



Pilot Report:

EMBRAER SUPER TUCANO

by Matt Thurber

For a journalist, the best part of attending the annual **EAA AirVenture** extravaganza in Oshkosh, Wis., is that often serendipity reigns, and the result is an entirely unexpected bonus, in this case the opportunity to fly Embraer's EMB-314 Super Tucano light attack turboprop. Embraer arranged to fly the Super Tucano (Air Force designation A-29) to AirVenture to display it at the company's booth, alongside its Phenom 100 and 300 business jets, and to highlight the company's partnership with Sierra Nevada, program manager for the bid on the U.S. Air Force's 20-airplane Light Air Support contract. The other bidder is Hawker Beechcraft with the AT-6; both airplanes are powered by a 1,600-shp Pratt & Whitney Canada PT6A-68. The Air Force is expected to announce the

winning bidder in January.

As is typical with any military airplane, an extensive briefing was conducted before the flight. In this case, the briefing was under the welcome shade of Embraer's big tent next to Phillips 66 Square, fanned by a breeze that kept the hot summer temperatures at bay. This particular Super Tucano, built in 2006 and with just 635 hours on the clock, is operated by Tactical Air Support, which leases the airplane from its owner, Presidential Airways. Tactical Air Support uses the Super Tucano to support various military exercises and events such as Embraer's and Sierra Nevada's AirVenture display. Gerry Gallop, a pilot for Tactical Air Support, flew the Super Tucano to Oshkosh. Gallop is a former Navy pilot who flew F-16s as an adversary pilot during Top Gun training events.

Having recently flown Hawker Beechcraft's T-6C (which is similar to the AT-6 but with a less powerful 1,100-shp engine), I was somewhat familiar with the Martin-Baker Mk 10 ejection seat and the protocols surrounding its use, but Gallop painstakingly led me through the process. Nobody likes to think an ejection will happen, but if I've learned anything flying with military pilots, it's that they like to prepare to a degree that civil pilots rarely consider (and perhaps ought to). The Super Tucano's canopy is not designed to eject you through the canopy," Gallop explained. Fracturing (detonation) cord should break up the canopy during the ejection sequence, but cone-shaped protuberances on the top of the seat will also do the trick as the seat rockets

the pilot up and away. "The only time we would really think about ejecting is if we have an uncontrolled fire," he said, "or we have a loss of flight controls."

For a two-seat, single-engine airplane, the Super Tucano is fairly large, with a wingspan of 36.5 feet and length of 37.3 feet, both about three feet more than the T-6, and a relatively heavy 7,000-pound empty weight and nearly 12,000-pound mtow. Even at the higher weight, compared with the T-6's 4,600 pounds empty and 6,300-pound mtow, the Super Tucano handles like a much lighter and smaller airplane, delightfully responsive yet stable.

Flying one of the display airplanes at AirVenture involves various logistical dances with all the pilots waiting to arrive and depart, while the airshow and flight demonstrations

continue during the late afternoon. I can't say it wasn't fun to be one of the pilots standing outside a super-cool airplane on the P2 taxiway next to Runway 18/36, sharing space with a bunch of famous names in aviation awaiting their turn to fly.

Ready for Takeoff

After the elaborate strap-in procedure—I was in the back seat, which is normally the instructor's position in the two-seat Super Tucano—Gallop fired up the big PT6 and we waited in line, then eventually taxied onto the runway for a takeoff to the north. The Super Tucano's nosewheel steering is mechanical, so somewhat stiff compared with the hydraulic steering of the T-6C. Like the T-6, the Super Tucano is pressurized, and you have to wear an oxygen mask that delivers oxygen from the onboard generating system, basically like a portable oxygen concentrator, which squeezes it out of the air.

I had some trouble staying straight on the centerline during the takeoff roll, and after we finally got airborne, I realized that I had forgotten one of Gallop's instructions during the briefing: to move the seat up to align the line-up balls in the cockpit so that I could see better over the nose. I was too far down in the cockpit and thus couldn't see the runway centerline. Keeping straight should be easy because the airplane has automatic rudder trim, which kicks in at 50 knots, although I didn't really notice its effects much because I

was weaving a bit, trying hard to stay near the centerline.

One handy feature on the Super Tucano is a button on the throttle that pops up a caret on the torque gauge for setting power. Just push the button, and the Fadec automatically calculates the takeoff power setting for the existing ambient conditions and places the caret on the desired torque setting.

The ride smoothed out during climb-out, and my view improved when I blipped the electrical control to move the seat up. The Super Tucano accelerated quickly after we rotated at about 100 knots. Gear up after liftoff and establishing positive rate of climb, then after retracting the flaps we accelerated to 200 knots and headed east over Lake Winnebago. The Super Tucano responded instantly to my every command, smoothly and precisely pointing the nose and banking the wings as I moved the stick and stopping on the desired attitude quickly and cleanly.

I had time for some crisp Dutch rolls and steady steep turns, then a bit of aerial maneuvering before we formed up with a Beech Bonanza A36 from which photographers were shooting photos and video for Embraer and Sierra Nevada. The light was just about perfect, late afternoon rays of sun bouncing off a bleached cloudy backdrop, typical Oshkosh summertime weather. Gallop flew formation on the A36, a masterful demonstration of the skills that a military pilot learns; he kept the Super Tucano precisely where the photographers asked, and if they requested 20 feet up or down or sideways, Gallop

complied smoothly and accurately. We spent about half an hour flying formation with the A36, then broke away in a classic peel-off maneuver, just like in the movies.

I flew the Super Tucano back to Oshkosh. Sadly, we didn't have time for aerobatics, although I did get to fly a simulated bomb run on an unsuspecting farmer's barn, which we utterly destroyed, thanks to the Super Tucano's weapons delivery and electronic warfare simulation system. I didn't feel comfortable landing the Super Tucano from the rear seat, so Gallop took over as we neared the airport. We touched down at 95 knots and taxied back to Phillips 66 Square as the sun set behind the many gorgeous aircraft parked on the ramp.

Aircraft Capability

The Super Tucano can carry a 3,420-pound payload, leaving plenty of capability for external stores and fuel. Ferry range with external fuel is 1,540 nm (8.4 hours) and 780 nm (3.4 hours) with internal fuel. Maximum level speed is 320 ktas, or 280 ktas with external stores attached. When flying the Super Tucano to different locations, Gallop said he cruises at about 240 ktas and burns about 550 pph. The airplane's mission computer has a cruise function that displays the optimum altitude given existing conditions and wind. "We take a look at that and see what it suggests for us," he said.

The Super Tucano stalls at 80 knots. Maximum altitude is 35,000 feet, and pressure differential 5.0 psi. The airframe is designed for a 12,000-hour fatigue life in typical combat



Visitors to AirVenture, general aviation's big show, had the chance to check out the military trainer, which shared the ramp with several of Embraer's business jet offerings.

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operations or 18,000 hours in training operations and is limited to a maximum of +7 and -3.5 g. The Super Tucano is certified for 133 weapons configurations. "That's important because it gives a flexibility to the aircraft that is unrivaled," said Taco Gilbert, Sierra Nevada vice president of ISR business development (and retired U.S. Air Force brigadier general). The Super Tucano's wings can hold internal .50-caliber guns, freeing up an external hard point that can be used for other weapons or payloads and reducing drag, compared with pod-mounted guns. Rough landing strips are no problem for the Super Tucano, which is designed for austere field operations, with a rugged landing gear, high ground clearance and low-pressure tires. The oil cooler is located on the side of

the engine compartment to avoid FOD damage.

The Super Tucano's instruments include dual six-by-eight-inch color LCDs for each pilot, GPS navigation backed by a laser inertial reference system, head-up display in the front cockpit, night-vision-compatible internal and external lighting, full hands-on throttle and stick controls, autopilot with mission-planning capability, forward-looking infrared system, tactical VHF and UHF radios with seven optional datalinks and computerized attack modes.

Embraer had delivered 160 Super Tucanos to six customer countries as of the end of July. For the U.S. Air Force Light Air Support bid, Embraer partnered with Sierra Nevada, and more recently Boeing joined the program to help with the airplane's weapons systems. According to Embraer Aircraft Holding president Gary Spulak, if the Super Tucano team wins the latest bid (the team won the first bid, but a Hawker Beechcraft lawsuit derailed that award and the contract was reopened),

the airplane will be assembled in a plant in Jacksonville, Fla. This will involve "a \$2.7 million investment by Embraer," he said, "in the facility build-out, equipment, machinery, tooling and software to stand up that operation and get it ready for service. The program will support more than 1,200 jobs across the United States for our vendors, suppliers and other partners." This includes 50 new jobs in Jacksonville, he said, and an annual payroll there of about \$2.5 million. More than 100 suppliers in 20 U.S. states will help the program comply with the Buy America act, "with more than 86 percent of the Super Tucano made up of parts coming from U.S. companies or qualifying countries," he said.

Both Hawker Beechcraft and the Sierra Nevada/Embraer/Boeing team have submitted their bids and are awaiting the announcement of the winner in January. "We're looking forward to a successful competition," said Gilbert, "and looking forward to winning it a second time."

Gerry Gallop of Tactical Air Support, which operates the Super Tucano on display at Oshkosh, gave author Matt Thurber a chance to put the aircraft through its paces.



The cockpit of the Super Tucano includes dual six-by-eight-inch color LCDs for each pilot along with GPS navigation, night-vision-compatible lighting and autopilot.

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This demo flight provided the opportunity for some formation flying, as photographers in the back of an A36 shot video of the Super Tucano in action.

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