Socata TB-20/-21 Trinidad

The Socata TB-20/21 Trinidad is a stylish, load-hauling, French import with a surprisingly low accident rate.

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The Socata TB20/21 Trinidad is a stylish and spacious airplane with good performance characteristics and a surprisingly low accident rate.

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It may not be the fastest airplane to sport a big 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

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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 Socata 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 900 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 Socata TB-20/21 Trinidad population tops out at about 830 airframes, with the plurality based in France. There are about 260 on the U.S. registry, according to the TB Users Group.

After its promo appearance at the Paris Air Show in 1977, the Socata 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 North America, Inc. is headquartered in Pembroke Pines, Florida, as a wholly owned subsidiary of DAHER-SOCATA. It still supports all models.

TB-20 Trinidad 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.

Socata TB-20 Trinidad Construction

The relatively simple, monocoque fuselage has a comparatively low parts count compared to like aircraft. According to the company, it took 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.

TB-20 Trinidad 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 Trinidad 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 Socata 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.

Gull wing doors enhance attractive lines but raise concerns about egress if the airplane flips.

Socata TB-20 Trinidad Cabin Comfort

Another feature that distinguishes Socata's 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.

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.

Socata TB-20 Trinidad Loading

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 3.5 170-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 Socata 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.

Trinidad 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. 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.

Socata TB-20 Trinidad Handling and Performance

There's nothing peculiar about operating the TB-20 Trinidad. 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

Modular panel has right-side gauges angled to face the pilot.

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 TB-20 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.

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 TB-20 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.

Socata TB-20 Trinidad Maintenance and ADs

Socata TB-20 Trinidad 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.

Socata TB-20 Trinidad Owner Comments

I have owned a 1993 Trinidad TB-20 since 2007 and fly between 50 and 70 hours per year. The airplane had about 1100 hours total time when I purchased it. The three previous owners had taken very good care of it so it did not require any remedial or catchup maintenance. In addition, Frederick Aviation (now Landmark Aviation) in Frederick, Maryland, has performed excellent maintenance on the aircraft.

The door sill is higher than on a Piper or Beech, but the large opening helps ease boarding.

Annual inspections have averaged $3587, and have typically included some preventive maintenance and parts replacement to prevent failures—such as gear relays, a vacuum pump, door seals—as well as upgrades such as a Pulselite and reupholstering of the front seats.

Even though the aircraft is no longer in production, parts availability is generally good through Socata North America in Pembroke Pines, Florida, or my local dealer, Muncie Aviation in Muncie, Indiana.

Insurance has averaged $2278 for a $145,000 hull value and $1 million smooth liability coverage.

The airplane is a joy to fly and very comfortable on long trips, although headroom is limited for tall people. Thanks to the trailing link landing gear, landings can be made very smoothly. It gets admiring comments at most airports. I make most landings with just 10 degrees of flap as full flaps, 40 degrees, generate a lot of drag and considerable initial pitch up. Lowering the gear and simultaneously selecting 10 degrees of flaps means no pitch up and allows a smooth transition to descent.

Performance is pretty much per book: I flight plan for 150 knots at 8500 feet with fuel consumption of 12 GPH.

The gull wing doors could use stronger hydraulic struts to keep them securely open when there is any wind—watch out in any strong or gusty wind. Baggage compartment accessibility is limited due to the triangular shape of the door. If you want to use hard-shell suitcases, make sure they will fit.

There is an outstanding user group at www.socata.org that provides a great deal of useful information, including a searchable message board. It also has complete service and parts manuals on the line. I recommend that any prospective buyer join and make use of the resources.

Rolf H. Scholz, via e-mail

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 hours.

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

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.

Gregory Maxwell Applegarth, Kentfield, California

The TB-20 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 TB-20 and -21 pilots 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 Trinidad displays good manners on landing—our review of Trinidad accidents found only one rollout loss of control event.

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.

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 TB-20. 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 City. 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 TB-20.

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 TB-20 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 very pleased!

Millard Alexander, via e-mail

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