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FEATURE

H O M E B U I L T HOMAGE



**MARK PHILLIPS' ZENITH
DRAWS FROM DECADES AGO**

BY TI WINDISCH

THERE WERE PLENTY OF STRIKING AIRPLANES in the homebuilt section of EAA AirVenture Oshkosh 2018, but none of them looked quite like the one belonging to Mark Phillips. Running the airplane's N-number, N701RX, through the FAA Registry tells you it's a kitbuilt aircraft, and the kit was manufactured by Zenith Aircraft Company. But something just doesn't check out about this particular aircraft named *Elixir*, registered as the one and only Zenith 701.1.



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he most noticeable difference between Mark's Zenith 701.1 and everything parked around it is the nose. What looks like an old-school radiator sits behind the propeller, giving the not-so-old homebuilt a retro, flat-front look. Inspecting the aircraft more closely reveals additional details that feel both familiar and foreign, as though it were an actualized idea based on airplanes you'd seen before, without actually being any of them. That's because that's exactly what it is.

Mark, EAA 496947, got the inspiration for his 701.1 at the same place he caught the aviation bug: Oshkosh. When Mark accompanied his brother to the Oshkosh fly-in convention in 1995 and saw some of the homebuilt offerings, he was hooked.

"I walked into the field next to Theater in the Woods, and it was full of Long-EZs, and VariEzes, and different canard airplanes," Mark said. "They'd all parked up in that area, and I was floored. I'd never seen anything like that in my life, and I remember this guy getting something out of one of the airplanes. And I went up and I said, 'Excuse me, sir. Did you build your airplane?' And he gets up, and he smiles, and he looks around and says, 'All of these are homebuilts,' and, you know, something clicked."

What clicked was a simultaneous love for aviation and homebuilding. Mark began his first project soon after that fateful Oshkosh trip and finished his RV-6A, *Mojo*, in 2004. *Mojo*, a Bronze Lindy Award-winner in 2005, served Mark well for years. After more than a decade with *Mojo*, a completely different type of airplane caught Mark's eye.

The year was 2016, and the planes in question were a 1937 Stinson SR-8B and a 1934 Waco UKC. Mark knew he wouldn't be able to resist the allure of these beautiful vintage airplanes. He also knew he couldn't afford to take over caretaker duties for one of them. His career as an industrial maintenance technician treated him well, but unfortunately not quite that well. So, Mark did what he always does and found a solution.

THE 701

Zenith kits have a strong history in the world of homebuilding, although they don't exactly reach back to the 1930s. Still, it would eventually be a Zenith 701 kit that allowed Mark to fulfill his vintage airplane desire. He fondly recalled his first encounter with the type at his home airport in Shelbyville, Tennessee.

"The most fun I'd ever had on a flying machine was my first flight in a Zenith 701 with the doors off," Mark said. "The folks at Jabiru had built it and developed a firewall package for their 2200 engine. They said they could hear me laughing out loud as I flew over their hangar. I flew over their hangar and I was just, 'Woohoo!' I've never flown anything like it before in my life. This thing's just a hoot."

That fateful Zenith 701 flight came just after Mark spent AirVenture 2014 looking for the right low and slow flyer. He left undecided but did not remain so after experiencing that 701 flight. He ordered the kit soon after.

Building the airplane in retro style was always the plan, although the exact kind of retro changed and evolved as the build progressed. Early on, Mark envisioned a throwback to the Curtiss Jenny with an old snake oil wagon paint scheme. Then, his love for the classic Stinsons and Wacos altered his vision.

The final look of the 701.1 was not something Mark planned from day one. Instead, he said the plan was dictated more by the airplane than by him.

Mark Phillips



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“Once I decided ... that the airplane was going to go in that direction, to kind of the vintage look, it’s almost as if the airplane kind of led me along to it,” Mark said. “You know, I’d go to do something, and it was almost telling me, you need to make this part look like this or you need to make this curve or whatever. I don’t know how to really explain it, but it basically took on a life of its own.”

DEVIANT BEHAVIOR

Mark classifies all of the many changes he made from the original 701 design as moments of deviant behavior. Since he’s not an aeronautical engineer, Mark didn’t make changes that would alter flight characteristics that much. However, just about everything else is custom.

“I’m not an aeronautical engineer, so the wing construction — except for the tips — is 100 percent the way it comes from Zenith,” he said. “I don’t take chances with that.”

Thanks to some help from Zenith, Mark’s mostly 6061-T6 aluminum kit came wider on the top and bottom, allowing the longerons to live inside of the skins. He fabricated a new flaperon control system and switched the elevator system to a push-pull tube system that was familiar to him from his RV building days. Those changes allow ample room for baggage. Mark likes to joke that the CH in CH 701 also stands for cargo hauler when it comes to the 701.1.

Mark used the standard pulled rivets that came with the kit for most of the project, except for some AN426 and AN470 rivets he used wherever it made sense. The side skins, for example, use mostly back-riveted AN426-3 flush rivets.

Elixir has one of the cleanest firewall forwards an airplane possibly could have. The engine wiring is concealed within tubes under the cowl, with cables and the choke on one side and mag and electrical wires on the other. A 120-hp, six-cylinder Jabiru 3300 Generation 4 engine sits inside and pushes a wooden Sensenich CK prop.



Top: When the panels in the 701.1 are closed, no new-school instruments can be found.

Middle: Mark can open these panel doors to access his avionics, which gives him the best of both worlds when it comes to retro style and modern technology.

Bottom: Red leather seats with an *Elixir* logo and a gorgeous wooden interior ensure passengers are riding in style.

“There’s always a better way to do something that may not be something you can afford, but if you can make it work, make it work. But then always remember that perfect is the enemy of good enough.”

— MARK PHILLIPS

At first, Mark’s panel appears to just have a standard pack of classic instruments, but there is more there. Two wooden panels open like picnic trays in a classic car to reveal a Garmin G3X Touch GDU 450 on the left side and a GTR 200 comm radio plus storage space on the right. Other modern touches, such as a two-axis autopilot, ADS-B In and Out, and retractable LED landing lights, can be found on the bottom of the fuselage.

“The idea was to make the whole thing look like it could have been built in the 1930s,” Mark said. “Basically until her secrets are revealed, inside or out, you don’t really see anything that could not have been built back in the day. And then you pop open the doors in the panel, and then you see the avionics.”

The doors on the 701.1 are an original design done by Mark. The door handle itself serves as a latch to catch under the wing, as a way of holding the doors open for taxi or whenever else Mark may want them open.

“I completely designed and built the doors from scratch,” he said. “I wanted the bubble doors so you had more elbow room, but I wanted them out of metal.”

The Matco 6-inch wheels, brakes, and tires on the airplane all came with the Zenith kit. The main landing gear is surprisingly standard, but the nose gear is entirely different from the standard 701 version, aside from the bottom yoke. The steel part is chrome, and the redesign to the gear gives Mark a trailing link suspension that makes him feel better about the prospect of hitting something hard on landing.

“The standard Zenith nose gear is just a tube with that yoke on it, the aluminum yoke, and it slides in a couple of nylon blocks with bungee cord for suspension,” Mark said. “Well, I wanted a little more robust suspension than that, and doing a lot of design work and trying all kinds of things, I modified it.”

Some of the smaller bits of deviant behavior are some of Mark’s favorites. A trip to visit his daughter in Louisville, Kentucky, one night caused him to realize he couldn’t tell if his strobes or landing lights were on. His solution was simple yet effective. He drilled a small hole and glued in a piece of fiber optic cable to allow the pilot to look out and check the lights.

“It took half a day and \$5 worth of stuff,” Mark said. “I love doing little detail things like that.”

Another “little detail” is the vents in the side of the airplane. Adorned with its *Elixir* name, Mark went to special trouble to engrave those himself, as he did with most of the lettering in and on the airplane. He strove to do as much as he could himself on the airplane, aside from the welding, to ensure it was done exactly right.

Left: Elixir's door handle also functions as part of a mechanism that can hold it open.

Right: A carefully engraved vent allows air to flow in when Mark wants it to.





CLICK HERE TO VIEW MORE PHOTOS ON MARK PHILLIPS' ZENITH 701.1

ZENITH 701.1 SPECS

AIRCRAFT MAKE & MODEL:
(registered as) Phillips Mark A 701.1
CERTIFICATION: E-AB

WINGSPAN: 27 feet
WING AREA: 122 square feet
HEIGHT: 8 feet, 2 inches
MAXIMUM GROSS WEIGHT: 1,220 pounds
EMPTY WEIGHT: 747 pounds
FUEL CAPACITY: 22 U.S. gallons
SEATS: 2

POWERPLANT: Jabiru 3300 Generation 4
HORSEPOWER: 120
CRUISE SPEED: 80 mph
G-LOAD: +6/-3g at 1,100 pounds

V_{NE}: 110 mph

"This airplane is extremely budget," Mark said. "That's why pretty much everything, I built it myself."

The stick is made from wood because, as Mark reasons, it only makes sense for a stick to be wooden. It's bird's-eye maple, which is also used for the wood trim in the airplane. All of the bird's-eye maple in the 701.1 came from the same block that Mark purchased for the project.

The seats are custom red leather, which Mark designed himself. He also did the padding and installation. The seats were cut and sewn by an upholstery shop in Tullahoma, Tennessee.

Elixir's modified windscreen contains a center section that runs uninterrupted from the cowlings all the way back to where it meets the top fuselage skin. Mark said he got that idea online.

"I had followed some of the online discussion regarding the 'beanie mod,' which replaces the flat cabin top window with a curved extension of the windscreen," he said. "As I understand it, this is to help smooth the airflow over the top of the fuselage and make the elevator more effective at high angles of attack."

The paint scheme certainly fits with the retro feel of the airplane, drawing from a period-appropriate subject. Unlike most of the rest of the muses that inspired Mark, this time it wasn't an airplane. It was a car — the 1935 Duesenberg SSJ that Clark Gable drove some 80 years ago. The scheme was applied by a painter in Shelbyville, Tennessee, and Mark taped off the curved lines and did the N-numbers.

The finished product makes it seem as though Mark never erred during *Elixir's* construction, an idea the builder finds hilarious. Plenty of his dreamed-up ideas proved to be impossible, or at least impossible for Mark to build.

His shop, colorfully known as the Possum Works, contains a wall of shame full of ideas that didn't work out. One failure that stands out for Mark is an earlier attempt at a redone flaperon system that refused to cooperate.

"I've got a picture of this pile of hardware that I tried to make the flaperon system work with, and [when] I think back, I probably invested 300-400 hours and, I don't know, 500 bucks, and [had] been trying to make this thing work and it just — it was no good," he said. "It just wouldn't want to work. I said screw it, and I threw it out. It's in a little box. But what's in there now works great."

All of these subtle — and not so subtle — alterations were made because that's the way the airplane looked to Mark as he built it. Plato's theory of forms is a similar idea that states, simply, that our mind's eye has an ideal version of every object that real-world versions are copies of. Every chair is a copy of the perfect chair, every table a copy of the perfect table, and Mark's *Elixir* is a copy of the most perfect airplane he could imagine.

PERFECT FIRST FLIGHTS

Mark's RV, *Mojo*, looks radically different when compared to his Zenith 701.1. One thing that links the two airplanes (besides the builder and his deviant behavior) is the first passenger who flew in each: Mark's father.

All of the skills and ideas that went into Mark's airplanes are his to use because he got them from his dad, which led naturally to Mark bringing his father with him on *Mojo*'s first flight.

"I inherited my hands and my mechanical abilities from him, and he's been my biggest supporter since the get-go, and he's always been great," Mark said. "He's come up and visited with me while I was building the RV, and helped buck rivets and with fixing stuff. And he was telling me that he would be my first passenger in my RV, so as soon as I got my Phase I flown off, I flew down [to Atlanta] and took him for a ride in the RV."

As Mark's vision for *Elixir* became a completed airplane in his shop, his father had some health difficulties, including more than one stroke and some trouble with his eyesight. He's been recovering, but Mark felt powerfully motivated to finish his latest project for his dad.

"I really had to get this done," Mark said. "To get him so he could be my first passenger. ... He was my first passenger on that plane (the RV), and I was determined that he would be able to fly with me in this one."

Mark retired early from his career to focus on the build and was able to keep his tradition going by giving the man who gave him so much a ride in his pride and joy.

"It worked out great," Mark said, emotion heavy in his voice. "He was thrilled."

A lesson imparted to Mark from his father has guided him through the Zenith 701.1 and his entire life: just find a way to make it work.

"There's always a better way to do something that may not be something you can afford, but if you can make it work, make it work. But then always remember that perfect is the enemy of good enough," he said. "You know, you got to hit that sweet spot and then move on. ... That's true for pretty much anything. Raising kids. You know, building a house, dealing with business associates. Your job, your career, whatever. That's the way you got to look at stuff." **EAA**

Ti Windisch is the assistant editor at EAA and enjoys learning about various types of aircraft. Outside of aviation, he can often be found watching, writing, and podcasting about the NBA. Email Ti at twindisch@eaa.org.

Top: It's much easier to find out what Mark's airplane's name is than what model it is when looking at *Elixir* straight-on.

Middle: Mark built his 701.1 for low and slow flying, and the airplane is definitely capable of that mission.

Bottom: With tubes containing most of the necessary wiring, Mark's firewall forward section is squeaky clean.

