



The Searey Was Then; The USA Is Now

*A popular kit-built hull amphib
goes factory-built LSA*



Story by Mark Twombly, photos by Edwin Remsberg

What's the most popular hull seaplane? That's easy: with an estimated 500 to 600 in the U.S. and Canada and 50-75 flying elsewhere around the world, it would have

to be the Lake amphibian. But check your six, Lake — there's a contender for the throne, and it's called the **Searey**.

Since 1992 Searey manufacturer Progressive Aerodyne has shipped about 600 kits, of which an estimated 500 have been completed.

But the classic, build-it-yourself Searey was then; this is now: Progressive Aerodyne, based in Tavares, Florida, has a new-generation Light Sport Aircraft-certified Searey design, the LSA, in two versions — the turbocharged 115-hp Rotax 914-powered Elite, and the normally aspirated 100-hp Rotax 912-powered Sport. Both are available as factory-built S-LSA aircraft (the LSA) and as Amateur-Built Experimental E-LSA kits (the LSX). With new factory-built and kit models being sold and flown, the Progressive Aerodyne Searey is catching up with the out-of-production Lake.

ULTRALIGHT LINEAGE

And why not — the Searey's two-place, side-by-side cockpit is comfortable; the airplane is attractive and easy to fly; the Rotax engine provides economical performance; and with a lineage that stretches back to an ultralight design, the Searey is an affordable way to get into fun water flying.

At first glance the LSA and LSX appear identical to the older kit-built design, but there are some important structural and aerodynamic differences. The tapered, slightly swept Poly-Fiber-covered wing incorporates some internal structural changes, as well as vortex





Progressive Aerodyne's new LSA/LSX design incorporates a number of structural and aerodynamic changes compared with the company's earlier classic kits. Side-by-side cockpit (left) is comfortable with great visibility.

generators on the upper surface and washout on the outboard sections. The vortex generators improve controllability at low speeds, while the washout lowers the angle of attack of the outer wing to keep it flying when the wing root stalls, thus making for docile stall characteristics. The changes to the wing transform the Searey from a design that could exhibit tricky handling in certain situations into one that is truly docile and stall/spin-resistant.

Other changes that distinguish the LSA and LSX from the earlier classic Searey include a third-generation hull design, more dihedral in the horizontal stabilizer to increase clearance from the water, an engine shroud (standard on the Elite, optional on the Sport) that does more for appearance than drag

reduction, and a fuel sump mechanism. Options include a carbon-fiber hull, Rotax 914S engine, electronic instrumentation, and various avionics options.

My first flight in the LSA was with Kerry Richter, the president of Progressive Aerodyne and designer of the Searey. His family founded the company after designing and manufacturing the Buccaneer series of ultralight amphibians that clearly are the forerunners to the Searey.

Richter has supreme confidence in the structural integrity and handling qualities of the Searey, a fact that quickly becomes evident in one of his extremely aggressive demos. During my brief flight with him in the Elite at AirVenture, he banked into a fast, steep, low-level turn and then suddenly pulled back hard on the stick, a disconcerting maneuver that resulted in... nothing — no accelerated stall with bottom-wing drop/top-wing roll as would be expected. Various attempts at power-on and power-off stalls led to nothing more exciting than gentle mushing — no sharp break and pitch down or wing

drop. On the water, Richter's energetic step turns felt more like a hockey player boogying around the ice rink at full tilt than a very light aircraft gingerly tiptoeing in a foreign environment.

My opportunity to get to know the Searey LSA at a more studied pace came during a visit to Chesapeake Sport Pilot (www.chesapeakesearey.com), a flight school at Bay Bridge Airport (W29) in the shadow of the mighty Chesapeake Bay Bridge southeast of Baltimore, Maryland. CSP specializes in Light Sport Aircraft instruction. Chief flight instructor Helen Woods became enamored of seaplanes while earning a master's degree in marine science at Virginia Institute of Marine Science, which operated a military surplus de Havilland Beaver. The pilot, Sam White, had owned a Republic Seabee, and according to Woods, talked about it incessantly.

Woods earned her Single-Engine Sea rating about 10 years ago on the Chesapeake Bay. In time she began looking around for a suitable Light Sport Aircraft-certified seaplane to add to CSP's training fleet. The Searey LSA

was her first choice because its composite construction could stand up to the Chesapeake's saltwater environment, and the sliding canopy makes for easier egress in the event of a water accident, compared with a hinged canopy. Plus, with the Searey's conventional gear the school would have an airplane to use for tailwheel instruction.

Though light herself, Woods had heavier students in mind when she ordered the lighter Sport LSA with the 912 ULS Rotax sans engine cowl and the lighter carbon-fiber hull.

Time has proven that it was a good decision to add an amphibious trainer to CSP's fleet. When I visited in early September, Woods and instructor Dan Wroe had already logged about 150 hours of dual given in the Searey.

SMASH AND DASH

I did two flights with Wroe, cruising over the Chesapeake's pastoral Eastern Shore, doing water work on several of its pristine tributaries and getting the measure of the Searey's hard-surface handling with some smash-and-dash work at the Cambridge-Dorchester Airport.

The preflight inspection involves checking the many exposed bolts and nuts that secure all of the parts and pieces. You'll need a short ladder to give the composite propeller and the Rotax engine a thorough look, check the oil, and "burp" the engine — pull the prop through at least two revolutions until you hear a wheeze that means oil is being forced from the crankcase to the dry sump tank.

The fuel sump system incorporates a rubber bulb to draw fuel from the bottom of the tank, which is located behind the two seats. The fuel is routed through a line that exits the left side of the fuselage. Squeeze the bulb to prime the line, open a petcock, and take a fuel sample.

The only thing unusual about the pre-takeoff checks is that engine oil must be at least 120-degrees F before taking the runway. The electric flaps are set using a console-mounted pushbutton control: 10, 20, or 30 degrees are available. Once in the air and established



Helen Woods, chief flight instructor at CSP, was instrumental in creating the Searey instructors group and developing a comprehensive transition training program that addresses issues arising from pilot-error accidents.



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in initial climb, push the buttons in sequence to retract the flaps in 10-degree increments.

Progressive Aerodyne recently changed the aileron actuating system to a Frise design. CSP's Sport was the first LSA delivered with the new ailerons, and without question the airplane is very light in roll control, with some adverse yaw, although Woods says it is much reduced compared with earlier Seareys. You soon learn to lead turns with the rudder and go easy on aileron deflection to achieve a coordinated turn.

All seaplanes are high-drag airplanes in flight, and the Searey is no exception. CSP has a mantra it teaches its Searey students: "Energy, energy, energy," which really means "lack of energy." When engine power is taken away, whether intentionally or not, air-

speed quickly plummets. Reduce or lose power and you must push the stick forward right now to maintain 69 mph until flaring — briefly — for landing.

TAMING THE FORCES

One design factor that contributes to an unusual handling characteristic is the same as the Lake's — a high, pylon-mounted pusher engine. Apply power and the nose pitches down, reduce power and the nose pitches up. With normal throttle movement the pitch down/pitch up is not particularly significant, but if unprepared for it you can get into trouble, especially when on or close to the water. Also, the pusher prop causes a left-



turning tendency when power is applied, and the opposite when power is reduced. Add to that the left-turning gyroscopic precession that occurs on a land takeoff when the tail comes up, and you have an interesting mix of forces to tame.

A second design factor to consider is the plastic Full Lotus sponsons that hang off the outer wing panels to stabilize the monohull when motionless on the water or slowly taxiing. At speed, such as in a step turn, the mono-

Time has proven that it was a good decision to add an amphibious trainer to Chesapeake Sport Pilot's fleet.

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As Goes Lake, So Goes Searey

Its DNA can be traced to an ultralight seaplane. The new wing design incorporates effective stall-spin avoidance technology. And, the main landing gear is in your peripheral vision when retracted, making it pretty doggone easy to check gear position before a water landing. So how come it takes 22 hours to learn to fly the Searey LSA?

That's the combined ground (8.75 hours) and flight (13.5 hours) training time needed for a certificated landplane-only pilot to become proficient at land, water, and air operations in the Searey.

You say you have an SES rating or Sport Pilot seaplane endorsement but no time in a Searey? Great — knock 3 hours off the newbie's water takeoffs and landings syllabus, for a total of 10.5 hours flight training plus the standard 8.75 hours of ground — 19.25 hours in all.

Although the training time may suggest it, the Searey isn't some turbojet that requires a weeks-long type-rating course. Instead, the fledgling Searey Flight Instructor Association (SFIA) believes that comprehensive ground and flight instruction is the most effective way to address the root causes of Searey accidents over the past 20 years.

Those causes include some that are common to all amphibians, seaplanes, tailwheel aircraft, or personally flown aircraft in general — forgetting to retract the landing gear for a water landing; exceeding personal limits on crosswind landings; base-to-final stalls/spins; poor speed control on takeoff, initial climb, and landing; and mismanaging tailwheel control — and some that are more specific to the Searey. These include failure to anticipate and account for the pitching moment created by the pylon-mounted pusher engine; failure to correct for a loss of power and immediate degradation of airspeed by pitching down to maintain a safe flying speed; and aft, out-of-CG-envelope loading.

The common denominator in all of those causal factors is pilot error, and the key to reducing the number of accidents due to pilot error is better pilot training. That was the motivation behind the formation of SFIA and the development of the formal training program, but closely aligned with that goal is making the Searey more attractive to aviation insurance underwriters.

Tom Snow, who has been a partner in a Lake, is interested in buying a Searey to use for training on the Tennessee River near Chattanooga. "I really miss being on the water," he says, "and one of the appeals of the Searey is that it is brand new as opposed to a decades-old Lake." When he checked on insurance, however, his

agent quoted a very high premium for hull and liability coverage. The Searey community was facing the same problem that Lake amphibian owners confronted: a shrinking pool of underwriters offering increasingly expensive hull and liability insurance.

Lake Aircraft's Armand Rivard attacked the problem by developing and implementing a formal transition training program that calls for 25 hours of dual instruction, and recurrent training. Now, Lake owners who complete the training and recurrency programs using approved instructors can take advantage of preferential insurance offered through the AOPA Insurance Agency. As goes Lake, so goes Searey.

"My passion as a CFI is for people to fly safely," says Helen Woods, chief flight instructor at Chesapeake Sport Pilot. Woods worked with a couple of other Searey flight schools in the U.S. and Australia to develop and implement SFIA's training curriculum, which is codified in a substantial three-ring-binder notebook. She also helped found SIFA to administer the training program. To become a SIFA-approved Searey instructor, a candidate must complete a 22.25-hour instructor transition course. Thus far the membership is comprised of Woods, Wroe, and Kissimmee, Florida-based instructors John McLeroy and Don Laughlin.



Rod Machado (left) and AOPA President Mark Baker (right) present award to Woods proclaiming Chesapeake Sport Pilot as one of AOPA's Outstanding Flight Schools for 2014.

Developing a formal instructor and pilot training program was the first step. Seeking relief from the problem of lack of competitive insurance was next. "Our goal was to improve insurance options by demonstrating that the Searey is a safe aircraft if the pilot is properly trained," Woods says. Denise Porter, an insurance agent with Aviation West who specializes in Light Sport Aircraft, has been working with Woods and is a fan of SIFA's Searey transition curriculum. "Now that we have a training program, we can hope for better premiums and more underwriter participation, especially for pilots new to the Searey," she commented.

—M.T.

hull tends to roll more easily than the floatplanes I'm familiar with, and it took a delicate touch on the stick to keep the Searey from rolling (banking) too far to one side. The danger in that is submerging the sponson and most likely breaking its special hinged attach point. If the attachment breaks, the sponson will swing freely on the hinge so it won't be lost to the water, but it means a taxi back to the dock or ramp for a repair.

The Searey's engine-airframe configuration makes for a rearward center of gravity, and with light loading in the cockpit it is possible for the center of gravity to be far aft, even out of the envelope. Aft CG loading makes any airplane unstable in pitch. Woods, who sometimes carries ballast in the cockpit, says it's almost impossible to fly the Searey solo because "wherever you go someone's gonna want a ride."

Compared with larger and heavier floatplanes, things happen relatively fast when taking off in the Searey, even with the smaller 100-hp 912 motor. Stick back, apply power, wait briefly for the nose to pop up, stick forward to get on plane, then another brief wait while airspeed builds to the 45-50-mph liftoff speed. You have a 5-degree pitch window to work with on the takeoff run. Too much nose-down pitch results in pronounced porpoising as the airplane rides over its generous bow wave; too little and drag increases and performance suffers.

It's hard to imagine an amphib with an easier and more conclusive way of confirming that the gear is up for a water landing — look to the left and right to see a main landing gear tire hoisted just outside the canopy. In case you fail to see those big tires at your shoulders, check the gear-position indicator lights and listen for the voice-alert system. Despite all of those checks, gear-down water landings still occur in Seareys. Go figure.

On midfield downwind select flaps 10 degrees, reduce power, and raise the nose to reduce airspeed to 80 mph. Turn base, check gear position, flaps 20, speed 75. On final check gear position and reduce to 70 mph. Flare, but keep a bit of power in it to the touchdown to avoid getting too slow. The Searey has a flatter landing attitude than the typical floatplane, and visibility and controllability are excellent in all configurations.



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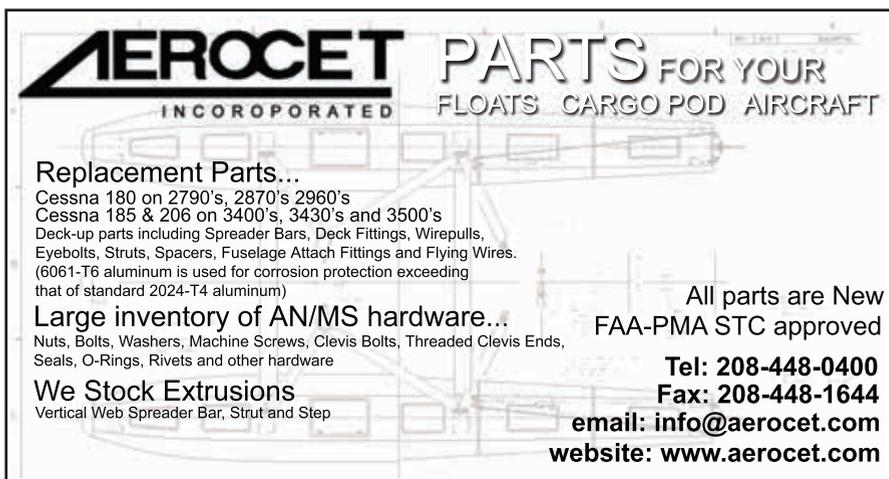
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is up for a water landing.

The runway landings we did at Cambridge-Dorchester involved a crosswind, and I found it a bit of a challenge. The Searey is short coupled and requires more rudder and less aileron to correct for drift than might be expected. Wroe had to remind me to try and align with the runway centerline before touching down, but I still managed to drift some on each landing. Pilots transitioning into a Searey who are not proficient in a tailwheel aircraft probably will find it more of a challenge to master hard-surface runways than water operations.

Based on the brief cruising we did to and from the training areas, the Searey appears to be a pleasant cross-country flier. Normal cruise yields about 90 mph indicated, at just over 5 gallons per hour. The big Lexan canopy and high wing make for great visibility, the semi-reclined seats are comfortably positioned, and you're sure to draw a crowd at every stop.

The new Searey LSA is indeed a spunky, fun waterbird. It's nimble, has great visibility, it's comfortable, and though docile in phases of flight where it pays to be docile it still presents enough challenges — power and pitch, the effect of loading on center-of-gravity, the tailwheel configuration, and the fact that it is a relatively high-drag airframe and what that means in the event of a loss of power — to be taken seriously.

Intrigued by the Searey LSA but would like to take an extended test drive? Chesapeake Sport Pilot will demo one for as long as you like. Try it out. You'll have a ball!

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