the ground a fraction of a second before the main gear. If you do this at just the right airspeed (about 15 MPH) you'll touch down perfectly. If you do it with too much airspeed you may instantly find yourself ten feet above the ground. If this happens, just poke the nose down (so you don't stall) and fly it onto the runway.

If this is your first solo, you will now have a feeling of elation like you have never experienced before. Your fellow pilots will know how you feel – they remember how they felt – but the rest of the world can't possibly understand. You just have to be there.

THE NEXT FEW FLIGHTS

As soon as you've successfully completed your first flight, and you're through congratulating yourself and kissing the ground, you'll want to go right back up again. Try a few more circuits using the same take-off and landing techniques as you did for the first flight. As you develop a feel for the Lazair's personality, you can vary the take-off procedure a bit until you discover the technique you

like best, but until you've practised a few stalls and know what to expect and how to react, **be sure you have lots of airspeed.** One of the more popular techniques among Lazair pilots is the **obstacle clearance take-off.** This is the one in which you lift off, then hold it down (just a couple of feet off the runway) and accelerate in the ground effect. Then, when the airspeed gets to about 30 MPH, you rotate and climb out at a very steep angle. Don't forget that you may be climbing at an angle which cannot be maintained for long. As soon as your airspeed drops to near 25 MPH, get the nose down.

Your first landing was made with power on, and you may want to make a few more like this until your confidence builds up. However, you'll find that you will use a lot less runway if you kill the engines before you land. Fortunately, there is almost no noticeable change in pitch when the engines transition from **idle** to off, so you can shut them down when you're quite close to the ground. Try it a couple of times just when you begin to flare, then gradually begin to shut down at higher altitudes. There is a definite increase in sink with the engines off (**this is why we do it!**) but you will soon get used to this and should have no problem judging your approaches.

STALLS

A stall in a Lazair is about as violent as a kick from a decrepit house fly. However, any stall results in a loss of altitude. An inadvertent stall, entered at low altitude, followed by a slow or inadequate recovery attempt, could just ruin your whole day. Stalls should be practised for two reasons – to learn how to recognize the signs that tell you a stall is imminent, and to develop the recovery technique so that it becomes almost automatic.

Start your first stall at least 1000 feet above ground level. Check for other aircraft in all directions (especially below) and throttle back to just above the 4-stroking speed.

As you lose airspeed, gradually pull back on the stick to maintain a level or slightly nose-up attitude. Continue to pull back gradually until you feel the first shudder. Then, before the stall develops, shove the stick ahead momentarily to reduce the angle of attack, and resume flying. Try it again only this time hold it in the stall for a few seconds before initiating recovery. Try a few more stalls and watch your airspeed indicator. Make a mental note of the stall speed of your Lazair under these conditions.

Now try a few stalls with the throttles right back to idle and again note the reading on your airspeed indicator. You'll notice a considerable difference, due mainly to the effect of the propwash over the wings. Try a few more stalls at cruise power until you're familiar with the way your Lazair behaves.

FLYING IN WIND

So far, all your flying has been done in very still air. Obviously you don't want to wait for the wind to die down completely every time you want to go flying. How strong can the winds be? The answer to this question is not simple.

The Lazair is capable of flying in very strong winds – but you're not – at least not until you've had lots of experience in moderate winds in a Lazair. Experience in other types of aircraft will be an asset of course, but it's not the same. The Lazair has a wing area comparable to most light aircraft, yet it weighs only one tenth as much. You can't expect it to react in the same way when the wind blows.

Wind speed alone is not the only factor to consider. The direction of the wind and its rate of change (in both speed and direction) must be taken into account when the to-fly, or not-to-fly decision is made. A steady eight MPH wind blowing straight down the runway can be a

real asset — it shortens the take-off roll and reduces your ground speed considerably when you're landing. However, an eight MPH crosswind can make landing much more difficult, and an unexpected 8 MPH crosswind gust when you're just about to touch down can cause you to land sideways.

How do you handle these situations? First, make sure that your transition to more difficult wind conditions is gradual. If the wind during any flight is just a bit stronger or just a bit more gusty than the previous flight, you can probably handle it. But if you've never flown in winds above 5 MPH, a 15 MPH gust could necessitate a change of underwear. If you like fundamental rules, try this one: **If in doubt, don't.** Sitting on the ground on a beautiful sunny day, waiting for the winds to subside can be very frustrating — but it's not as frustrating as rebuilding wings.

Take-offs in moderate winds are not usually a problem, especially if you can take off directly into the wind. If you're flying from a square (or round) field, an upwind take-off is almost always possible. Even if you're using a relatively narrow runway, you can usually reduce the effects of a crosswind by starting your take-off roll from the downwind side of the runway and taking off diagonally. Regardless of the size or shape of the runway, be sure you know the wind direction before you take off. If you don't have the luxury of a wind sock, a handful of grass thrown into the air by your ground crew can be helpful.

If you're taking off in gusty conditions, remember that a headwind gust can get you airborne with very little ground speed. This is great until the gust suddenly subsides and leaves you several feet above the ground with insufficient airspeed to sustain flight. Although this situation is unlikely to result in any serious damage, it does nothing to enhance your reputation as the local flying ace, and should be avoided. When an overly helpful gust

offers to assist you into the air, decline the offer and hold the airplane on the ground while you gain a bit more speed. When you're sure you have enough speed to fly without the assistance of the gust, then lift it off.

Once you're in the air, you'll find things much easier if you turn and head upwind as soon as you can do so safely. This practice can be precluded by trees, buildings and other impenetrable obstructions, and obviously is not recommended if you're flying from a real airport where you would be expected to fly a normal circuit pattern. However, if you can turn upwind, it will increase your angle of climb dramatically. Also, as you may remember from your taxiing, a crosswind will tend to lift the upwind wing. Turning upwind will help to keep it down. Once you've made the turn and you're flying into the wind, the airplane will be easier to control and any changes in wind speed will be less noticeable. When you reach your desired cruise altitude, you can level off and play with the wind, but be sure you have plenty of altitude to allow for any unexpected sink.

The effect of gusty or turbulent conditions on roll attitude is not difficult to control because the Lazair rolls so slowly. However, because the mass of the Lazair is so low, it can be accelerated upward or downward very quickly by thermals or downdrafts. Flying completely through a small but aggressive thermal can be a particularly exciting experience. As you enter the thermal, the rising air catches the wing and lifts the whole airplane up like an express elevator. Then, as you fly out of the thermal, you suddenly lose the added lift on the wing, but now the tail is driven upward and you find yourself staring down at the ground. Like so many other things, this is no problem if you have sufficient altitude.

Landings in windy and especially in gusty conditions should always be made with power on. Besides giving you the option of aborting the landing, having the engines running provides additional airflow over the control sur-

faces and allows you to use differential power settings to counteract crosswinds. As was suggested in the section on taxiing, increase the power on the **upwind** engine to correct the yaw caused by weathercocking.

EPILOGUE

The preceding pages of this booklet were written to help you get from the ground to the air with a minimum of drudgery and a maximum of enjoyment and safety. There was no intention to make this an “Everything you ever wanted to know . . .” manual, but it should help you to get started. The rest is up to you.

The suggestions contained in this booklet are merely that — suggestions. The sport of microlight (or ultralight) flying is in its infancy. As time goes by and the sport grows, the participants will be forever discovering “a better way”. As you gain experience in your own Lazair, you too will develop your own preferred techniques and procedures. If your way makes sense, if it doesn’t conflict with the laws of the land (or the air) or with the laws of physics, and if it can be practised safely, then try it your way. Obviously, some things must be done by the book, but a pilot must be more than a memorizer of books — he must be able to think.

However, until you do have a better way, glean what you can from the people who have been there. Learning from your own mistakes is effective and perhaps even admirable, but learning from someone else’s mistakes can be considerably less costly.

AND A PARTING PLEA

As a member of the microlight fraternity, you have responsibilities – not only to yourself, to other pilots around you and to people on the ground – but to the rest of us who would like to continue to fly our microlights in the relative freedom which we now enjoy. At present, both the MOT and the FAA have adopted an almost hands-off policy regarding microlights. However, they are watching the development of the sport closely. New regulations are just around the corner and may be in effect by the time you read this. The regulations presently proposed appear to be much less restrictive than those proposed a year ago, and will allow the enjoyment of the sport to continue. However, any time someone does something stupid, any time someone attempts to fly an unsafe airplane, any time someone flies too low over a farmhouse or a group of people, any time someone flies in weather conditions beyond his ability, any time someone antagonizes the pilot of a “real” airplane or an airport operator or controller, he will be providing justification for tightening the regulations. Contrary to popular belief, the future of the microlight movement is not just in the hands of the committee members in Ottawa or Washington – its in the hands of the participants. Right now, we have a good thing going. Let’s not screw it up!

Notes

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