Stemme Soaring Amotorglider without the compromises

M. Landid BY THOMAS A. HORNE Motorgliders are the boutique hybrids of the general aviation fleet. Exotic-looking, usually foreign-made, and with systems alien to both airplane and glider, these rara aves appeal to pilots who want it both ways. The trouble with traditional motorgliders, however, is that they involve great design compromises. Something bad happens when you try to combine the attributes of both sailplane and power plane in the same package. The extra drag of a feathered propeller, together with the weight of the engine, diminish the sailplane aspect. Motorglider engines are kept light and fuel tanks small to PHOTOGRAPHY BY MICHAEL P. COLLINS



minimize this drag, but that means less power and curtailed range, so in powered mode motorgliders usually make for slow, short-legged cruisers. There's little in the way of baggage space, either.

Then along comes the Stemme S10-VT, a motorglider built in Strausberg, Germany (near Berlin), and marketed in the United States by Stemme USA in St. Louis. The Stemme has a unique propulsion system that eliminates the worry of propeller drag in soaring flight, and has a turbocharged engine and a fuel capacity that permit faster cruise speeds over long ranges. It's probably the only motorglider that works equally

well in both flight regimes.

At the heart of the Stemme's design solution is its retractable, stowable propeller—the brainchild of Dr. Rainer Stemme, the company's founder.

When in sailplane mode, the twoblade propeller is folded back into a compact disc, held against the prop hub by springs, and enclosed within the Stemme's extendable nose cone. When it's time to transition to powered flight, the pilot cracks open the nose bowl and extends it forward, primes the 115-hp Rotax four-stroke engine, and turns the ignition key. As propeller rpm builds, the prop blades extend by centrifugal force. Now you're ready to fly out of that sinking air, or fly cross-country at speeds as high as 140 knots. Or take off without a tow plane.

Stemme USA has been showing off the S10-VT for the past few years at air-shows and in private demonstration flights. My turn at the controls came last fall, when "Glider Bob" Saunders, Stemme's field sales representative, brought N5021 (as in 50-to-1, the Stemme's glide ratio in sailplane mode, get it?) to AOPA headquarters in Frederick, Maryland. Saunders is based in Telluride, Colorado, where he racked up hundreds of hours soaring the S10-VT









The Stemme's pop-open nose cone lets a spring-loaded folding propeller extend for powered flight. Hinged wing panels swing back for easy storage. The cockpit is snug, but comfortable, and sports a nonstandard panel, control stick-mounted brake levers, and two variometers.

before taking it on the road. He shares a telephone listing at the Telluride airport with a charter operator—also named Bob. So when people call, they have to specify whether they want to talk to "Glider Bob" or "Charter Bob." I knew you were asking yourself about that.

Spot a Stemme on the ramp, and you notice the wings first. The span is an airliner-size 75.5 feet, although the wings can be folded back for storage in a hangar or trailering. You do this by removing a couple of pins at the spar joints, pulling the outer wing panels out, then swinging them to their stowage spots on the empennage.

To enter the cockpit, you sit on the wing root and swing first your legs, then your hind end, over the canopy sill. The seating position seems too reclined at first, but you acclimatize after you close the canopy and settle in.

Starting the Rotax is fairly conventional, which is more than can be said about the panel layout and instrumentation—at least from a power pilot's point of view. N5021 is a day-VFR airplane, so the front-and-center position on the panel is devoted to a couple of variometers—instruments that record rates of climb and descent with far greater accuracy than those found in

the prosaic, powered spam-cans most of us fly. One of the variometers is electrically powered, and gives off distinct tones that signal lift or sink. More on this shortly.

That huge wingspan means that you have to be extra vigilant while taxiing, and give plenty of room between you and other airplanes, buildings, etc. Years of taxiing light singles will make you want to taxi the same way you always do—which could make for an expensive ding on the Stemme's ultra-smooth fiberglass wings.

Takeoff is a graceful, slow-speed affair. Raise the tail at 40 kt, then lift

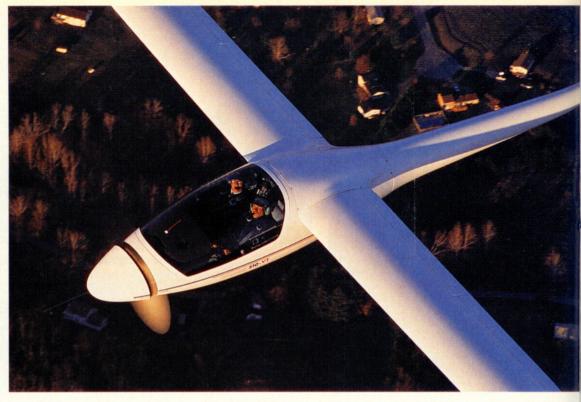
off a few knots later. Accelerate to 60 kt, then begin climbing at the $V_{\rm Y}$ of 62 kt. Our rate of climb turned out to be about 700 fpm. This was with the propeller set at low pitch; for cruise, you can set the variable-pitch (that's the V in VT; the T is for turbocharged) propeller for lower rpm and faster airspeeds.

West of Frederick and over the valley between the mighty Catoctins and majestic South Mountain, Bob and I scan the sky for signs of lift. It is a 4,000-foot-scattered, gusty kind of day, so the best markers would be the clouds themselves. It is turbulent in the climb to 3,000 feet, so we knew that

there ought to be some kind of lift, somewhere.

Sure enough, here comes a bump and a squeal from the variometer. In rising air, the electric variometer gives out a "beep, beep" sound that increases in frequency with an increase in lift. Hit a good patch of lift, and it's "beep-beep-beep-beep" in rapid succession. Sinking air brings on a discouraging "boop, boop" falling tone.

So it's beeping like mad, and we feel secure enough to shut down the engine



and do some soaring. To do this, you shut off the engine using the key switch, then pull on a centrally mounted propeller brake. This stops the propeller, and the springs draw the blades to the center of the hub. Then you pull on another handle to center the prop in the horizontal position. This is necessary because the nose has an ovoid cross-section, and the prop must be stowed horizontally if the nose bowl is to be retracted. A tug on a third lever is the final procedure in the shutdown. This

closes the nose bowl, bringing it flush against the rest of the fuselage.

Now it's eerily quiet. The headphones come off, normal conversation begins, and the game of finding, and keeping, lift begins in earnest.

A few beeps later we were in a good 55-degree bank at an airspeed hovering around the Stemme's 54-kt best L/D (lift over drag—the speed that will yield the best glide performance).

There, 400 fpm up. No, it's up to 500 fpm. "Boop, boop," and it's—uh, oh—a



sink rate of 600 fpm. "We went through it," says Saunders, who recommends backtracking to find the core of the thermal. Back we go, and sure enough

we're beeping back up.

Yanking and banking near the stall can be discomfiting for many power pilots, but it's a fact of life for those who fly sailplanes. That, and dealing with the rudder pressures needed to keep adverse yaw under control. Those ailerons are way out there on a huge moment arm, and it can take a fair amount of foot power to keep the canopy-mounted yaw string centered. Then there's the overbanking tendency, another strong force when in steep, thermalling banks.

Eventually we come very close to the cloud base, which is the best we'll do

The nose doesn't sit very high on the ground, so there's no need for an aggressively nose-high three-point landing.

this day. I must say that, even as a lapsed sailplane pilot, I was a bit concerned about killing our only good engine and going thermal-hunting at 3,000 feet. Didn't seem high enough for me. But the Stemme's excellent glide ratio meant that we could easily glide around looking for thermals without too much concern about altitude loss. Besides, if altitude ever became a concern, we could turn the engine back on. Ah, luxury.

Had we wanted to fly cross-country as a power plane, Stemme says that the airplane has a maximum cruise speed of 140 kt, assuming full throttle and a 10,000-foot cruise altitude; a 75-percent power setting yields a 135-kt cruise. With the optional 32-gallon fuel tanks, range is advertised as being "900-plus" nautical miles. I'm assuming that's a VFR range, because Stemme is vague on this topic and the S10 hardly seems like an airplane meant for serious IFR flying. Anyway, pilots who buy a Stemme will learn all about the airplane during the five-day training course offered as part of the purchase price. You can take the training in the United States, or go to



The Stemme's 115-hp Rotax is accessible via removable fuselage panels just aft of the cockpit.

To prevent engine overheating, side-mounted cowl flaps automatically open when the
nose cone is extended. The landing gear's extension time is 14 seconds.

Stemme S10-VT

Base price: \$175,736 Price as tested: \$221,637

Specifications

Powerplant Rotax 914 F2/S	l, turbocharged, 115 hp	
Recommended TBO	1,000 hr	
Propeller	2-blade, folding,	
variable-pitch Stemme 11AP-V		
Length	27 ft 6 in	
Height	5 ft 8 in	
Wingspan	75 ft 6 in	
Wing area	201.6 sq ft	
Wing loading	9.3 lb/sq ft	
Power loading	16.3 lb/hp	
Seats	2	
Empty weight	1,410 lb	
Empty weight, as tested	1,450 lb	
Maximum gross weight	1,874 lb	
Useful load	464 lb	
Useful load, as tested	424 lb	
Payload w/full fuel (standar	d tanks) 320 lb	
Payload w/full fuel, as teste	d 280 lb	
Fuel capacity, std	24 gal (23.2 gal usable)	
Fuel capacity, w/opt tanks	32 gal (31.2 gal usable)	
Oil capacity	4 qt	

Performance

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Takeoff distance, ground roll	600 ft
Takeoff distance over 50-ft obstacle	1,350 ft
Max demonstrated crosswind component	16 kt
Rate of climb, sea level	800 fpm
Best glide ratio	50:1
Minimum sink rate	112 ft/min
Maximum level speed, sea level	125 kt
Maximum level speed, 10,000 ft	140 kt
Cruise speed/endurance w/45-min rsv,	long-range

(fuel consumption)

@ 75% power, best economy, 10,000 ft

135 kt/ 780 nm/5.5 hr (5.0 gph)

Service ceiling 33,000 ft

Limiting and Recommended Airspeeds

Limiting and Recommended Amspeeds		
V _X (best angle of climb)	58 KIAS	
V _V (best rate of climb)	62 KIAS	
V _A (design maneuvering)	97 KIAS	
V _{L/D} (best lift/drag)	54 KIAS	
V _{FF} (max flap extended +16°)	76 KIAS	
V _{FF} (max flap extended +5°, +10°)	97 KIAS	
V _{I.F.} (max gear extended)	76 KIAS	
V _{LO} (max gear operating)		
Extend	76 KIAS	
Retract	76 KIAS	
V _{NO} (max structural cruising)	146 KIAS	
V _{NE} (never exceed)	146 KIAS	
V _R (rotation)	50 KIAS	
V _{S1} (stall, clean)	47 KIAS	
V _{SO} (stall, in landing configuration)	42 KIAS	

For more information, contact Stemme USA Inc., 1401 South Brentwood Boulevard, Suite 760, St. Louis, Missouri 63144; telephone 314/721-5904; fax 314/726-5114; or visit the Web site (www. Stemme.com).

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.

Strausberg and spend a few days attending a factory-conducted course.

Spoilers can be used to slow the Stemme in preparation for landing, flaps can start coming down at 97 kt, and the electrically-powered landing gear can be extended at or below the ship's $V_{\rm LE}$ of 76 kt. Make your final

With a service ceiling of 33,000 feet, the Stemme would be the steed for motorglider altitude records.

approach at 60 kt, and try for a flat touchdown attitude; the nose doesn't sit very high on the ground, so there's no need for an aggressively nose-high attitude to make a three-point landing.

How much, you say? How does \$176,000 grab you? N5021 came with a load of options—all but the solar cells



(which charge the Stemme's main and auxiliary batteries; the latter provide electrical power in soaring flight). These included winglets, extended rudder pedals, tinted canopy, a night-flying instrument panel lighting system, widetrack tires, and strobes. Of course, you can order an oxygen system for those altitude records you plan to set. With a service ceiling of 33,000 feet, the Stemme would be *the* steed for motorglider altitude records.

So sure, the Stemme is pricey. But where else can you find a no-compromises motorglider that outperforms the rest, makes you the center of attention wherever you go, and lets you bump up against the tropopause? If you want unique, and have a glider certificate (the S10-VT is certified as a glider) or rating, then the Stemme is the way to go.

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