TOBAGO

If at first you don't succeed, try, try again

BY THOMAS A. HORNE

French industrial design long has been distinguished by a penchant for the stylistic. Form flourishes, and function assumes a secondary role of importance. In the past, this inclination sometimes was cultivated without adequate attention to the forces of the marketplace. The Société de Construction d'Avions de Tourisme et d'Affaires (Socata—the general aviation branch of Aerospatiale, the French aerospace conglomerate) has been working for several years at developing a lightplane that would sell successfully in America.

Their last effort, the Rallye 235, languished briefly in the United States before it finally went out of production two years ago ("Rallye 235C," January 1980 *Pilot*, p. 78). A four-seater with a 235-hp Lycoming O-540 engine and leading-edge slats, the Rallye was a modest STOL performer that never caught on. Its relatively high price (approximately $50,000) and narrow appeal made it any easy victim of competition from American makes.

Now there is the Rallye Tobago, designated the TB-10. No slats, no claims for extraordinary short-field performance; just a simple, economical lightplane with some unique construction features and a very comfortable cockpit layout. Socata has introduced some new design objectives with the Tobago. The airframe is built in five separate modules, then joined in a final assembly stage. Officials at the manufacturing facility in Tarbes, in the south of France, claim this results in a significant reduction in the Tobago's construction time and 60 percent fewer parts than one might find in a comparable airplane. What is easy to build is easy to service, the theory goes, so there are high hopes that Tobago owners will not face long or expensive downtimes when maintenance is required.

It is an unusual-looking combination of parts—long, thin wings supporting a wide body, a cowling that looks too large when you consider that a 180-hp Lycoming O-360 is underneath, anti-spin ventral strakes, gull-wing doors riding on gas-filled pistons and a large, squared-off stabilator that looks as though it were pasted on as an afterthought.

Elegant? I think not. France, what happened? There is a certain logic behind the Tobago's looks. Thin, narrow wings usually have abrupt stall characteristics. Not so with the Tobago. Its computer-designed airfoil is thicker at the tips, and the wash-out is such that stalls in the landing configuration produce no sudden breaks.

The cowling is indeed too large for its engine. Two justifications are offered: easier access for servicing and growing room for the airframe to accommodate a 250-hp Lycoming IO-540, to be featured in an upcoming retractable called the TB-20 Trinidad.

The size and placement of the stabilator

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give the Tobago a great deal of pitch sensitivity; flying in the least bit of turbulence can be a chore after just a short time.

But, ah, the interior! Those gull-wing doors rise to make cabin entry a breeze. Adding a hand grip on the side of the fuselage would help, though, because—*look out!*—as the doors rise, they move out, forcing you to get out of the way. That means off the wing, unless you have something to hang on to.

Inside, it looks and feels like the interior of a luxury sports car: comfortable, semi-reclining seats; nice wide cabin with plenty of shoulder room; and a power console separating the front seats. You are surrounded by glass, and the visibility is excellent. The drawback here is that in the summer months the cabin can turn into a sauna, and the fact that the doors are mostly glass does not help a bit.

And then, there are the French touches. An overhead approach-plate holder is of dubious benefit, since the pilot must look up, away from the panel, to use it. Nice idea, but why overhead? Of more practical value is a sliding glareshield. Instrument reflections are a problem at night because of all that glass, so there is a hood that slides out, preventing the light from reaching the cockpit windows.

Switches and circuit breakers are identified by pictorial symbols. This is a stab at an international language, but there are shortcomings here, too. For example, the symbol for pitot heat is clear; but others, such as the water wheel/spigot (auxiliary fuel pump) and various lightning-flashes (these could be the nav lights, lighting rheostat, battery or emergency locator transmitter) could cause confusion in a tense situation.

The most obvious feature of the instrument panel is that it is organized into three separate units. In front of the pilot is the flight-instrument module, with a standard T display. Below the yoke on the front panel is the fuel selector valve, next to the magneto switch. Along the top is a row of glareshield-mounted, emergency annunciator lights.

The center section contains the avionics, and the right module carries the engine gauges: tachometer, manifold pressure and exhaust gas temperature.

These panel modules were designed with maintenance in mind. Release a latch underneath, and each module tilts back, permitting access to all the instruments without the usual necessity of disturbing the fire wall or working in tight quarters.

The Tobago I flew was a prototype, assembled in Canada under an agreement with Avions Pierre Robin, another French lightplane manufacturer. Some of the information learned from the Tobago's first pass around the United States prompted modifications. Push on/off switches have been replaced with panel or toggle switches. The fuel, oil and voltmeter gauges, originally aligned vertically, were changed to the standard, horizontal presentation. The manifold-pressure gauge, previously half the size of the tachometer, has been enlarged to the standard, 3.5-inch diameter. Its primary markings, once in millibars, have been changed to inches of mercury.

The front seats are by far the most comfortable; rear-seat passengers face a tight squeeze in this prototype Tobago. U.S. versions of the final design will have vertically adjustable seats.

Gull-wing doors, reclining seats and sports-car-style power console mark the interior. The panel, divided into three hinged modules, is designed for easy maintenance of the instruments.

Density altitude was not a factor the day I flew the Tobago, but with three aboard and a few gallons of fuel under full, the airplane had an alarmingly flat takeoff angle of climb. Rate of climb was 500 fpm, but it just did not feel like it. Retracting the 10 degrees of flap extension used for takeoff provided a momentary sink, then a slight improvement in climb to about 700 fpm, which is closer to the book figure.

Doggy down low, the Tobago seems more at ease at altitude. Roll response is not remarkable, but there is plenty of authority in pitch. Chandelles, lazy 8s and steep turns require only very light stabilator forces.

A cruise power setting of 23 inches of manifold pressure and 2,300 rpm yielded an indicated airspeed of 122 knots. This is a 73-percent power setting at 4,000 feet, and fuel consumption runs 10.4 gph. Socata made a good choice in the O-360. It is a proven engine, and, at 65-percent power in the Tobago, it is possible to burn 9 gph in exchange for a 113-knot (130 mph) true airspeed. Too bad there is not more power available for takeoff.

Fly 80 knots in the pattern, then slow to 67 knots on final. The best landings are power-on greasers; even though the laminar-flow wing floats eagerly in ground effect, you do not want to perform any slow, power-off approaches as a routine matter. Since the Tobago mushes abruptly, full stall landings should be avoided.

One approach was high and hot, so the decision was made to go around: full power, carb heat off, target speed 70 knots initially, then 73 knots after making a flap retraction. This was scary. Again, a flat climb angle, but this time the rate of climb was down around 300 fpm. The treetops looked very close as they slid by.

With the Tobago, Socata hopes to take a bite out of the market held by the Piper Archer. The two airplanes have nearly identical performance figures, and why not? They both use the O-360, and their gross weights are similar. However, the basic Archer has a useful load about 80 pounds greater than the Tobago, and a wing area larger by 42 square feet. What the Archer does not have, though, is the comfortable proportions and visibility of the Tobago.

By the time you read this article, the Tobago should have received its U.S. airworthiness certification. We will see if the TB-10, a big seller in the European market for the past year, will live up to the manufacturer's hopes for America. The exact price has not yet been determined, but, Socata said it will come close to that being asked for the Archer (around $45,000). Currently the TB-10's European price is around 195,000 francs, which translates to about $47,000—without options, of course.

The French are still trying. If Americans are not attracted to the Tobago, they will not have long to wait for the more powerful TB-20 Trinidad, scheduled for U.S. certification in the first quarter of 1982. This will share the same airframe, but produce speeds in the 160-knot range, competing with the Piper Arrows. Eventually, the Trinidad's 250-hp engine may even be turbocharged.

Somehow, the corporate atmosphere in this country discourages new lightplane design concepts. Foreigners trying to crack the American market are willing to take more risks. Whether the Tobago becomes a footnote in aviation history or a success, only time can tell. But, *vive* Socata for its persevering spirit. □

TOBAGO

AEROSPATIALE/SOCATA
RALLYE TB-10 TOBAGO
U.S. price not available
AOPA Pilot Operations/Equipment
Category: IFR

Specifications

Powerplant	Lycoming O-360-A1AD, 180 hp @ 2,700 rpm
	Recommended TBO 2,000 hr
Propeller	Hartzell HC/C2YK-1BF/F constant speed, 74-in, two-blade
Wingspan	32 ft
Length	25 ft
Height	10 ft 6 in
Wing area	128.1 sq ft
Wing loading	19.76 lb/sq ft
Power loading	14.05 lb/hp
Seats	4 (5 opt)
Cabin length	8 ft 4 in
Cabin width	4 ft 2 in
Cabin height	3 ft 8 in
Empty weight	1,480 lb
Useful load	1,050 lb
Payload w/full fuel	706 lb
Gross weight	2,530 lb
Max takeoff weight	2,530 lb
Max landing weight	2,407 lb
Fuel capacity, std	330 lb (324 usable) 55 gal (54 usable)
Oil capacity ea engine	8 qt
Baggage capacity	100 lb

Performance

Takeoff distance (ground roll)	1,180 ft
Takeoff over 50 ft	1,770 ft
Max demonstrated crosswind component	25 kt
Rate of climb, sea level	790 fpm
Max level speed, sea level	133 kt
Cruise speed, 75% power	
4,000 ft	123 kt
6,000 ft	125 kt
Fuel consumption ea engine	69 pph (11.5 gph)
Cruise speed, 65% power	
6,000 ft	115 kt
8,000 ft	118 kt
Fuel consumption, ea engine	58 pph (9.7 gph)
Economy cruise speed, 60% power,	
8,000 ft	109 kt
Fuel consumption, ea engine	51 pph (8.5 gph)
Range @ 75% cruise w/45-min res, std fuel, best economy	
4,000 ft	475 nm
6,000 ft	510 nm
Range @ 65% cruise w/45-min res, std fuel, best economy	
6,000 ft	582 nm
8,000 ft	550 nm
Range @ economy cruise, 60% power, w/ 45-min res, std fuel, best economy	
8,000 ft	580 nm
10,000 ft	570 nm
Service ceiling	13,000 ft
Landing distance	
ground roll	623 ft
over 50 ft obstacle	1,378 ft

Limiting and Recommended Airspeeds

Vx (Best angle of climb)	65 KIAS
Vy (Best rate of climb)	73 KIAS
Va (Design maneuvering)	122 KIAS
Vfe (Max flap extended)	95 KIAS
Vno (Normal operating)	128 KIAS
Vne (Never exceed)	165 KIAS
Vr (Rotation)	65 KIAS
Vs1 (Stall clean)	60 KIAS
Vso (Stall in landing configuration)	52 KIAS

All specifications for prototype TB-10 are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted.

Operations/Equipment Category for aircraft as tested; see June 1981 Pilot, *p. 103.*