



# The Seawind Flyer

Winter 2006

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*The evolution of an intelligent design*

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## LET THE FLIGHT TESTS BEGIN

Last August 31, the Seawind certified test article made its first flight and we looked forward to forging ahead with flight testing. Two weeks later a clicking sound was heard in the wing attachment area. Even though we were confident it was not serious, it could not be ignored, so the wings were removed from the aircraft.

Normally in flight testing, you make one change at a time and then flight test. That way you know what each change did. In this case, we found no smoking gun. We saw five or six minor areas that could cause such a sound. We documented and modified all of them and put the wings back on the aircraft. The noise was gone and so was a month of time.

Because of glitches such as this and record rains, we got in only a few days of testing in early fall. When the test team was satisfied that the basic envelope had been successfully explored, the decision was made to head south. Then we sat for seven days waiting for a break in the weather. On Saturday, November 18, I left Saint-Jean in N46SW with the test aircraft (TA-1) C-GDBS just 15 minutes behind me. We both cleared U.S. Customs at Burlington, Vermont.



*The two Seawinds enter the USA.*

I headed south and TA-1 went to the Midwest where it will spend the Christmas holidays. It will then go to the Southwest during January and February. By that time, we hope to have completed VFR testing.

These delays are very exasperating for us and for our customers. Many delays were our own fault; others, like the weather, we cannot control; as for the rest, I have no answer. They just happen.



*The spin chute will remain on the plane until the spin testing is completed.*

I recently read an article about Eclipse, which has just run into more problems and delays. I believe they are now more than four years behind schedule. This is not intended to be disparaging about their efforts. It is intended only to show that despite all the hundreds of millions of dollars and all the experts they employ, certification of an aircraft is a monumental task.

I have been flying the experimental proof-of-concept (PoC) version of the Seawind for 13 years with devices and hardware that, although proven reliable all these years, are not permitted to be used in certified aircraft. We've had to replace these items with more expensive parts that require modifications to the aircraft in order to be implemented. Each change results in a mountain of paperwork that must be prepared to document the change. We knew this would not be easy because we knew how difficult it was to develop the PoC version. Despite years of experience, I still underestimated certification. What should be a quick and minor modification or installation, for certified aircraft, requires weeks or more of time.

Hopefully, there are not many glitches left.

## SOME FLIGHT TEST RESULTS

We will advise you when we have documented performance results for certification. We will not project, speculate, or exaggerate performance specifications. All tests start at five percent over gross weight at 3,570 pounds to allow for fuel burn. The Seawind gross weight is 3,400 pounds.

~ Flutter – TA-1 has been configured as determined by the ground vibration test and per the recommendations of the FAA designated engineering representation (DER). It was flown at

$V_{NE}$  (never exceed speed) and reported to be rock solid. It still has to be flown at  $V_D$  (dive speed) +10%, which is 20% faster than  $V_{NE}$ .

~ Stall speed with flaperons on the PoC Seawind was 59 mph at 3,200 pounds and approximately 60 mph (52 knots) at 3,400 pounds. The stall speed with the certified Seawind without flaperons is 54 knots at 3,400 pounds. The flaperons give a lower stall speed but add more friction to the aileron circuit, which requires increased maintenance to lower friction for the ailerons to return to neutral. However the flaperons cause adverse yaw to be compensated by ample rudder. The Seawind has very good ground effect because of the wing and sponson design as well as the flat plate hull. Both configurations land at about 55 to 58 knots.

For these reasons, we have decided to disconnect the flaperon mechanism and continue the flight testing. Without flaperons, the autopilot should not require a yaw damper. That will save our customers about \$4,500 and five pounds. The cruise speed appears to be as predicted, but we cannot tell how much it will increase when the spin chute is removed.

~ Crosswind Landings – The certification requirement for crosswind landings is a 90° crosswind equal to 20% of stall speed, i.e., 10.8 knots (12.4 mph). It has been met. I have made crosswind slip landings in winds almost twice as strong.

~ Brakes – The specialized brakes designed for salt water have been tested holding the Seawind at full power.

~ Ailerons – The ailerons meet the stability and roll rate requirements for certification.

~ Air Rudder – The pilot has found the rudder to be very effective. The spin test will be the determining factor.

~ Elevator – The elevator easily raised the nose on a land takeoff roll at maximum weight, which is the most demanding test.

~ All of the controls, when released, return to neutral as required for certification.

~ Landing Gear – The trailing link landing gear is very smooth and forgiving. The Seawind is the kind of aircraft that will be used on unpaved or gravel runways. This landing gear makes it possible.

The Part 23 flight test requirements are exhaustive. Any aircraft that passes all these tests is as safe as man can make it. The Seawind is one of the strongest aircraft with the versatility to make gear-up landings on numerous surfaces. It can land on water, snow, a swamp, a plowed field, a corn field, soft pasture, etc.

The rest is up to you. Pilot training, skill, safety, and good sense will make the Seawind a safe, versatile aircraft.

## MEANWHILE BACK ON THE GROUND

Believe it or not, other testing continues as well.

~ Wheels & Brakes – The wheels are being tested for 1,000 miles at full gross and 100 braking tests also at full gross.

~ Damage Tolerance Testing – Damage tolerance testing (fatigue testing) of the stabilizer and wing will continue for months. The

test articles have numerous disbonds and intentional damage at the highest stress points.

Fatigue testing is more critical for an aluminum aircraft where damage propagates. Fiberglass aircraft do very well with redirecting stresses around holes or other damage. Static load tests are the most critical for fiberglass structures and we have passed them all.

A recent static load test on the wing spar root end exceeded ultimate load by 33%. Other tests on the Seawind combination bond joints showed them to be 71% stronger than an adhesive-only bond joint. By the way, the adhesive bond joint tests were 37% stronger than ultimately required. For those of you who are not familiar with aircraft design, the ultimate load is 150% of the maximum expected load.

## ...AND BACK AT THE FACTORY

Now that the TA-1 is gone, our concentration is on production start-up and completing the tooling to increase efficiency.

The second test aircraft (TA-2) will be used for the IFR, autopilot, and FADEC certification. We met with the representative from Aerosance to work out the details of the installation. Aerosance developed the FADEC system and is now part of the Continental Motors organization.

The installation is nice and clean even with the long distance from the control console and the tail mounted engine. We have decided to use a separate lever for the throttle and rpm instead of linking the two together. The reason is that the rpm can be set at high on the approach and, if a go-around is executed, only the throttle need be advanced. There is no mixture lever with FADEC.

We were told that there will be at least a 15% reduction in fuel consumption and a five percent increase in take-off power.

The production templates and jig are being finalized with the second aircraft. At the same time, we have been building subassemblies for testing. The composite parts for the third aircraft will be completed this month. The fourth aircraft is for the first independent customer. It will start production in January.

All our molds, jigs, and fixtures continue to be built in-house, and we should have a complete complement of tooling by April. Thereafter, we will make duplicates as needed to support targeted production levels.

## THE BUILDING KEEPS GETTING BETTER

We were very fortunate to have found the facility we have at Saint-Jean-sur-Richelieu. It has 80,000 square feet of floor space. The building, constructed in the late 1950s, is a substantial structure. We have been gradually making improvements to support production: first, with temperature controlled fiberglass manufacturing rooms; second, with a cutting and trimming room, a glass fabric cutting area, and a resin mixing area. We now have a 45-foot-long paint spray booth, and we are establishing a metal working area and production support areas.

The building had 10 rolling steel doors on the east side, 12 on the west side, and was almost impossible to heat since the doors face the prevailing winter winds. Last year we replaced the 22 rolling



*It keeps getting better.*

12-foot-wide door panels with two 70-foot-wide bi-fold overhead doors. What a difference.

We just completed the installation of curbing, drainage, and top-soiled areas, which will be landscaped next spring. We also plan to improve the center office and entrance area. New paving was installed in the front, and the side parking lot is scheduled for repaving next year. Although improvements have been gradual in order to preserve capital, the place is really shaping up.

The city of Saint-Jean has welcomed the Seawind project and has helped us in many ways to make the program successful.

Richard Silva

## PRICE INCREASE

We have been reviewing the cost increases from our suppliers that are the result of inflation as well as the exchange rate of the U.S. dollar. In addition, we have been forced to include some costly items in order to achieve certification. We are continuing to hold down cost. The Seawind amphibious retractable landing gear aircraft is still priced less than the popular fixed landing gear composite aircraft. The price of the basic aircraft will increase to \$336,900 on January 15, 2007 and will be held until the completion of certification flight testing, now expected to be in March 2007.

## SALES

Sales of the Seawind 300C continue to grow at a steady pace. We currently have 85 deposits and expect to have several more before the year's end. If you have been considering purchasing a Seawind, know that there is not much time remaining to take advantage of our current **no risk deposit** program. Your \$9,000 **no risk deposit** goes into an interest bearing escrow account in your name and entitles you to a demo flight in the production Seawind 300C. If for any reason the demo flight does not meet or exceed your expectations, your deposit will be returned with interest. You have nothing to lose. Time is running out for this pre-production conditional sales agreement. Once the Seawind is certified, we will no longer be offering the **no risk deposit** program. Expected delivery dates are now into mid 2008. To reserve your delivery position number, contact Dave Arnold at 610-384-7000 or [darnold@seawind.net](mailto:darnold@seawind.net).

The time has come for us to start contacting customers who will be taking delivery of the first production Seawinds to come off the line. These customers have started to receive the Owner's Guide of Options and Accessories. This is a guide to assist you in determining the options and accessories that will meet your needs. It is also intended to become an ongoing product devel-

opment and customer service guide. As always, please feel free to contact us with any questions or comments.

## SEAWIND REFERRAL PROGRAM

Seawind customer referrals are our best advertising. We encourage you to refer friends and associates to us. If the referral is a new lead for us and results in a sale, Seawind will pay you a finder's fee. The referral must be a personal acquaintance and not a name from an organization's mailing list.

If the referral results in a sale, Seawind order holders will receive \$750 when the aircraft is delivered or, instead, owners may elect to reduce the cost of any Seawind accessory or service by \$1,000. Non-Seawind order holders who refer a lead that results in a sale will be paid \$500 upon aircraft delivery.

Take advantage of the Seawind Referral Program by telling friends and associates about the world's most versatile land plane and the world's fastest seaplane. We have a referral form that will need to be completed and returned to us. Give us a call to request it or see your Owner's Guide for the Seawind Referral form.

## SUN-N-FUN 2007

The 33<sup>rd</sup> Annual Sun-n-Fun Fly-In will be held April 17-23, 2007, at Lakeland Linder Regional Airport in Lakeland, Florida. Activities during the week-long event include more than 400 educational forums and hands-on workshops and more than 500 commercial exhibitors showcasing their latest and greatest in aviation related products and services. There will be an air show at 2 p.m. each day featuring many of the world's top aerobatic performers and an evening air show on Friday, April 20.

For Sun-n-Fun 2007 we are making special plans as we will be introducing the certified production Seawind 300C. The Seawind team will be there all week at exhibit spaces N-020, N-030, and N-031. Our full display area will feature the certified production Seawind 300C. Plan on joining us Friday evening when the Seawind team will be your hosts for a reception at our exhibit area. Refreshments will be served. We look forward to seeing many of you there. For more information, go to [www.sun-n-fun.org](http://www.sun-n-fun.org).

It's never too early to start making your plans for EAA Airventure Oshkosh. Next year's 55<sup>th</sup> annual event will be held July 23 through 29, 2007.

David Arnold

## GEAR-UP LANDINGS

One of the greatest concerns of pilots who fly retractable gear aircraft is landing with the gear up. As we have stated many times, a great advantage of the Seawind is the sacrificial center keel. With landings on grass, snow, soft earth and, of course, water, there will be little or no damage in a gear-up landing. Our landing gear position reminder system should help you to remember as well. We will publish details on our warning system in a future Flyer.

The following article appeared in the July 2006 edition of *The Aviation Consumer* magazine and is reprinted here with their permission.

# What a Gear-up Costs

*Even for a modest single, the bidding starts at \$40,000 or 20 years worth of premiums. Insurers always pay but so will you in higher rates, betterment and for hidden damage.*

By Jon Doolittle

It's a groaner we've all heard: There are those who have and those who will land with the gear in the wells. The notion is absurd, of course. All of us know plenty of pilots who've retired from flying having never scratched an airplane, let alone scrubbing the antennas off with the million-dollar runway slide.

Gear-up landings happen to pilots of all experience levels, but there's good evidence that it tends to be a high-timer type of mishap for reasons we don't fully understand. Landing gear accidents are more of an embarrassment than a serious safety problem because people rarely get hurt and the airplane is (usually) repairable. But gear-up landings represent a substantial percentage of the cost of flying, not only to insurers, but to owners and pilots. We can't tell you exactly how much it will cost if you land with the wheels up, but we know from unfortunate history what will need to be replaced. As shown in the charts on page 21, the financial carnage is staggering and as an owner, you'll pay for some of it. In gathering numbers for this article, we spoke with shops around the country and looked at a range of light general aviation airplanes using actual repair

invoice totals. Gear-ups are more expensive than ever.

## **BENT METAL**

Gear-up landings begin with the violent meeting of propeller and pavement, which requires the removal of the prop and the engine, referred to as R&R (removal and reinstallation). Most shops that do a lot of this work have either a flat rate, depending upon the engine type, or else a good idea of how much time each R&R will require.

Propellers involved in these accidents can rarely be repaired, so there are three possibilities: If one is available, you may opt to replace it with a used overhauled prop. But since shops are often required to scrap the hub as well as the blades, the supply of used propellers is dwindling.

Option two is to replace the propeller with a new one of the same type from the original equipment manufacturer. These are generally available but can be expensive. Choice three is a new STC'd propel-

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***Gear-up landings represent a substantial percentage of the cost of flying, not only to insurers, but to owners and pilots.***

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ler, which is available for most airplanes and is priced between new OEM replacements and used overhauled props.

Because most variable pitch props are made by either Hartzell or McCauley, one is usually the OEM and the other competing with a lower cost STC'd challenger. We think the STC props are a good value, but we would urge owners considering one to ask around among other pilots with similar airplanes who have made the change to see what they think. Unlike propellers, engines can usually be saved after a gear-up landing, but require a teardown inspection, including examination or replacement of a number of engine-driven accessories, including vacuum pumps and magnetos. Some shops quote with these items included and some don't. Always ask.

The teardown inspection focuses on the bottom end of the engine and the cost varies with type and size of engine, with the number of cylinders the chief variable in teardown price. A typical teardown quote includes a flat labor charge as well as a list of

parts that must be replaced in order to legally assemble the engine.

The final invoice will include parts and labor associated with any other damage found during the inspection which is not related to the gear-up landing, but which must be addressed before assembling the engine, such as corrosion, a distressingly common finding typically not paid for by insurers. (More on this later.)

In addition to the teardown cost, you'll have damage to other parts of the airplane, mostly those components that took over for the tires. This varies with the type of airplane and how well the pilot finessed the landing. When airplanes skid off the runway and encounter signs, lights or trees, the ante goes up. Pilots who flip the gear switch down midway through the event find that the gear motor won't pick the airplane up but will be strong enough to do a great deal of damage to the retraction system.

The big damage cost variable is type of airplane. Some types have most of the damage confined to a few easily replaced components. Several shops that we talked to told us that Bonanzas often ride down the runway on the nosebowl and the step, grinding away the inboard corner of the flaps, nosebowl and the bottom of the step, doing little other damage.

Another shop said that Cessna 210s tended to cost more to repair since they slide along on the belly, requiring a great deal more sheet metal work, new antennas, gear doors and the like. Twins will obviously cost more to fix because there are two props and two engines. Amphibians are the other side of the landing-gear accident coin. Forgetting the gear in an amphibian when landing on land usually leads to a very short landing roll, some scraped paint and not much else. Often, the keel strips don't even need to be replaced. The big no-no in amphibians is extending the gear before a water landing, the dreaded "gear-down" landing. This ends with the airplane pitching forward and capsizing. In salt water, this usually leads to a total loss. And it's one type of landing-gear accident where people can and often do get hurt.

## WHO PAYS?

While insurers bear most of the immediate burden for these accidents-and it's a big number-they know about how often it's going to happen and how much it will cost. They have collected their money in advance, have it set aside earning interest and are just waiting for the phone to ring. This isn't the case for owners.

The first cost that an owner bears is his in-motion deductible. These typically range from \$0 to \$2500 for landplanes and are substantially more for amphibians, frequently as much as 10 percent of the airplane's value.

Another expense some owners have to pick up is the cost of "betterment." Insurance contracts are meant to restore the airplane to the same state it was in before the accident. If repairs result in increasing the value of the airplane, insurers may ask the owner contribute to the extent that the airplane has received betterment.

Like engines, propellers have recommended intervals between overhauls, expressed either in hours of service or years installed. Unlike engines, propellers aren't normally repairable, but must be overhauled or replaced with new units. This is where betterment raises its head.

Here's how it works: If you have a propeller with a 1500-hour TBO and you land with the wheels up when it has been in service for 1200 hours, your insurance payout will give you a zero-time propeller. But your insurer may ask you to chip in 4/5ths of the cost of an overhaul. Bear in mind that the pro-ration is based upon the cost of the overhaul and not the cost of the replacement propeller. In the world of gear-up landings, the prop shop's overhaul price is largely irrelevant except for this calculation.

Some insurers prorate propeller overhauls and some don't. Most told us they didn't bother unless the propeller had high time or was run out when it was damaged. Several adjusters told us that they had fairly wide latitude in settling claims and that often, the way they approached a claim depended upon the attitude of the owner. Most said that they give more consideration to a pilot who's reasonable to deal with, who

admits his mistake and seems to have learned something from the episode.

Engine damage not related to the gear-up that's discovered in the course of a teardown inspection is also the owner's burden. Engine shops told us that they found unrelated damage in 70 to 90 percent of the engines that they tore down, ranging from minor corrosion to cracks in the crankcase to killer ADs that required replacement of major components. The amount of damage found tends to increase as the engine accumulates time since its last overhaul. In our example, we assume that both engine and propeller have 1000 hours since the last overhaul.

## LOST VALUE

Another item to run up the cost of a gear-up is the loss of resale value due to damage history in your logbook. Until you sell your airplane, this isn't a cash cost and the size of it depends on several factors. In general, older airplanes take less of a damage history hit, since a larger proportion of similar airplanes have also been damaged at one time or another. Other factors include the kind of damage that the airplane suffered, the way that repairs are done and the reputation of the shops that did the repairs.

Replacement of parts is less an issue than repairing the same parts. But regardless, an airplane that has suffered a gear-up landing will bring a lower price than a similar serial number that has not, so sooner or later, that cost will become real. In the chart, we used 8 percent of the *Bluebook* value for airplanes built in 1990 and 6 percent for those built earlier.

Owners who have gonged their insurers for gear-ups can expect to pay higher insurance premiums at their next renewal and for a couple of years afterward. Most companies told us that they looked for rate increases that ranged from 10 to 25 percent. One company told us that if the owner had suffered his first slide and had been with the company for a number of years, they often didn't increase premiums after a gear accident.

In general, most other companies who would otherwise compete for your business will refrain from offering

quotes the very next year so that the company that paid the claim can get at least a token return. Typically, insurers will fork over between 10 and 25 years of premium in a typical gear-up landing, so they know they can't recover much of it from you. Nonetheless, expect higher premiums for the next couple of years.

The most painful cost for owners who fly often is the loss of use during repair. Repair time depends upon how badly the airplane was damaged, but also how quickly everyone involved steps through filling out forms, reviewing repair bids and sending out components for repair. Often, the process is held up by the availability of a propeller or other part, or by backlogs in engine and prop shops. The duration of the repairs also seems to vary according to where in the country repairs are being made.

One adjuster told us that there weren't as many shops doing major repair work in the northeast as there were 10 years ago and he has had to ship damaged airplanes south or west for repairs. It's also our impression that airplanes get fixed more quickly in those parts of the country.

We based our estimates on time out of service on conversations with shops, insurance brokers and adjusters. We think that three months is typical for a garden variety gear-up landing, given the amount of work that the repair shop has to send out.

## FLYING AGAIN

Another cost to keep in mind is the price of getting back in the saddle. After not flying for three months or more, budget some dual. Your insurer may require it and if they don't, it will help with your renewal if they know you're trying to make yourself a safer pilot.

Keep in mind that not all of the costs in our chart will apply to you. Not everyone has deductibles and many insurers won't pro-rate the life on your propeller. Not every engine will have unrelated damage. But these are real numbers, taken from real invoices and, in the aggregate, this is what we think will happen. If you find yourself in this situation, there are some things that you can do

to minimize the damage to your wallet. First, be mindful that all claims situations are negotiations. Be prepared for some give and take. Most adjusters will do whatever they can to help if they feel that you're being reasonable and taking responsibility for what happened. Adjustors have seen hundreds of gear-up landings. If you forgot to put the wheels down, just fess up. They have to pay, either way.

Be involved in the process of getting your airplane back on its feet. We can't stress this one enough. In even the most straightforward claims, there are decisions to be made. You're the one who has to pick the shop to do the repairs, the engine facility for the teardown and the prop shop. If you aren't sure where to start, ask the people

who maintain your airplane. If your engine is beyond mid-time, it makes sense to apply the insurance teardown money to an overhaul. Maybe it makes sense for you to spend an extra \$1000 to upgrade from a used overhauled version of your old propeller to a new STC'd propeller.

Each step of the way, look at your options. Think about how each decision will affect the overall cost of repairs, the time it will take to do them and their effect on your airplane's resale value. Make certain that your insurance company is in agreement with your decisions before you execute them. If there are items that each of you will pay for, make sure everyone is clear on who is paying how much for what.

If you bought your insurance through an

aviation insurance broker, get his or her help. Unlike auto or homeowners insurance agents, brokers are literally your paid representative rather than an agent of the company. Claims advice is part of what you have paid commission for and the good specialists have been through the drill many times.

If you do suddenly find yourself on the other side of the line between those who will and those who have, remember that as bad as you feel about it, your flying life will continue. As long as airplanes are flown by human beings subject to distraction, complacency, fatigue and forgetfulness, there will be those who have, and those who hope they won't.

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Another year is over and we all have so much to be thankful for, even though we have not met our date. We are confident and pleased that we are bringing you the best possible amphibian.

We have a great group of customers and interested followers. Our customer list continues to grow. We've received many messages of encouragement and thoughtful comments, for which we are so grateful.

Again our sales office will be open on a limited basis between Christmas and New Year's Day.

All of us at Seawind USA and Advanced Aero and Flight Dynamics in Canada wish you and yours a joyous Christmas, happy holidays, and a prosperous new year.



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