

DECEMBER 2006

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**Zodiac  
CH 601XL**

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your way!**

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- **The E-LSA Transition**



**Have It  
Your Way...**



**... Ready-to-fly,  
or ready-to-build!**

By Dan Johnson

**T**he strongest interest in ready-to-fly special light-sport aircraft (S-LSA) to date has come from pilots operating Cessna, Piper, Mooney, and other general aviation (GA) aircraft. It is estimated that more than 100,000 currently certificated pilots are looking at their prospects for maintaining an up-to-date second- or third-class FAA medical and considering the LSA option. Many are concluding that LSA are worthy airplanes and recognize that downsizing to an LSA two-seater *can* meet their flying goals, a fact that has driven a good share of LSA sales thus far.

Thousands of those pilots have private or higher certificates with instrument ratings. They're accustomed to having a full panel and want one even if flying in instrument meteorological conditions (IMC) isn't in their plans. In fact, flashy dual-screen plus electronic information and navigation panel layouts have proven quite popular in many S-LSA, even though they add tens of thousands of dollars in cost. Think about it; selling a late-model GA plane can net a return that easily exceeds the price of a decked-out S-LSA.

With this fact clearly in mind, Aircraft Manufacturing & Development Company (AMD), led by Mathieu Heintz, added an aircraft capable of instrument flight rules (IFR), the Zodiac CH 601 XLi, with the "i" representing instrument, to its line.

### The Zodiac Companies

You might be confused. While AMD, based in Eastman, Georgia, builds ready-to-fly Zodiac CH 601 XL S-LSA, another company owned by the Heintz family, Zenith Aircraft of Mexico, Missouri, manufactures Zodiac CH 601 XL kits that are built under the experimental amateur-built regulations. Any certificated pilot, including sport pilots, may fly these aircraft. However, sport pilots may fly only those 601 XLs that comply with the LSA definition.

Until earlier this year, Czech Aircraft Works also built ready-to-fly 601 XLs; however, that agreement was mutually concluded, and AMD is now the only company producing the S-LSA version of the Zodiac.

AMD is also the manufacturer of the Alarus, a Part 23 certificated design that has been in production for



The amateur-built Zodiac 601 XL may be flown by any certificated pilot, including sport pilots if it is built to meet LSA requirements.

12 years. The company describes it as a "dedicated IFR trainer, of which nine out of 10 are sold in group purchases to flight schools." Some 250 Alarus aircraft have been produced. AMD has built about 150 of those, or an average of 20 aircraft a year, while Zenair Ltd. of Canada and JAI of Amman, Jordan, also have built a few similar planes.

Because there's a "good deal of interchangeability" of component parts on the Zodiac and Alarus models, Mathieu said all of the LSA models are built using Part 23 production processes. This turns out to be more efficient, as Part 23 quality assurance procedures require that certified and non-certified production parts not become co-mingled. The good news for Zodiac 601 XL/XLi buyers is that the aircraft is built using the same techniques as the more expensive Part 23-certified Alarus models.

All AMD Zodiac aircraft conform identically to the design of originator and Heintz family patriarch Chris Heintz. AMD Sales Manager John DeGonia acknowledged that some beautiful Zenith kits have been assembled, but they may not identically conform to the original design because a builder is allowed to make modifications.

But, depending upon your pilot

certificate, your funds available to purchase an airplane, and what your flying goals are, there's a Zodiac 601 XL you truly can have your way!

### Perfect for Sport Pilots

Even in proven designs like the Zodiac CH 601 XL, improvements can and do happen. The Zodiac's refreshed wing design features a slight taper for added cruise speed and crisper roll response. Inside the wing, a shorter vertical spar (which passes through the cabin) permits the seats to be reclined back more, offering a supportive posture that still assures plenty of visibility. I found the long seat bottom restful for my legs, and I imagine a six-hour cross-country flight would be reasonably tolerable.

An updated canopy configuration has the bubble-top canopy opening to the front instead of to the side as in older Zodiacs. The new way permits both pilot and passenger to enter simultaneously. Dual gas pistons make raising the large canopy easy.

A step on the side of the fuselage allows folks to step onto the wing easily. Once atop the wing, you place one hand on the rear seat support and your other hand on a panel handle just above the radio stack to help lower yourself into the cockpit.



Photo courtesy AMD

The AMD Zodiac 601 XL earned S-LSA certification in 2005. The ready-to-fly airplane is built in AMD's plant in Eastman, Georgia.

Once seated, I noticed the rudder pedals were moved forward to give more legroom than in earlier Zodiacs. Optional deluxe leather seats create a luxurious surrounding in the Zodiac XL. All versions of the Zodiac S-LSA use dual control sticks with push-to-talk buttons and a trim control on the top of the stick.

AMD originally planned to offer the Zodiac with the 116-hp Lycoming O-235 engine, but because the 100-hp Continental O-200 is 80 pounds lighter, AMD elected to go with the Continental, the same engine used by the IndUS Aviation Thorpedo, American Legend Cub, and CubCrafters Sport Cub. (Both American Legend and IndUS have also certified S-LSA with the 120-hp Jabiru 3300.)

The Continental O-200 has a long history valued by some buyers of LSA. Because many GA pilots have experience with the well-known engine brand, John said their confidence is higher than with Rotax or Jabiru. Also, a legion of mechanics is trained to work on Continentals and parts are in ready supply across the nation. "You can take a Continental engine to

any aviation service shop, and they'll know how to handle it," said John.

Although Teledyne Technologies, Continental's parent, has annual revenues of \$1.5 billion, support for this engine's use in LSA was proven by a visit to AMD from Brian Lewis, president of Teledyne Continental Motors Inc. In their discussions, AMD asked Brian to take some weight off the engine. A lighter starter motor and lighter weight castings for the cylinders shaved off 20 pounds, John said.

As further proof of its continued support, Continental displayed its light sport engine (LSE) at EAA AirVenture Oshkosh 2006. AMD said it worked with Continental to produce this engine. "However, AMD is only installing the FAR 33 certificated version of the engine at this time, as it adds significant value and can be used in IFR flying," said Mathieu.

### Relaxed Controllability

The Zodiac's large bubble canopy offers a panoramic view. Taxiing out for take-off you have a broad view of any traffic. During steep turns it was easy to confirm the maneuvering area was free of

other traffic. In straight and level flight, your view of the world is enormous in every direction except downward.

The Zodiac's flaps work electrically; on older kit-built 601s, the response was almost too swift. AMD uses a different flap motor that delivers a response closer to what a Piper pilot might know. Factory pilots say you can lower flaps before slowing into the white arc speed range as long as you don't put full flaps above white arc speeds.

All of my landings went well, thanks to the good preflight explanations I received. On the kit-built versions, I had been encouraged not to bring the Zodiac to a high flare as I might touch the tail. Although I prefer to execute full-stall landings, I guarded against that reaction, and the plane settled in beautifully. On the AMD Zodiac, the landing gear is taller, raising the tail and allowing the full-stall touchdowns I prefer.

Basically I adopted an attitude-landing technique as a substitute for full-stall touchdowns. Such a method does not allow you to slow dramatically as is useful for soft-field or short field

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landings. Yet most GA pilots will find Zodiac's behavior well-suited to their experience.

Based on conservative initial advice, I used 70 mph on approach and rounded out at about 60 mph. Later I discovered I could use approach speeds down into the 50 mph range, as could anyone with a bit of experience.

While doing Dutch roll coordination exercises, I found little rudder was needed; the ailerons can execute turns on their own. The coordination between ailerons and rudder was quite acceptable in the Zodiac, and this may be partially due to the design's full-flying rudder.

Some of the turn qualities no doubt also derive from Chris Heintz's use of an all-flying rudder. Much like a stabilator for horizontal tails, the all-flying rudder—which has no fixed surface—is said to promote a cleaner airflow across both sides of the surface. Smoother movement across the surface generates less flow separation on the lower pressure side.

The Zodiac's pitch will seem rather sensitive to most GA pilots, although it gave good feedback to movement. In a couple hours, most GA pilots will become accustomed to the effortless feel. This is a common reaction to many LSA varieties I've flown.

My trials with steep turns done at 45 degrees to 50 degrees of bank showed stable and steady characteristics. No additional power was needed as is common with most aircraft, and this also explains why little back-stick pressure was needed to maintain the turn at a constant altitude. It reveals the Zodiac as an efficient flying machine.

Using 100 mph for good over-the-nose visibility, the Zodiac's climb rate hit 900 fpm with two on board at something less than full gross weight. With a finer technique, climbs can reach 1,000 fpm.



Above, the instrument panel of an amateur-built Zenith 601 XL. Below, the panel from the AMD 601XL S-LSA. The 601 XL's panel is designed to accommodate a wide variety of instruments including all of the latest digital instruments and avionics.



At a 130 mph cruise, the Zodiac felt faster than the speed indicated, but numbers don't relate perfectly to the sensation of speed. Perhaps that massive canopy imparts a sense of motion. The Plexiglas canopy also had good optical qualities, appearing distortion-free to my eyes.

Full stalls came at 40 mph indicated (44 mph true airspeed, said AMD) when flaps are fully deployed. Zodiac stalls exhibit benign qualities with no tendency to fall off on a wing. After discovering the stall qualities, I believe approaches can be done at 55 mph or so, which would shorten overall landing distances significantly.

The Zodiac's adverse yaw is modest. I found only a slight hesitation before initiating a normal coordinated turn. I saw no tendency to turn in the opposite direction in any adverse yaw trials. Such good behavior further burnishes the Zodiac's image for GA pilots.

Overall, the Zodiac felt solid. Zenith reports the design is stressed for 6g's plus or minus; this is a figure that exceeds nearly every GA airplane manufactured today. That doesn't mean you should reconsider learning how to do outside loops if you buy a Zodiac, but you'll have a tough machine.

Comparing the AMD Zodiac to the Zenith Aircraft's kit version, John said the AMD model is more apt to conform to traditional expectations.



**Built in America with U.S. labor and other costs, AMD can be competitive with imported and middleman-handled Light Sport Aircraft.**

However, he said the kit is so easily built that it's hard to cause it to not also conform. He repeated earlier comments that the design's 21-year history is long; it is highly reliable and only loses that quality when homebuilders modify the design.

### **Ready-to-Go Zodiac?**

In late October, John reported a 90-day backlog on deliveries. "That's about where we want it," he said. He reported that about 25 AMD Zodiacs are currently flying; he expects to have 35 airborne by the end of 2006. "More than 1,000 Zodiac aircraft are flying throughout the world today," John said proudly.

Currently AMD is building three planes a month; it expects to increase that to five per month in 2007. John said the company has built up the production pace gradually. AMD has about 20 employees



Leather seats are an option, as are AM-Safe airbag-equipped seatbelts. A baggage area behind the seat can accommodate up to 40 pounds.

**The Chris Heintz design uses an all-flying rudder, which is said to promote cleaner airflow across the tail surfaces.**





and operates out of a 28,000-square-foot hangar at the Heart of Georgia Regional Airport.


The fall 2006 price of the IFR-capable AMD Zodiac CH 601 XLi is \$94,900, including the 100-hp Continental O-200A engine (FAR 33 certified) and a Sensenich two-blade propeller.

The standard AMD Zodiac CH 601 XL starts at \$79,900 and comes with a number of standard items such as wingtip strobe lights, tail light, locking canopy, dual brakes, emergency locator transmitter, elevator and aileron electric trim, and Dynon engine

monitoring system (EMS). "Also, there is no shipping or handling costs because the aircraft is manufactured in the USA," added Mathieu. At less than \$80,000 and without added transport cost, the Zodiac compares well with all but the lowest-cost imported LSA. John feels some importers of European LSA aren't as experienced with the designs they are selling as AMD is with its model; John himself has more than 1,000 hours in a Zodiac.

Built in America with U.S. labor and other costs, AMD can be competitive with imported and middle-

man-handled LSA. But, some AMD components keep the company working hard to contain costs. For example, one component affecting AMD's price is the \$25,000 FAR 33 certified Continental engine, a substantial price premium over the non-certified Rotax and Jabiru engines. Rotax does offer a certified version for an additional \$5,000; Jabiru is not presently offering an FAA-certified version.

For GA pilots, a Zodiac CH 601 XL or XLi is a conventional-looking light aircraft built with components they know. It exhibits handsome performance for the class, cooperative handling, and room for two to travel. At 130 mph, you and a friend could cover 600 miles in a day's flying in good comfort with an enormous view. In a crowded field of sharp S-LSA, the Zodiac compares favorably. For a fraction of the cost of a new Piper or Cessna, the Zodiac aircraft deserves a close inspection. "Y'all come down to Georgia and go for a flight," John invited. The all-American airplane and the all-American engine should find a steady following from those wary of foreign purchases and product support. 





## CONTACT

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### Kit-built Zodiac 601XL

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## SPECIFICATIONS

(Note: All specifications and performance figures provided by factory. Figures are unverified except as otherwise stated in article.)

## DIMENSIONS

Wingspan: 27 feet  
Wing area: 132 square feet  
Length: 20 feet  
Height: 6.6 feet  
Seating: 2, side-by-side  
Cabin width: 44 inches  
Empty weight: 770 pounds\*  
Gross weight: 1,320 pounds

Useful load: 550 pounds\*  
Payload (full fuel): 370 pounds  
Fuel, max: 30 gallons  
Wing loading: 9.9 pounds/square feet  
Power loading: 13.2 pounds/hp  
Powerplant: Continental O-200  
Power output: 100 hp  
Propeller: Sensenich, two-blade  
Baggage area: 40 pounds

\*Empty weight, useful load, and payload are for the basic VFR Zodiac 601 XL model.

## PERFORMANCE

Never exceed speed (VNE): 140 knots/161 mph  
Maximum design cruise speed (VC): 108 knots/124 mph  
Stall speed, best flaps (VSO): 38 knots/44 mph  
Crosswind component: 20 knots/23 mph  
Max rate of climb: 1,000 fpm  
Take-off distance: 450 feet  
Landing distance: 670 feet  
Cruise duration (econ.): 6.0 hours (no reserve)  
Cruise range (economical): 780 miles (no reserve)  
Fuel consumption (economical): 5.0 gph