

Yes, Virginia, there is more than one two-place aerobatic kit-built airplane on the market. In this case, it's the Acroduster Too from Starduster Corporation. It's very nifty and agile in four-cylinder garb, absolutely muscular in six. Since its origin as an Unlimited aerobatic design from Morgan Schrack's pen back in the early 1970s, some 680 sets of plans have been sold with more than 100 flying examples completed.



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Acroduster

"TOO" ★

FRANK GORHAM

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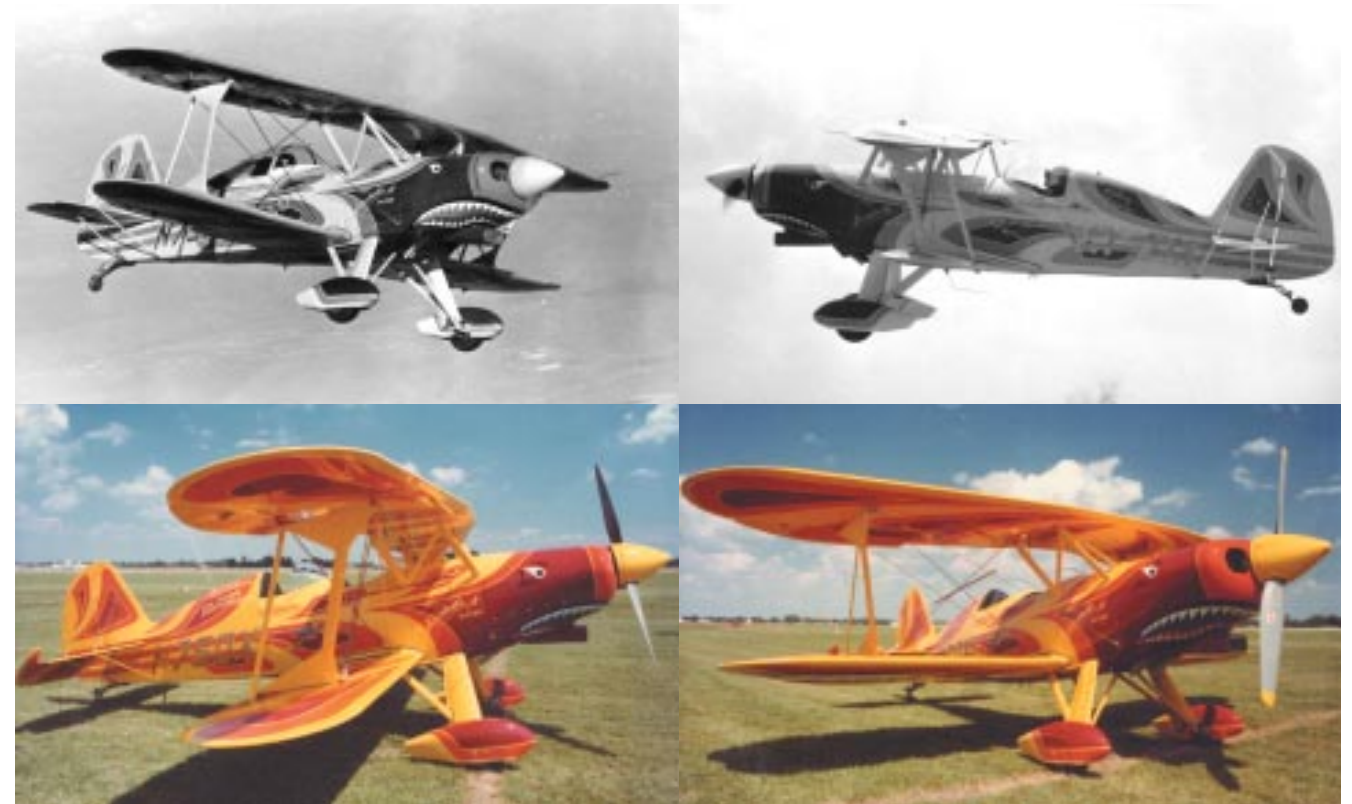
Probably its closest comparisons are the Pitts S-2A and S-2B, although the Acroduster's plus or minus 9g rating (more with plywood leading edges!), generous maximum gross weight, and docile ground handling put it in a category of its own. With more than ample counterbalanced tail feathers, the Acroduster Too can hammerhead as well to the right as to the left, something seldom tried in most Pitts. Gyroscopic tumbles—no problem!

Our own example, the Gold Duster, of James McKeehan's "Building the Gold Duster" fame, is a strikingly well-proportioned, open cockpit version with a modified Starduster turtledeck rather than the more aerodynamic and larger Acroduster version. What is lost in drag and cross-country baggage capacity seems more than made up for by the visual appeal and compliments wherever we land.

With its original Lycoming IO-360-A1B, now rebuilt and counterbalanced as a "new" A1B6 to accommodate an MTV-12 three-blade composite prop, the Gold Duster can manage the full IAC Sportsman sequence without taking a break for lack of energy/altitude. Horsepower is about 210 with a 4-into-1 exhaust. The air/oil breather is vented into the exhaust, drawing a vacuum in the crankcase and relieving back pressure on the pistons. We typically depart Panama City's Bay County International Airport (PFN), heading northeast to our favorite sod farm practice area some 10 miles away and have plenty of altitude to begin our sequence when we get there.

As with most cute little aerobatic rides, it is a different airplane with a passenger up front. With two "wide bodies" on board and a hot, muggy, high-density altitude day at Tara Field (4A7) south of Atlanta, a bit more patience is required and a little more time to dream about one day doing that IO-540 upgrade! Of course the upgrade means more fuel burned and higher approach and stall speeds but with cruise speeds around 160 mph true for the canopy equipped birds.

The prototype Acroduster Too, N5462, was called the Super Starduster



N750X was painted in a spectacularly unconventional artistic scheme (it was California, remember!).

Too when it first rolled out in the early 1970s. It has recently been lovingly restored by Gary DeBaun and his wife, Chrissy, up in the cold country of Minnesota. Gary flies it at IAC contests in that neck of the woods and teases all of us about selling it in the darkest, coldest days of each winter. Gary reports spectacular performance figures, especially climb rates on his HIO-360 version.

The first plan's built version, N121RM, flew its maiden voyage in January 1975 out of Starduster's then and soon to be home again, Flabob (RIR) in Southern California. Randy McCoy was the builder. The airplane has since migrated to Jim Speer in Boonville, North Carolina, by way of Wisconsin. Jim has added a canopy since buying it in 1995.

The prototype IO-540 version itself is an interesting story. N750X was the logical follow up, improved version of what had now become the Acroduster Too, with the airframe rated to handle in excess of 300 hp. The new airplane was built around a 260-hp Lycoming

IO-540-N with nitrous oxide! Its original airfoil was a modified symmetrical design with a very sharp leading edge that gave it "unbelievable" snap roll ability, very fast cruise numbers, but also very fast stall and landing speeds. It was so "snappy" in fact that the wings were reverted to the original airfoil section in short order.

N750X was painted in a spectacularly unconventional artistic scheme (it was California, remember!). It included a mean looking set of tiger's teeth and eyes on the engine cowling as the late Eric Schilling, Starduster test and demo pilot, was a former member of the World War II Flying Tigers. The airplane was flown in demos, contests, and air shows in the late 1970s by John Helton. John's daughter, Janet, managed a notable achievement by soloing not just N750X, but 35 other airplanes on her sixteenth birthday, June 29, 1978. This record-setting event was duly recorded by both television and print media at the time, including N750X on the cover of *Time* magazine.

N750X then passed through several

hands before finding a new home with Paul Bellefeuille in Lantana, Florida. The paint and fabric were completely replaced, lower ailerons extended one bay, spades added, and the front seat and controls removed. Lexan flooring was installed, and it was painted a beautiful gloss black with the trim reflecting the original paint scheme. Three years ago, it was acquired by Dale Evans of Miami who has re-plumbed the upper fuel tank and upgraded numerous instruments while adding a GPS and other goodies. Dale loves the IO-540, which easily cruises 155 to 160 mph for 2 to 2-1/2 hours with reserves on its 45 gallons of 100LL (30 in the fuselage tank).

The "Gold Duster," N363J, has also had an interesting history. After being built, essentially next door to the Starduster factory in 1981, it was flown briefly by its owner, Jim McKeehan, and then put into storage in Arizona. Some years later it was sold and taken to Oregon where Buck Roetman bought it with just under 200 hours total time and flew it back to Georgia in the late



1990s as his air show ride. We bought it from Buck with 363 hours (yes, that is the tail number too!) when he moved into an Eagle. Since that time we have come to fully appreciate the 4130 tubing, wood and fabric building methods detailed in Jim McKeehan's book. Somewhere along the way it apparently showed its face south of the border as Gary DeBaun reports that the Café at Flabob Airport (RIR) has a framed picture of 363J inverted with smoke-on 100 feet over the heads of applauding spectators somewhere in Mexico. At least the caption is in Spanish. In the same frame is an Unlimited sequence card.

So, just what is the Acroduster Too? It's a two-place, open (canopy optional), wood and metal tubing constructed biplane with both the fuselage and wings beefed up to handle the additional loads of competition aerobatics. It is best recognized by the now-famous Starduster elliptical wing planform, but in this case with a fully symmetrical airfoil section. The fuselage is covered with sheet aluminum to the back of the rear cockpit, allowing full access for any needed maintenance. Landing gear is either conventional bungee or 2024 spring aluminum. The main fuselage fuel tank holds 25 gallons, including five in the inverted tank. An optional 12 gallons can be carried in the upper wing tank, or the space used as a storage locker as in 363J. Add an inverted oil system, constant speed prop, alternator, starter, usual VHF radio, transponder, engine and flight instruments and the IO-360 version will tip the scales at around 1,050 pounds. The IO-540 version is heavier unless you leave out the constant speed prop, governor, etc., and go for fixed pitch wood prop as Chris Shearer is doing. In fact Chris even stretched his about six inches and widened the fuselage by two inches to accommodate his taller frame.

Not a bad idea when you consider this is an airplane pretty much designed for the FAA standard passenger and pilot. That is, my son Kevin's 6-foot-2-inch frame or my 220-plus pounds fairly well fill the aft pit. The front is slightly roomier due to the taper of the fuselage from front to rear.

Sitting on a seat pack chute, without a canopy, behind a windshield carved smaller by a prior owner means the breeze can get under your helmet visor when the neck is stretched out while inverted. We have learned to hunch down while pushing!

How does an Acroduster Too fly? Consistently excellent. Factory test pilot articles on different versions of the airplane all seem to read as if they were written about ours. My own comments:

Roll control (four interconnected, Frieze-type ailerons) is precise and very light in normal flight, the ailerons getting heavy only with large deflections when approaching Vne (200 mph) in ours, which has no spades. Roll rates are in the 120-180 degree per second range. Not head-knocking fast, but a great surprise and pleasure to the uninitiated on their first aerobatic ride. Nevertheless, fast enough for any IAC sequences up through Intermediate—a level at which John Helton apparently had great success during his 1970s campaigns. The roll rate is an area with room for improvement if you wanted to take an Acroduster Too into the Advanced arena.

Pitch control (both aerodynamically and mechanically balanced) is very effective, almost too sensitive at times. This requires a little getting used to in order to avoid porpoising on the initial takeoff and an especially deft touch to fly a smooth wing position in formation. Full stall is achieved going into spins long before full aft elevator throw is reached. With a neutral stability center of gravity (CG) position and the fully balanced elevator, it is sometimes necessary to manually place the elevator in the desired neutral position during unusual attitude recoveries rather than simply releasing the stick. This means the Beggs-Mueller emergency spin recovery will need a little hands-on assistance if recovery is not as immediate as expected. Conversely, with so much elevator authority, it is possible to recover from a fully developed inverted flat spin by the unconventional method of simply applying full aft elevator while the engine is still running at full power. (Don't try this at home!)

Roll and pitch stability is absolutely

Maneuver	Minimum Speed	Max G Loading	Best Speed	Best G Loading
Loop	140 mph	3g	160-180 mph	3-4g
Snap Roll	120 mph	n/a	130 mph	n/a
Slow Roll	120 mph	n/a	160 mph	n/a
Aileron Roll	120 mph	n/a	160 mph	n/a
Immelman	180 mph	4g	180 mph	4g
Cuban-eight	140 mph	3g	160 mph	4g

neutral once properly rigged. On some rare days, I am able to fly a 50-mile cross-country without touching the stick. Most interesting is the CG-related pitch stability, which allows you to "park" the nose anywhere you choose. It will stay there with zero tendency to fall towards the horizon until, of course, you run out of airspeed going up, or run into Vne going down. This means the airplane must be constantly flown through any maneuver in order to obtain and sustain the rates of pitch change required.

What about entry speeds and g's for aerobatics? First, a 1977 quote from the late Eric Schilling. "I have found that 140 mph was the lowest entry speed at which a decent loop could be accomplished. At 140 mph, and using a 3g pull up, a nice round loop could be accomplished. More or less g's results in a sloppy or incomplete loop. At higher entry speeds 4g's appeared to give the best results. 6g's caused a speed bleed off more rapidly than when using the 4g pull. I therefore think a 4g pull is the optimum up to 180 mph."

To which I say—absolutely, positively correct! I aim to finish the IAC Sportsman contest sequence with the g meter reading exactly 4g positive, not one bit more or less. Eric went on to list minimum and best speeds for the usual aerobatic maneuvers, again as if he had been flying our plane yesterday.

The same neutral pitch stability mentioned above, when coupled with the low speed flight characteristics of the symmetrical airfoil wings can lead to some real fun in the traffic pattern. To begin with, all of that rudder surface and a constant speed prop mean that from a close-in 1,000 foot AGL downwind (runway under your lower wingtip), you can reduce the throttle to idle, roll into 60-plus degrees of bank opposite the numbers and land on them! The problem is the rate of descent achieved may prevent a com-



Factory specs are always interesting and sometimes even correct!

Wing span	21 feet 10 inches
Length	18 feet 6 inches
Height	6 feet 10 inches
Empty weight	1,020 pounds
Cruise speed	150 mph
Max speed	160 mph
Vne	200 mph
Stall speed	57 mph
Rate of climb	2,100 to 2,300 feet per minute
Power	200-hp Lycoming IO-360

(My comments: The cruise and max speeds would be a lightweight canopied plane with the front seat covered; our stall speed is more like 65-67.)

pleted flare if the airspeed is bled off in the turn. The result is a mush through the flare and a gear and ego-testing plop onto the runway. That is an extreme example of the need to avoid reaching idle in most landing approaches until well into the flare. In 363J, anything less than 90 on short final begs for added throttle into the flare. We fly the entire base and final at 100 mph unless

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we need a short roll, in which case the speed is slower with power on!

Getting to the runway and knowing just where you are is a different challenge. While the Acroduster Too has excellent forward visibility for a biplane, a little added technique on the approach makes things a whole lot better. We always try to fly a curving, aircraft carrier-type, approach right down to the numbers. This gives us a clear view of the runway and all of its references right up until the flare at which point the nose blocks our forward view. When traffic or other considerations put us on a long straight-in final, I add enough rudder to keep the runway in plain sight all the way down to the flare point, then kick it out for touchdown.

Ground handling with a properly aligned tail wheel, leaf springs, etc., is a breeze. Most landing rolls are best handled with very little rudder pedal input after touchdown. The airplane will roll smoothly straight ahead with minimum assistance from the pilot. If you are having "one of those days" then more vigorous, even aggressive pedal control will quickly get you heading back in the right direction. Just remember to stop the rate first before correcting back to the desired path!

Finally, thanks to Bill McIntyre for taking considerable time enlightening me on the ways of the 1970s aerobatic world and to Greg Mayotte, Bill Falcon, and Dale Evans on the merits of a six-cylinder Duster. And a special thanks to Ken at Starduster for supplying copies of numerous related articles from the Starduster magazine archives. By the way, Starduster is once again back under the good offices of former owner Bill Clouse who plans to return the venture to its original home at Flabob. In the interim you can reach them at Stolp Starduster Corporation, 129 Chuck Yeager Way, Oroville, CA 95965, or at www.starduster.com. ✈

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