

EAA Sport Aviation

The Magazine of Recreational Aviation

www.eaa.org

JANUARY 2004

Canadian
Craftsmanship
Glascir Builds Partnership

Pietenpol Passion
Liquid Cooling





Canadian Craftsmanship

Glasair III builds a partnership

Budd Davisson

A perfect glass airplane built from a kit is such a cliché that it's becoming increasingly difficult for builders to make their airplanes stand out from the rest. A kit is essentially a blank canvas with the basic premise already laid out, so it's up to builders to devise ways to make the finished airplane uniquely theirs. Apparently Andy Seefried and Don Bendickson did just that because their Glasair III earned the coveted Grand Champion Kit Built aircraft at EAA AirVenture Oshkosh 2003.

Andy and Don both call Campbell River, British Columbia, home, although they didn't know each other until brought togeth-

er by the Glasair. Don purchased the kit that eventually became C-GGTM in 1991. "I have had a lifelong interest in aviation, trained for my private pilot certificate when I was 17, and have owned a dozen or more airplanes since then, starting out with a Cessna 172 in 1973, various floatplanes, a couple of twins, and several helicopters."

By the late 1980s, Don was becoming more aware of homebuilts, and it became obvious that custom-built aircraft offered the kind of performance that really appealed to him. "The Glasair caught my eye, so my wife and I stopped at the plant during a holiday. I flew the demonstrator once, and the deal was done." It wasn't long before a huge plywood crate arrived.

"When I started working on the airplane, I didn't realize how much time it would take and how little free time I had between running a business and raising a family. In 1994, I made my first trip to Oshkosh and came away really enthused, but by 1995, I realized I was going nowhere fast. That's when I met Andy."

Andy Seefried had the kind of childhood that eventually led him into aviation. "I grew up on a farm near Medicine Hat, Alberta," Andy says, "right next to a military range where the Canadians and British held war games. Our farmhouse was almost directly off the end of the runway, so while I was still a little tyke, I could identify Spitfires, Mustangs, and Harvards. Later, when jets came in, sonic booms were such a natural part of life that we didn't even look up."

Andy had his life well under way with a family, a home, and a business, when his brother approached him with an idea. The year was 1980. "I'm not certain what sparked it, but one day my brother just up and says 'Let's buy an airplane.' I'd always liked airplanes but hadn't thought seriously about owning one. I didn't fly, but that didn't worry me. In fact, when my brother made the suggestion, I hadn't experienced even one pleasure ride in a light airplane. Still, I didn't even think about it. I just said yes."

"One day, I was operating my road grader," Andy says, "when a trucker handed me a copy of *EAA Sport Aviation*. When I got to the back cover, wow! There was an ad for the prettiest thing I'd ever seen—a two-seat, all-glass airplane. I had to have one! I

LEE ANN ABRAMS



The sculpted custom panel neatly flows from one side of the airplane to the other and visually ties the entire cockpit together.

MARK SCHABLE

ran that grader hard for two more years to earn the extra money to order a Glasair IIS-RG kit. And, naturally, I joined EAA."

Andy started on his Glasair II and discovered something almost immediately. "I've always liked building stuff, but I found I absolutely love the airplane-building process. *Love it!*" Andy was so driven that he finished the II in only two years. It was a by-the-book VFR machine, and he flew it for a year and 100 hours before selling it. Although Andy missed the airplane almost immediately, in less than two years Don Bendickson came into his life with a very interesting proposal.

Partnering for Perfection

Don says, "I met Andy, and we talked a lot about building airplanes and flew my helicopter a little. I knew he had built a Glasair II, and I decided I'd approach him about coming in with me on my airplane. Otherwise I knew I'd never get it finished."

I think a lot of the detail work came about because I didn't want to finish too quickly.

I was having too much fun!

Andy went over to see Don's airplane, and he says, "I was pretty excited. Don had the wing in a jig and had done some work, but everything was covered with cobwebs. In my opinion, the Glasair III is the ultimate flying machine, so when Don made his proposal, it took me less than two heartbeats to make up my mind. Trying not to appear too eager, I said, 'Yeah, why not.'"

The official start of the joint venture was in 1995 when they moved everything to Andy's workshop. "We definitely did not sit down at the beginning and say we wanted to build an award-winning airplane," Andy says. "I think a lot of the detail work came about because I didn't want to finish too quickly. I was having too much fun! As I got deeper into the detail work, we decided to see how perfect we could make

this airplane, even though we still weren't looking at winning awards with it. The goal of near perfection was enough for us."

When asked about the engine, Andy initially passes it off by saying, "It's just the recommended angle-valve Lycoming, an IO-540-K1A5." But the rest of the story says something about Andy Seefried and his approach to building. Andy says, "We had a specialty shop in Colorado build the engine, but I went down there to help out a little."

Don clarifies what "help out a little" means: "Andy spent eight hours a day for 15 days at the engine shop. He did things like polishing and smoothing every part, so when he painted them they looked like porcelain. He took care of a lot of the outsourcing like getting the

cylinders' flow matched, dynamically balancing the crank, and vibrationally stress relieving most of the parts. He put so much of himself into the process that it is a very special engine and definitely ours."

Andy adds, "We used new Lycoming nitrided cylinders, which were combined with 10-to-1 NFS pistons with ceramic-coated tops for increased combustion efficiency and a custom grind cam. The ignition is handled by two LSE ignition systems. Using a gram scale, we matched up piston and rod assemblies to equalize slight weight variations. The cylinder heads were bead blasted clean then Alodined to a rich gold color, and the barrels were painted gloss black.

"We were as meticulous as you could possibly be, and the result is that it not only runs extremely smooth, but on the test stand we were guaranteed a minimum of 330 hp while still driving all the accessories."

"Right from the beginning we wanted an airplane that had absolutely no cooling problems," Don says. "We had heard nightmare stories in that area, and we also wanted to eliminate as much of the cooling drag as possible."

Their approach to cooling parallels some of what is seen on racing airplanes. Rather than depending on the cowl to form the cooling plenum, Andy boxed off the top of the engine, creating a self-contained, totally sealed plenum that runs from head to head. The inlet areas of the nose bowl are plumbed tightly into the plenum chamber, allowing no air to escape without taking some heat with it. The inlets were smoothly contoured to encourage maximum airflow, and the exhaust outlet areas were reworked to gradually accelerate the exit air. Even though the inlet areas are about half of what calculations show an engine of this size and power should need, the pair report head temps never get warmer than 380 degrees, and oil temps stay



Andy and Don's throttle quadrant—an alternative to standard push-pull engine controls—flows with the custom panel and further customizes the interior.

MARK SCHABLE

cooler than 210 degrees—even during long climbs in hot weather. Cruise numbers are 360 CHT and 192 degrees on the oil.

The nose inlets also incorporate a pair of nicely shaped secondary inlets, which direct air to the oil cooler and engine induction. Rather than being connected to a piece of scat hose, however, the vents lead into smoothly-tapered glass runs that are integral parts of the cowling on each

side. When you look at the inside of the cowling, you aren't even aware they are there. They just look like fat cowl stiffeners.

Scat hose blast tubes come off the back of the plenum chamber and provide cooling air for the fuel pump, fuel filter, battery, and cabin heat.

Devil in the Details

Andy says, "We've gone to extremes to make sure there are no gaps anywhere in the airframe. Cowlings,



For cooling, the builders boxed off the top of the engine, creating a self-contained, totally sealed plenum running from head to head.

MARK SCHABLE

canopy, belly, and wingtip covers are all very tightly fitted. A dime won't fit into any of the control surface gaps. I designed removable fairings for the flap hinges to clean them up. When it comes to airflow, both cooling air and general aerodynamics, every little bit helps, and anywhere that air is leaking or disturbing the overall efficiency of the airplane is being degraded."

Since the engine is usually cowled, spectators miss all of the incredible detail under the hood like the neatly bundled wiring harness, the powder-coated firewall with hand-spun aluminum fuel/oil line pass-through dimples, the 40 aluminum firewall trim pieces, the insulated and cooled battery box, as well as the crankcase oil/air separator featuring a "no greasy belly" system.

Onlookers also miss little details like the cowling lock pins. A virtually invisible plug is unthreaded on each side of the cowl, revealing a 3/16-inch hole with a threaded piece of wire visible in the middle. If you saw it, you'd say, "What the...?" Then one of the partners will reach in their pocket and pull out a little

Onlookers also miss little details like the cowling lock pins. A virtually invisible plug is unthreaded on each side of the cowl, revealing a 3/16-inch hole with a threaded piece of wire visible in the middle.

key-looking thing, thread it onto the wire, and pull the cowl-length wire out slick as can be.

The top rear of the upper cowl shows no fasteners at all because it's attached with a cleverly designed multi-pin, pull-down system that's activated by a concealed lever accessible through the oil door. Cowl removal and replacement is fast and easy and works perfectly every time. Andy says he demonstrated it 20 or 30 times at Oshkosh.

Another slick trick: The oil door is electrically activated from inside the cabin but doesn't require any wires to be disconnected when removing the cowl.

Unfortunately for casual passers-by, so much of the details are missed. How many noticed that there were no fasteners visible on the spinner? Or the hydraulic oil

sight gauge incorporated into the fuselage skin? Or the slick little fairings over the canopy hinges? And no one will have any way of knowing that the airplane has power door locks that have manual backups and incorporate a safety feature whereby the emergency gear hydraulic system can't be activated without first releasing the door locks.

A more obvious feature, however, is the instrument panel that, like so many other things, started with a single detail and built into an entire concept.

"We weren't planning on producing a panel that, as some people say, looks like a piece of sculpture," Andy says. "We just wanted an appealing panel that mounted a throttle quadrant rather than the normal push-pull engine controls. As I was working on it, it got out of

hand and sort of evolved."

The panel flows from one side of the airplane to the other, blends into the side upholstery, which flows through the sculpted hat rack and forward to the center console and up the throttle quadrant. The visual effect is impressive, tying the entire cockpit together.

"The plug for the panel was made from whatever I had lying around the shop like foam, wood, plaster of Paris, and even a little concrete mix. We pulled a mold from that, and it worked so well that Aerotronics in Billings, Montana, now offers duplicate panels for sale.

"The wood accent pieces are Malaysian blood wood, which is a hard, resinous wood that shapes beautifully and needs no finish. You just sand and polish it.

"The electrical and avionics took a lot of time because I was facing such a steep learning curve, but I really enjoyed doing it. I just routed

one wire at a time and scratched my head quite a bit while poring over schematics. Amazingly, everything works with the exception of an autopilot porpoising problem, but a fix is in the works."

There seems to be a theme developing here in which Andy sees the skills required to build as projects themselves. Don says, "Andy is really amazing in his ability to take a new skill and become really good at it in a short time. The avionics are good examples of that, and the interior is another. Most builders would get an upholsterer involved, but Andy didn't. He used his wife's

sewing machine and did the seats himself. He molded the rest of the cockpit upholstery and glued it in place. You just wouldn't believe what he can do. But more than that, what he doesn't know how to do, he'll learn and become a professional at it first time around. He's literally a jack of all trades and master of all of them."

Paint is another of those areas usually left to the professionals, but not with Andy.

"The paint drove me nuts. I definitely am no painter. I worked and worked at it. In fact, I shot the red stripe at least six times, didn't like it,

The top rear of the upper cowl shows no fasteners at all because it's attached with a cleverly designed multi-pin, pull-down system that's activated by a concealed lever accessible through the oil door.



The Lycoming IO-540-K1A5 uses new nitrided cylinders combined with 10-to-1 NFS pistons with ceramic-coated tops for increased combustion efficiency.

MARK SCHABLE

Most builders would get an upholsterer involved, but Andy didn't. He used his wife's sewing machine and did the seats himself.

and wiped it off. Actually, I never did really get the hang of painting, and the airplane still needs some future TLC in that department. Oh, well."

When you see an airplane that is as finely detailed as this one, the obvious question is, "How much does it weigh?" because with detail comes a weight penalty.

"We worked really hard at keeping it light," Andy says. "We came in at 1,605 pounds fully equipped where the factory says 1,625 pounds with unknown equipment."

Even though Andy didn't want the building process to end, eventually the partners ran out of things to do, and the airplane was ready to fly. It first flew on June 10,

2003, and the only glitch they've had was one gear leg that initially didn't lock up. Other than that and the autopilot, it has been trouble-free.

Andy says, "This airplane really performs! It climbs like crazy. I've seen as much as 3,400 feet per minute and 252 knots indicated straight and level. We flight plan at 235 knots and always get it."

Since the majority of homebuilt airplanes at any fly-in are built from highly refined kits, competition can be fierce when it comes to the judging. And when that judging is being done at Oshkosh,



where so many airplanes are purpose-built to win awards, it means just that much more when an airplane wins Grand Champion in the kit-built arena. On top of that, it's seldom a builder in *any* category that does it all: paint, upholstery, avionics included. So Andy and Don's airplane is truly special.

Perfection is one thing. But perfection that is attained entirely by the skills of the builders—with no outside help—is a rare thing indeed. C-GGTM has it all!

