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Affordable Motorgliders? Yes, a Whole Family of Them You Can Build

MARCH 1, 2022 BY DAN JOHNSON — 7 COMMENTS

Article Update — Photos of the designer's own project... see at bottom. —DJ 3/2/22

A steady stream of readers ask about motorgliders. This is one of recreational aviation's most interesting aircraft types. Motorgliders can soar reasonably well for those interested in working thermals or ridge lift to ascend without motor noise.

Many others might never shut down the engine and soar but are intrigued with efficient cross country flying. In a motorglider, a pilot can be more confident as the aircraft can glide far further than other types, providing a broader safety margin.



From a one-man operation comes the Italian **Piuma Project**. Designer and builder **Tiziano Danielli** describes his creations as "a friendly family of ultralight" motor gliders."

Trouble Is... Motorgliders Are Expensive ...Or, Are They?

Fully manufactured LSA motorgliders may get you airborne quickly whereas you need to build your Piuma, but the factory-built version will cost substantially more. I've written about **Pipistrel's Sinus**, **Ekolot's Elf**, **Distars's SunDancer**, the **Phoenix Air motorglider**, and even the kit-built **Sonex Motorglider**, among several others (even more here). Most of these will cost multiples of the cost of a Piuma homebuilt motorglider.



If you'd like a motorglider without the big bill, Tiziano's Piuma series might be just what you are seeking.

"As readers will see on the website, I am not a company, but only a passionate pilot / designer / builder of ultralight motor gliders in wood and fabric for personal use who has decided to sell the construction plans to finance his passion," related Tiziano.

"Now I am retired, but ... being a technician by training, this allowed me to document technical texts in order to first perform the structural calculations of the elements making up the aircraft and then design and build the objects of my hobby." Tiziano fulfilled his dream — with a lot of effort — and he is willing to share that effort via a plans set and descriptions of materials needed.

Readers who want to save money acquiring a motorglider may finally have a good option: the Piuma Project — composed of five models, the Original, Evolution, Tourer, Twin Evolution, and Almerico. The latter two are two seaters, though Tiziano admits his primary interest is the single place model.



"The first idea was to design, to build and to fly a little one seat ultralight motorglider, for personal use, very safe in flight, simple in the construction, and easy to pilot," said Tiziano. "I wanted it to have flight characteristics and comfort higher than various tube-and-fabric ultralights of that time." (This was at the end of the '80s.)

The first flights of the Piuma Original date back to 1990. This was followed with the Tourer.

Piuma designs have a significant history, yet Tiziano saw value in upgrading his plans and info package. "Given growing interest in minimal ultralights," Tiziano reported, "in 2021, the drawings of the Original Piuma, the Construction Manual, and also the Project Book were improved with new photos, all now available also in English language." Based on my scouring every page of his website, I can attest his command of English is

excellent. When you examine Piuma's website, you will even find English measurements, unusual for a European developer.

Touring Piuma Motorglider

Perhaps a majority of pilots interested in motorgliders will rarely fly them as soaring machines. With long, slender wings, gliders and motorgliders have an elegant, graceful look and are efficient aircraft with low fuel usage per mile flown.



A Piuma Tourer confirmed the suitability of the name by flying from Venice to Sicily one year (1,250 kilometers or 776 miles) and from Venice to Paris another year (900 kilometers or 560 miles). These flights confirm, Tiziano said, "that even with a small motorglider, I can do great trips."

He has also designed and drawn two-seater versions: the Piuma Twin, later replaced with the Piuma Twin Evolution, that incorporates all the improvements suggested during nine years of Piuma Twin construction: a 20 centimeter (8 inch) longer front fuselage, for better balance without ballast and a rear fuselage similar to the single seat Piuma Evolution.

The designer's interest and that of many single seaters/pilots/builder may remain with the single seat models. Not only will they be less costly but with only a single seat, buyer need only satisfy themselves.

Constructing Piuma

Tiziano sells neither completed motorgliders nor kits. These are "scratch-built" aircraft, meaning that builders have to acquire all the materials and follow drawings to build any of the Piuma models.



"Construction time depends on the builder's meticulousness," said Tiziano. "Normally, about 1,000 hours are sufficient for a person with limited woodworking experience to complete the work. Plans are composed of a large technical sheets (24 x 40 inches) with lots of details."

"Some component elements require the use of a lathe and/or milling machine, but most of the construction may be built without special tools. It is very easy," said Tiziano. He completed his **Piuma Original** after 18 months of work, in a two-car garage measuring 21 feet long and 13.2 feet wide.

Drawings show multiple views and have all the details. A "Construction Book" is provided with instructions and references to the drawings that explain more details relating to each model. Drawings and the book also note all the materials to be purchased specifying the quantity and quality of each necessary element, from the aviation birch plywood to the aluminum alloy parts and including Dacron fabric, glues, and more.

A "Project Book" is not necessary for the normal builder, but it is very important for those who want to know the project better. The Project Book contains design considerations; lots of drawings of the fuselage, wings, tail, and more; structural calculations; plus flying characteristics and speeds.



The construction plan set sells for \$200-\$400 (each model) is somewhat different in price) in early 2022. Tiziano reported, "The cost of materials, excluding engine and instruments, is around \$4,000 (at 2020 prices)."

Based on that number my guesstimate for total price with a used Rotax two-stroke engine, basic analog instruments, and minimal paint might be \$15,000 or less.

How This Gets Interesting After Mosaic Is Released

Professional build centers have been highlighted as one of Mosaic's many aspects. Everyone including FAA recognizes that kits built with oversight from people who know the aircraft and the process of construction makes for better, safer airplanes. Because safety is FAA's main consideration, professional builder-assist centers are expected to part and the new regulation. I have been predicting we will see the NPRM by Oshkosh 2022 (mere months away now).

Such a center could, for example, set up shop specifically to assist buyers of the plans sets. The result could be Piuma motorgliders assembled under controlled circumstances.

Piuma Original (Tourer specs shown for some parameters)
TECHNICAL SPECIFICATIONS
all data provided by the designer

- Wing span — 38.4 feet (34.1 feet)
- Total wing area — 125 square feet (99 square feet)
- Aspect ratio — 11.2:1
- Dihedral — 3°
- Total tailplane area — 17.2 square feet
- Length overall — 19.4 feet
- Height — 4.6 feet
- Empty weight — 320 pounds
- Max take-off weight — 518 pounds (550 pounds)
- Useful load — 198 pounds
- Max wing loading — 4.14 pounds per square foot
- Recommended load factors — +3.4 / -1.2
- Ultimate load factors — +6.8 / 2.5
- Max level speed — 51 knots (81 knots)
- Normal cruising speed — 43 to 48 knots (73 knots)
- Stalling speed — 26 knots (34 knots)
- Never exceed speed — 65 knots
- Best glide ratio with power off — 17:1
- Take-off — 330 feet
- Landing — 330 feet
- Max climb rate at sea level — 390 feet per minute (1,000 fpm)
- Min sink rate (at 31 knots) — 200 feet per minute (235 fpm)
- Engine — 25 horsepower (40 horsepower, Rotax 447)

To help you **find lots more information** and details plus more photos for each model click or tap any of the several links below. (Note: English is used and is very good.)

- [Piuma Original](#)
- [Piuma Evolution](#)
- [Piuma Tourer](#)
- [Piuma Twin Evolution](#)
- [Piuma Almerico](#)

- [Piuma YouTube channel](#)
- [All Piuma Project contact information](#)

* European use of "load factors" does not mean FAR Part 103 parameters. While light, these are not Part 103 ultralight vehicles.

This **March 2, 2022 update** provides photos of designer / builder **Tiziano Danielli's own project**. Here's a few words from him about it.

"I personally am still flying with my Original Piuma and I am completing the construction of the Almerico (images below), which I modified into a single-seater for personal use."

"The construction plans of the Piuma Almerico single-seater that I used for my personal use are not yet completed [but] I intend to make them available to the builders, together with hundreds of photos of the details under construction, in the coming months."



FEATURED AIRCRAFT & ENGINES

AeroSport, LLC BuildCenter offers a distinctive Light-Sport Aircraft within reach of almost any budget and available in multiple configurations. BuildCenter by Skyflex is fun and capable and available as a kit fully-built LSA or ELSA.

Progressive Aerodyne designed and supplies the Skyflex series, arguably the most celebrated of all light seaplanes in America. A close community of hundreds of owners offers camaraderie few other brands can match.

AeroJones Aviation builds the very popular CT series of Light-Sport Aircraft for Asia-Pacific markets. CT is the latest version, a 95% carbon fiber design with superb performance, roomy cockpit, great useful load, and a parachute as standard equipment.

Continental Jet-A Engines Why is the EA commonly turning to Jet-A engines? What's the future of flying? HAVE YOUR SAY

US Sport Planes offers the all-composite, well-proven Jabiru line, one of the most popular Light-Sport Aircraft in America and the world. CT is 95% carbon fiber (with superb performance, roomy cockpit, great useful load, and a parachute as standard equipment) — a market leader for many years!

Arion Aircraft has designed and built one of the most beautiful Light-Sport Aircraft in the world: the Special LSA and kit-built aircraft sector. The all-American designed and built aircraft is priced fairly and flies wonderfully... need you search for more?

Certified Service Outlets FLIGHT DESIGN USA

Flight Design USA Why is the CT the best selling Light-Sport Aircraft in American and the world. CT is 95% carbon fiber (with superb performance, roomy cockpit, great useful load, and a parachute as standard equipment) — a market leader for many years!

Vickers Aircraft has created one of the most distinctive new LSA seaplanes yet to emerge. Powered by the fuel-injected, turbocharged, and intercooled 161-horsepower Rotax V165C, this sleek model is the only other seaplane ever introduced with multiple features to set it apart from the crowd.

Texas Aircraft, from the Lonsdale state, offers a bright new entry: **Colt 100**, a descendant from an established Brazilian light aircraft. Colt is a handsome, clean-sheet design built of aluminum with a steel safety cell structure, performing strongly with its Rotax V16 engine, and showing a well-equipped, modern, deluxe interior that any pilot can love.

Airtime Aircraft (Fly2Com) is the nation's largest seller of Light-Sport Aircraft, focused on the CTL8 and CT Super, the top-selling LSA in America. Airtime has represented Flight Design's CT series since Day One and knows more about the model than anyone outside the manufacturer. Run by a father and son team, Tom and Tom Duranton, Sr. and Jr., are enthusiasts that can get you in the aircraft you want and can help you maintain, upgrade, or enjoy your aircraft.

BRM Aero manufactures the handsome Bristol all-metal LSA. This highly evolved, multi-generation Light-Sport was carefully engineered for luxury, comfort, excellent stability, and safety while being fun, fast, and easy to fly.

North Wing is America's leading manufacturer of weight shift LSA and Part 103 ultralight trikes. The company's wing designs are as good as those made by other manufacturers use them. Aircraft prices are highly affordable by all.

Lockwood Aircraft is the builder of two of light aviation's best-regarded flying machines: the Almerco and the Drifter line. Most sport aviators already know the Lockwood brand, a leader in Rotax maintenance and aircraft services.

CSB Hawk is much-beloved by owners with more than 2,000 aircraft flying. With wonderful flying characteristics, the Hawk Special LSA. An enduring pioneer among light aircraft, Hawk leads from Ohio with additional operations in Florida.

available in a variety of models, including Part 103. Build a kit or buy a ready-to-fly Hawk Special LSA. An enduring pioneer among light aircraft, Hawk leads from Ohio with additional operations in Florida.

Aeroplanet USA ends your search for a Light-Sport Aircraft that is both familiar and new: **Comet 103**. This 85%-used copy of Comet's 102 is built with modern materials and well equipped but for tiny fraction of the cost of a new Skyline.

Seamax Aircraft designed and manufactures a wonderful Light-Sport amphibious flying boat of the same name. Created in Brazil Seamax is a beautifully finished, high performing aircraft. The first of its kind under the name Seamax is a high standard for light floatplanes.

Ekolot America represents three handsome all-composite designs that boast very attractive prices to match their handsome exterior cleanliness and beautiful interior. Built in Poland and represented in three locations around the USA, here is an affordable aircraft you'd be proud to own.

Alion Aviation imports and represents the expensive VLS aircraft from 2008 in Europe. This retractable two-seat model has proven itself to be a fast, competitive light aircraft with performance to match or exceed many legacy general aviation aircraft while burning a fraction of the fuel. If you want to get fast, here's one great choice.

SilverLight Aviation created an all-American proplene with modern sophistication and equipment built by a proven expert. Gyroplanes like ART 1 fly much like fixed wings but with real advantages.

Bristol USA distributes the highly-refined Bristol aircraft from 2008 in Europe. The Czech-built aircraft is a 5th generation design with excellent performance, wonderful handling, and a most appealing shape. Other airplanes may look similar but Bristol has gone far beyond.

Aero Adventure offers what is likely the lowest cost boat-hull seaplane in the light aircraft market with a kit that, complete with engine, sells for less than \$80,000. Add a long history to its credit and Adventure is a seaplane worthy of a close look.

Evektor is Number One and always will be. The Czech company's SportStar was the number one LSA to win approval but engineers have steadily improved the model far beyond that 2005 version that started the new wave.

Aerotek Aircraft imports the A220 and A220 ProVoc gear or taildragger Special Light-Sport Aircraft. A family of four models is an excellent price. Aerotek has wide, affordable appeal.

SportairUSA is a pioneering LSA distributor featuring the top performing STOL the Savage Nomad Shock Ultra, and Z-Flap — a full-size, mid-America operation providing LSA & Part 23 airframe, engine & prop maintenance, repair and avionics.

The Airplane Factory (TAF) produces the Sling series of motorized aircraft (theally) and now this fine flying, all-metal beauty is available in the new five flying, all-Special Light-Sport Aircraft. Here is an LSA to follow.

Composites EFX manufactures a line of light helicopters. Choose a fully-built Part 103 model or the exciting turbine-powered XET kit-built model. Whether you pick, the price is remarkably low for any ultralight of this sophistication and sturdiness for a helicopter. Learn more about this fascinating entry...

Aerolite 103 is a remarkably priced (way below \$20,000), well-equipped, Part 103 ultralight that flies beautifully. Several hundred are airborne and production has never been more solid. New is an airplane every pilot can love and afford.

Evolution Trikes developed and continues to refine their Rotax powered, absolutely magnificent weight shift control aircraft (or trike). Rev is their new very affordable single place machine.

ROTX aircraft engines