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SEPTEMBER 2015



# ICON A5

THE MUCH-HYPED LSA IS FINALLY HERE. DOES IT DELIVER ON ITS PROMISES?

BY PIA BERGQVIST



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**THE ICON A5 IS A SLEEK, EASY-FLYING LSA DESIGNED FOR PILOTS WITH LITTLE EXPERIENCE. AN AMPHIBIAN, IT IS AT HOME IN THE WATER AND ON THE LAND.**

I'm generally biased in favor of anything that flies, but truth be told there have been a few light-sport aircraft that I haven't enjoyed flying. I felt that those airplanes were so light on the controls that it was rather unsettling. While the Icon A5 looks cool, I was prepared for the worst when I went to fly the two-seat amphibian. Boy, was I in for a surprise.

To my eye, the A5 is one of the sexiest light airplanes to have hit the market in ages. Icon has also done a terrific job of promoting its hot commodity through exciting videos and a relentless social media campaign that has produced more than 1.2 million likes on Facebook. While I subscribe to the notion that airplanes must look good to fly well, as Marcel Dassault famously said, I wasn't so sure about the Icon. I was questioning, for instance, whether the engineers had to compromise flying qualities to meet their spin-resistant design goals.

Another reason I was questioning the flying characteristics of the A5 is that it took the Icon team several years to get from the announcement that it

would develop an amphibious LSA to the day when the first production model had a Light Sport Aircraft airworthiness certificate displayed inside the cockpit.

That day happened just a few days before I headed to Napa Valley, California, as one of a select few journalists to have been invited to fly the A5 out of Lake Berryessa in the scenic rolling hills just east of the valley famed for its exquisite wines.

On the eve of our arrival, Icon founder and CEO Kirk Hawkins gave us a full briefing on the history and design of the airplane. The A5 is a two-seat light-sport amphibian constructed mostly of carbon fiber materials pushed through the skies by a 100 hp Rotax 912 iS mounted at the back of the fuselage. With its folding wings the airplane is made to be transportable, so customers won't have to contend with the rising cost of airport storage if they want to trailer it back home.

When conceiving the Icon, Hawkins' goal was not so much to target the aviation market as the multibillion-dollar power sports and outdoor

recreation segment. The airplane is not meant for transportation. It was not built with speed, range or payload in mind. It is strictly designed to be the ultimate flying toy — a personal watercraft with wings.

However, Hawkins had some serious design goals for his team. The A5 had to, in his mind, be safe and easy to fly. Ease of flight has definitely become an important issue because about 40 percent of the more than 1,250 deposit holders are currently nonpilots. Of course, they will have to become sport pilots or better before they can act as pilot in command of the A5. Another design target was, perhaps, not quite as serious, yet it was equally important. In every way, the airplane had to be, to borrow Icon's term, "badass" to help capture the imagination of the flying and nonflying public. Hawkins'

approach was much like Apple founder Steve Jobs' — design was equally as important as function — so Icon's design team was melded with its engineers.

I had a chance to touch and feel the production A5 at the briefing, and I took a turn at folding the wing by grabbing onto a large handle smoothly molded into the wingtip. Icon had initially planned an electrically actuated retraction system for the wing, but it proved too heavy and complex to pull off.

While the wing retraction and reinstallation process was not easy, I completed it almost totally on my own on my first try. I have no doubt that, with a little practice, I could do it solo. In order for the A5 to be street legal, the outer portions of the horizontal stabilizer also need to be removed, a process that is quick and easy. I would estimate the entire procedure would take no more than 10 minutes. I can't tell how long it would take to load or unload the airplane from a trailer, but the A5 was transported to the lake after the briefing and made ready for the next day's demo flights.

In addition to incorporating the handle for the retraction, the wingtip is shaped to allow for planing in case the wingtip is dipped into the water during a takeoff or landing. However, intentional wingtip planing is prohibited. With the big steps on either side of the fuselage, which Icon calls "sea-wings," you would probably have to do some pretty aggressive maneuvers on the water to get the airplane to tip.

To nail the look of the airplane, Icon brought in German design guru Klaus Tritschler from BMW Group DesignworksUSA to serve as vice president of design. While 3-D software was used in creating the A5, Tritschler's team constructed full-size clay models of the airplane and panel, just like automobile designers do. The process allowed the designers and engineers to touch and see the airplane and to make changes on the spot. "Judging the airplane by looking at a screen is not enough," Tritschler said. "If you see something, it is much easier to develop."

One of Icon's biggest obstacles in the process of designing the pieces of the A5 puzzle was the restriction of the LSA weight limit. "It is hard to

**1 THE A5 WAS DESIGNED WITH FOLDABLE WINGS TO ALLOW FOR EASY TRANSPORTATION AND OFF-AIRPORT STORAGE. 2 ICON'S DESIGN TEAM CAME UP WITH ITS OWN INSTRUMENT DESIGNS, INCLUDING THE ANGLE OF ATTACK INSTRUMENT ON TOP OF THE PANEL. 3 CLAY MODELING HELPED THE DESIGNERS AND ENGINEERS LAY OUT A COCKPIT DESIGN REMINISCENT OF ONE IN A LUXURY CAR.**



# Icon A5

The Icon A5 we flew for this report was equipped with Icon's Founder's Edition package, which is installed in the first 100 customer airplanes. The package includes the Complete Aircraft Parachute (CAP), a Garmin 796 GPS, LED night lighting, removable windows and a few aesthetic upgrades not included in the base version. While it won't be available until serial number 101, the base price is currently \$197,000 plus \$15,000 for the parachute (which is required in the United States).

<b>PRICE AS FLOWN</b> \$247,000	<b>USABLE FUEL</b> 20 gallons
<b>SEATS</b> 2	<b>MAX RATE OF CLIMB</b> 629 feet per minute
<b>ENGINE</b> Rotax 912 iS	<b>TAKEOFF GROUND ROLL</b> 640 feet
<b>HORSEPOWER</b> 100 horsepower	<b>WATER TAKEOFF</b> 840 feet
<b>PROPELLER</b> Fixed-pitch Sensenich 3-blade, composite	<b>LANDING GROUND ROLL</b> 590 feet
<b>LENGTH</b> 23 feet	<b>WATER LANDING</b> 700 feet
<b>HEIGHT</b> 8.1 feet	<b>MAX SPEED</b> 98 knots true airspeed
<b>INTERIOR WIDTH</b> 48.5 inches	<b>HIGH SPEED CRUISE</b> 95 knots true airspeed
<b>WINGSPAN</b> 34.8 feet	<b>NORMAL CRUISE</b> 84 knots true airspeed
<b>WING AREA</b> 135 square feet	<b>RANGE</b> 427 nautical miles
<b>MAX GROSS WEIGHT</b> 1,510 pounds	<b>STALL SPEED (CLEAN)</b> 45 knots calibrated airspeed
<b>EMPTY WEIGHT</b> 960 to 1,080 pounds	<b>STALL SPEED (FULL FLAPS)</b> 39 knots calibrated airspeed
<b>USEFUL LOAD</b> 430 to 550 pounds	<b>SERVICE CEILING</b> 15,000 feet



make something rock-solid that is light," Tritschler said. The team needed more weight to play with. So Icon Aircraft petitioned the FAA to allow for a weight increase for the A5. After 14 months of contemplating the exemption, the FAA came through, allowing an increase from the amphibious LSA limit of 1,430 pounds to 1,680 pounds with the caveat that there had to be a parachute on board (U.S.-registered airplanes). However, the A5 has a max gross weight of 1,510 pounds since it was the targeted design weight.

The luxury car styling is evident in the sleek lines of the panel and cockpit. Circuit breakers are located overhead to minimize the number of buttons on the panel. The idea was to simplify the panel to remove some of the intimidation new pilots experience when they first strap themselves in to the pilot's seat. Consequently the A5's panel looks like no other airplane panel I've seen.

Annunciations are also simplified. There are common alerts such as oil pressure and alternator, but also idiot-proof ones such as "purge bilge" and "land airplane," a prompt the pilot gets with a low battery, failed alternator or fuel pressure issue.

To get the unique feel in the cockpit, the team also designed its own instrument gauge faces, with the exception of Garmin's portable, panel-mounted 796 GPS, which is used for navigation. The target with the gauges, Hawkins said, was to make them easy for nonpilots to interpret. For example, unlike most round-gauge airspeed indicators, the Icon's airspeed needle revolves from the bottom (more like a car's speedometer) rather than the top.

Hawkins' history as a U.S. Air Force F-16 pilot brought him to emphasize angle of attack as a primary instrument. The A5's AOA gauge is mounted at the top of the panel centered in front of the left seat. Rather than using the standard concept of chevrons turning from green to yellow to red depending on the airplane's angle of attack, Icon designed a miniature wing as a "needle" pointing into green and yellow arcs or a red line for the critical angle of attack. There are also white dotted lines, one of which indicates the optimal position for the AOA needle during climb and approach. More on that later.

I found all of the gauges to be sleek and easy to read, with the exception of

the altimeter, which Tritschler said is likely to be modified.

In the early morning hours, we headed out to Lake Berryessa and traveled by boat from one of the main ramps to a camp that the Icon team had set up on a scenic bluff at the southwest corner of the lake. As we floated along peacefully, two Icon A5s came screaming around the corner in formation in the light of the rising sun. Cool! I thought, yet I was still expecting to use all of my flying skills to keep the airplane in the air, let alone put it safely on the ground or water, when it was my turn to climb into the cockpit.

I was on the first sortie of the morning, flying with Icon's director of flight training, Jeremy "Hilda" Brunn. A large handle at the top of the canopy allows it to be opened and closed with one hand. Entering the cockpit from the shallow shoreline was easily accomplished by stepping onto one of the seawings, the tips of which are removable in case of damage. In addition to providing lateral stability on the water, the seawings offer terrific platforms for hanging out and dunking your lower legs in the water, sharks and alligators allowing. But the best place to sit on the airplane when the engine is off is on top of the wing, which is an easy hop.

While the view from the top of the airplane sitting in the water was spectacular, I was ready to fly. I climbed in and sat down in the left seat. The 48.5-inch-wide space provided plenty of elbowroom, and there was a ton of space for the knees below the panel. The A5's seat is static, but the rudder pedals move to provide more or less legroom for pilots of different sizes.

With Brunn and me — a total of about 300 pounds — a pair of headsets, 8.5 gallons of fuel and, as I found out, two bottles of water, the airplane was around 70 pounds below max weight. At a total of 430 pounds, the useful load is the A5's most limiting factor. Chunky pilots will have to persuade their buddies to buy their own airplanes because they won't be able to carry adult passengers.

The single fuel tank, which has a total capacity of 20 gallons, is located underneath the luggage compartment, which can hold up to 60 pounds if the limited load capacity allows. There are also handy storage compartments

between the seats, in the left and right sidewalls and inside the seawings.

With the electronic ignition, the Rotax spun up the fixed-pitch propeller without a hitch, and subsequent start-ups were just as quick and easy despite the hot June temperatures, which hovered around 90 degrees by the early afternoon. Pusher engines can be tough to keep cool, especially when they are mounted behind the fuselage, but Icon says its engineers solved the issue by widening the cowl to allow for more airflow around the power plant and adding a cooling fan on the prop shaft.

Due to the warm temperatures we

flew with the side windows removed. It made the ride a bit loud, but the airflow was fantastic. A small bracket was attached to the front part of the window opening — a clever way to prevent water from splashing into the cockpit.

Brunn took the controls to demonstrate a step taxi, and the airplane quickly transitioned from floating to smooth planing. Suddenly we were in the air and Brunn gave me the

**EXTENDING FROM THE HULL ARE A PAIR OF SEAWINGS. THEY PROVIDE STABILITY ON THE WATER AND HELP OCCUPANTS GET INTO AND BACK OUT OF THE AIRPLANE.**





controls. The center stick felt comfortable in my left hand, and I was able to rest my right arm on the center-console to move the throttle lever forward and aft. There is neither mixture nor prop control to worry about since the engine operation is optimized electronically.

We climbed up the hill from the lake at nearly 700 fpm toward Angwin Airport (203), where we were planning on doing some landings with the gear down. I made some shallow turns to familiarize myself. The control harmony felt great, so I decided to try a steep turn. I managed to hit my own wake on the first try.

Hovering around 85 knots after we leveled off, cruise speed is not one of the Icon's strong points. But again, cross-country traveling was not included in the list of design goals for this fun machine. As we approached Angwin, which sits at nearly 1,850 feet and has a long but narrow runway, Brunn let me keep the controls for the first landing. "Just fly the white line on the AOA," he said. Transitioning from using airspeed to a combination of AOA and airspeed was more intuitive than I had expected.

Focusing mostly on the AOA gauge and the outside environment, my first landing was smooth and I had no trouble keeping the castering nose-wheel aligned with the centerline of the 50-foot-wide runway. With only light winds, we taxied along to the end of the runway to take off in the opposite direction.

Even though it was early morning, the air was already warm, and Brunn said: "I think I'm going to have a sip of water before we take off. Would you like one? There is a bottle right there."

Right in front of the left armrest was a cup holder placed so inconspicuously that I hadn't even noticed the bottle until Brunn pointed it out.

We rolled out on the runway again, and despite the hot weather, we were off the ground in just a few hundred feet. We did another landing at Angwin before heading for the lake, and on the way back we pulled the power to idle. Icon claims a 9:1 glide ratio for the A5. Even though we were at no more than 3,000 feet, it appeared that we could have made it all the way to the water, which was about 7 nm away, targeting the white line on the AOA.

My flight with Brunn was a perfect

**LIKE MOST FLYING BOATS, THE ICON CAN TAXI FROM WATER TO LAND. THE PILOT SIMPLY LOWERS THE GEAR IN THE WATER AND MANEUVERS THE CRAFT ONTO SHORE.**

introduction to the A5. But it was the next flight, with Icon's founder and CEO, Kirk Hawkins, in the right seat, that was the real eye-opener.

As we took off to do a few touch-and-goes on the water, Hawkins leaned over and covered up the main instruments, forcing my eyes to the AOA. Keeping the miniature wing on the dotted white line, I had no trouble landing the A5 on the water. It was both a blast and a piece of cake.

The third time around we experienced a glitch, which is not completely unexpected in an airplane that was used as a final prototype. The flaps would not come up. We taxied back to camp, and after a quick troubleshooting session, Hawkins said we would fly the demo without using flaps.

We climbed up for the spin-resistance demo. With no flaps,



Hawkins slowed the airplane until the AOA needle was pointed at the red line. The wings were shaking in protest, indicating the stall. Maintaining the red line on the AOA and applying full power, Hawkins stomped the left rudder pedal to the stop and applied full opposite aileron. The airplane hung on without any trouble at all. Hawkins then gave me the controls and let me play around with the same awfully wrong condition. I was amazed that I could still make turns while keeping the airplane at the stall, and it showed no tendency to spin in a fully cross-controlled condition.

After a few minutes of playing around in a flight condition in which many airplanes would have taken us into a burning hole in the ground, the Icon had actually climbed nearly 300 feet. Part of the reason why the airplane maintains controllability while the inner portions of the wings are stalled is that the outer portions are still creating lift due to a noticeable wing cuff that helps maintain airflow over the wing surface and ailerons.

For the finale, we landed the airplane near a ramp area. Touching down without using flaps was just as fun and easy as with them down. Taxiing straight toward the long, steep

ramp, we lowered the gear in the water about 20 feet from the pavement. The Icon smoothly transitioned from water to land as the wheels kissed the ground and I experienced the sense of being a heavily breathing amphibian as I powered up the Rotax to climb up the steep hill to the top of the ramp. There, the castering nosewheel allowed the A5 to swing around in a tight radius, and using a lot of brake, I meandered back down the hill. Once in the water, I flicked the bilge pump switch located in the center of the panel to make sure the airplane was drained before taking off again.

Since the water eliminates the constraints of the runway edges, Brunn's approach to teaching new students is to start with them learning to land on the lake. Icon has developed a full training offering and has used a few of its nonpilot employees as guinea pigs for its training program since so many deposit holders have no flight experience. Read the sidebar for more information.

As an extra treat, the original prototype A5 came in for a visit in the afternoon. It is a beat-up airframe that has nearly 1,000 hours on it, flown that day by test pilot Chuck Coleman. I decided to pick his brain a little. As there

wasn't much wind when I landed at Angwin Airport earlier in the day, I wanted to get his impression of the airplane's crosswind handling. While the A5's demonstrated crosswind component is 12 knots, Coleman said he has flown the airplane in crosswinds up to 20 knots without trouble. Mind you, he is a test pilot.

With the approval to produce the A5, Icon's biggest obstacle is the ability to ramp up production and after-purchase support. The current tooling is designed to produce 37 airplanes per month, and the 140,000-square-foot Vacaville, California, facility has the space to double that capacity, should the need arise. Icon hopes to deliver 60 airplanes by next year's Air-Venture. That appears to be a very optimistic target, but with millions of dollars from investors in the United States, Asia and Europe, Icon may just be able to pull it off.

The question is: Will the customers who have put in \$2,000 to \$5,000 deposits, some of whom were expecting to pay around \$140,000 (in 2008 dollars), be willing to pay the price tag for the first 100 airplanes of \$247,000? I hope they will because the A5 is unquestionably as badass as Hawkins was shooting for. 🍷

## WHAT DO YOU NEED TO BECOME AN ICON PILOT?

To fly the Icon A5 you need a minimum of a Sport Pilot certificate with a seaplane endorsement. Icon has structured its pilot training programs to cater to a variety of pilots' experience levels. The company offers a sport flying intro (SFI) course for those who want to see what it is all about. That course provides two flights on the lake for \$500. All pilots who purchase an A5, no matter how experienced, will be required to go through a training program. All programs include ground training and unlimited access to Icon's on-line training curriculum. Here is a breakdown of what you would need depending on your flying experience.

**Seaplane-rated pilot:** Icon's most basic seaplane transition course (TX-S) includes four hours of flight training and costs \$1,250.

**Non-seaplane-rated pilot:** For pilots without a seaplane rating, Icon provides the land transition course (TX-L), which includes up to eight hours of flight training for \$2,500. Whether the pilot holds a Private or Sport Pilot certificate, the course will provide a sport pilot seaplane endorsement rather than a seaplane rating.

**Nonpilot solo course:** New pilots can go through the initial sport solo (ISS) course, which brings them to the

point of flying the airplane solo. The three- to five-day course includes up to 10 flights and costs \$3,000.

**Sport Pilot license:** A full Sport Pilot license (SPL) training curriculum is available for customers with no experience. With 30 hours of flight time included, the course technically can be done in two weeks, continuous or separate, or three five-day sessions. At the completion of the course, the customer would walk away with a Sport Pilot certificate and a seaplane endorsement for \$9,500.

