

# A tame trainer for wild attitudes

**W**hat would you do if your wind-screen suddenly filled with a view of green fields? If you're flying a German-built Grob 115C1 Acro, you'd recover and do it again. Since it last appeared in *Pilot* (see "Grob G115C," September 1993), this former utility-class trainer has learned a few new tricks that Grob hopes will help to win over the American market. Grob came to the United States in the late 1980s with a beautifully engineered but somewhat expensive 115-horsepower two-seat trainer; the market did not respond. The company tried the non-aerobatic Grob 115C1 a few years ago and got a better reaction. It had a redesigned tail, wet wings, a baggage compartment, and a 160-hp engine. Since then, 19 of you have purchased the aircraft. (Grob is not new to the American market. The company earned its reputation by building classy gliders, and more than 300 have been sold in the United States.) At about the same time, Grob (officially Burkhart Grob Luft-und Raumfahrt GMBH & Co. KG, located in Tussenhausen-Mattises, Germany) certified a fully aerobatic airplane, the 180-hp G115D, with inverted fuel and oil systems and a constant-speed Hoffmann propeller. Only two sold, primarily because the price was \$212,000, but Grob marketers received a lot of inquiries. The strong reaction, despite poor sales, convinced Grob planners that they were on to something. Now, if only they could bring the price down. (The D models can still be ordered, but they are no longer marketed aggressively.)

## The gyrating Grob

By Alton K. Marsh



PHOTOGRAPHY BY MIKE FIZER

The result of Grob's efforts is the new G115C1 Acro, an aerobatic aircraft approved for positive G maneuvers that can withstand six positive and three negative Gs—a capability equaling the best of the aerobatic trainers on the market. Grob removed the expensive inverted fuel and oil systems of the D model and retained the less-expensive fixed-pitch Sensenich propeller found

Additionally, it may spit a light coating of oil from the breather tube onto the underbelly and wings during aerobatic flight until pilots learn to keep the quantity slightly under 6 quarts. For the photography accompanying this article, 12 aileron rolls were made with the oil level just under 6 quarts, and not one drop of oil was found on the aircraft underbelly afterward.

## The price reduction to \$125,000 will help cure sticker shock.

on the utility model, rather than using the pricey constant-speed Hoffmann composite prop from the D. Grob didn't have to do a thing to strengthen the composite airframe. It was already capable of aerobatics. The tough airframe, Grob says, has an infinite life, with a certified TBO of 12,000 hours. Subject to a satisfactory inspection at that point, it is then approved for another 12,000 hours. (A flight instructor and an aerobatic student were killed in the crash of a Grob D1 in Florida last August. Evidence points to failure of an independent paint shop to balance the control surfaces after the aircraft was repainted. The crash led to an airworthiness directive prohibiting aerobatics in all Grob models, including the 115C1, but a fix was approved in February. The FAA required Grob to install additional mass balance in tail control surfaces to provide an additional margin of safety in the event that future aircraft are repainted without rebalancing.)

Examine the aircraft closely and you'll see the finer details that mark this as an aerobatic aircraft. The canopy can be jettisoned, for example. There is a G meter, the control yoke was replaced by a stick, a five-point harness was added, and a new section, "Supplement 2, Aerobatic Operation," was added to the flight manual.

The lack of inverted fuel and oil systems simply means that if the aircraft is flown in negative G maneuvers (for example, sustained inverted flight), the engine may momentarily cut off until the aircraft rolls upright and the fuel supply is restored. Since it lacks an inverted oil system, the engine has poor lubrication when inverted; hence, the limitation on negative-G maneuvers.

Has the 115C1 caught the eye of the buying public? It is too soon to tell, although interest has been shown by some Air Force flying clubs.

The 160-horsepower 115C1—at \$125,000, a price that reflects a recent reduction—is supposed to help with the sticker shock problem, while keeping the same airframe and most of the aerobatic performance of the 115D. Initial customers include those who want a sports car look and feel, with the capability of light aerobatic maneuvers.

The 115C1 Acro, while it will never be the aircraft of choice for advanced aerobatic competitors (its roll rate is only 90 degrees per second, compared to 180 deg/sec for the Decathlon and 360 to 420 deg/sec for

Pitts and Extra aircraft), seems well suited for the newest trend in flight training—emergency maneuver training—essentially an introductory aerobatic course to teach recovery from inadvertent rolls and steep pitch angles or spins.

There are several G115C1 Acros flying in the United States as trainers and rental aircraft. The West Valley Flying Club in Palo Alto, California, uses them for aerobatics, primary instruction, and formation training. The aircraft get particularly high marks for ease of maintenance from instructors there, but they are flown with half-full tanks or less on hot days, to improve performance and to stay within maximum load limits.

An initial test flight took place at Mercer County Airport near Trenton, New Jersey, where corporate jets dominate the ramp.

Noted during a brief walkaround was the ventral fin under the tail, added to improve spin recovery; the high quality of the construction that includes tight

Neatness and sleek lines are the obvious signs of German engineering. Note the \$300 clock on the lower left panel. There is lots of room left over for the IFR bells and whistles.







The roomy cockpit makes wearing a parachute comfortable. Included as standard equipment is a five-point harness.

seams and well-finished surfaces, gap seals (tape) on the control surfaces, and a finely crafted \$300 clock on the instrument panel. The \$135,000 cost of the test aircraft included a Bendix/King KX 155 nav/com, a Bendix/King KT 76A Mode C transponder, and a David Clark Isocom intercom.

It looked somewhat toy-like and a little out of place on the ramp, where it was parked next to a Falconjet, but its good looks attracted a great deal of attention. From cockpits festooned with twinkling lights and highly complex systems, corporate pilots emerged for a closer look at a simple-to-operate aircraft that promises fun, not merely transportation. Of course, at 124 knots, the aircraft is none too shabby in the transportation role, either.

"What can it do?" a Falcon pilot asked. The answer is, just about everything required in a basic aerobatics course: spins, loops, hammerheads, Immelmans (a half-loop, half-roll), split-S maneuvers, aileron rolls, barrel rolls,

lazy eights, and chandelles.

The corporate pilot could only watch with envy as an instructor and I taxied out for a familiarization flight. It was a hot spring day, so the canopy was left partially open; unfortunately, it must be closed for flight. The canopy offers excellent visibility and is tinted to provide sun protection for passengers.

Checking the pushrod-connected

flight controls prior to takeoff, it was obvious that while the cockpit is roomy, full left and right stick movements favor the ectomorphic. Full aileron travel meant that the stick had to be pressed slightly into one leg or the other—in fact, you can see it in the photographs with this article—but it never hindered aerobatic flight.

On the takeoff roll, the aircraft seemed to require greater rudder attention than does a Cessna 152 or 172 to track the centerline—nearly as much as some tailwheel aircraft, in fact. However, the flight manual suggests taking the load off the steerable nosewheel at 32 knots for improved directional control. Once that technique was mastered on a later flight, the takeoff rolls magically became straight.

The ventral fin has done its job in taming the spin. Halfway through a one-turn spin to a heading, slight rudder pressure was begun in preparation for the recovery—the technique required by other aerobatic trainers. But the Acro came out of the spin immediately. On a subsequent spin, rudder pressure had to be delayed until the last possible second to avoid coming out prior to reaching the





Aerobatics are smooth and simple, although the pilot's legs can get in the way. The slower roll rate is perfect for beginners.



quickly once again.

While briefing the landing, the instructor (who had flown the aircraft for the first time earlier that day) cautioned that full flaps would be required to prevent excessive floating. (A factory representative suggests 30 degrees or 45 degrees of flaps for landing and adds that exact airspeed control will prevent floating.) He also suggested leaving the power up slightly for the touchdown, thus flying it onto the runway. The flaps have four main positions; 0 degrees, 15 degrees, 30 degrees, and 60 degrees (yes, 60). Intermediate positions are possible as well. On landing, the aircraft appeared to be aligned with the centerline, and it appeared that way to the pilot in the right seat, too. But the aircraft jerked sideways slightly at

touchdown. Students who learn in a Grob 115C1 Acro will not have lazy feet. A California flight instructor who frequently flies an Acro said, "If you're not real exact with that stiff gear, you're going to lurch." The gear was designed to be stiff to take student training abuse.

It takes more than one flight, however, to evaluate the 115C1 Acro fairly. As already noted, it must be flown differently than the average Cessna 172, although it is no more difficult. The next month, Grob demo pilot Mark Huber brought another G115C1 Acro to Frederick, Maryland. Unlike the rushed and brief exposure to the aircraft in Trenton, there was time for a full checkout and a demonstration of the aircraft's aerobatic abilities.

The majority of maneuvers are entered at 132 kts. The loop became the primary demonstration maneuver because it is

desired heading. A falling leaf maneuver proved that the aircraft can, on rare occasion, get temperamental, like a high-performance aerobatic aircraft. Held in a stall with stick full back, and with rudders

used to prevent the aircraft from turning, the Grob began oscillations left and right with increasing speed, finally dipping a wing and beginning a spin entry before the controls were released. It came out

**Grob 115C1 Acro**  
Base price: \$125,000

Specifications		Fuel capacity	39.6 gal (37.7 gal usable)	Landing distance, ground roll	450 ft
Powerplant	Lycoming O-320 D1A, 160 hp	Oil capacity	8 qt	<b>Limiting and Recommended Airspeeds</b>	
Recommended TBO	2,000 hr	Baggage capacity	121 lb utility	V <sub>X</sub> (best angle of climb)	65 KIAS
Propeller	Sensenich 74-in diameter, fixed pitch		0 during aerobatic maneuvers	V <sub>Y</sub> (best rate of climb)	81 KIAS
Length	24 ft 8 in	Airframe fatigue life	12,000 hours	V <sub>A</sub> (design maneuvering)	128 KIAS
Height	9 ft 3 in	<b>Performance</b>		V <sub>FE</sub> (max flap extended)	112 KIAS
Wingspan	32 ft 11 in	G limits Aerobatic	+6, -3.12 (flaps up)	V <sub>NO</sub> (max structural cruising)	134 KIAS
Wing area	131 sq ft		+3.8, -0 (flaps down)	V <sub>NE</sub> (never exceed)	184 KIAS
Wing loading	15.42 lb/sq ft aerobatic	Utility category	+4.4, -1.76	V <sub>R</sub> (rotation)	54 KIAS
	16.65 lb/sq ft max gross weight	Takeoff distance, ground roll	600 ft	V <sub>SI</sub> (stall, clean)	52 KIAS
Power loading	12.68 lb/hp aerobatic	Takeoff distance over 50-ft obstacle	1,100 ft	V <sub>SO</sub> (stall, in landing configuration)	51 KIAS
	13.64 lb/hp max gross weight	Max demonstrated crosswind component	20 kt		
Seats	2	Rate of climb, sea level	700 fpm		
Cabin width	41 in	Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)			
Cabin height	42 in	@ 75% power, best economy	124 kt/3.3 hr (8.8 gph)		
Empty weight	1,455 lb	@ 65% power, best economy	108 kt/ 3.9 hr (7.6 gph)		
Maximum gross weight	2,182 lb utility	Landing distance over 50-ft obstacle	1,120 ft		
	2,028 lb aerobatic				
Useful load	728 lb utility, 574 aerobatic				
Payload w/full fuel	490.2 lb utility, 336.2 lb acro				

For more information, call 906/548-9465 or write Grob Aircraft Division, 1070 Navajo Drive, Bluffton, Ohio 45817. Additional information may be found on the Grob web site ([www.grob-aerospace.com](http://www.grob-aerospace.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.

easy and can be entered at any speed between 119 and 132 kts. In a descent to pick up the entry speed, continuous slight reductions of the throttle were necessary to avoid exceeding engine rpm limitations. As with any trainer, a pull on the stick inducing at least 3 Gs, and preferably 3.5, was required to enter the loop. On the way up, power can be increased again. Aerobatic pilots generally look ahead as the loop begins, then check the wing's relationship to the hori-



Owners will appreciate the attention to detail, like this built-in dipstick.

zon before throwing the head back to wait

for the opposite horizon to appear. The great visibility aids not only the quest for the perfectly symmetrical loop, but also the search for other aircraft. Down the backside, throttle management again becomes necessary to avoid overspeeding the engine. The Acro has the power to complete loops, even those made by pilots with limited aerobatic experience, without stalling or buffeting as the aircraft goes over the top.

Aileron rolls, because of the slow roll rate, are just right for the beginner and adequate for the once-in-awhile aerobatic enthusiast. There is plenty of time to plan the next control input.

Yes, it would be nice to have a constant speed propeller to reduce the workload during aerobatic maneuvers, but that would bring up the price issue again. For flight schools, however, the rugged construction and more powerful, American-built (and therefore more familiar) engine may tip the scales in favor of a decision to go with Grob. □