



Four seats. Full fuel. Let's go!

BY PAUL DYE

FLIGHT REVIEW



Slingshot*TSi*



An August afternoon at Big Bear Lake in Southern California. Field elevation—6750 feet. Density altitude—8970 feet. Four seats—all full. Fuel tanks—full as well. I looked down the 7000-foot runway at the meadow that is often part of the lake. Many pilots have ended up there under just these conditions: full up, gross weight, high, and hot. But I wasn't afraid as I pushed the throttle forward to the stops and released the brakes. No, I wasn't afraid, but I was mildly concerned. I had my abort point picked out: If we weren't off the ground by Taxiway Delta, I was going to call the whole thing off. But sure enough, the acceleration was positive, the controls responded well, and the nosewheel (followed by the mains) was off well before we got to the decision point—and we had already accelerated to best climb by the time we got there.

Some new jet? No, this was the latest offering from The Airplane Factory, a South African company known for its two- and four-seat kits, and sold in America as a kit or factory-assisted build. The Sling TSi debuted for show at AirVenture 2018, but wasn't yet licensed to fly. The pink slip, in fact, arrived while I was at their booth, and Phase 1 testing was performed by factory personnel in the Oshkosh area as soon as the show folded up and everyone had gone home. With 40 hours of testing and a fresh sign-off for Phase 2 in the books, the factory pilots departed for their home base of Torrance, California, making the trip



The turbocharged Rotax 915 iS fits nicely under the cowling of the TSi and provides plenty of power.

in one day and nearly nonstop. And that was with, as they said, “a bunch of stuff from the booth piled in the back!”

The secret to the new Sling at first appears to be the obvious—the all-new Rotax 915 iS, boasting 141 hp at full song and able to keep that much horsepower all the way up to 15,000 feet. Coupled to an electric Airmaster constant-speed prop, it can give spectacular climb or speed, depending on what you need at the moment. Set for takeoff with maximum horsepower, it had no trouble pulling our gross-weight airplane off the pavement and over the mountains of Big Bear, then with a twist of the rotary knob to select cruise performance, we accelerated to the IAS redline of 145 knots, truing out at slightly over 160

knots. If that were all that was new about the TSi, it would be a winner.

But talking with Matt Liknaitzky, leader of The Airplane Factory USA, there is much more that sets the TSi apart from its older four-place brother, the 115-hp Sling 4 Turbo, than what is under the hood. The wing, for instance, has a different airfoil, different construction, and will carry extended fuel in outboard tanks that will take it a very long way. The cabin appears to be relatively familiar from my limited time in the earlier four-place, but in fact it is different, as is the tail section. It might look like a Sling 4 with a bigger engine, but it is an entirely refined version. Always willing to try out a new aircraft, we met Matt and his business partners, Jean



The intercooler is large, providing significant cooling after the turbocharger compresses the air, making for better efficiency and more power.



The slip ring on the rear of the Airmaster prop provides power and control for the electric constant-speed blades. It's a good match for the 915 iS engine.



The panel in the factory demonstrator is loaded but very well organized. This machine is ready for serious IFR cross-country work!

d'Assonville and Wayne Toddun, at Big Bear Lake. Wayne is also the owner of the Sling TSi we flew. And after seeing what it can do, we're impressed.

What's New?

While it is easy to think of the STi as an upgrade to the Sling 4, according to Liknaitzky, it is mostly a new aircraft. In addition to the completely new powerplant, the wing is entirely new, with a lower profile airfoil for more speed and with more aileron authority. There is a greater use of flush (pulled) rivets on both the wing and the tail, making for better airflow as well.

The main landing gear is now more aerodynamic, with airfoil-shaped struts for lower drag. The canopy and doors are

new designs, as is the cowling, although they look very similar to those on the original 4. There is a greater use of countersunk Camlocs and other fasteners to make the overall package cleaner, faster, and more aerodynamic. The empennage is also new, with a counterbalanced rudder and larger, fully balanced elevators.

Creature Comforts— A Refined Cockpit

I flew the original Sling 4 when it was first introduced and have always remembered being impressed at the comfort and size of the cabin. Not only were the front seats comfortable with a well-thought-out set of controls, the rear seats and baggage area were also quite roomy. Being used to Lycoming-powered four-seat



The Airmaster prop is constant-speed, and the rotary selector makes it easy to set exactly the rpm you want for each flight phase.

aircraft, I was completely surprised that a 115-hp Rotax could haul an airplane this size around with apparent ease.

The same thing is true with the TSi—maybe even more so. Although the longeron is slightly higher than some might like on a “sedan” type airplane, the truth is that it is no different than most two-seat homebuilts where you have to lift yourself up a bit from wing level to get in. Aside from that, the seats are very comfortable, and the controls all fall naturally to hand. The panel is well thought out, and I'd have a tough time coming up with a better layout than what they had in the demonstrator. Switches are where you'd expect them,





(Left) The high-back bucket front seats provide plenty of support and comfort for long trips. (Right) The rear bench seat folds down but is comfortable for two normal size American adult males when upright.

and they match up with the checklist sequences very well—a sweep of the cockpit before start and then before takeoff is all you really need.

The aircraft we flew was equipped with a dual-screen Garmin G3X Touch EFIS and its associated autopilot, a G5 for backup of the primaries, and a GTN 650 Navigator. It also had extended-range fuel tanks, which had small fuel valves just to the right of the pilot's knees to supplement the main Left/Right/Off fuel selector. The throttle is mounted on the center console, along with the single braking lever that brakes both wheels. Although we are big fans of individual brake pedals, the steerable nosewheel on the TSi makes ramp maneuvering easy.

Passengers won't be disappointed with the cabin either. Getting into the roomy rear seats was simple, and access to the baggage area behind those seats was made even easier with a rear baggage door. The aircraft was equipped with a whole-airframe ballistic parachute, and this took up a chunk of the baggage area. But the space that was lost is supplemented by a luggage tube that extends back into the tail cone and can easily be used for light and/or long items such as skis (your choice, water or snow). Jean d'Assonville, the wiry partner in The Airplane Factory USA, demonstrated the utility of the tube by sliding his legs and torso back there and proving that he could use it as a sleeping area. Your mileage may vary, of course.

The gull-wing doors are similar to what we remember on the original Sling 4 and are easy to reach and use. For someone like me, used to getting in and out of a two-place cockpit with a slider or tip-up canopy, you have to remember to slide out a little as you go up, or you will hit your head—but it's far better than on a typical low-wing production plane where you have to get in through a side door.

Overall, we found the cockpit to be comfortable and convenient, and it held four full-size adults with ease.

Flying the TSi

Gross weight was the first thing I thought of when I saw Matt and two others climb out of the cockpit at Big Bear just after noon on a warm summer day. With





THE AIRPLANE FACTORY SLING TSi

Kit price	\$53,297
Estimated completed price	\$135,000–\$200,000
Estimated build time	1400 hours
Number flying (at press time)	6
Powerplant	Rotax 915 iS 141 hp @ 5800 rpm
Propeller	Airmaster/WhirlWind 3-blade, Electric constant-speed

AIRFRAME

Wingspan	31 ft 1 in
Wing loading	16.8 lb/sq ft
Fuel capacity	46 gal
Maximum gross weight	2094 lb
Typical empty weight	1080 lb
Typical useful load	1014 lb
Full-fuel payload	738 lb
Seating capacity	4
Cabin width	44 in
Baggage capacity	55 lb

PERFORMANCE

Cruise speed	145 kt
Maximum rate of climb	1200 fpm
Stall speed (landing configuration)	48 kt
Stall speed (clean)	52 kt
Takeoff distance (to 50 ft agl)	550 ft
Landing distance (from 50 ft agl)	558 ft

Specifications and pricing provided by the manufacturer.

The gull wing doors allow easy entrance and exit, and aren't as large (and wind-catching) as on many aircraft because of the high longerons.

digital signs at the end of the runway toggling between 8950 and 9000 feet density altitude, I put on my risk management hat and asked, "So who's staying behind while we go flying?" When Matt gave me a puzzled look and said, "Well, I thought we'd all go!" I took a long pause and asked, "Well, how much fuel do we have then?"

"The tanks were full when we left Torrance, so probably a little more than 40 gallons. We can fly all afternoon!" Hmm, I thought—sure, if we make it off the ground! "Don't worry, Paul," Matt reassured me, knowing what I was thinking. "We're right at gross, but don't forget—we're turbocharged! We've got sea level horsepower no matter what the density altitude says!"

Climbing into the Sling TSi, I was surprised how roomy it was. We put two full-size adult males in the back seats, and they had both leg and shoulder room to spare. I reached down to adjust my seat forward, and the big guy behind me said, "Don't worry about it—I've got more than enough space!" He was right. And this is not to mention the roomy baggage compartment and ski tube installed back in the tail.

Getting things started was easy with a well-organized panel and nicely developed checklist. I've been flying more and more Rotax iS-powered aircraft recently, so the little song and dance for checking both lanes (channels) of the engine controller and both main and backup fuel pumps went quickly and made sense.

It's important to remember to bring the rpm above 3000 shortly after start to bring the alternator on line. But with modern avionics, the battery will most likely last well past the taxi to the run-up area and runway, if you forget. You'll easily exceed 3000 rpm on the takeoff roll, so not to worry.



(Left) Folding the rear seat back down creates a cavernous baggage compartment, and the baggage door is big enough to crawl through, making loading and unloading easy. The vertical column is the housing for the optional whole-airframe ballistic parachute. (Center) The TSi has an optional ski tube that is good for long, lightweight items. (Right) Want to camp with your airplane, but hate tents? Install the optional ski tube, fold the rear seats down, and you've got a camper!



(Left) The wing tips on the all-new wing are actually small winglets. (Right) The wing design is all new on the TSi, sharing almost no parts with the Sling 4. The winglet tips make for an excellent high-altitude cruising machine.

The TSi has a single brake lever on the console to the right of the throttle, and it controls both brakes. There is also a parking brake, a necessity when you don't have toe brakes to hold during run-up, and your hands are busy with throttle and ignition switches. The brake handle was convenient to the palm of my hand as I controlled the throttle, and it took mere seconds to have a comfortable system worked out for speed control on the ground. The nosewheel steering was positive and powerful, with enough turning angle to swing the airplane tighter than if you

locked a brake. It was pointed out that if you turn at minimum radius, the inside wheel is actually going backwards! Despite this sensitivity, it was easy to taxi in a straight line without hunting.

Run-up was routine for a Rotax, and it took little time to set switches and check controls so that we were ready for takeoff. The flap selector is a rotary knob with settings for up, 1, 2, 3, or down. We selected one notch for takeoff and rolled out onto Runway 26 at Big Bear. I cheated toward the threshold lights to make sure I had all 6752 feet of pavement available and mentally selected my no-go

point. I needn't have worried—acceleration was substantial when I pushed the big throttle lever forward, and we hit the 55-knot rotation speed about the time we hit the numbers after using the displaced portion of the runway for the initial roll. Liftoff came quickly thereafter, and I had already accelerated past normal climb speed before the decision point. It was a piece of cake as we headed out over the lake and pointed ourselves over the mountains to the right to head down into the desert.

Best climb was claimed to be about 80 knots, but I found little difference in

Straight from the Top—An Interview with Matt Liknaitzky

Matt Liknaitzky is a busy man. He sells Sling aircraft and MGL electronics across the United States from his Torrance, California, base, and there is quite a demand for both. Matt took the time to bring the new Sling TSi to us for its first media evaluation, and we cornered him into answering a few questions while he was here.

KITPLANES®: You mentioned that the majority of parts in the TSi are different than the Sling 4. What are the significant differences between the two?

Matt Liknaitzky: Only about 20% of the airplane parts are common between the Sling TSi and the Sling 4. Here are the major differences:

Airframe

- All new wing with lower profile airfoil for higher speed, more aileron authority, pulled countersunk rivets on the leading edge third of the wing (and underside)
- Flush-riveted empennage leading edge surfaces
- Airfoil-shaped main landing gear legs
- More streamlined wheel pants
- New canopy and doors
- Balanced rudder
- Larger, fully balanced elevator
- Countersunk Camlocs instead of Dzuz fasteners
- New cowling design (with similar looks)

Powerplant

- Much more powerful engine (135 hp continuous versus 100 hp continuous on the Sling 4)
- New prop from Airmaster/WhirlWind with larger diameter, large-chord blades

Comfort

- New seats and interior
- New cabin air/heat mixer control
- New rear seat vents

KP: What does "TSi" stand for?

ML: Turbo Sport injected.

KP: If a customer in the U.S. chooses the factory assist option, where will they do this?

ML: At The Airplane Factory USA in Torrance, California; Midwest Sky Sports in Caro, Michigan; or Synergy Air in Eugene, Oregon.

KP: The panel on the demonstrator we flew was beautifully laid out and finished. Is the panel standard, or does the customer receive a blank sheet of aluminum as with most aircraft kits?

ML: We have several standard panel offerings, and Midwest Sky Sports is manufacturing custom-designed Sling TSi plug-and-play panels that are ready to be installed in the airplane. But the



(Above) The large NACA duct on the right side of the cowling is for the intercooler.
(Right) The Airmaster constant-speed prop is fitted with WhirlWind blades.



rate even when I went 20 knots faster. This is more or less instinctive to a typical pilot who flies air-cooled engines in the high mountains and deserts of the West. But since the Rotax was water cooled, the excess cooling air really wasn't necessary, and I pulled back to get to the cool air with no change in water or oil temps. This was sweet—no need to worry over temps! We held the takeoff rpm setting for the constant-speed prop for 4 of the allowable 5 minutes, then selected “climb” with the rotary knob on the prop controller. As much as I like a fistful of levers, the

truth is you just don't use that many different prop settings on a flight.

We left the prop in “climb” at Matt's suggestion, and as we topped the ridge of mountains that form the southern edge of the high desert, we leveled off at about 8800 feet msl, showing a density altitude on the Garmin G3X Touch screen of 10,700 feet. After letting the airplane settle into cruise attitude, Matt pointed out that we were creeping up on the IAS redline of 145 knots, and I might want to pull the power back a bit. The TAS was reading 162 knots, and it agreed well with ground speed,

standard kit includes just a blank sheet of aluminum and all the options in the world.

KP: We understand that the kits are matched hole. Are the holes final size so they can be riveted immediately, or do they need to be drilled and/or deburred?

ML: Holes are final size and can be riveted immediately.

KP: What kind of lead time can a customer expect for a standard kit, quickbuild kit, or the factory assist program?

ML: Right now, we have standard Sling TSi kits in stock and a three-month lead time on quickbuild kits. For factory assist, there is a three-month lead time until the kit shows up at the build center, then it takes approximately three months to complete it.

KP: Do you provide engine support, or is that provided directly by Rotax?

ML: We provide a complete firewall forward kit with everything needed to install the engine, which we also supply. We support engine installation, and Rotax provides additional service and support.

KP: We know that the airframe is primarily built with pulled rivets. Are there any places in the kit where builders will need tools for solid rivets or other specialized aircraft assembly techniques?

ML: All parts of the airplane that have solid rivets (wing spars and spar box, flap brackets, etc.) are riveted at the factory and are not required to be riveted by the builder. No specialized techniques are required.

KP: The big NACA scoop in the cowl for the intercooler is impressive. Is the intercooler standard with the Rotax 915 iS, or is that something unique for this installation?

ML: Yes, the 915 iS gets its awesome power from the intercooled turbo. The intercooler is standard with the engine, and every Sling TSi will have that scoop.

KP: Sling has come a long way from the original two-seat LSA to the new TSi in a very short number of years. Have these airplanes been flying in South Africa for a while, and are they just now appearing in the U.S.?

ML: The TSi is brand new. The aircraft you flew is the first production unit after the initial prototype, and Wayne Toddun and his son Matthew traveled to the factory in South Africa to build it. It was then brought to the U.S.

KP: How many are flying worldwide?

ML: There are now about six flying worldwide, and many more are in progress. There have also been more than 350 Sling 2s, and 200 Sling 4s delivered around the world.

KP: How quickly can spare parts (either for original construction or after the airplane is flying) be acquired? Does everything have to be ordered from South Africa, and how quickly can they provide spares?

ML: We have all TSi parts in stock. But should a part be out of stock, we have a once monthly airfreight shipment from South Africa to augment our sea freight containers of kits and quickbuild kits.

—P.D.



with very little wind aloft either in the forecast, the reports, or showing on the EFIS. This thing was way faster than I expected. Somehow, I keep thinking LSA when I think of Sling, and I need to put that out of my mind—now!

Although our destination of El Mirage dry lake was right off the nose, I did a few turns left and right to see how the airplane handled. Pitch and roll were very harmonious, and it took almost no rudder to keep it coordinated in cruise. Very nice. Pitch was stable but not ponderous, and roll was also responsive without being too light. I rolled into a steep turn, and the altitude was on rails—we barely showed a change on the altitude tape while going all the way around to the left. When I got there, I warned the backseaters that I was going to reverse at full deflection to see the roll rate, and they laughed as we popped around from 45 degrees left to 45 degrees right with very little time elapsed. I barely got out a “one potato, two potato, three...” before we were settled into going the other way. A gentle chandelle followed, showing that yes, I needed to use some rudder, but no, it wasn’t heavy or excessive—it was just what I felt was right.

I eased back on the throttle because it was time to start descending for our lakebed stopover, and it was then that I found out just how slippery the airplane really is. “Go down or slow down—which

do you want to do?” is a phrase you often hear with clean airplanes, but this thing already had the gear hanging out! I pulled the throttle back almost to idle and waited until I saw a slowing trend on the ASI before trimming nose down and pegging redline until we hit the bumps. Then I slowed it down some more in level flight before dropping to a few hundred feet above El Mirage to check things out. It was my first visit there, despite having flown over it countless times, and I was pleased that there is clearly a long set of tracks demarking a roughly east-west runway. There was a windsock planted on a substantial pole (showing a southwesterly flow of air), and even a port-potty out there in the middle of nowhere.

With Adelanto airport (home of a Predator training operation) just to the south, I pulled up into a right-hand pattern, keeping the throttle mostly closed and bleeding off speed to the top of the white arc. I popped flaps to pin the speed, then added the rest for a full-flap, curving approach to my first landing in the airplane—on a lakebed, where I could let it roll anywhere I wanted. There was plenty of contrast on the smooth, flat surface to allow height judgment, and the touchdown was nice because I didn’t have to worry about length. We rolled out using a little brake and nosewheel steering to park over by the windsock. A van with three teenagers drove by with

one of them on the roof, enjoying the freedom of a lakebed with no real restrictions. They might have been practicing for a Burning Man performance—at least, that was what it looked like.

It was 100° F on the lakebed at 13:00 local time, but it was a dry heat. We piled out and enjoyed the surreal nature of stopping at a place where you could walk in any direction and still not run out of room to land or take off in the airplane. We took some pictures, admired the rugged windsock that looked to be planted on an old telephone pole, then loaded back up to pick out a landmark for the beginning of the takeoff roll. Lakebed takeoffs are a bit disorienting because you keep looking for some sort of threshold or runway alignment markings to give you a hint of where you are. But there aren’t any, so you just find the direction of the wind, taxi away from it until you feel you have adequate distance for the takeoff, turn around, and go! Once again, we were off quickly and turning back toward the mountains, which promised cooler, smoother air when we got up above 8000 feet.

The Sling TS*i* handled afternoon desert thermal bumps nicely as we climbed for altitude, the long wings giving a smooth ride and seemingly passing us off from one thermal to the next without much effort. Dropping back into Big Bear Valley, we set up for the typically steep



Extended range tanks are located in the outer wing panels and give this airplane enough range to fly from Oshkosh to Southern California with only one stop.

approach to Runway 26 and had another uneventful touchdown. With speed very easy to manage and maintain, the Sling makes a pilot look good! I quickly adapted to the hand brake, and taxiing to a tie-down spot, I was sad that our time in the air had ended. This is a nice airplane, and the fact that it is really a true four-seater makes it one of a very small number that can claim that distinction.

What Does It Take to Build?

The Sling TSi, like all of the Sling aircraft, is a pulled-rivet airplane with prepunched matched-hole parts. This means it assembles fast, with no drilling or deburring, according to the factory. The demonstrator that is now being flown in the United States, after its debut at AirVenture 2018, was built by Wayne

Toddun and his son using the factory build program at the company's headquarters in South Africa. He reported that the program was made easy with the help of factory support personnel.

The airplane is assembled like all aluminum pulled-rivet airframes, with parts that fit well together. Common aircraft tools are required, but anything requiring solid rivets will be done by the factory, so a prospective builder does not need to tool up to the extent that a traditional metal aircraft builder might expect.

The kit is complete, but builders have numerous options to select from, including avionics suites, extended-range fuel tanks, a whole-airframe ballistic parachute, and an extended baggage tube, among others. Building instructions are modern, with pictures

and a sophisticated parts identification system that has been proven on the kits for the two-seat Sling 2.

Although a trip to South Africa to do a factory-assisted build is an adventure to add to the already wonderful adventure of building, it isn't necessary. Liknaitzky says that customers can now find the same level of support at several factory-authorized build centers in the U.S.

A True Four-Seater

The Sling TSi is truly one of very few homebuilt kits available today with four seats and the capability to use them. While not as fast as an RV-10 at lower altitudes, the turbocharged engine has promise to even the score at altitude. The baggage and load carrying capability won't equal that of a Murphy Moose, but it is more than sufficient for two or three people to take off on an extended trip—in both distance and time. The new Rotax engine is efficient and sophisticated, promising years of service.

All in all, the Sling TSi is an impressive machine and one to be considered if you want something more than a traditional two-seat cruising machine. If you're looking for adventure—from the mountains to the deserts—from the plains to the sea, it's worth adding to your list. †

For more information call 424-241-0341 or visit www.airplane-factory.com.



The Airplane Factory team enjoying the solitude of El Mirage Lakebed—and the airplane that brought them there.