THE CANARD PUSHER

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If you are building a RAF design, you must have the following newsletters:
VariViggen (1st Edition), newsletters 1 to 59.
VariViggen (2nd Edition), newsletter 18 to 59.
VariEze (1st Edition), newsletters 10 thru 59.
VariEze (2nd Edition), newsletters 16 thru 59.
Long-EZ, newsletters 24 through 59.
Solitaire, newsletters 37 through 59.
Defiant, newsletters 41 through 59.

A current subscription for future issues is mandatory for builders -- as this is the only formal means to distribute mandatory changes. Reproduction and redistribution of this newsletter is approved and encouraged.

PLEASE NOTE: BUILDER SUPPORT IS ON TUESDAY AND FRIDAY FROM 8:00 AM TO 5:00 PM ONLY. If you have parts that you would like us to see and/or would like to drop in, please make it Tuesdays and Fridays if you can. If you need to come other than those days, please call so we will be sure to be here. When you call on Tuesdays and Fridays for builder assistance, please give your name and serial number. It is required before you can be put through to Mike. This is a company policy and we must adhere to it.

When writing to RAF, send along a stamped, self addressed envelope if you have builder's questions to be answered. If you are placing an order, it's best to keep it separate from a request for an answer.

RAF ACTIVITIES

As many of you know, Rutan Aircraft has been sued by an English Company, Aviation Composites.

In 1982, RAF was contracted by Colin Chapman of Lotus Cars, Ltd. to design and build a microlite aircraft. A proof of concept aircraft was built and a basic flight test program was conducted. No problems were found with regard to its stall characteristics.

Aviation Composites employed VariEze builder, Ivan Shaw, and built a similar but much heavier version and had several problems with it. Aviation Composites approached Scaled Composites requesting developmental help. While we were assisting Shaw with flight testing, we discovered a poor spin recovery characteristic. (See CP55, pg 5).

Aviation Composites next step, of course, should have been to equip the aircraft with a spin recovery parachute and to develop an appropriate aerodynamic fix for the problem. Instead, they discontinued support of the flight testing and sued RAF for all of their expenses to date, allegedly amounting to several million dollars.

This situation, win or lose, of course, poses a serious threat to RAF's financial ability to continue to provide builder support. We will keep you informed of developments in future CP's.

NORM HOWELL DOES IT AGAIN!

A new world record - this time in a very light Long-EZ, N9TS, borrowed from his friend, Terry Schubert, of Cleveland, Ohio.

The C1-A (altitude record), (1102 lbs. max. take-off weight) now belongs to Norm. He took-off at 1101 lbs.!, climbed to 25,000 feet, establishing a new altitude record for this weight class. The entire flight lasted only 55 minutes. Norm has put together a really neat oxygen system using a full face military mask and says it worked great for this flight.

Congratulations, Norm. What will be next? Norm already owns several speed/distance records in his Quickie, the "Ugly Quickling".

FLY-INS

Shirl and Diane Dickey have organized no less than three (3) fly-ins this year. (What a go-getting couple this is!). The first of these fly-ins is at Kanab, Utah on May 27th, 28th and 29th, 1989. Shirl will have the usual race schedule (similar to Jackpot and Wendover) which will start at 8AM Sunday 5-28-89. Camping is encouraged and a steak fry will begin at 7PM that evening. Contact:

Shirl or Diane Dickey
1702 W. McNair
Chandler, AZ 85224
602-491-1548.

#2 - 7th Annual Jackpot 125 Proficiency Run. Jackpot, Nevada, July 1 2, 3, and 4. Come join the fun at Cactus Pete's Casino on the airport at Jackpot, NV. Prize money will be paid from 1st to 5th place in each category. There will be a dinner show (featuring Glen Campbell!) Saturday night. A ribbon cutting contest Sunday morning, plus a spot landing contest. What more could you want? This is the fly-in of the year and is not to be missed. Contact Shirl or Diane for details or call Cactus Pete's Casino at 1-800-821-1103.

#3 - 4th Annual Bonneville 120 Fly-In and Air Race. Held at Wendover, Nevada. Lodging at the Stateline Hotel and Casino - advance reservations required. Call 1-800-648-9668. Similar to the Jackpot 125, the Bonneville is an even faster course, from Wendover Airport across the Bonneville salt flats and back. Dinner and shows, live entertainment after dinner, spot landing contest, poolside cocktail hour and awards presentation dinner. A really historic speed center. The casino has a lot of Bonneville salt flats memorabilia and this weekend event is a place to be if you are interested in speed and fun and you fly your own homebuilt composite airplane. Don't miss out - reserve early. Contact Shirl and Diane for details.

LONG-EZ 84 ABOVE AND BEYOND THE OUTBACK

"While the Northern Hemisphere braced for winter weather, the folks Down Under were busy celebrating their Bicentennial Year and the promise of Summer. Among the many and varied events which commemorated Australia's Bicentennial Year was an Air Race unlike any other ever run in Australia. It's fitting that an air race should have been part of Australia's celebrations as aviation has played such an important part in Australia's pioneering growth. The vast distances and remoteness which are such a part of Australia make aviation a vital part of life in the land Down Under. Without the airplane, the prosperity and well being of Australia would not be what it is today.

The "Aviation Event of the Decade", as one newspaper called it, was actually known as the GE Bicentennial Around Australia Air Race. Sponsored by General Electric (USA), the race lived up to its name as it covered more than 6100 nautical miles and virtually circled Australia. More than an air race, it was a "Bicentennial Event" which brought the celebrations to remote places and people in the vast Outback of Australia, as well as to its capital cities.

105 competitors took the starters flag in Narromine, New South Wales for the first race leg to Toowoomba, Queensland. The lineup was quite a spectacle as military and civilian single and multi-engine aircraft taxied into line to await their flag-off. Among the competitors were some noteworthy vintage aircraft and four homebuilts; a Thorp T-18, two Long-EZs, and a VariEze. The highest finishing of these was Long-EZ '84', built and piloted by Queensland businessman Magna Liset. His copilot and navigator was Wayne P. Johnson, a US Army Captain and Flight Instructor on exchange to to the Australian Army Aviation Centre in Magna's hometown of Oakey, Queensland.

Long-EZ 84 crossed the finish line at Rockhampton to capture ninth place at the end of the first day's racing. It was an indication of the aircraft's true potential. 84's aircrew had decided to restrict maximum rated power to climb only, thereafter throttling back to

75% power to conserve the engine and ascertain if the aircraft would be competitive. It became very clear from the outset that this would be a long race, one in which the fleet of wing might not necessarily be the victor. Speed and endurance were to be critical elements of any winning combination.

Second day's race leg was somewhat shorter, run from the coastal plains of Rockhampton to the dry inland cattle ranching area of Longreach, home of the "Stockman's Hall of Fame". Over this leg, Long-EZ 84 managed a higher average speed than in the previous leg and secured fourth place for the effort. This was partially due to guessing the winds aloft better than some of the competitors, and to the use of a ram-air plenum which had been fitted to the aircraft prior to the race. The newly fitted ram air system was good for an additional 50-125 RPM in cruise flight. The resultant difference in true airspeed can easily be appreciated.

The departure from Longreach early on the morning of the third day wasn't without some drama. A crack was discovered in the prop spinner during last minute preparations and a decision was made to stop-drill it until more permanent repairs could be made. These were planned for the end of the day at Alice Springs, where we hoped time and resources would allow such an effort. Unfortunately the vibration generated by running the engine at continuous high RPM made the crack worse, as was evidenced by its singing in the navigator's ear during cruise flight. As it turned out, there was an unexpected delay during the intermediate stop at Mount Isa. The copilot-navigator donned his A&P hat and raced off to find an FBO equipped to make airframe repairs. Spinner repaired and polished, Long-EZ 84 sat in the 38° C mid-day sun awaiting its starting time. Long-EZ 84 crossed the finish line at Alice Springs late in the afternoon with what its crew felt would be a good performance. The aircraft had flown predominantly low-level over the longest the most remote race leg of the entire event, using thermals enroute to enhance true airspeed. This was possible because the winds aloft were forecast as either headwinds or crosswinds. Given the aircraft's rather sluggish climb performance, but excellent cruise and turbulence penetration, it was decided to gamble on a low level leg with an accent on precise great circle navigation. The ride for the "guy in back" wasn't conducive to the stubby pencil routine or computing, but the pilot accurately flew the directed headings and courses and '84' maintained its great circle route within one-quarter mile throughout the entire leg. The Race Director's announcement that M. Liset in Long-EZ 84 had won the Longreach to Alice Springs leg was its crew's first indication that they were truly in the running. It had been a good day! The first of several.

Analysis of aircraft climb and cruise performance during the first three days convinced both navigator and pilot that the contest would effectively be over once the high performance twins, especially the Royal Australian Air Force's entries, reached conditions favoring higher altitude cruise performance. The winds aloft during the timeframe of the air race were predominantly westerlies and northwesterlies. Obviously, an aircraft with good low-level performance, accurately flown along its shortest route, would fair much better than a high performance aircraft better suited to upper-level cruising.

Long-EZ 84 made the most of its 'tactical advantage', winning the fourth leg from Alice Springs to Darwin, as well as the fifth and sixth legs from Darwin to Broome and Broome and Canarvon. This run of success put the little homebuilt into second place as the fleet reached Perth, only 20.42 points behind the Ted Smith Aerostar 601P of Ted Rear. By the time the race reached Perth, it was a National event with considerable attention from the news media. While Perth Businessman Ted Rear enjoyed the attention of his hometown press, Magna Liset and the 'Unusual tail-first homemade airplane from Queensland", weren't short of curious onlookers, well wishers, and radio and TV commentators. In fact, by the time it reached Perth, anyone remotely interested in the air race knew about the little plastic airplane built by some fella from Queensland. What's more, they wanted to see and touch it for themselves. All of this instant notoriety, although flattering, was a little troublesome at times. Everyone wanted to leave fingerprints all over the canopy. The navigator spent most of his time rescuing

Magna from the upteen thousandth redundant question or (re)polishing the canopy. About two hours of this and your fun meter was just about pegged out!

As predicted, once the race turned eastward and tailwinds became the order of the day, the big boys got on with it and left the less well endowed struggling to catch up. Long-EZ was now hard pressed to hold its own and, in fact, lost ground slowly. It was very disappointing to watch the ground speed figures, knowing that the big guns were doing much better at higher altitudes, and had been doing so longer. Add the fact that as the day wore on, the winds aloft typically lost intensity. All of which meant that the early birds definitely got the best worms.

It turns out that Long-EZ 84's left magneto developed a 'leak' while crossing the Nullabor Plains. The crew thought that the hard full-power running at low altitudes prior to Perth had taken a toll on the rings and valves, which accounted for the noticeable, but then unexplained loss of revs. The magneto problem was only confirmed after the race..

When all was said and done, Long-EZ 84 wound up capturing the 3rd place prize, good for $4,000.00. Or as Magna put it, "This air race stuff is okay!"

You may be wondering how the race was run. Funny you should ask. The navigator asked the pilot the same question, and spent the first two days figuring out the answer. Simply put, it was a handicap race based upon manufacturers' design specifications and 75% cruise performance. The resultant calculations yielded each competitor's handicap True Air Speed (TAS). Each day the Race Director would announce the handicap winds aloft figures used by the timing and scoring section; generally a question of worst or best case from actual area forecasts. It was then up to the individual competitor to achieve the best ground speed (shortest time interval) given their handicap TAS corrected for the handicap winds aloft forecast. To keep the race within the reach of all competitors, altitude was limited to 10,000 ft AMSL. Competitors seemed to honor this restriction, although there were unconfirmed reports of some of the high flyers and fast movers sneaking above the mark to 'have a look'.
Long-EZ 84 represented the breed very well. It's average TAS was 161.64 Kts. The highest recorded TAS was 170.39 Kts. The highest recorded groundspeed was 251.76 Kts, achieved while crossing the Nullabor at 10,000 ft AMSL between Forrest and Ceduna. Bear in mind that the aircraft consistently took off with the highest all up weight of the two Long-EZs in the race. Fuel capacity was never a problem; however, the very long distances of some of the legs, combined with rather stringent VFR fuel reserve requirements in Australia, made for a heavy aircraft on occasion. This was particularly evident in climb performance, especially since the aircraft was fitted with a Great American Propeller Company cruise prop. On one of the legs, an unexplained loss of TAS and groundspeed became evident as the flight progressed. Engine instruments said everything was operating at full potential but the navigator's computer said .04 Kts slower than anticipated. The culprit turned out to be a thin coating of salt brine on the aircraft's surfaces which effectively gave it a fine sandpaper finish. Washed and rewaxed, the elusive knot found its way back to the airspeed indicator. Smiles all 'round! The Lycoming 0-235 engine was run at 2,900 RPM during cruise flight with ram air applied. Descents were made at V_{ne} with the actual descent point/gradient dependent upon the known and forecast winds aloft. Let's just say that Long-EZ 84 made an impressive finish at the end of each leg, as witnessed by many spectators on the ground. From the back seat, it sounded quite spectacular to hear the engine at full chat on the downhill slide. The old prop really sings!

In essence, the GE Bicentennial Around Australia Air Race was just that - a race. Those competitors who were serious about racing and winning had to push themselves and their aircraft. In the final analysis, it was the optimized integration of man and machine which spelled the difference between success and "also ran". Anyone who came thinking they could 'cruise' around Australia and do well just didn't understand the problem. Long-EZ 84's success was the culmination of much hard work by a man who spent five years of his life building a dream. The aircraft is one of the finest aerodynamic

examples you'll find anywhere. The pilot flew the aircraft to its potential, and the navigator kept it on track along carefully plotted great circle routes. One of the critical keys to success was the aircrew's use of very accurate 1:250,000 JOG-AIR maps. Although this meant considerable map preparation prior to each leg, and 131 map sheets at the start of the race, the navigational accuracy and appreciation of winds aloft and groundspeed made the result well worth the effort. There were times when the navigator was planning until 2:20 AM and getting two hours sleep prior to wake-up call. Likewise, the pilot spent his rest days checking, double checking and cleaning the aircraft for the next day's competition. The reward was to get within 20.42 points of leading the air race overall, and earning third prize in the end.

History will record that an aircraft designed by an American named Burt Rutan, built and piloted by Magna Liset and navigated by a United States Army Exchange Officer came within a stone's throw of leading the most prestigious air race in Australia's history. It came home third and made a lot of people very proud. It generated a lot of interest and excitement and put the homebuilt crowd in the spotlight. and it surprised a lot of people with their very expensive single and multi-engined aircraft.

In most forms of human endeavor, there is some element of that stuff called luck. One competitor was overheard in Perth as he observed how "lucky that Liset chap is." A friend of Magna's caught the comment and added, "Yeah mate, and the harder he works, the luckier he gets." It's refreshing to hear people who appreciate that building an aircraft is no small task. Doing it well deserves respect, if not admiration. It was one helluva air race. You should've been there!"

by Wayne P. Johnson

REMOTE MOUNTED SPIN ON OIL FILTER

Many builders have inquired about such a device and, in fact, several builders have built their own system. Lycoming has the parts necessary to accomplish this but they are incredibly expensive. Long-EZ builder, Mel Hinson (N160EZ), has purchased the tooling to build the adaptors that bolt directly to the accessory case in place of the oil screen housing and your present Vernitherm valve will screw right into this adaptor. These remote filter adaptors will fit all 0-235, 0-320, 0-360 and 0-540 engines. In addition, Mel has tracked down the remote filter mount (a Cessna part) and he plans to make these two parts available for around $180.00. You will have to provide the AN fittings (elbow, nipples, etc.), the high pressure hose (Stratoflex is best), the Vernitherm valve, and the gaskets.

This will give you a remote spin on oil filter (adaptor uses an approved Champion aircraft filter) built from approved aircraft parts with built in bypass valve and will allow 50 hours between oil changes and should extend the life of your engine. For more information or to place an order, call or write Mel. He is presently flying one on his Long-EZ. Contact:

Mel Hinson
Rt 20 Box 316
San Antonio, TX 7821
512-828-0551 (H)
512-651-5086 (W)

THE BUNGEE ELEVATOR TRIM SYSTEM ON AN EZ.

This is an area that has generated a lot of questions and this will be an attempt to help answer many of those questions and, hopefully, give everyone a better insight into the EZ bungee pitch trim. First of all, all that follows here assumes you have built your airplane reasonably accurately - that canard incidence is correct and that wing incidence and relative wing incidence is correct. These items can greatly influence elevator's position and will effect the bungee trim system's ability to trim.

The elevator shape is critical to the success of this bungee spring-operated pitch trim system. If the elevator is the "perfect" shape, it will float in a faired position relative to the canard at approximately 120 to 130 KIAS, without the springs. This means that at this speed, the aircraft will fly hands off and maintain level flight, even if the springs are disconnected and removed. This is about

optimum and not everyone will have this situation. If you do, it will then be possible to pick a pair of springs that will provide you with enough spring power to trim the plane hands off down to the approach speed (approx. 65 KIAS), as well as to trim hands off up to the maximum level flight speed. This is normal and perfectly acceptable. Now, if you go faster (by descending, for example, you may run out of forward trim and may have to provide this force by maintaining forward pressure on the stick. Again, for an EZ, this is normal and nothing to be worried about. At the same time, you will probably have to "help" the trim system by maintaining back pressure on the stick as you approach a stall or reach full aft stick. This, also, is normal for an EZ and many other planes.

The problem is when your elevator shape causes your elevator to float, no springs, at, say, 80 KIAS or at, say, 160 KIAS. Obviously, if either of these cases applies to your aircraft, your elevator shape is not correct and you will probably not be able to come up with a pair of springs that can provide enough range to cope with as low as 65 KIAS or as high as, say 170 KIAS (max. level speed). This is because the elevator is trying to fly to a different position than the one you need it to be in for the speed you are indicating. If you put a strong enough spring into the system, you may be able to overcome the elevator's lift and force it to a position it does not want to be, however, this is a losing proposition for two reasons. You almost certainly will not be able to trim hands off at the other end of the speed range, and more importantly, your speed stability will be compromised. All EZ's (Vari and Long) have excellent speed stability (as do all Defiants). That is to say, if you set the power for a given speed and trim for level flight, the airplane will maintain this speed even if you displace the airplane by pushing or pulling the stick. When you release the stick, the plane will quickly return to level flight and be on speed as before provided you did not change power or trim. If you install overly powerful bungee springs in the trim system, to overpower an incorrectly shaped elevator, your airplane will not return to the trim speed. In fact, it will be difficult, maybe impossible, to trim it to fly level at any speed.

We have tested this by simply removing the trim springs and flying the airplane. We attempt to fly level at various speeds, increasing speed perhaps 5 Kts at a time, until we find the trim speed at which the EZ flys level, hands off without diving or climbing. This speed should be close to 130 KIAS. 120 KIAS is OK, 135 is OK but much more or much less will require a fixed trim tab on each elevator or a new elevator with the correct shape. A small aluminum tab pop riveted to the bottom trailing edge of each elevator and bent up per sketch (See page 12) can be adjusted to cause the elevator to float exactly at 130 KIAS with no springs. This will allow you to use the weakest possible pair of springs that can provide enough force to hold the plane hands off from approximately 65 KIAS to approximately 170 KIAS.

We are not necessarily recommending that everyone go out and fly with no trim springs! On the contrary, while it is not difficult to fly without any springs in the pitch trim system, it is extremely aggravating and tiring because you have to hold the trim force required all the time. You can never relax or let go of the stick. So keep the flight short (or fly at the elevator's natural trim speed, once you have determined it). Do not attempt to conduct a test flight such as this unless you have plenty of experience in the airplane. We have done this many times and it is not that big a deal. It is just not a good idea for a low "time in type" pilot.

With the correct shaped elevator, your bungee trim system should provide you with the capability to trim hands off from around 65 KIAS to around 170 KIAS, no more and probably no less. If you have to push to fly level at 150 or 160 KIAS, your elevator shape is wrong and its lift is stronger than your springs. The only way to fix it is to install the fixed trim tabs (one each side) or to build a new, correctly shaped elevator.

FLUSH RUDDER BELHORNS FOR A LONG-EZ.

A few enterprising builders have designed their own method of hiding the external rudder belhorn and when Mike and Sally converted their Long-EZ, N26MS, about a year

ago, we started getting enquiries from Long-EZ builders who wanted to do the same. Now that we have a years experience on the system used by Mike and Sally, we feel we can share it with Long-EZ builders who may wish to remove the external belhorns. RAF will be making a simple set of instructions, drawings, sketches and photos available within the next 6 to 8 weeks. These will sell for around $10.00.

The first "flush belhorns" Long-EZ we ever saw was Ben Ellison's Long-EZ (of Ellison Throttle Body fame). A beautiful Long, the simple elegance of the smooth outboard faces of the winglets made it even cleaner. Then we saw Joe LaCour's Long-EZ at Oshkosh and he had done something similar to Ben's and made some sketches as to how he had done it. Mike and Sally decided to use Joe's basic method and it has worked flawlessly for just over a year now. Ben Ellison, Joe LaCour and Mike and Sally's Long-EZs have one thing in common, all have forwarded mounted brake master cylinders. The hidden rudder belhorns method used by all three of these Long-EZs has the rudder striking a hard mechanical "stop" at full throw. This means that it is mandatory to have a strong spring in the rudder cable to allow normal use of the brakes.

While we have not tried this method on a Long-EZ with the brake master cylinder mounted on the firewall, per plans, we believe that with the springs installed correctly, this method should work well. This is only for Long-EZs with the tall, high performance rudders and would not work well at all on the small, original rudders.

First of all, why do it? Mike did it because it looked better and he tells people he gained 10 kts! (which, of course, is nonsense). Obviously, it is lower drag but probably so little as to be impossible to measure. Not having the steel belhorns protruding out of each winglet saves you from catching your clothes on them, it also saves you from bending them on the side of the hangar and cracking the paint but, best of all, from a safety standpoint, it eliminates the possibility of someone flipping the rudder cable end thimble over the back of the belhorn. This can make for quite an exciting take-off if you don't catch it in your preflight! The external steel belhorns are removed and discarded, new belhorns are fabricated (from full size patterns) and installed into the rudders. A new rudder cable conduit must be installed in a different location in the wing. (Much easier to do in original construction but certainly possible as a retrofit). A strong compression spring, rigged like tail wheel springs, must be installed into each rudder cable to allow you to use the brakes after the rudders strike their stops at the end of their travel.

With forward mounted brake master cylinders, the CS-15 belcranks can be removed and discarded and pulleys can be installed in their place between the CS-71 belcrank brackets. The rudder cables can then be routed through the firewall through a short length of nylon conduit, thus eliminating the large slot required when using firewall mounted brake master cylinders. Also, when using forward mounted brake master cylinders, the rudder cables can be small, 1/16" diameter, all the way from the rudder pedals to the rudders.

The simple plans will consist of full size patterns for all parts required, and will cover building from scratch, new construction, as well as how to retrofit to an existing Long-EZ, however, it will be a simple set of instructions and will not cover every tiny detail, rather, it will assume that since you built the airplane, you can surely figure out this simple thing! Mike did take a series of photos of his retrofit, so these will be included plus a brief outline of procedures.

If you would like a set of these "plans", send a check for $10.00 to Rutan Aircraft, Bldg 13 - Airport, Mojave, CA 93501 and Joan will mail them to you.

CAUTION - 8" PROP EXTENSIONS

There have been two failures of 8" long prop extensions that we know of! Neither of them occurred on a RAF design but both were on pusher aircraft. Both prop extensions were purchased from Sport Flight in Florida. We understand that his company manufactures their prop extensions form 6061-T6 aluminum. All RAF-designed (Brock manufactured) prop extensions are machined

from 2024-T3 aluminum which is approximately 20% stronger. The sizes of the radii between the flange and barrel are critical. At least one of these failures probably was due to a resonant vibration at the natural frequency of the prop/prop extension. This could be a serious mater and RAF is currently working with experts in this field on just what magnitude the problem is, or isn't. Burt ran his Defiant with 8" Brock prop extensions for over 900 hours with no sign of a problem. We should have a lot more info on this subject in the next CP. If you are currently running an 8" Sport Flight prop extension, our recommendation would be to remove it and replace it with a Brock 2024-T3 prop extension before next flight.

ACCIDENTS AND INCIDENTS

A Washington Long-EZ was circling low level over a sparsely inhabited area when the pilot felt/heard a creaking sound and immediately smelled gasoline. There was obviously a major gasoline leak os he picked out a relatively smooth area and executed an emergency landing. The pilot got out and on his way out thought he saw a hole in the fuel gauge area but right then the fuel caught fire and, unfortunately, the entire aircraft was consumed. The pilot was not injured but the cause of the fuel leak/fire is unknown. There is a highly speculative theory that the aircraft was hit by a bullet! This pilot was a Viet Nam war helicopter pilot and highly experienced in such events and is sure that is what he felt/heard just before he smelled the gasoline.

Not much we can learn here except, perhaps, to refrain from flying low over what could be someone's property - someone who may not want your flying over them and may take action against you. Keep in mind, this is speculative theory, not proven, but a strong possibility. A experienced pilot, well know to RAF and respected by all who know him as a man of integrity.

A Los Angeles Long-EZ pilot/builder installed a breather system from his engine to one of his exhaust headers, similar to the system developed, tested and sold by Wes Gardner and similar to one Mike and Sally have had on their Long-EZ for over 5 years now (with excellent results). The only difference was the fact that an anti-backfire valve (one directional check valve) that Wes calls out and that MIke and "Sally have installed, was omitted. On top of that, this aircraft was known to have one cylinder pumping oil (turned out to be a seized piston ring). Oil consumption was very high and this pilot had filled it with 8 quarts prior to taxiing out for take off. Just prior to taking off, the tower informed the pilot that smoke was coming from the engine. His rear seat passenger looked back and saw flames coming from the cowl near the wing root. The tower dispatched a fire truck and the fire was quickly extinguished.

The Long-EZ was seriously damaged, all engine compartment wiring was burned and the foam was melted out of the wing root. It will take several months of hard work to fix.

What caused this fire? Well, this pilot and Mike, at RAF, don't fully agree. The builder feels that the breather tube welded into the exhaust header cracked, allowing oil onto the outside of the hot exhaust, which caught fire. Mike believes, based on his own experience, that without the anti-backfire valve, the hot exhaust gases went into the breather line, melting or burning it off. Since the engine was burning excessive amounts of oil, this line probably had oil in it and when the rubber hose caught fire, it also ignited the oil which then turned into a hot fire causing lots of damage including melting the rudder cable pulley and bracket. Mike speaks from experience! When he first installed his breather system, he also tried it without the check valve, ore anti-backfire valve. He was lucky, he ran it on the ground and, when the hose melted through, he saw it before any more damage could occur. There was no fire in his case, probably because his engine was not using much oil, but the hose from the crankcase to the tube welded into the exhaust was melted/burned beyond recognition in a matter of minutes!

If you are planning on installing a breather system such as Wes Gardner's, be absolutely certain you do it right! He has lots of experience with this, so contact him, better yet, buy his kit and install it exactly per his

instructions, and you will have an excellent breather system that does not throw oil all over your cowling.

EXHAUST SYSTEM CRACKS

Lew Miller, Long-EZ builder/flyer, reports finding hairline cracks across the flanges and around one exhaust stack after 250 hours of operation. This was a Brock exhaust system and he had been smelling a faint exhaust smell while climbing with the cabin vent closed for sometime and had searched high and low in the engine compartment before he found the almost invisible cracks. He welded up all cracks and has had no more problems and no more smell but says he is not confident he won't have this re-occur since he has done nothing to fix the cause.

We have not heard of a Brock exhaust system cracking before but an exhaust system can, and will, crack if you have excessive vibration. Watch out for this - any exhaust smell in the cockpit is cause to examine the exhaust system with a bright light and possibly a magnifying glass. Please report any cracks to RAF so we may report them in the CP.

AILERON "VIBRATION"

The reports in CP58 have really put the cat among the pigeons! A controversial topic, to say the least. In spite of all of this, only three flyers have reported finding their ailerons vibrating visibly in flight (one was not sure), one reported finding his vibrating at various RPM's while running on the ground -probably true of all EZ's while they are sitting on their wheels (the tires are like springs, as is the gear), so we believe you must look for this problem while in flight and it will be difficult to see and will require a rear seat passenger to watch the ailerons. If you have a visibly vibrating aileron or ailerons, you should increase the mass balance as required to a maximum of what it takes to balance the ailerons with the top skin level. If it only takes 25% or 50% of the maximum to stop the vibration, then that is enough. Unless you know you have this problem, do not change the mass balance.

Brock has the new aileron belhorns available now and many have been delivered and installed. If you have evidence of worn or beaten out rod end bearings in your aileron control system, you should ground your airplane until you have replace the original belhorns with the new part which is about 8 time stiffer and this is out of the vibration frequency that has been causing the problems. A number of Long-EZ owners have reported worn out rod ends, but far more have reported no sign of wear or vibration. Apparently, it depends greatly on the vibration characteristics of each engine/prop/mount combination and it does not necessarily occur in all Longs - watch for it, though, this is a potential accident waiting to happen - always listen to your airplane - it will invariably try to warn you before it bites!

RAF RECOMMENDED SUPPLIERS

Aircraft Spruce PO Box 424 Fullerton, CA 92632 714-870-7551	Wicks Aircraft 410 Pine Street Highland, IL 62249 618-654-7447
FeatherLite PO Box 781 Boonville, CA 95415 707-895-2718	Brock Mfg. 11852 Western Ave. Stanton, CA 90680 714-898-4366

The above suppliers are still the only authorized RAF dealers for all your various aircraft materials and components.

SHOPPING

RUSTY FOSTER'S SPACE SAVER PANEL (see several previous CP's), a really neat piece of gear, will be available only until December 31, 1989. Unfortunately, Rusty has decided to discontinue the Space Saver Panel then. If you want one, or want information on one, write or call: Rusty Foster
PO Box 1569
Portola, CA 96122
916-832-5993

THE BEST FUEL VALVE we have ever seen - anodized aluminum, replaceable body, easily removable barrel (not tapered!), with 'O' ring seals and an excellent, positive, position

spring detent system. Best of all, it is a simple bolt-in replacement for your existing brass weatherhead or Imperial valve. It is now in stock at both Aircraft Spruce and Wicks Aircraft. It is expensive, at around $120.00, but well worth it in the long run, no more sticking fuel valve, no more disassembling and greasing the valve, just easy, smooth rotary action.

NOSE WHEEL SHIMMY DAMPERS

If you still have the original plans nosewheel shimmy damping set up, you are risking nose wheel shimmy and possible nose fork failure. Bob Davenport, a Long-EZ builder in Vero Beach, FL, has designed and sells the best shimmy damper available. We have never heard of a nose wheel fork failure from anyone using Bob's shimmy damper. Contact:

Bob Davenport
PO Box 650581
Vero Beach, FL 32965-0581
407-567-1844

WHITEY BALL VALVES (Fuel Valve)

The SS-44xF4 stainless steel valve which we recommended for a good fuel valve does have one drawback, it does not have a very wide recommended operating temperature range. No one has ever reported this as being a problem, but a better choice of Whitey valve would be their SS-83xF4, a valve specifically designed for temperature extremes. Quite frankly though, the very best choice of fuel valve is the one recommended in CP58 and now stocked at Wicks and Spruce.

FOR SALE

Continental 0-235, 2340 TT, 160 SMOH, B & C 10 AMP alternator - $3600.00

Escort II Nav/Comm, 2 yrs old $825.00.

Narco AT150 Transponder, 2 yrs old $490.00.

Narco AR850 Encoder, 2 yrs old $225.00.

Gauges, instruments and tools - Call for prices.

CONTACT: John Creel
415-522-4016

Complete set of Long-EZ upholstered cushions - $100.00.

Goodyear brake cylinder - $30.00.

Thermos-type fuel cap and recepticals - $20.00 ea.

Long-EZ full size cover - $80.00.

Complete set of new 0-235 Lord mounts including nuts and bolts - $130.00.

2 Goodyear flight custom tires 500x5 6 ply with 500x5 wheels and brakes, axles and brake discs - $300.00.

2 500x5 wheels only with brake assembly and discs - 200.00.

Nose wheel and tire 280-250-4 -$35.00.

Fuel pump - cylinderal interrupter-type 12 - $50.00.

Sport Flight Long-EZ 0-235 exhaust system - $300.00.

CONTACT: Dick Cutler
Box 1058
Dublin, PA 28917
215-257-0817

Whelan Strobes/Nav lighting system, new - $400.00.

Narco AR-850 Blind encoder, new - $300.00.

CONTACT: Dave Pepper
4735 N. Court
San Diego, CA 92116
619-296-4615

CANARD PUSHER DIGEST

The Canard Pusher Digest for the Long-EZ is still available. The Canard Pusher Digest is basically a recompilation of information from CP24-CP56 into chapters that

correspond to chapters of the Long-EZ plans. (For a complete description of the Digest, see CP57). Note that the Digest is for builders and flyers of the Long-EZ only! The Digest does not support other RAF designs.

Quarterly updates to the Digest are also available. These updates provide additional information from newly published CPs to bring the Digest current.

I've recently managed to get a very good deal on duplication of the updates, and I'm passing on the savings!. Effective immediately, the cost of an annual update subscription drops from $30.00 to $20.00. For those of you who ordered the update service at the higher price, I have already credited your account with an additional 2 updates for each year you ordered, free of additional charge!

CP Digest for the Long-EZ $57.00
(Includes Updates 57 & 58)

Annual Update subscription $20.00
(4 Updates)

Send payment to:

Stet Elliott
Building 12-I-2
Governors Island, NY 10004
(212) 825-0011

We cannot say enough for this publication. It has been an immense help to Mike Melvill in his assisting builders when they call for support. Every builder would find it just as helpful since there are now so many CP's to search through when you need some specific piece of information. Here it is, all nicely indexed and researched for you. Stet and Kim Elliott have done a tremendous job and we appreciate the fact that they are publishing quarterly updates. What a job! ED

THERE ARE NO PLANS CHANGES FOR ANY RAF DESIGNS THIS TIME.

Please submit any significant plans changes that you may come across as you go through the building process.

Since RAF is no longer active in the development of homebuilts, we are not likely to discover many new errors or omissions in the plans. For this reason, we need help from you.

FIRST FLIGHTS

Congratulations to Mr. Alvin Grace of La Grand, OR who reports Long-EZ SN1395 has flown 80 hours with not a moments trouble.

Congratulations, also, to Gerard Castaing of Colomiers, France (see photo this CP) for the Jan. 14, 1989 first flight of F-WCGG. Not many of us can park under the Concorde!

Brazilian Francisco Honorato de Oliveira flew his Long-EZ PP-ZFH for the first time June 7, 1988. (See "Letters")

Please send First Flight information to the newsletter so yours may be included. Though we have no way to know true numbers, we estimate over 500 each Long-EZs and VariEzes have flown. EZ-ily the most popular homebuilt of the decade.

LETTERS

"Dear Sirs;

I appreciate the larger print on the newsletter. I also appreciate the accidents/incidents section as these harsh lessons should not be allowed to go unpublicized. With the fatality rate 10 times higher for general aviation than for cars, and homebuilts even worse, we dreamers and "on a wing and a prayer" people must constantly be shocked back into the real world.

Thanks again for all the work you do for us in keeping up with what is going on in the field

and developing ideas that make flying safer and more efficient.

Larry Freeman"

"Dear RAF,

When I first saw the VariEze in 1978 Oshkosh EAA Convention, I decided that it would be my next plane. It wasn't. When finally the conditions to initiate building an airplane happened, I bought the plans for a Long-EZ, RAF #2001-L, Brazilian identification PP-ZFH.

Authorization to start construction was given by Brazilian authorities surprisingly easy.

More difficulty was encountered in obtaining the materials in our local market. I almost gave up. Styrofoam started to be manufactured in Brazil only three months before I started construction. PVC foam had to be substituted for polyurethane. BID fiberglass is common in the Brazilian market but UND was not available. After a long search, I was able to have it made by special order. Epoxy resin was not a problem. Metal parts where estimated in a very high price.

I traveled to Los Angeles and acquired the remaining parts (metal kit, metal parts, UND tape, landing gear). I returned with approximately 100kg of materials in my baggage looking forward to meet Brazilian customs officers.

Construction went normally, with usual mistakes. I have two spare winglets...

Plans are clear and easy to follow. The Canard Pusher complements all necessary information. Burt Rutan did a marvelous job.

The PP-ZFH did its first flight June 7, 1988. 80 hours already with no incidents. PP-ZFH is the first Long-EZ built and flying in Brazil.

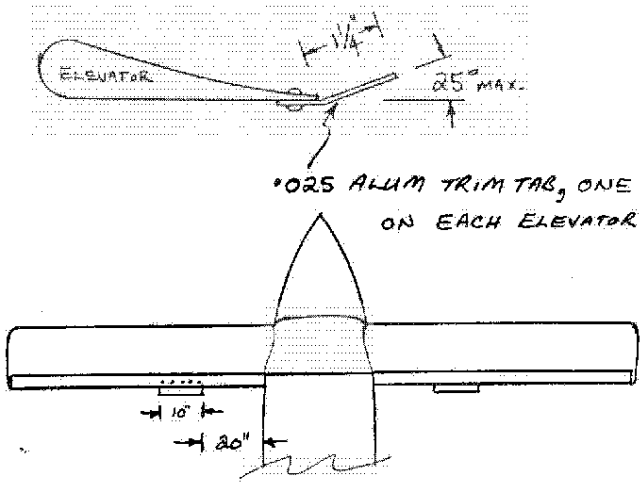
Francisco Honorato de Oliveira"

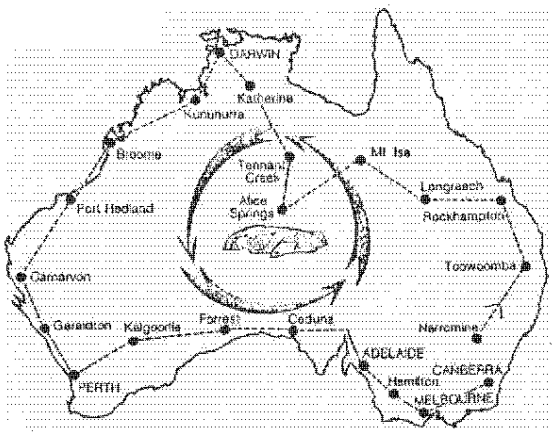
"Dear RAF:

I now have about 200 hours on Long-EZ N88LE which was completed in June 86. I have been very satisfied with its book performance and reliability. I was pleased to receive "best homebuilt" at the Eastern Regional Fly-In in Orange, Mass. this past June 88. My most memorable "incident" occurred while flying on a cross-country a few months ago. While over Michigan, shortly after I had switched tanks, the engine went silent and could not be restarted. I was vectored by Grand Rapids to Sparta Airport. The Long-EZ is truly an excellent glider when the chips are down, and handles nicely. Water was found in the gascolator and was found to have come from the tank filled at the last fuel stop. I don't know how this could have been prevented. The suggestion of being within reach of a landing site when switching tanks or having plenty of altitude certainly holds true. I would also like to mention that when I constructed the EZ, I installed a fuel filter after the electric fuel pump. Even though I was extremely careful to keep the wing tanks cleaned at all times during construction, I am still finding very small (1/32 inch dia.) pieces of blue foam in the filter. I have found extremely small trace amounts also in the carburetor filter. I am convinced that frequent inspection of the carburetor filter is critical, and I would recommend the additional filter. I installed it so that it can be viewed easily before flight, and can be easily removed and cleaned.

Keep up the good work with the CP. I've found it to be an invaluable "extension" of my Long-EZ.

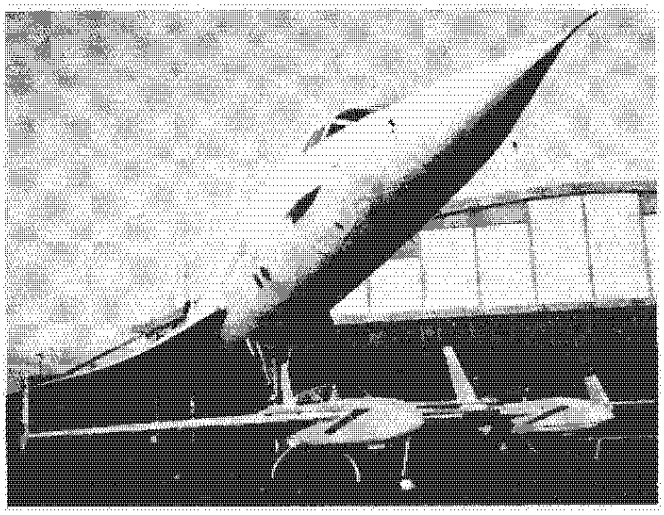
Bill French"



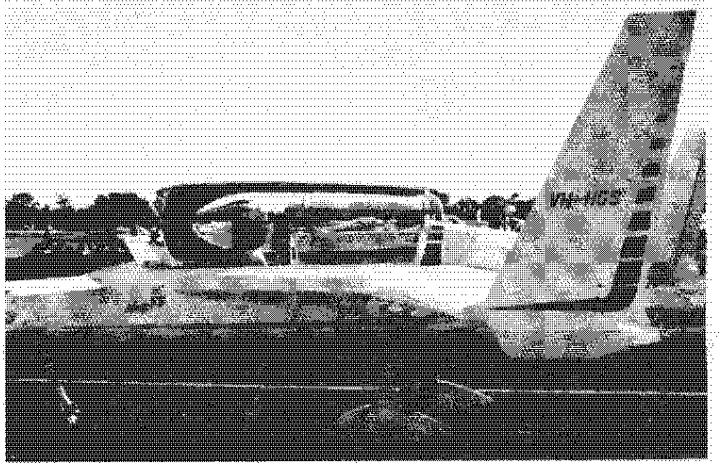


Magna Liset and Wayne Johnson's 6100 NM course around Australia.

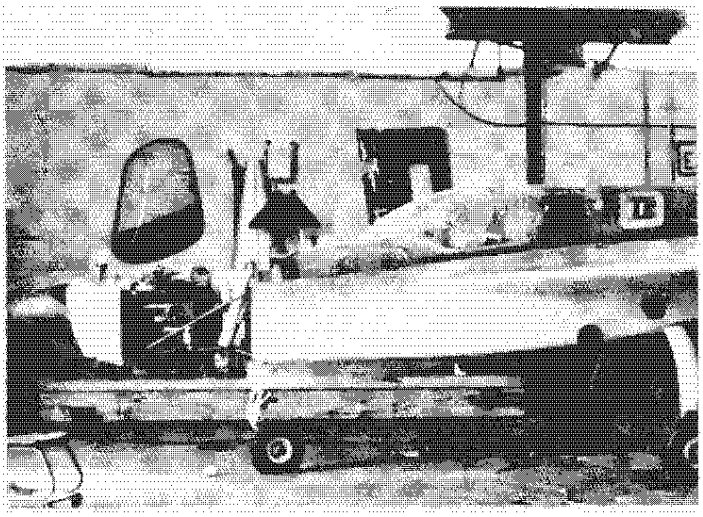
Left-Wayne Johnson, Right-Magna Liset with their trusty "Round Australia: racing steed.



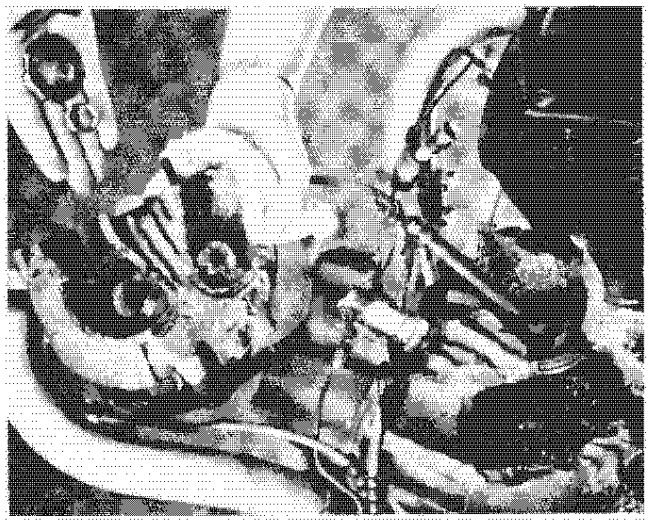
Not many of us get to park under a Concorde! Gerad Castaing and friend do.



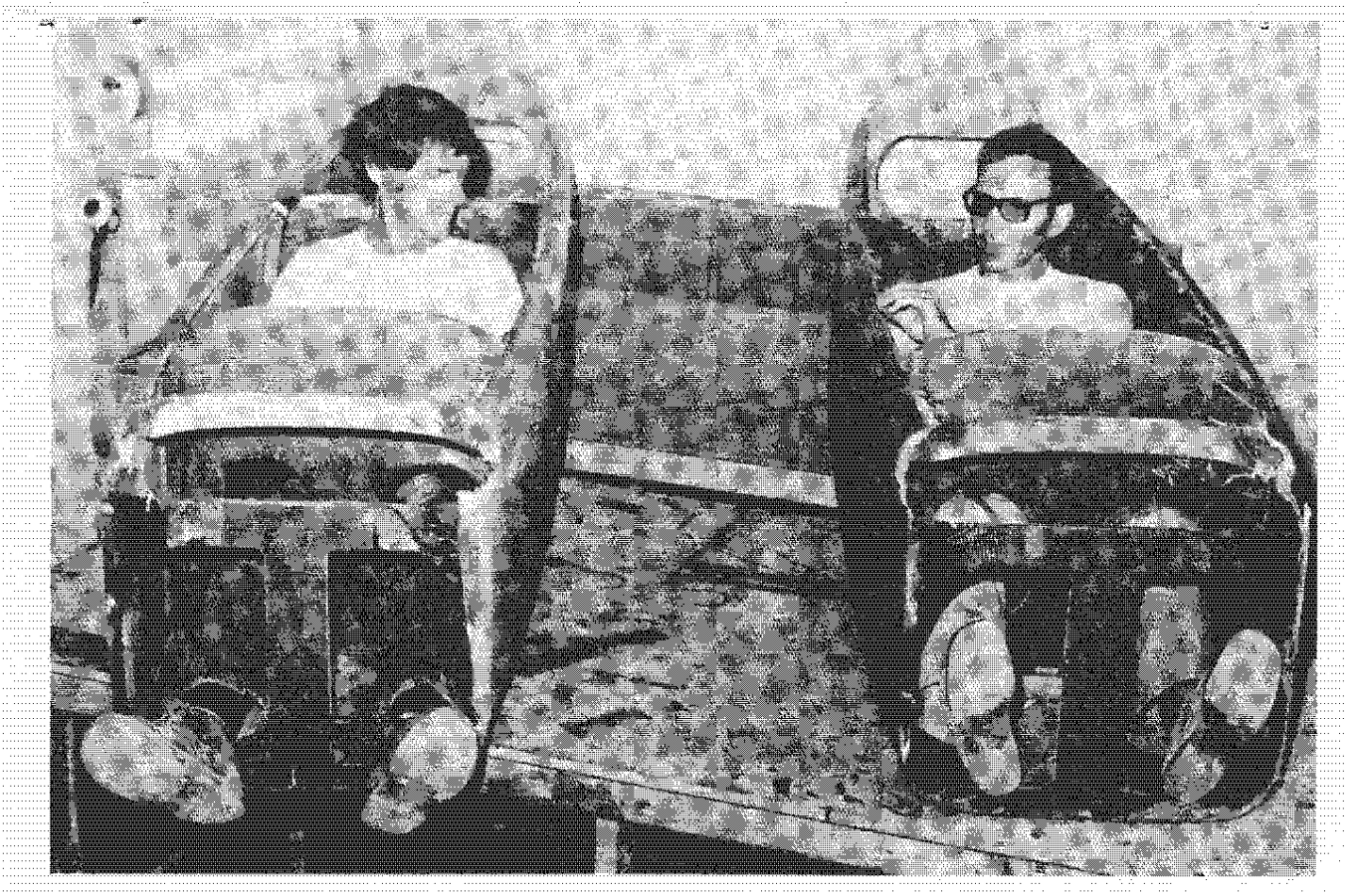
Murray Bridge taxiing his beautiful, new Long-EZ - Nifty paint scheme!



Bayard DuPont's Defiant - What in the world engine is that? A radiator, too - surely not.

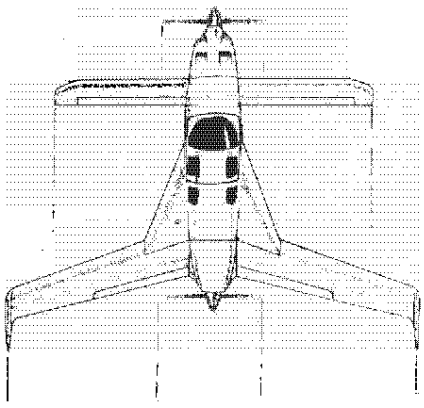


Long-EZ Pilot's nightmare come true! Joe LaCour's 0-235 engine after dropping a valve. Yes, he did glide back to the airport and greased it on the numbers, prop stopped. It's enough to make you change oil more frequently!



A LITTLE NOSTALGIA!
Dick and Mike flying their new Long-Ez's in close formation around the shop! Circa 1980

Rutan Aircraft Factory
Building 13, Mojave Airport
Mojave, CA 93501



first class mail

TO:

April '89

The line which appears above your name lets you know through which Canard Pusher you are paid. If your label says **LAST ISSUE CP 59**, then this is your last issue, and you need to renew.

CP 59