assembly of the AiResearch turbosupercharger system had failed because of fatigue. Failure of the bellows allowed the elbow to drop off the wastegate flange, and consequently the engine firewall, main fuel line, and electrical wiring were exposed to open flames of the engine exhaust.

In view of the hazard potential of undetected cracks in these bellows installations, the NTSB recommended the FAA issue an airworthiness directive to require an inspection at an early date of the bellows on all turbusupercharged aircraft for cracks. And to specify an appropriate time interval between subsequent periodic inspections, and require a modification of the elbow so that it cannot fall off of the flange if the bellows break.

CHANGE SPECIAL VFR?

The Natonal Transportation Safety Board is concerned about the continued use of special Visual Flight Rules (VFR) clearances and VFR weather minimums, which apply to flights outside controlled airspace.

From 1964 through 1972, 44 fatal accidents occurred which involved special VFR clearances. These accidents caused 105 deaths. "Weather" was cited as a cause in one of the accidents and as a factor in 38. The probable cause was undetermined in two of the accidents, because the aircraft crashed into the water and the wreckage was not recovered. There were three accidents in which "weather" was not cited as a cause or a factor. Twenty-nine of the pilots involved held private pilot certificates, 12 held commercial pilot certificates, 2 held student pilot certificates, and 1 held an airline transport pilot certificate. Ten of the pilots were instrument-rated and had an average of 6,624 flight-hours. Thirty-three of the remaining 34 pilots had an average of 1,138 flight-hours, and 11 of the 33 had less than 200 flight-hours.

During the same years, the Safety Board cited "ceiling" as a cause and a factor more frequently in fatal, General Aviation accidents than any other meteorological factor, and cited "fog" as a cause and a factor second most frequently.

Under current special VFR rules, weather conditions could be below the Instrument Flight Rules (IFR) landing minimums prescribed for an airline transport pilot, yet a student pilot or a private pilot with low flight-hours and no instrument rating could be granted permission to land during daylight with a ceiling as low as 100 feet, so long as the visibility was at least one mile. The special VFR weather minimums do not consider such factors as terrain clearance and obstacle clearance, which are considered in IFR minimums. The special VFR weather minimums also apply to VFR operations outside controlled airspace at 1,200 feet or less, above the surface.

The Safety Board says that the special VFR rules and the VFR rules pertaining to operations outside controlled airspace do not provide an adequate margin of safety and should be changed at the earliest possible date. Accordingly, the Safety Board recommends that the Federal Aviation Administration: 1) Abolish 14 CFR 91.107. 2) Amend 14 CFR 91.105 to require the same weather minimums outside controlled airspace as are required within controlled airspace.

ALTIMETER CHECK ORDERED BY FAA

The Federal Aviation Administration has ordered operators of General Aviation aircraft to conduct a one-time inspection of their altimteres to determine whether they are of a type which may be defective.

The inspection should have been made within the aircraft's next 10 hours time in service after December 5, 1974, the effective date of the FAA airworthiness directive.

Altimeters affected are manufactured by United Instruments, Inc., Wichita, Kan., and are identified by part number and serial number specified in the directive, which was published in the Federal Register November 29, 1974. Over 70,000 altimeters are estimated to be involved.

If the altimeters are of the designated part and serial number, the aircraft operator must limit his operations to daytime visual flight only. In addition, the operator must install a placard on the aircraft's instrument panel which states: "AIRCRAFT APPROVED FOR DAY VFR (VISUAL FLIGHT RULES) FLIGHT ONLY."

Further, under the directive, operators must replace the altimeter with an airworthy unit or with an approved replacement part before December 1, 1976.

If the aircraft has two altimeters of the type affected, visual flight restriction is not necessary provided both instruments are operating properly. If one altimeter fails, however, the operator is limited to day VFR flight only. In any case, both altimeters must be replaced or modified before December 1, 1976.

Basis for the airworthiness directive stems from recent reports that some of the altimeters have experienced loosening of the plastic flim bearings (teflon tape) which are bonded to the altimeter's mechanism to separate two moving metal assemblies. This loosening may allow the tape to fall into the altimeter's gear mechanism causing the instrument to jam. A jammed altimeter results in an unsafe condition because the pilot is unable to determine his altitude above the terrain. This is most critical during night and IFR (instrument flight rules) conditions.

While it has been established that some cleaning fluids will loosen these teflon tapes, reports indicate that loose tapes also have been found on altimeters that were not subjected to cleaning fluids.

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Grumman American's New 4-Place TIGER

By Don Dwiggins

PLANE & PILOT REPORT

GRUMMAN AMERICAN HAS a real Tiger by the tail — in the 1975 Model AA-5B entry in the highly competitive four-place, single-engine airplane market.

Tiger's most obvious improvement over G-A's Model AA-5 Traveler is the switch from 150 to 180-hp, but other subtle changes are equally noteworthy. All together they spell trouble in the marketplace for other aircraft selling at prices 30 percent higher than this new entry from Cuyahoga County.

For an airplane that "just grew," Tiger offers a rare combination of performance, ruggedness, low-cost maintenance, and all at the right price — about $31,500, full IFR.

Over the years, 30 grand bought you different airplane bargains, but as prices have climbed, so has value in this case. Back in 1942, $30,000 would buy you a nice Grumman Widgeon with a pair of 200-hp Rangers, or a T-50 Cessna Bobcat with a pair of 225-hp Jakes.

In 1944, $30,000 would get you a brand new AT-6, and in the late fifties a handsome Helio Courier. The Navion H and the Cessna 207 went for about that price in 1969, but today, you'll have to spend about $10,000 more to get another ship with the kind of performance Tiger offers.

Introduced last September, first deliveries of the Tiger began in January, and the factory's production goal is 200 Tigers for 1975, before the Grumman folks move their operation down to Savannah, Ga., where Grumman makes Gulfstream II's.

Thus, N1521R, which I flew for this report was an early production plane. The Tiger logo was there — a funny little Disneyish character, painted on the restyled engine cowling, with "Tiger" stripes streaking back like red flames from an afterburner.

Starting up front, you notice the restyled cowl, with landing light imbedded at left front, and the central air intake sealed over. In its place is a redesigned baffle under the hood to turn ingested air downward from the main ram-air ports over the cylinders, to be exhausted through a venturi system underneath.

Thus, without enlarging the engine cowl, it provides more than adequate cooling for the bigger 180-hp Lycoming O-360-A4K, which replaces the 150-hp O-320-E2G of the Traveler.

Tiger retains the full-castering nosewheel, introduced on the early American Yankee. Elsewhere the genealogy is less apparent, when comparing the Tiger with the Grumman American Trainer and TR-2.

While this is basically a pilot report, the Tiger's performance is directly proportional to the quality of design refinement that went into it, so let's examine a few more items before leaping off:

The wing itself is a masterpiece of simplicity in design — a constant chord wing of 31.5 feet span and 140 square feet area, consisting of three interchangeable sections, from root to tip. There is no twist in the wing — triangular spoiler strips on the leading edge of the inboard sections provide adequate root-stall, with no sacrifice in drag due to washout.

The ailerons run half the span length and have funny V-shaped trailing edges, that Grumman people say give better response with reduced aileron travel. The same-size flaps are no barn-door affairs, and in fact resemble the little drag flaps on the early Cessna 170.

Tiger flaps have 45 degrees of down travel compared to 30 on the Traveler, and seem more than adequate for steep power-off descents for short-field approaches, made at the proper speeds. They are electrically operated, by a switch between pilot and copilot seat, just ahead of the elevator trim wheel.

The Tiger's horizontal stabilizer is wide, wide — 12 feet 8 inches — and provides a strong vibratory stall warning, when buffeted by turbulence from the flaps in a nose-high attitude.

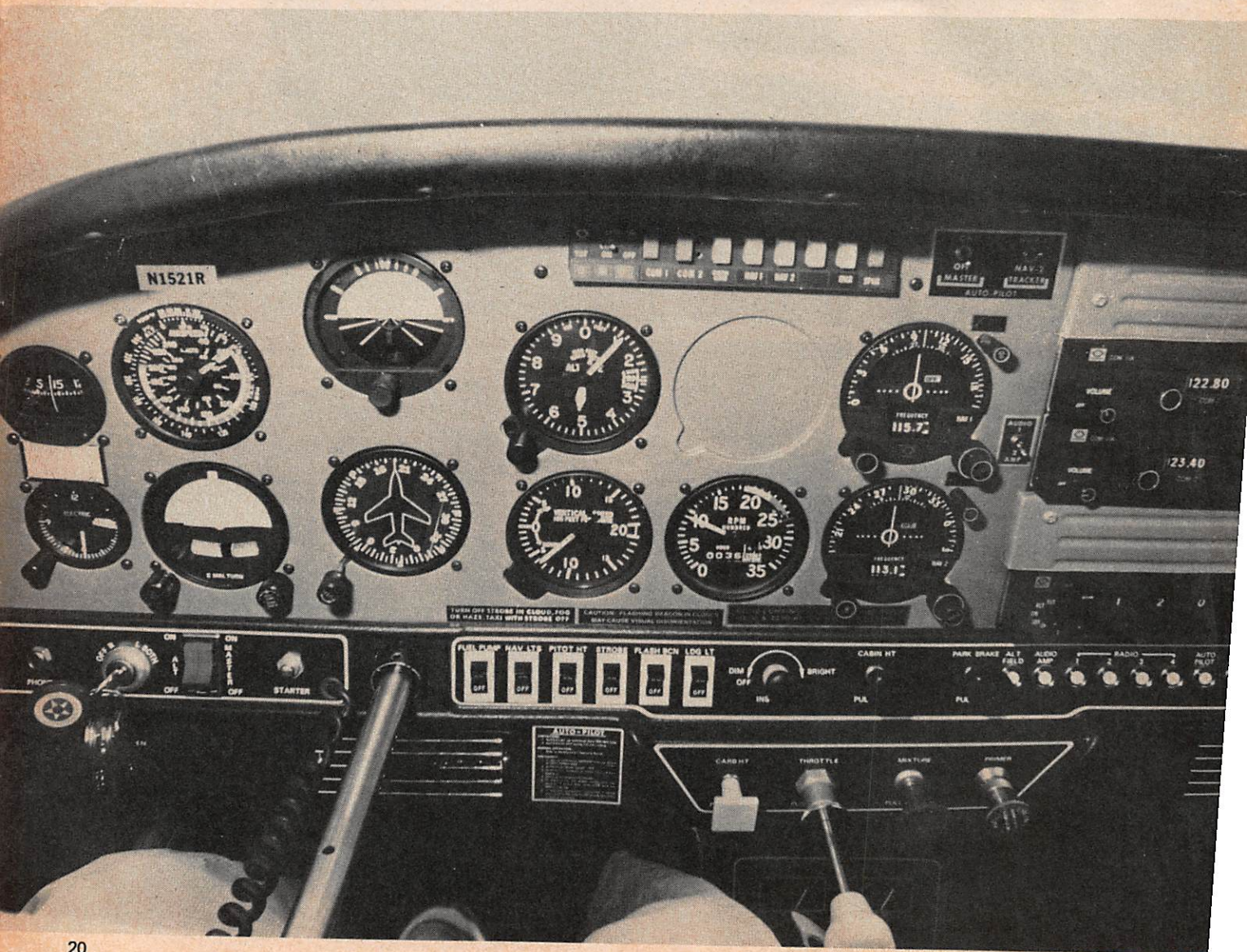
Back to the wings — their super-smooth contour results from the Grumman American bonding method of construction, which provides greater strength with less drag from rivet heads. This innovation, adapted from Grumman's experience with jets (the F-14 Tomcat), is one of several cost-cutting improvements that make the Tiger inexpensive to manufacture without sacrificing strength. Another is the steel-tube single spar over which the ribs are slipped, and the aluminum honeycomb hull construction — lighter, stronger, and occupying less space, thus providing extra cabin width.

Enter the Tiger by sliding the canopy back and stepping in from either side. Four sports-car type bucket seats are there, the front ones adjustable fore-and-aft. You can fold down the back seats to convert the ship into a "Flying Tiger" cargo plane, one that can carry 340 pounds plus pilot and copilot (with four on board, the baggage compartment, reached via a side door, takes 120 pounds).

Visibility is excellent in all directions except directly overhead — the bubble canopy top of the TR-2 was metalized for both the Traveler and Tiger, but it's still picture-window looking, with over-the-nose perspective ideal, on the

The new Tiger from Grumman-American in flight over a glittering sea. Overhead photos of interior show rear compartment arrangement with and without seats, a useful choice.

RIGHT—Sliding canopy gives the Tiger an open-cockpit touch. Performance increase of new model is substantial.
BELOW—Inflight shot of panel shows easy IFR descent at 60-mph IAS, using full aft trim and 90 rpm for 600 fpm!
OPPOSITE PAGE—Nose-to-nose are the Tiger and the famous TR-2. Two beautiful planes that are hard to beat.



ground and in the air.

Takeoff is fast — the fixed-pitch, 75-inch metal McCauley with 180-hp behind it gets you off the ground in 865 feet (sea level and gross weight), but with two on board you're headed skyward in well below that.

From rotation onward and upward, the Tiger is a trim-tab airplane; let your right hand rest on the trim wheel and pick your speeds, like 105 IAS, which gave me 1,000 fpm. The day being overcast, I elected to level at 5,000 feet for a get-acquainted session.

First, cruise setup at 2500 rpm (roughly 70 percent power) produced a TAS of 150 mph. Then some steep clearing turns, wingovers and a couple of lazy eights revealed the Tiger to be responsive to gentle pressure flying. Roll rate is excellent.

Slow flight at 70 mph IAS showed the Tiger to handle well in that mode, in all three torques, and further power reduction brought on a stall warning case of shakes, so strong the loud horn seemed unessential.

Stall recovery is simple — let go. The nose settles to the horizon as power is applied. We found a unique ability of the Tiger to descend at 500 fpm with full flaps and aft trim, hands off — the "poor man's IFR descent."

I don't think I'd trust a student pilot to go through a layer that way, even though there was no tendency to fall off; in turbulence it could be different, but the demonstration did show the Tiger's inherent stability.

I tried several max speed runs, and at 4350 feet MSL grabbed a snapshot of the panel which showed the speed meter reading 160 mph at 2700 rpm. The OAT was about +5 degrees C., which computed to 170 mph TAS, which is what Grumman claims, no better, no worse.

Cruising along at a low db sound level, in solid comfort at 160 mph TAS, we were burning 10.9 gph, according to the book, at 75 percent power and 51 gallons available providing a range in excess of 750 miles or 4.7 hours (no reserve).

That is the kind of performance that will sell Tigers, when you compare it to competitive 180-hp aircraft.

Tiger's climb is as good or better than that of competitive fixed gear types, and its 1,000-pound useful load is better than that of its 180-hp rivals. Among the 200-hp retractables, only the Mooneys can well exceed the Tiger cruise capability, so for $10,000 less it has plenty going for it.

Landing the Tiger is no sweat — line her up on final, cross the fence at 70 and let the mains go *squeech*! Gentle braking can stop you in under 400 feet, no wind.

You can fly the Tiger with the canopy cracked open on a hot day, and on the ground there are side vents to scoop in prop wash for comfortable taxiing.

So there you have it — Grumman American's newest addition to a growing line of General Aviation planes that now stretches from the Trainer to the Gulfstream II, and on up into sophisticated military jobs, AgCats, spacecraft, and so on.

With their million-dollar wind tunnel facilities, expertise in building warplanes, and aerospace stuff, and a common-sense approach to General Aviation flying, you can look for plenty of action when they get consolidated in Georgia. They're sinking more than $1.5 million in research and development work each year, and for once you and I will benefit!

Last December 20, the new G-A twin Cougar prototype flew, behind a pair of 260-hp Lycomings; its goal is 200 mph for a four-place retractable light twin, in the $50,000 ballpark.

Down the line, a new 300-hp retractable single in the Bonanza class may soon be unveiled. It's a spinoff from early R&D on a ducted-fan aircraft under development by G-A and Rhein-Flugzeugbau GMBH, a VFW-Fokker subsidiary in West Germany.

When Astronaut Neil Armstrong in 1969 announced triumphantly from the Moon that *"Eagle Has Landed!"* he was calling spaceship Earth from a lunar module built at Bethpage, N.Y., by Grumman workers. When I set foot back on the ground after flying the Grumman Tiger, I didn't yell: *"Dwiggins has landed!"* — but I sure felt like it! It was that good a ride! □

TIGER

AIRCRAFT NAME: Grumman American Tiger
BASE PRICE: $31,500 (IFR equipped)
YEAR/SERIES: 1975
POWER
ENGINE: Lycoming O-360-A4K
HORSEPOWER: 180
POWER LOADING: 13.3 lb./hp
MIN. AVIATION FUEL GRADE: 100
NORMAL CRUISE RPM: 2700
SUPERCHARGED: No
FUEL INJECTED: No
SPECIFICATIONS
WINGSPAN: 31'6"
WING LOADING: 17.1 lb./sq.ft.
LENGTH: 22 ft.
HEIGHT: 7'8"
WING AREA: 140 sq.ft.
SEATING CAPACITY: 4
BAGGAGE CAPACITY: 120 lb.
GROSS WEIGHT: 2400 lb.
USEFUL LOAD: 1,000 lb.
EMPTY WEIGHT: 1285 lb.
PERFORMANCE
STANDARD FUEL CAPACITY: 52.6 gal.
USABLE FUEL: 51 gal.
MAX. RANGE: 800 mi.
(At best power, altitude, mixture setting)
BEST RATE OF CLIMB: 850 fpm
TAKEOFF (50 ft. obstacle): 1550 ft.
NORMAL LIFTOFF SPEED: 60 mph
NORMAL APPROACH SPEED: 75 mph
STALL SPEED (clean): 65 mph
STALL SPEED (flaps): 61 mph
SERVICE CEILING: 13,800 ft.
MAX. FLAP EXTEND SPEED: 120 mph
NORMAL CRUISE SPEED: 160 mph
MAX. SPEED: 170 mph
SYSTEMS OPERATIONS
FLAPS: Electric
TRIM: Elevator, manual
AUXILIARY FUEL PUMP: Electric
COWL FLAPS: No
RESETTABLE CIRCUIT BREAKERS: Yes
The above information is taken from official sources or computed to conform to normal standards. Unless otherwise specified, fuel is given in gallons, distances in statute miles, and performance at standard temperatures at sea level. Speeds are in mph.

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