



# The Seawind Flyer

Winter 2005

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## THE EVOLUTION OF AN INTELLIGENT DESIGN

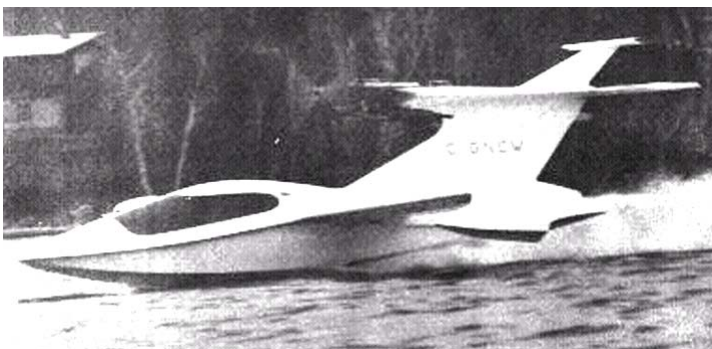
Even the simplest aircraft design undergoes some change from the drawing board to the flying aircraft. Each aircraft is designed for a specific mission, and the objective is for it to perform its design function very well. The remainder of the flight envelope is a series of compromises which have to be performed safely.

The very fact that airplanes fly, dictates most of the physical form and features. That is especially true with general aviation certified aircraft. The experimental and kit built market has developed some unique unconventional aircraft configurations, but these designs generally have not been certified.

All aircraft are an assemblage of compromises. In particular, amphibians throughout the years have had to make even more compromises. In order to operate on water, and especially to leave the water, amphibians must adopt a shape which is not aerodynamically efficient. As a result, seaplanes have always been slow, and have had poor handling characteristics. In an attempt to increase speed, most designers have sacrificed space and comfort. In an attempt to increase payload, they have sacrificed range, accessories and amenities. I read about a trip involving two people in a Seabee through northern Canada. They removed the landing gear so that they could carry enough provisions to last a week.

The result of the compromises for amphibious aircraft have also resulted in awkward and cumbersome looking aircraft that were neither good fish nor good fowl.

Then along came Roger Creelman; a carpenter in Ontario Canada, Roger was not only good with his hands, but also had a keen eye for aesthetics and artistic composition. His objective was to create a fast, affordable amphibian.



*The beginning of a vision*

According to test pilot, Mr. Bruce Sinclair, "The first hull that was developed never flew, since it would not get on the step."

When the first aircraft was ready to fly, Sinclair said, "It was a very short hop as it became very evident that the aircraft had many controllability and fundamental design issues." Sinclair left them with a long list of suggestions.

After three days of frantic work, he was called back to try one more flight. According to Sinclair, "This flight lasted only a few seconds, as the aircraft was virtually uncontrollable from lift off... The aircraft dove nose first into the icy water...The aircraft was designed with lots of floatation and was very strong."

"At this point, Roger and Len (his brother) decided to enlist the support of the National Research Counsel in Ottawa...The airfoil on the first aircraft was one of Roger's design... and was simply what Roger had envisioned as what a pleasing and efficient airfoil would look like!"

Despite the mistakes and mishaps, a beautiful design began to emerge.



*The features undergo refinement.*

What followed was the selection of a NASA natural laminar reflex airfoil, NLF (1) - 0215 (F), which was developed for its gentle stall characteristics. It has low drag when the flaps are retracted - 10° up in cruise.

During a rebuild, Roger achieved the final design, which, except for minor details, is the aesthetic of today's Seawind.

The Seawind is truly an artistic composition. It is a sculpture; it is the epitome of form following function. If you look closely, you will notice a break line which continues from the forward hull line to the aft hull line, and diminishes the visual impact of the step discontinuity.

Another subtle line on the leading edge of the vertical tail, just behind the engine cowling, carries the eye up to the dorsal fin on the top of the tail. The trailing edge of the air rudder completes the visual line up to the trailing edge of the fin. These design details actually increase drag, but they tie together the entire

composition. The swept back sponson (balancing floats), on the wing tip gives the illusion of speed, even when the Seawind is standing still on the ground.

The finishing touch is the one piece wrap around windshield, which gives the classy Seawind its futuristic look.



*The creation of a classic design.*

IT IS TRULY AN INTELLIGENT DESIGN and we applaud the artist.

It was about this time that I first saw a picture of the Seawind at the 1986 Oshkosh airshow. Having had a very slow Lake amphibian, I already had the water bug. I had to have a fast Seawind!

The fledgling company was having great difficulty in putting the kits into production. Roger Creelman was no longer a part of the company. I wanted to see this intelligent design go into production, so foolishly, I became a major investor. I say foolishly because I was not told, nor was I aware of the problems that needed to be solved, to make it a viable vehicle. It never happened.

I will spare you the gory details and go right to the next milestone. I took over the project in 1991 and moved it to the little town of Kimberton, thirty miles west of Philadelphia, Pennsylvania.

Before starting my own building design and construction company, I had worked in the design and construction of facilities for large aero space companies, such as Republic Aviation on Long Island, and General Electric Space Technology Center and Boeing Vertol Company in Pennsylvania, where I designed and supervised the construction of the Vertol V/STOL Wind Tunnel. The latter gave me the contacts and enabled me to put together a team of retired aircraft design engineers to get the Seawind underway.

At that time, I had very limited knowledge of aircraft and had to depend on the consultants, but I did give them two directives.

First – Do not change the design appearance of the Seawind. Second – Engineer it to be certifiable in the future.

When asked, “Did you design the Seawind?” I always say, “I wish I could take credit for designing the Seawind, but I can’t. My contribution was to keep it beautiful and to complete the development.”

So, at a “mini skunk works” in Kimberton, Pennsylvania, the evolution of the Seawind continued. I had learned that the Seawind was underpowered with the 200 HP Lycoming engine and the

two-blade prop and could barely get off the water.

It also had oil cooling problems, as can be seen by the trial and error cutting and patching prior to the maiden flight of the 200HP version in Canada during the summer of 1989.



*That is when I still had hair.*

We solved both problems by going to a slotted flap system for more lift; and changing to a 300 HP Lycoming engine with a three-blade Hartzell propeller.

We also found out that the prototype aircraft was a “one of”, i.e., there were no molds for the internal parts. The structure had to be redesigned as well as the landing gear, flight controls and the hydraulic and fuel systems. It took two years and two months to engineer and construct the first experimental kit Seawind. That is the Seawind I fly today.

All the consultants had moved on except for Ed Allen, our aero dynamist, who had supervised the team, Erwin Durchlaub, our structural engineer, who specialized in composites, and Charlie Morrell, who did most of the detail design drawing. Gus Geissinger, our shop foreman, and George Brisky, our business manager, along with Millie Bednar, kept the place organized.

It seems that every aircraft development project has its first aircraft crash, and the Seawind was no exception. The first kit had a reversible propeller, which did what was deemed impossible to do, and that was to reverse in flight. The test pilot and I descended in the Seawind on a 2 to 1 glide slope (10.9 to 1 is normal) at 3,000 feet per minute. We could not reach the runway, even though we were at 2,400 feet above the ground, and less than a mile away. His choices were to hit a building or a 45° embankment. He chose the embankment, which was covered with large flat boulders. We hit the embankment at about eighty miles per hour and pitched up 45° in less than six feet and slid up the hill and back down the other side. We survived a 20g landing.

The Seawind made me a believer in the strength of fiberglass composites. If the Seawind had been aluminum, I would not be writing this journal.

The aircraft sustained damage, but did not have one hole completely through the hull.

We replaced the hull and vertical tail but we were able to reuse the wings, horizontal tail, engine mount and engine, as well as

all the flight controls and control surfaces which were reinstalled on the new hull. That aircraft flies today, with over 2,200 safe hours, 1,200 water landings and numerous flight tests and demonstration flights. We did get a lot of valuable information from the accident, and gained a lot of confidence in the strength of the structure. I just wished that there would have been a safer, cheaper way.

After the reverse prop accident, Charlie, Gus and I set out to make the Seawind easier to manufacture for a realistic price, and easier for our customers to assemble.

Please bear with me, for I would be remiss not to pay tribute to some very dear people.

My brother-in-law, George Brisky, was the business manager until his sudden death from a heart attack while on vacation. Gus Geissinger made a major contribution to the evolution of the Seawind until he succumbed to cancer. The Seawind would not exist today without the efforts of Charlie Morrell, who suffers from a debilitating stroke. I owe them, and many others, a debt of gratitude. We miss them everyday.

### THE EVOLUTION CONTINUES

Every aircraft, bar none, have problems when they first roll out the door. Again, the Seawind was no exception. It had always been my plan to refine the Seawind in kit form when we could make changes quickly and easily. Charlie, Gus and I spent a few years refining things like the fuel system (which has been failure free), the hydraulic system, engine cooling baffles, and the semi-tuned stainless steel exhaust system, to name a few. Besides all the refinements, we also developed an excellent cabin heating and fresh air system, power assist nose wheel steering, removable pin mooring system, unique water rudder, boarding steps, a long-range fuel system with provisions to balance fuel, and very effective concealed spray rails. We also reshaped the hull bottom to improve the water handling characteristics.

### THE KIT BUSINESS

The kit company delivered 135 full kit aircraft to the customers. To date over 74 have flown and most of the remaining aircraft are under construction.



*The fleet of home built Seawinds grows every year.*

The vast majority of the kit customers are great people who are very responsible, and enjoyed the building process. Many of the Builders contributed constructive ideas and provided meaningful feedback during our development program. Above all, they en-

joy flying their Seawind.

I would be less than honest if I did not mention the small group who are irresponsible by making major changes to their aircraft without proper engineering and judgment. They made all manner of changes including 50% to 100% increases in power to a high thrust line amphibian. Many made changes to the fuel system, almost all of which resulted in fuel starvation. At the same time four of our customers violated their contract and tried to copy the Seawind design.

Quite frankly, there was no future and diminishing pleasure in providing kits to customers.

### CERTIFICATION

The natural evolution led to certification of the Seawind.

Many little details and a few major improvements could not be made to the kit without a major investment in new molds and tooling. Those items were carefully noted, sketched and archived. All new molds and tooling would have to be built before the Seawind could be certified.

The evolution continued as we incorporated the following in the certified Seawind.

- ~ We increased the cabin headroom by two inches.
- ~ We developed a totally mobile 26g crashworthy seat.
- ~ We developed a wing mounted trailing link landing gear.
- ~ We selected the 310 HP Continental engine and the Hartzell Scimitar propeller.
- ~ We will be certifying the FADEC engine control system.
- ~ We have improved the canopy seals and designed a secondary escape hatch.
- ~ The certified IFR Seawind will have lightning protection.

In addition, we have developed a retractable water motor, which can be used for docking, backing up and complete maneuverability on water with the big engine shut down.

Even as we near completion of certification, plans are under way for the further development of the Seawind.

### WHAT THIS EVOLUTION PROMISES

- ~ Our first certification objective is day and night VFR.
- ~ It will be immediately followed with IFR certification.
- ~ Autopilot will be certified at the same time as IFR certification.
- ~ The FADEC engine control system will be incorporated in the second prototype.
- ~ The glass cockpit will follow the FADEC certification.
- ~ The diesel engine is the final effort on our current program.

Our policy is that we will make all future options or developments available to our early customers at the same price. The exception is changing to a diesel engine and a different propeller.

### IS THIS IT?

Every time we think we have run out of ideas, we think of more.

For the past fifteen years we have not run out of ideas, and I expect we will not change. Right now I can't think of any, h'mmm, except maybe for snow landings and take off provisions ...h'mmm.

## MEANWHILE BACK AT THE FACTORY

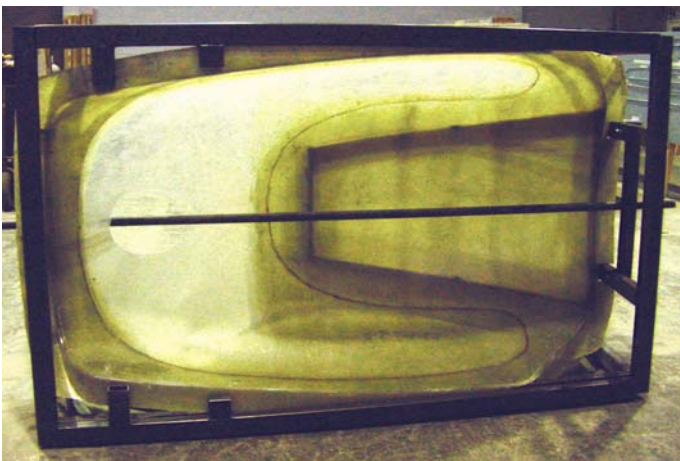
The Assembly of the first articles (certified flight test aircraft) continues. As the parts are being assembled, we have been refining our tooling and developing templates to be ready for full production.

The wings have been fitted to the hull as we get ready for installing the sponsons and the canopy.



*The flight test vehicles take shape.*

This was one of the most difficult fixtures to build because of compound changing shapes.



*The fixture for the distinctive Seawind canopy.*

The fixture locates the perimeter frame, plexiglass opening, hinges, latches and the hold open system, as well as the overhead fresh air duct and the new secondary hatch.

Even with the latest computer 3-D modeling system, we must carefully check every aspect of fit before production commences.

## THE TESTING CONTINUES

The structural and environmental testing continues and continues and continues.

**LANDING GEAR:** All the landing gear tests and attachment tests in the wings have been completed. We had to demonstrate and test a 2550 pound side load, a 3390 vertical load, and a 2750 braking force on each main gear leg. We have passed the tests.

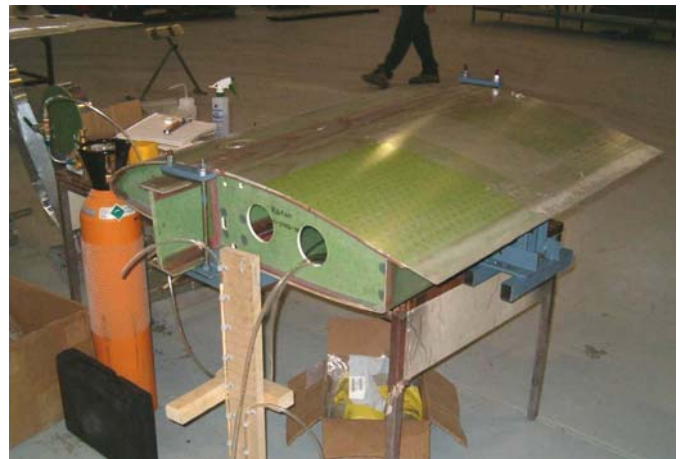
Additional tests to lighten the weight of the trailing link were done. We have passed the tests. The main strut is next.



*The trailing arm is now thinner with 1 top and 3 side holes.*

**THE WING:** The test wing has undergone forty-two days of high temperature and humidity, the application of ultimate load plus 10%, and testing at high temperature. Test loads as high as 8300 pounds per wing have been applied, as well as the landing gear test loads previously reported. That same tattered and battered wing has now been painted and transported to Lightning Technologies test facility in Massachusetts. As you read this Flyer, the wing is being zapped with lightning bolts in numerous places.

A **FUEL TANK LEAK TEST** had to be conducted because the Seawind has a wet wing. Vinyl ester resin is used in industry for



*Wing Tank undergoes pressure test*

fuel storage tanks. Unlike epoxy resin, vinyl ester resin is unaffected by any of the fuels, i.e., AVGAS, MOGAS, diesel, JET A, oil, hydraulic fluid, etc., as is the closed cell PVC core. You will never have to replace expensive or rubber bladder fuel tanks.

We had to build a major section of the wing, strap it to a shaker table two-thirds filled with liquid and shake it at a displacement of 1/32 inches, at a frequency of 2400 cycles/minute for twenty four hours. I am certain this condition could not happen in nine life times. Yes, it passed the test.

**HORIZONTAL STABILIZER:** Like the wing, the horizontal stabilizer is critical to flight, and had to be tested under the same environmental conditions. We did so to ultimate loads, plus 10%, with induced damages and disbonds. Every load condition had to be tested. With loads as high as 4200 pounds, we then tested with one of the four attachment bolts removed. Yes, it passed the tests.

**CONTROL SURFACES:** The ailerons, flaps, rudder and elevator must undergo static load tests to ultimate load. Ultimate load is limit load, 3.8g for normal category aircraft x 150%, which equals 5.7g forces. They must then undergo removal of the most critical hinge and be tested to limit load 3.8g forces. Of course, this is all done after forty-two days of conditioning at 140°F at 85% relative humidity. Yes, they passed the test.

**FUSELAGE:** The fuselage includes the vertical tail structure and mid deck. As with the wing test article, the fuselage/vertical tail has intentional damage induced at critical locations. All bond joints have a 1" disbond every 12" and have been conditioned at 140°F @ 85% humidity for forty-two days.

The horizontal stabilizer loads were induced on the vertical tail up to 1800 pounds, with rolling moment of 4600 ft. lbs. Yes, it passed.

We had to test the hull wing rear attachment with a side load force of 5800 pounds. Yes, it passed.

The hull was then tested for a bow landing on water with an up force of 12,000 pounds. (Seems to me it would have to be a submarine.) This is an incredibly high load, but it is very significant when you consider off field landings such as a farm fields. No land plane has to survive this kind of test.

Now to the tests often asked about; the engine and mount. The vertical tail and engine mount is designed to withstand the required special crash loads, i.e., 18g forward and 9g down. Other aircraft are 9g forward and 3g down. Yes, it passed the test.

Let's face it, anything will break if you crash it fast enough and hard enough, even the Seawind. Under those conditions, the vertical tail is designed to fail to the side, not forward.

The same severe crash loads will be applied to the engine mount in the tail. Forward forces of 9810 pounds and vertical forces of 4905 pounds will be applied. The limit loads will then be applied to the engine mount with the most critical main member severed. We will let you know the results when tested.

Why am I filling your mind with all these details and numbers? The purpose is to show you the incredible strength of the Seawind.

The first concern of all of us is safety. We had investigated the feasibility of installing a ballistic recovery parachute. It is not feasible for the Seawind because the engine and propeller are where the chute should be located. We asked about using two chutes, but according to BRS, two will not work, it would have to be one or three chutes.

As you can see from the types and number of tests conducted, the Seawind is the strongest general aviation aircraft available, and it has the most landing options. It can be landed on airports, roads, and firm turf with the landing gear down. Most importantly, it can be safely landed with the landing gear up on a soft field, plowed fields, corn fields, swamps, sand, snow, ice, and of course, water. If done properly there will be no damage and best of all, you will fly it again.

**Dick Silva**

## **WHERE ARE WE NOW??**

What a great summer and fall we have had! The interest in our aircraft has been expanding and gaining momentum; customers are becoming more serious and the buzz in the market is becoming louder and louder. Certification testing is continuing with a few hitches and frustrations, but positive movement overall. The concept Seawind, N46SW will be for sale in the spring of 2006.

**SALES:** As we reported in earlier newsletters, Sun n' Fun 2005 elicited a great response, resulting in six total sales and over sixty interested customers. EAA Oshkosh 2005 was a continuation of the great response, resulting in a total of sixteen sales and another fifty interested customers. We have sold a total of 50 at the writing of this Flyer and we're expecting several other contracts to be signed prior to the end of the year.

We are continuing to offer our 'no-risk' deposit program in order to reserve the current \$309,900 pricing. We will maintain the \$309,900 pricing until the sale of the 60<sup>th</sup> Seawind 300C contract. We have approximately 30 contracts that are in the hands of potential customers. We hope to sell our 60<sup>th</sup> by December 31, 2005.

## **FINANCING: UNITED STATES**

We are pleased to announce that we are able to provide qualified buyers with very attractive Seawind 300C financing from NAFCO. The terms are 10% down, financed up to 20 years at a fixed interest rate (currently 6.2%), with no pre-payment penalty.

## **CANADA**

The Bank of Montreal will provide our Canadian customers financing at 15% down for 15 years at a fixed interest rate (currently 6.3%), interest to be reviewed every 5 years. Even though aircraft can fly from country to country rapidly, financial institutions do not lend to aircraft registered in another country. As the Seawind sales spread to other countries, we will be seeking additional agreements with foreign institutions. We will also be appointing Service Centers to assist you.

## **THE OUTBOARD MOTOR:**

Many of you are familiar with the Seawind 300C docking/trolling motor, but we wanted to reprint the information for new

subscribers. Building the two-stroke, 2.5hp water-cooled motor into the nose of the Seawind 300C sounds simple enough but it was no easy task. The motor had to be modified and an extension and retraction system developed. The motor can now be deployed or stowed at the push of a button. The rope starter, throttle and choke are extended into the cabin.

Steering can be accomplished with the standard built-in water rudder or the motor can steer like a bow thruster by rotating the thrust angle a full 360 degrees using a tiller on the center console.

By rotation of the propeller direction, the Seawind can go straight ahead at 4-6 knots or back up at 2-4 knots. The throttle will adjust the speed down to zero, giving the Seawind total water maneuverability. Although useful for trolling for Muskie or Lake Trout, the unit is not fully appreciated until you use it to facilitate docking. If your mission for the day is a fast business trip that doesn't involve water, the motor can be removed in about 15 minutes, allowing you to leave its 26 pounds at home.

If you are one who plans on spending more time on the water than that required for take-off and landing, this option just might be for you. It may even help you catch that record-breaking fish that keeps eluding your angler skills – the one that got away!

#### **QUESTIONNAIRE:**

We have received responses from 74% of our customers on the questionnaire regarding Options and Avionics for the Seawind 300C. We constructed the questionnaire for our current customers in order to determine their preferences for options and avionics. Each of you is welcomed to review the questionnaire and complete it if you'd like. It can be found at [http://www.seawind.biz/questionnaire\\_intro.html](http://www.seawind.biz/questionnaire_intro.html) or we can fax/mail it to you if you prefer. Just follow the instructions and complete the answers. The items that have been accepted are the following;

~The FADEC (Full Authority Digital Engine Controls) added to the aircraft as an option for approximately \$13,500 – 79% Yes.

~The optional 3 year or 1000 hrs extended engine warranty priced at approximately \$1,900 – 76% Yes.

~IFR equipped Seawind 300C – 79% Yes.

~IFR with MX 20 Stack includes the audio panel with marker beacon with six-place intercom, [MX 20 moving map](#), [GNS 430 GPS/COM](#), [SL 30 Nav/Com](#) with Glide Slope, the [GTX 327 transponder](#) and [GI 106a CDI](#), for approximately \$28,650 – 68% Yes.

~Autopilot – 60% yes, 30% no.

~Glass Panel - 35% intend to purchase a glass cockpit. 59% prefer the Garmin - G1000 over the other systems.

~Seat Configuration – 85% will stay with the standard—4 seat. 15% will purchase both configurations.

~Upgrade package – 76% Yes. Which includes: Dual brakes for the copilot, high volume machined aluminum overhead ventilation outlets in lieu of the plastic outlets, (4 units), two additional forward panel mounted standard size vents, and special forward center console/arm rest/briefcase with space for maps, approach plates and an oxygen bottle. The unit is removable with four quarter turn fasteners to take home for flight planning, or to remove while swimming or fishing, four lap level reading lights, automotive-type finish on the Glare shield and console trim, with a TV miniature camera and screen to observe the engine cowling, for an approximate cost of \$6,700.

~Water Motor – 65% Yes.

**Bill Poirier**

#### **ANOTHER YEAR HAS GONE BY**

Our sales office will be open on a limited basis, and our factory will be closed between Christmas and New Year's Day, so that our employees can enjoy this time of peace and joy with their families.

The Seawind has a large extended family of ardent followers, a growing number of customers, and an expanding staff of dedicated people.

This is the time of year when we reflect on the many blessings we have received, and the fond memories of years past.

I know I speak for all of our staff when I wish all our readers a joyous Christmas and Happy Holidays.

We hope the New Year will bring you good health and prosperity.

**Dick Silva and all the people at  
Advanced Aero and Seawind, Inc.**

*Seawindinc*  
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