

Grumman American



180-hp
GRUMMAN

The Hummin' Grumman



Tiger
Tiger

*Reprinted from the
February 1975 Issue
of Air Progress*

I suppose all the prejudices of the writer should be bared at the beginning. I like Grumman American airplanes, always have. Speed, visibility and responsiveness are my prime personal requirements in an airplane; Pipers, Cessnas and Beechcrafts for the most part fall miserably short of the bonded wonders from Cuyahoga in those departments. Okay, maybe the Trainer and the Traveler don't have quite the range of the 150 or the Skyhawk. (The Traveler carries just 38 gallons to the Skyhawk's standard 42 and optional 52.) And maybe the AA's, loaded up on a hot day, won't get off as well as the Cessnas. But they fly with speed and style. For many of us, that's what an airplane is all about.

Now that the writer's biases are set down, we'll unashamedly declare the following: the Grumman American Tiger is a great airplane. The Tiger we flew delivers an honest 160 mph cruise with a 180-hp engine, fixed-pitch propeller and fixed landing gear. We are not in the habit of gushing like PR men, but sheer numbers force us to. Anyone who buys a Sundowner, Cherokee 180 or Cardinal this year is shortchanging himself.

We spent a good hour in Tiger N1502R doing careful speed checks at a variety of altitudes. We'd read the 160-mph figure with skepticism; most airplanes don't come within 10 mph

chunky 180-hp Sundowner, for example, is a 131-mph airplane at 75% (it used to have a book cruise of 141, but Beechcraft lowered the figure this year to fit reality). The Cherokee 180 is a 140-mph performer, and the 1975 180-hp Cessna Cardinal, judging from past *Air Progress* flights, can be counted on for 145-150 mph.

These are truly remarkable performance differences. If you apply the standard rule of thumb that required power goes up as the cube of the speed (i.e. to double airspeed you must increase the power eight times), the Tiger's aerodynamics are worth a 325-hp engine in the Sundowner. (Indeed, the Tiger matches the Sundowner's 75% cruise speed, by our figures, at around 45% power.)

Even more astonishingly, the Tiger has a better climb rate than any of its 180-hp competition. Book climb is 850 fpm at sea level; we bettered that figure considerably with 2 people and full fuel on a day slightly cooler than standard. Our VSI showed 1100 fpm during initial climbout from Cuyahoga County Airport. Three minutes after establishing 90 mph at 1,000 ft. msl, the Tiger was pushing through 3,700 ft., for an average of 900 fpm. The climb to 7,000 took exactly eight minutes, for an average of 750 fpm, and the VSI was still showing 700 fpm at 7,000.

As it turned out, we weren't even

bles (Arrow, Cardinal RG, Rockwell 112A, Sierra, and Mooney). All cost about \$10,000 more than the Tiger, burn a bit more gas, and cost far more to maintain and insure. Yet in the real world, only the Mooneys top 160 mph by a large margin, and a couple of those 200-hp retracts don't even come close to that figure. We've flown a brand new Sierra that clocked only 147 mph and a Rockwell 112A that showed us only 153.

Ah, but what about climb and useful load, you say. Surely the 200 retracts will vanquish the Tiger in these all-important areas. Not really. The 200R's carry from 1100 to 1200 pounds useful load and climb from 860 to 925 fpm. The Tiger is right in there at 850 fpm and 1,115 lbs.

Roy Lapresti was Grumman American's chief engineer during the Tiger's early development (he now is at Mooney). "In 1973, Roy Garrison (Grumman marketing manager) told us he wanted a 4-place airplane with an all-out top speed of 160 mph." The Patriot, a big, husky 180-hp four-seater had already been abandoned because it would have been too expensive to build, (see box on page 23), so the new airplane had to be an outgrowth of the 4-place 140-mph Traveler, which itself was an outgrowth of the 2-seat Yankee.

"Our calculations showed that we would get a 156-mph top speed by

180-hp TIGER

The Hummin' Grumman

By Dave Noland

of their book speeds in the real world; this claim seemed more outrageous than most. Here are the results of our flight checks:

Altitude	Power	True Air Speed
7800 ft	76 % (2700 rpm)	163 mph
	68 % (2600 rpm)	154 mph
	62 % (2500 rpm)	151 mph
	55 % (2400 rpm)	142 mph
9250 ft	70 % (2600 rpm)	159 mph
10,000 ft	59 % (2500 rpm)	148 mph
	48 % (2300 rpm)	134 mph

Next to these speeds, the competition looks pretty sad. Beechcraft's

climbing at the best-rate speed. Grumman check pilot Tom Rennolds had told us that best-rate was 90; a check of the owner's manual back on the ground revealed that it was actually 105 mph. You can never trust those salesmen types.

Another too-good-to-be-true claim for the Tiger is its useful load. With full IFR equipment, the Tiger will lift 1,000 pounds. This is (ho-hum, so what else is new?) better than any of the 180-hp competition.

The Tiger, then decisively thrashes its direct competition. Things get really interesting, however, when it flies off against the 200-hp retracta-

simply putting a 180 in the Traveler," says Lapresti. "That wasn't good enough, so we started looking for ways to clean up the airplane. It was pure coincidence that Cessna was doing the same thing with the Skyhawk."

"Interference drag between the struts, wheelpants and fuselage was critical," says Lapresti. "Fairing the struts made no difference at all, but it was where the struts joined the wheelpants and fuselage that was critical. The redesign was a cut-and-try sort of thing. We'd stick, on some clay, shape it, and go fly and see what happened, come back and put



on some more clay. The idea was to think like an air molecule and avoid all abrupt changes and angles."

What about wind-tunnel and tuft-testing? "We did some tuft-testing, but it didn't help any. There was no wind-tunnel testing at all. We didn't have one. That was before the merger with Grumman, though; the new light twin (see last month's Aeronews) has been in the tunnel at Bethpage, and is probably the most thoroughly tunnel-tested lightplane ever."

The second high-drag area was the cowl. "The original Traveler cowl was just a piece of metal wrapped around the engine with a hole cut in front to let the air in. The air would tumble in, tumble out and mess up the outer flow as well. The cowl and baffling were redesigned to speed up the air before it left the cowl and get it running in the same direction as the slipstream."

The results of all this were excellent," says Lapresti. "We were getting a top speed of 172 mph during flight test. One day we rented a Skylane and took them off together with identical loads. Well, the Tiger not only outran it, but it outclimbed it, too. Marketing just didn't believe us when we told them." But marketing finally believed; now the Tiger is certificated and in production with a real-world 160-mph cruise.

The Tiger's horizontal stabilizer is larger than the Traveler's, partially to balance the extra weight of the bigger engine, partially to give it a big-air-



One of the secrets of the Tiger's excellent speed is the smooth fairing of wheel pants and struts. We found the molding flimsy, though.

plane feel. The difference in feel is quite noticeable; after a couple of hours in the Tiger, the Traveler's wheel looks and feels like a Tinker Toy. The change is for the better; the Tiger lands smoothly and has a comfortable, solid feeling.

We did notice a strange quirk in the new elevator, though. A quick forward bash of the wheel (simulating severe turbulence) sets the elevator pulsing back and forth rapidly, and it takes four or five oscillations to dampen out. We've experienced nothing like it in any other airplane—normally the wheel returns quickly to center with very little overshoot.

G-A test pilot Bing Bingham attributed the control wheel bobble to a slightly overbalanced elevator. The FAA requires that such oscillations be "heavily damped," which according to Bingham, allows three to four oscillations. The trait is also present in the Traveler, though it is not so pronounced, probably due to the lighter weight of the control horn. After we'd expressed concern about the bobble, Bingham flew the prototype Tiger and rapped the controls at various speeds from stall to red-line. He reported back to us that all bobbles were within FAA tolerance.

Another Tiger modification is flaps. We've always thought that the flaps on Grumman-American airplanes were too small to be really useful; the Tiger's aren't any bigger, but they come down farther (45°, compared to the Traveler's 30°). Still, power-off

FAT ALBERT AND THE PATRIOT: R.I.P.

The Tiger isn't Grumman American's first foray into the higher-performance single-engine market. In 1970, shortly after the introduction of the 2-seat Yankee, G-A (then American Aviation) built and test flew a big, beamy, nicely sculptured 180-hp 4-seater called the Patriot. It featured an I-beam spar in place of the Yankee's simple tubular spar, a tapered wing and a wide, roomy cabin. The Patriot was no faster than a Cherokee 180, though, and American decided it just couldn't afford to tool up for a whole new airplane, especially a rather complicated one like the Patriot. So they kept it simple and just stretched out the boxy Yankee into the equally boxy Traveler. The one and only Patriot now resides in a crate behind the factory.

Buoyed by the Traveler's good performance, a couple of years later G-A put a 230-hp Continental into a Traveler airframe, and, in the words

of one G-A engineer, "scabbed on" a tapered wing root with an eye toward eventually tucking the wheels in there. The result was an "ugly goddam airplane" with a huge bulging and bescooped snout. It was called "Fat Albert."

"Fat Albert was the worst of all things," an engineer who worked on the plane told us. "It was slow... about 170-173 max—and would have been very difficult to build with the taper and twist. Fat Albert would have been a disaster." Again, G-A decided to keep it simple and efficient, and they got their 170-mph top speed with 50 less horsepower and a well tested, easy-to-build airframe.

Is a retractable 200-hp version of the Tiger in the future? Not likely. The Tiger is already so clean that G-A calculates only a 5-10 mph bonus from retractable gear, a bonus hardly worth the added weight, maintenance and insurance cost.

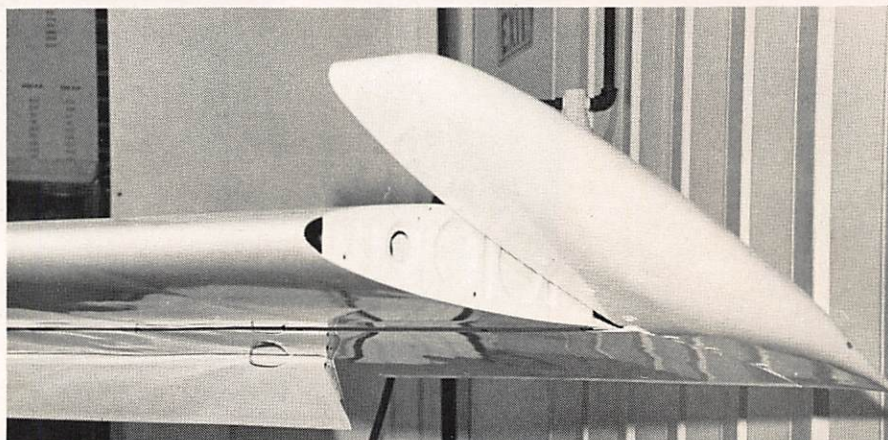
DON'T FORGET THE TRAVELER...

Sailing quietly along behind the flashy new Tiger is the reliable old AA-5 Traveler, a Tiger with a 150-hp engine, if you will. All those fancy aerodynamic cleanups went into the Traveler, too, and in case you hadn't noticed, it's now very close to a 150-mph airplane. The book says 147 at 75%, and ferry pilots for the first few '75 Travelers out the door report true airspeeds of 150 and better. At full power at 2500 feet, our Traveler trued 153 mph; at a conservative cruise setting we got 143 at the same altitude. A while back we ran an old Traveler and a Skyhawk under those same conditions and trued about 140.

So the Traveler just might be the sleeper of the year. With only 150 hp it is faster than every 180-hp airplane except the Cardinal, which has a constant-speed propeller. That's something to think about.



We liked the Tiger's clean, functional panel, especially the super-simple fuel selector and fuel gauge system. The Tiger's control horn is beefier than the Traveler's, which gives it a needed big-airplane feel in pitch. The wheel tends to bobble in turbulence, however, the result of an overbalanced elevator (right).



full-flaps rate of descent is only 1,000 fpm, not enough for a real short-field descent. On the other hand, full-flap go-arounds are sprightly, without the sag-mush-thrash routine that a full-flapped Cessna struggles through during a go-around.

That last 15° of flaps triggers a huge nose-up pitch, however. The first time we dropped full flaps on downwind at 110 mph or so, (max flap speed is 120) the Tiger reared its nose as if starting a loop. After several attempts, we developed a reasonable technique for smooth, nearly trim-free flap deployment: Let out

	Horsepower	Cruise Speed (75%)	Rate of Climb	Cabin load (Full fuel)	Endurance at 75% (Full fuel)
Tiger	180	160 mph	850 fpm	809 lb	4.8 hr.
Cherokee 180	180	141	725	767	4.5
Cardinal	180	150	840	701	4.6
Sundowner	180	131	792	638	4.9
Arrow II	200	165	900	839	3.9
Cardinal RG	200	171	925	760	4.9
Sierra	200	153	890	733	4.3
Executive	200	177	1055	696	5.2
112A	200	161	1020	674	3.9
Skylane	230	165	890	935	4.4
Cherokee 235	235	153	800	954	5.6

half flaps on downwind at 100 mph or so, but don't trim. As power is reduced and speed falls off to 90, the pilot will find himself holding considerable back pressure to maintain approach attitude. But rather than trim the nose up, simply let the flaps out to their full 45°. The nose-up pitch is almost exactly right to establish an 85-mph hands-off full-flap glide. This takes some practice, though; the owner's manual really should warn the pilot about full flap extension at 120 mph. Production airplanes will be easier to trim, though; trim rate is double that of the prototype we flew.

The Tiger stalls like a pussycat. The break comes around 60 mph indicated, preceded by a healthy buffet.

Old Travelers had rather Spartan interiors that somehow felt cramped (though a tape measure shows them to be nearly as big as the Skyhawk's). Last year, the instrument panel and seats were redesigned for a roomier

feeling; with their new upholstery this year, the Tiger and Traveler can at last be said to have truly attractive interiors. Legroom is excellent in the back seat, but a tall front-seat passenger still may get his skull lacerated if the canopy is closed abruptly.

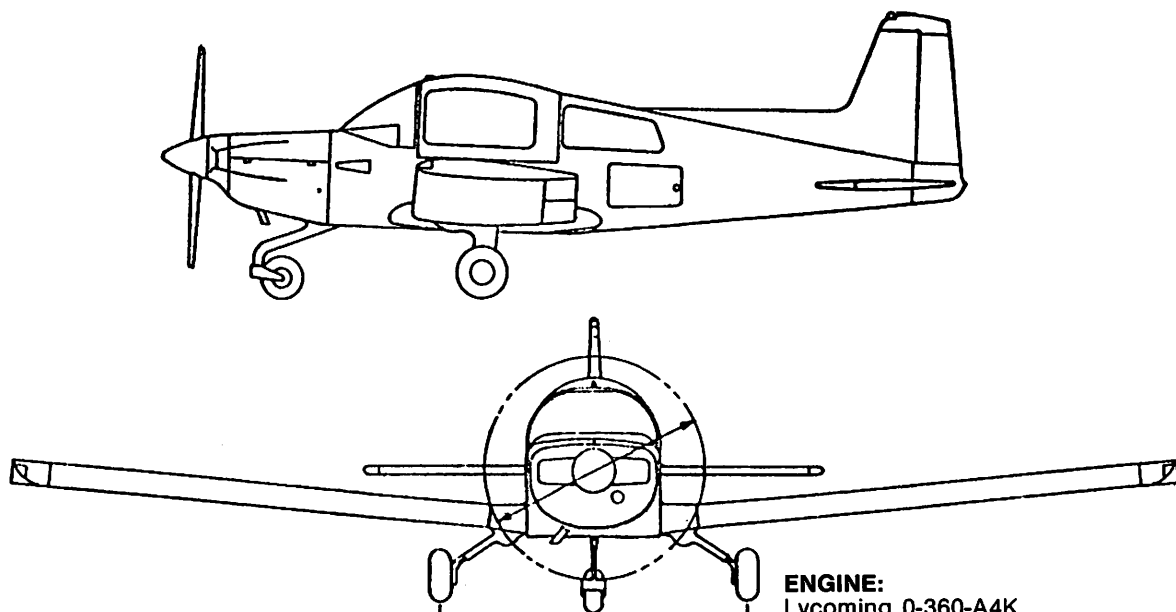
The Tiger's name reflects a marked change in thinking at G-A. Yankee, Trainer and Traveler are hardly names to fire the imagination; Tiger is a bit more gutsy. Also, in conversations with G-A executives, we heard the "American" in "Grumman-American" less and less. "I don't care if I never hear American again," one G-A exec told us. "As far as I'm concerned, the airplane is a Grumman Tiger." No doubt there will always be those die-hards who still call anything with bonded skins and bright-colored paint jobs a Yankee, but you can bet that future airplanes from G-A will conjure up visions of carrier-based fighters rather than bewigged New

England Puritans.

Alas, the op-art tiger-stripe paint job on the prototype will not be offered to the public. G-A may have to live up to its hard-charging new image, though; at the G-A dealer's meeting last fall, a dozen dealers requested tiger-stripes.

The future seems bright at Grumman American. The Trainer and TR-2 have carved out their own little niches in the market; the Traveler is 10 mph faster than the Skyhawk again; the Tiger seems destined to dominate the 180-hp class; and the GA-7 light twin was scheduled to fly in December. Soon, in fact, Grumman American will move its entire operation to Savannah, Georgia, where the Gulfstreams are built. Grumman Aerospace's money and expertise are now firmly behind all those grown-up BD-1's; maybe they see more future in Tigers than in Tomcats. □





ENGINE:
Lycoming O-360-A4K
180 hp at 2700 rpm

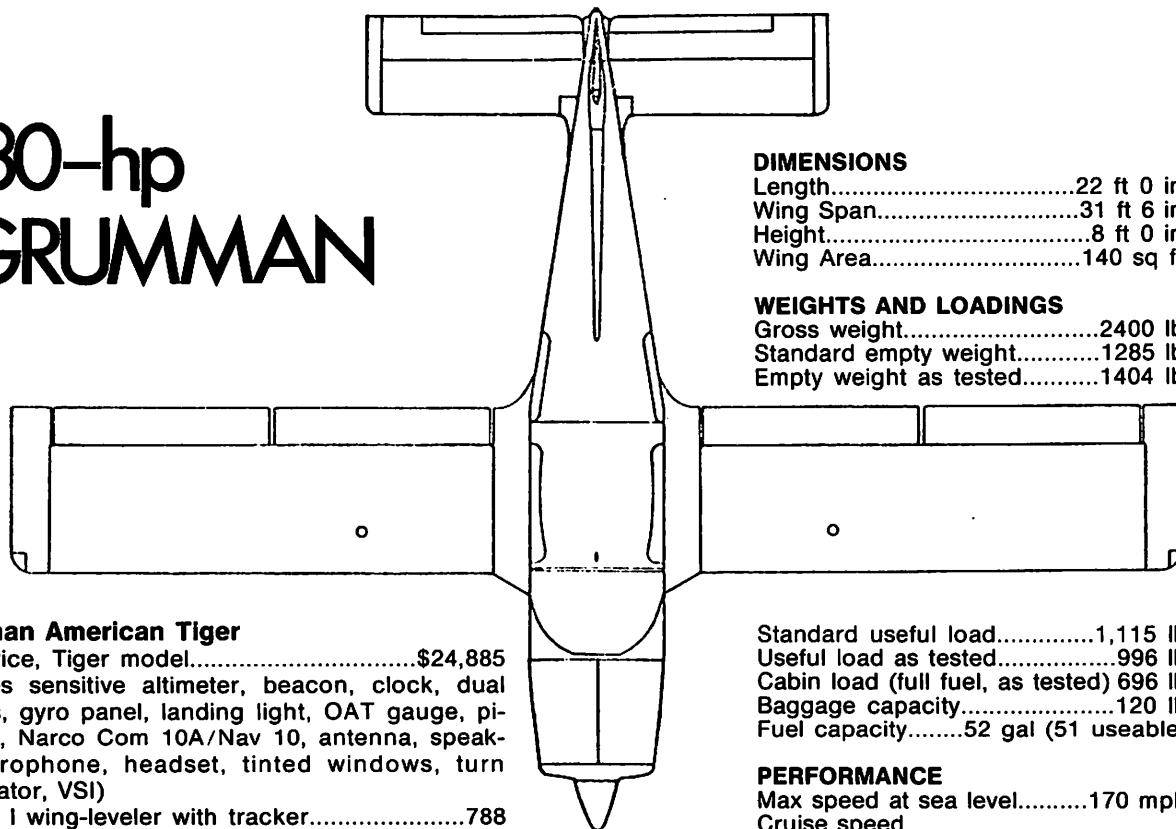
180-hp GRUMMAN

DIMENSIONS

Length.....22 ft 0 in
Wing Span.....31 ft 6 in
Height.....8 ft 0 in
Wing Area.....140 sq ft

WEIGHTS AND LOADINGS

Gross weight.....2400 lb
Standard empty weight.....1285 lb
Empty weight as tested.....1404 lb



Grumman American Tiger

Base Price, Tiger model.....\$24,885
(includes sensitive altimeter, beacon, clock, dual controls, gyro panel, landing light, OAT gauge, pitot heat, Narco Com 10A/Nav 10, antenna, speaker, microphone, headset, tinted windows, turn coordinator, VSI)
Century I wing-leveler with tracker.....788
Oil access door.....16
TAS indicator.....37
Left and right steps.....94
Strobe light.....341
Oil quick drain.....16
Rear seat vents.....95
Wheel fairings.....341
Narco package 4 (exchange).....6,851
(Com 11A/Nav 11, Com 11A/Nav 14, UGR-2A Glideslope, DGO-10 Pictorial Navigation Display, Marker Lights, PDF-35 ADF, antennas)
Total.....\$33,434

Standard useful load.....1,115 lb
Useful load as tested.....996 lb
Cabin load (full fuel, as tested) 696 lb
Baggage capacity.....120 lb
Fuel capacity.....52 gal (51 useable)

PERFORMANCE

Max speed at sea level.....170 mph
Cruise speed
(75% at 8500 ft).....160 mph
Rate of climb at sea level.....850 fpm
Endurance
(75%, 10.6 gph, no reserve).....4.8 hrs
Range (no reserve).....765 mi
Range (45-minute reserve).....650 mi
Stall speed, flaps up.....65 mph
Stall speed, flaps down.....61 mph
Obstacle takeoff.....1,550 ft
Takeoff roll.....872 ft
Obstacle landing.....1,100 ft
Landing roll.....380 ft
Service ceiling.....14,600 ft

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