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## Used Aircraft Guide June 2011 Issue

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### Used Aircraft Guide: Socata TB-20 Trinidad

**It may not be the fastest airplane to sport a six-cylinder Lycoming, but on pure style points, it has no equal.**

When the so-called Caribbean line from Aerospatiale first appeared at the Paris Air Show in 1977, the U.S. general aviation industry was booming, building mainly tried-and-true, if staid, designs like the Cessna 172 and the Piper Cherokee line. Against that backdrop, the new TB-20 was a splash of cold water.

It's not that the airplane was terribly innovative—it wasn't, sporting the same Lycoming engines we had all been flying behind for years. But it had something no

Skyhawk ever did: a sleek and stylish European panache. Ultimately, this didn't help much with sales, but the thing sure was—and is—good looking, what one aviation writer famously described as a Cherokee done over by Club Med.

The Trinidad is the top of the line of a small family (five) of single-engine aircraft developed and built by Socata in Tarbes, France, from which the TB derives.

Socata is the general aviation division of the government-owned aerospace conglomerate, Aerospatiale. Although the TBs are out of production, Socata is still going great guns with its turboprop TBM line, now up to the 850 model.

The Caribbean line of aircraft includes the TB-9 Tampico and -10 Tobago, fixed-gear singles of 160 and 180 HP and the 250-HP, retractable-gear TB-20 Trinidad and -21-TC turbocharged Trinidad. In this regard, the French have largely duplicated the American marketing strategy of a model for every price and usage strata. No surprise there.

The models share a common fuselage, wing and empennage, which has obvious advantages in production economies, something U.S. airframers haven't always done. In practice, this means that a batch of fuselages and flying surfaces can be built and kept on the shelf until orders need to be filled. It also means that for the Caribbean series, no distinction is drawn between the airframes: The two variants co-exist within the same run of serial numbers.

To date, the total worldwide TB-20/21 population tops out at about 830 airframes

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worldwide, with the plurality based in France. There are about 270 on the U.S. registry, according to the TB Users Group.

After its promo appearance at the Paris Air Show in 1977, the TB-20 was awarded French type certification in December 1981. The first Trinidad arrived in the U.S. during the summer of 1983, with FAA approval the following year. The turbo'd TB-21 got FAA certification in March of 1986.

Acceptance of these models can best be described as mixed. The French had been in the U.S. before with the Rallye, of which 3500 were made worldwide, and had not done well with it in a market that still supported volume sales. After a couple of failed efforts to introduce the TB line, Socata established its own operation just outside of Dallas, Texas. Aerospatiale General Aviation (AGA) shared facilities with Aerospatiale Helicopter Corp. in Grand Prairie. This facility was phased out in favor of a single distributor in Florida and as of this writing, Socata Aircraft USA is headquartered in Pembroke Pines, Florida, as a wholly-owned subsidiary of EADS Socata. It still supports all models.

TB-20 models built between 1977 and 2000 are so-called "Generation One" aircraft and most of those already in the field are of this vintage. In early 2000, Socata introduced the "Generation Two" or GT line, with upgrades to the original aircraft design. The GTs have essentially the same airframe, controls and powerplant as the

originals, but they have a modified carbon-fiber-based cockpit roof which increases headroom and cabin volume, thus addressing complaints from taller pilots. Other minor changes have been introduced. In 1990, starting with serial number 950, maximum landing weight was increased to 3086 pounds. Unfortunately, structural modifications were made to the landing gear attach points and they are not retrofittable to earlier models.

At the same time, the electrical system was changed from 14 to 28 volts.

A change to a higher-speed starter motor followed. To its credit, the detail and systems changes Aerospatiale/ Socata has made to the design are almost completely the result of customer experience. Also to its credit, according to reader feedback, the company has been responsive to customer requests for assistance, although one former owner who contacted us complained of weak parts support.



Socata got the lines just right on the TB20—it's pleasing to look at from any angle. Gullwing doors are a mixed blessing. They're great for ingress/egress, but owners say they're a nuisance in gusty weather on the ground.

## Construction

The relatively simple, monocoque fuselage has a comparatively low parts count compared to like aircraft. According to the company, it takes about 600 man hours to construct a Trinidad, which is excellent in context. This is lower than, for instance, the hours required to build a Mooney or Bonanza airframe. Most of the cabin is fabricated from reinforced glass fiber which sits on top of the load-bearing structure, the fuselage tub.

Flight controls are actuated by push rods rather than the more typical cables, which gives a positive—albeit a bit heavy—control feel similar to Mooney models. Since much of the wing trailing edge is occupied by the flaps, the ailerons are short span. It's a simple, yet sleek design.

A prominent distinction is the vertical stabilizer, which is located forward of the horizontal, all-flying tail or stabilator. Both control surfaces have trim tabs. Pitch trim is via an anti-servo tab.

The rudder trim tab is an additional surface appended to the rudder that looks like an afterthought. The main landing gear is a trailing link design that favors pilots who

occasionally botch landings; it soaks up the bumps well.

For power, the TB-20 uses the Lycoming IO-540-C4D5D version rated at a conservative 250 HP. The turbocharged TB-21TC combines the AB1AD version of the same powerplant, also rated at 250 HP, with a variable wastegate-controller Garrett AiResearch turbocharger. Recommended TBO for both is 2000 hours, which is a plus. But that doesn't mean TB-20 owners have an easy time of it. As with any large engine, overhaul costs are relatively high. In a phenomenon unique in recent experience, there's actually good news about the cost of operating the turbocharged engine.

When we covered the Trinidad some years ago, our sources quoted an average overhaul cost for the turbocharged engine of a whopping \$30,000. During the early 2000s, thanks to competition in the cylinder markets, overhaul costs actually

dropped for awhile. But according to *Aircraft Bluebook Digest*, the turbo version now overhauls for about \$50,000, compared to \$35,000 for the normally aspirated model.

## Cabin Comfort, Loading

Another feature that distinguishes the TB series is the top-hinged, gullwing cabin doors. These make access to any seat quite simple, with a minimum of fumbling and clambering. The cockpit/cabin is modern looking and is well organized.



Cockpit visibility is good, but forward windshield post and door frame obstruct.

It's 50 inches wide, the most expansive in its class. In fact, it's one inch wider than the Piper PA-32 family of cabin-class singles. The Trinidad can accommodate up to five people, with three on the rear bench seat when optional center lap belts are installed. There are individual bucket seats up front. The airplane is quite comfortable for four, although tall individuals have noted tight headroom, particularly in the rear. The newer GT models address this. The seats include an adjustable lumbar support.

To go with its notable spaciousness and comfort, the Trinidad can carry a comparatively hefty payload. It's almost a full-tanks and full-seats airplane, which is unusual for singles and light twins. It also has a generous CG range to permit loading flexibility.

At an average equipped weight of 1990 pounds, payload with full fuel (86.2 gallons usable/517.2 pounds) is 589 pounds. That works out to 3 1/2 170-pounders.

To put things in perspective, its full-fuel payload exceeds that of any other four-place single and even beats the A36 and B36TC Bonanzas. Among singles, only the Cessna 210 surpasses the TB-20's payload capability, but with less comfort, at least with regard to seat design and ingress/egress.

Visibility from all seats is first rate. The windshield and side windows wrap up into the roof line and the windshield extends down alongside the panel, meaning that the pilot can actually see down and forward a bit. That's unusual in low-wing airplanes and is a nice benefit.

Further, the seating position is high and the window sills are low, rather like modern fighter aircraft. Ergonomically, the cockpit is well organized. The panel is a modular arrangement with the right-side gauges mounted at an angle to face the pilot squarely. The center console has a trim wheel cleverly placed directly under the pilot's hand when it's on the throttle; trim adjustments during final approach are easy.

Models built before 1987 have the fuel selector mounted to the left of and just below

the pilot's yoke, an arrangement that was the subject of an AD. The three panel modules can be released quickly and tilted back for maintenance access to the instruments and avionics, making for easier repairs. Additional access panels are provided in the glareshield. The interior is well thought out, in our view, providing a lot of pockets and crannies for manuals, charts and odd pieces of gear. The biggest drawback is the relatively small, odd-shaped baggage door. It's hinged at the bottom and when fully opened, it projects quite a ways.

Care must be taken when loading the baggage bay. Access to the baggage bay for bulkier items than can fit through the door can be gained from inside the cabin. The rear seat back can be folded down or removed, which opens up a spacious area behind the two forward seats.

## Handling, Performance

There's nothing peculiar about operating the TB-20. From pre- to post-flight, the airplane is quite conventional; anyone stepping up from a Piper or Cessna will have no trouble with it.

There are some quirks: Inspection of the engine compartment is difficult because a number of fasteners must be unscrewed. Then, the one-piece cowl has to be put in a safe place while the inspection is performed so that a gust doesn't send it sailing down the ramp.

Many owners probably won't bother frequently enough to catch the odd deteriorating hose, loose connection or nesting bird before such oversights become a problem. (Mooneys suffer a similar shortcoming.) The cockpit layout is generally good, but it takes some getting used to. For example, the instruments have vertical temperature and pressure gauges, not analog dials.

Getting airborne is nothing unusual. Normal takeoffs call for 10 degrees of flap. The standard flap control is an electric switch that permits settings anywhere from up to full-down (40 degrees) to any increment in between. It must be monitored during operation to get the right setting.

Many Trinidads are fitted with the optional pre-select switch, which offers flaps retracted, 10 and 40 degrees. In maximum performance takeoffs, and climbing at best angle, the forward view is filled with cowling. You'll need to S-turn a little to get a full view of what's ahead. Rate of climb at Vy of 95 KIAS is 1250 FPM. Critical speeds are Vne, 187 KIAS; Va (maneuvering) 129 KIAS; Vlo (gear operating) 129 KIAS; and Vfe (max flap extended) 103 KIAS.

The airplane is not blisteringly fast for having such a large engine nor is it as slick in the descent as even some older Mooneys. Nonetheless, descent takes some planning, due to relatively low Vlo and Vfe. One option is to lower the gear at the top of descent and use the wheels as speed brakes.

The Trinidad's control response is good, with the highest noticeable effort in roll. The ailerons aren't large and under airload, the push rods may pick up some operating friction. This won't be objectionable to anyone stepping into a Trinidad from a Cessna but a Bonanza pilot will notice.

Pitch and yaw control effort is lower. So it's more an issue of balance, or control harmony, than hard work. The good tradeoff is that the airplane, thanks also in part to its comparatively high wing loading, handles turbulence well. It also displays good manners in the clouds, with no tendency toward pitch twitchiness or wing fall off.

Slow flight handling is good, too. While the stall speeds are marginally higher than



with other singles, the stall is

mild. The typical result is more of a high rate of sink rather than a pronounced

break. The flight controls are fully functional right through the stall. Intentionally cross-controlling near the stall or even in it produces sink rather than a snap.

Although it looks a tad dated now, the TB20's panel was a state-of-the-art wonder in the late 1970s, when it first appeared.

Pitch change with initial flap extension is minimal. It's more pronounced when full flaps are selected, particularly at the higher end of the allowable speed range. Saving full flaps until the landing is assured means adjusting trim or accepting high pitch forces down to the flare, at which point the up trim has to be put back in.

Full flaps generate a lot of drag, which means either accepting a steeper approach (good for obstacle clearance) or a partial-power approach. Low-speed technique is rewarded with satisfyingly short landing performance. In this respect, the TB-20 shows a bit of the Rallye heritage. Landings, except for the most highly botched and abusive, can be done repeatedly with grace. Lightly loaded, with just the pilot, it takes more attention, because CG is forward. But its manners (and willingness to forgive) are good.

It's axiomatic in airplanes that you never get something for nothing. In the Trinidad, this translates to modest cruise performance, thanks partly to that wide cabin. According to factory figures, 75 percent power at 8000 feet nets a true airspeed of 159 knots. Endurance with 45-minute reserve is 5.65 hours.

At the same altitude, 65 percent generates 149 knots and a bladder-busting 6.4 hours endurance. The turbocharged version doesn't perform quite as well at lower altitudes, which is typical of most turbo models.

The crossover point comes at about 12,000 feet. At its maximum operating altitude of 25,000 feet, 75 percent power generates a true airspeed of 187 knots and endurance of 4.5 hours; 65 percent power produces 169 knots and 6.2 hours. In the real world, say owners, the airplanes are a bit slower than the POH values.

## Maintenance, ADs

Owners report no characteristic maintenance bugaboos and we get mixed opinions on parts support. Parts are generally expensive, however. One of our least favorite features in any airplane is gullwing doors. They're a bad idea because they can trap occupants after a rollover accident.

Most of the changes made to the TBs are reflected in service bulletins and airworthiness directives. About a dozen ADs had been issued on the TB-20 and -21 by early 2003. Most of these are blanket ADs affecting many different aircraft: paper induction air filters, Bendix ignition switches, Bendix magneto impulse couplings, Hartzell propellers and Airborne vacuum pumps. Several blanket ADs cover various aspects of Lycoming engines (91-14-22, calling for inspection of the crank and associated parts for corrosion following a prop strike or at overhaul).

An AD issued in 1990 requires a one-time inspection of oil coolers on all TB series airplanes for cracks and what the text merely calls "distortions." If anything is amiss, the oil cooler must be replaced. The AD on the fuel system mentioned earlier was issued to deal with a few instances of fuel starvation.

In the original design, fuel lines run from the tanks forward and up to the panel-mounted fuel selector. Two conditions could occur: Fuel could drain to the low point, causing the fuel pump to cavitate. The original Dukes fuel boost pump is lubricated by fuel. Dry lines resulted in its failure. Or, vapor lock could occur, blocking normal fuel flow. The fix for the original system is to replace the boost pump with a wet-or-dry Weldon pump and to install a check valve in the line to preclude draining.

In 1987 and later models, the fuel selector has been relocated to the center console. Also, it has been modified so that it's not necessary to pass through "off" when changing tanks.

Three ADs have been issued on the horizontal tail; two of them require repetitive inspections. One requires replacement of the elevator trim tab control attachment. The second requires repetitive (every 100 hours) inspection of the stabilator actuator rod end assembly and attach fittings. Another repetitive AD affects the ailerons. The skin and balance weight attach rivets must be inspected every 100 hours. Substantial cracking requires aileron replacement.

## Owner Comments

I really love my 2000 Trinidad TB21 GT. I flew hundreds of hours in a Piper Arrow, but was ready for an upgrade. Having looked at lots of options, I was ready to sign for the purchase of a new Piper when a local aircraft broker said, "just take one test flight in a Trinidad before you buy that Piper." And that's all it took. The design, comfort, speed, range and solid flight characteristics sold me within the first 10 minutes.

My kids call it our flying sports car and we easily and comfortably fit our family of four (and all our baggage) on three- to four-hour flights. I am over 6 feet tall and find the cabin has good headroom and plenty of elbow room. I often fly it with three or four passengers. Kids use the optional fifth seat.

The quality of construction is excellent and despite much talk about limited availability of parts, I have found it to be actually better and faster than dealing with Piper. The visibility is very good and the handling is exceptional. I typically cruise at 8000 to 12,000 feet and plan for 160 to 165 knots, burning 16 GPH.



My annuals run around \$2500 to \$3000 per year and I understand that mechanics find it an easy airplane to work on. I do the recommended 25-hour oil changes and also complete lubrication of the control surfaces every two years. The Trinidad is an exceptional aircraft that has few equals.

Power is provided by the Lycoming IO-540 series, a reliable if not economical choice.

Gregory Maxwell Applegarth,  
Kentfield, California

I've owned a Trinidad TB21 serial number 638 since July 1991—just short of 20 years. I have over 2500 hours in this baby with landings at 265 different airports in the U.S., Canada and Mexico. Most of this flying is with my partner, Carolyn, although we have done quite a bit of four-person flying, as far as Maryland to Mazatlan.

This is a terrific travelling airplane—extremely comfortable seats, fantastic visibility, stable IFR platform and wing loading that allows easy flight in turbulence. Huge rudder control allows big crosswind control. Landing in Chihuahua with 20 knots gusting to 35 with an 80-degree crosswind is the only time I got from tower, "nice landing."

What does Carolyn like? She said number one was the way it stalls. It doesn't drop a wing, the nose drops, wing picks up lift, it rises, nose drops in a little rocking motion.

She likes the wide cabin, the great seats, the built in oxygen and the beauty of the airplane. It still gets quite a bit of notice and comment with the original paint.

What do I like? Mainly the strength of construction. The dealer had a sample of the wing spar. I got caught in a thunderstorm once. The airplane did fine (some hail damage), I didn't do so well. See my book *Flying Lessons 2005*, available from Amazon.

My experience of performance: Flight plan 160 knots, which is 70 to 75 percent power, 16 to 16.5 GPH. On west to east flights, we commonly fly 800 to 1000 miles in the low teens with ample reserve.

Cost? I went back through my records. Insurance (Avemco) started at \$2100/year and the latest is \$2585. Annuals: \$3350, \$1790, \$2645, \$3705, \$2680, \$7810 (two fuel pumps), \$7355 (new windshield), \$7810 (required 25-year replacement of oxygen bottle, replace turbo).

At 2000 hours, a firewall-forward overhaul cost \$50,000. The Mattituck overhaul was very satisfying—the engine is smoother than ever. At this year's annual, I replaced the turbocharger due to a small oil leak.

One of the reasons I have had such a satisfying experience with the IO-540 Lycoming is the ability to watch shock cooling between climb and cruise. With this airplane, that can be dramatic. I also added an electric AI. I'm thoroughly satisfied with my steam gauges and these add-ons.

Socata support has been excellent. Never any problem securing parts, but they are expensive. Owners who are able to make comparisons say they are not out of line. An example of support: In Texas on the way to Mexico and with the landing gear slow in retracting.

My Socata man on the phone had the local A&P crawl under and told him what to adjust. I asked Philippe if I should go to Mexico. He said, "Sure, John, go, I'll come get you if you need!" The worldwide Socata club maintains an active website, providing answers and suggestions to everything one would care to know.

John A. Snyder,  
Via e-mail



I'm an *Aviation Consumer* subscriber. I also own a share in a Trinidad, G-OMAO, based at Shoreham, on the South Coast in the UK.

If the fixed-gear Tobago looks just like the retractable Trinidad, it should. The two share virtually identical fuselages, wings, tailfeathers and other major components.

I think it best to point you to the definitive source of pretty much all there is to know about operating a TB20. This is a website created by Peter Holy, who has been operating a TB20 since he bought it in 2002. See: [www.peter2000.co.uk/aviation/tb20-experience](http://www.peter2000.co.uk/aviation/tb20-experience).

This website is so comprehensive and so valued by other TB20 operators, that when I stumbled across it, I contacted Peter and offered him free hosting. We have since become friends.

Bob Gilchrist,  
Via e-mail

The TB20 is one fabulous airplane. I have a 2001 GT model, with ultimate 20th century (pre-glass panel) avionics, including GNS530W, GNS430W, GDL-69 XM Weather, WX-500 Stormscope (which play on the Garmins) and Ryan TAS-600 traffic. I have a Bendix/King autopilot with flight director. Several TB20 and 21 drivers that I know have made the leap to Garmin 500 or Aspen panels. The install is

straightforward and the result looks very nice.

The TB cockpit feels like being in a sports car. It is comfortable for long trips. I flew last summer from Durango to Baltimore with two fuel stops. The trip took 11 hours but was not particularly tiring. It was certainly more relaxing than driving for 11 hours! I love the two doors, especially with passengers who are not expert in getting into low-wing singles. However, the gullwing doors can easily fly up if they're not latched securely. This can be a big distraction on a takeoff roll, or, as once happened to me, when turning from crosswind to downwind.

The plane is stable as a rock, flies really well at low speed, and climbs at over 1000 FPM up to 8000 feet. Above that point, she slows down, but I've taken her several times to above 16,000 feet in the summer over Colorado, where she's still climbing at 200 FPM. (I do wish I had turbocharging, though. Sadly, I don't think there's an aftermarket turbo.) On long trips, I fly at 65 percent power, which translates to 14 GPH and 150 knots at 7000 feet. At this burn, I can go five hours and have one hour in reserve.

I bought my airplane used in 2005, with 450 hours. The crankshaft was replaced (free of charge) by Lycoming at 500 hours, following a blanket AD. At 1400 hours, I am still on the original engine. I replaced the vacuum pump as a precaution when I purchased the airplane (at 450 hours) and then at 1100 hours. I've had no other significant repairs. I keep the ailerons, elevator and rudder lubricated, and replace at every annual the Sachs rods for the front gear.

There is a superb user's group ([www.socata.org](http://www.socata.org)) which is a wonderful technical and social resource for TB20 drivers. I've met many friends through this group and through the annual fly-ins that the group organizes. The airplane at max weight is slightly over 3000 pounds, about 500 pounds lighter than a Corvalis or Bonanza. This makes a big difference when you're pulling the airplane out of a hangar.

The visibility is terrific, but all that glass raises the interior heat level in the summer. Having a pilot's side door that can be kept cracked open greatly helps, but I'd really appreciate an air conditioner. I got one estimate for an aftermarket Keith AC, but I wasn't ready to pay \$35,000. I use an Arctic Air cooler, which takes the edge off, but is not the same thing.

I have 1800 hours, of which more than 1000 are in my TB20. I fly between 150 and 200 hours a year, with many local flights and some longer cross-countries. On the longer trips, I'm either alone or with one passenger. Next summer, I'm flying from Baltimore to Salt Lake. The airplane is well suited to my mix of short and long trips. Naturally, I'd like something faster, but feel very fortunate to own a TB20.

My recent annuals have cost about \$3000. Most of the parts I've needed are made in the U.S. Once, I needed a fairly specialized part from France. My mechanic had it within a week.

My TB20 looks sexy and is sufficiently exotic that I often get compliments. Once, I was rolling off the active at Concord, North Carolina (the home of NASCAR). Someone on the freq (either the tower or a bizjet pilot) said, "very nice paint job."

Was I pleased!

Millard Alexander,  
Via e-mail

I have owned a 1993 TB20 Trinidad since 2007 and fly between 50 and 70 hours per year. Fuel burn is between 11 and 12 GPH in cruise at 145 knots true and 65 percent, which is pretty much according to the flight manual.



My annual inspections have

averaged \$3600, but this

Bob Gilchrist, above, with UK-based G-OMAO.

typically included some

preventive maintenance/parts, such as gear relays, vacuum pump, nosegear extension struts, door seals and upgrades, such as installation of PulseLite and reupholstering/padding of the front seats.

My airplane had been very well taken care of by the previous owners, hence has not required any remedial/catch-up maintenance. Even though the aircraft is no longer produced by Daher-Socata in France, parts availability is generally good through Socata North America in Pembroke Pines, Florida, or through my local dealer, Muncie Aviation. Insurance has been around \$2200 per year, based on \$1 million smooth and \$150,000 hull value.

The airplane is a joy to fly and is very comfortable on long trips, although headroom is very limited for tall people. Thanks to the trailing link landing gear, landings can be made very smoothly. It gets admiring comments at most airports where I land.

The gullwing doors could use stronger hydraulic struts to keep them open when there is any wind; watch out in any strong/gusty wind! Baggage compartment accessibility is limited due to the triangular-shaped access door, so I tried several of my empty hard-shell suitcases to determine which ones will fit through the opening and how to stack them.

Trinidads have an excellent user group that provides a lot of very useful information, including service and parts manuals online. Any current or prospective owner should use these resources.

Rolf H. Scholz,

Via e-mail