FLIGHT DESIGN

Since 1988 – 25 Years – The Future of Flight

CTLS

Avionics:
Club
Advanced

Engines:
CTLS – 912S
CTLSi – 912iS
CTLSt – 914T

Content

The next generation from the market leader

The CTLS is the newest evolution of the Flight Design CT line of aircraft. Longer, lower and sleeker, the CTLS was designed specifically for the Light Sport Aircraft (LSA) category and offers many features to improve comfort and performance.

Flight Design has conducted extensive customer research including questionnaires at leading air shows. Based on those results and the design opportunities allowed under the ASTM Light Sport Aircraft standards, the CTLS was developed. The Flight Design development team worked for more than 24 months on development of the CTLS and invested significantly in this evolved design.

Flight Design used industry specialists and advanced tools including full–scale wind tunnel testing in the Mercedes-Benz wind tunnel to further refine the new aerodynamic design. Next generation computer flight test systems were used to develop the flight dynamics in a first for the Light Sport Aircraft industry.

Flight Design is committed to remain the leader in the Light Sport Aircraft category. Employing progressive design concepts and modern safety know–how, Flight Design joins the latest engineering techniques and software to state–of–the–art materials.

The CTLS is an aircraft capable of flying non–stop from Chicago to NYC, Charlotte to Dallas, and London to Frankfurt or Munich to Rome… flights of 1,800 km (1,000 miles). The large comfortable cabin and excellent visibility of the CTLS makes all your flights more enjoyable and a better environment for learning how to fly.

In production since 1997, nearly 1,800 Flight Design CTs have been delivered to customers worldwide. By operating the CTLS in some of the most challenging conditions on earth, Flight Design team members continue to learn and improve the aircraft.

The CTLS incorporates evolutionary changes that make it a great airplane for the demands of flying clubs and flight schools as well as private owners.

A modern aircraft should have all the safety improvements available for protecting the pilot and passenger. Every CT has a time–proven rigid carbon fiber cockpit forming a safety cell plus four–point harnesses. The standard equipment airframe parachute system is an important addition to the list of safety features on the CTLS. The system is always available should you need it.

The CT first earned its German Airworthiness Certificate in 1997. The Special Light Sport Aircraft FAA Airworthiness Certificate was issued to a CT in April 2005. Compliance of the CT family of aircraft has been verified by the independent LAMA audit in March 2008. The DGAC of India registered the CTLS In November 2009 for India. In November 2009 the CTLS received Chinese Type Design Approval, issued for the first time ever to an LSA aircraft by the CAAC of China in combination with Production Approval. And in 2012, the CTLS received its EASA Type Certificate.

Since the first flight, nearly 2000 owners have loved the high cruise speed, low stall speed, and the spacious cabin of all CTs.

The fuselage on the CTLS is 390 mm (1' 1") longer, which increases pitch stability and dampening significantly. The result for pilots is a smoother ride in turbulence and much easier landings.

By optimizing the shape of the fuselage, drag has been reduced while providing cleaner airflow to the stabilizer. Even the smallest improvements were executed to further increase lift and reduce drag.

The stabilizer trim tab incorporates a new flexible elastic hinge, which is aerodynamically cleaner plus the control linkage has improved gearing for finer control and better trim feel. The wing of the CTLS uses the same efficient and proven airfoil as the CTSW. Advanced winglets reduce induced drag, improving climb, cruising range and aileron control at low speeds while conveying a 21st Century look.

In total, the aerodynamic changes have have significantly improved the CTLS's stability, control and its overall ease of flying. While the top speed of the unlimited CTLS is impressively high, all CTLS fly with efficiency and low fuel consumption at all speeds.

New urethane polymer shock absorbers in the nose gear give high dampening and help to smooth out hard landings. The new composite main gear is extremely strong and rugged while also being flexible, absorbing over 50% of landing energy on the first rebound.

Five–axis CNC milling technology produced the metal molds for the new composite main landing gear. New brakes developed together with our partners give the correct balance of durability, performance and light weight.

Please fly safely

The Flight Design engineering staff created the CTLS with safety, performance and comfort in mind. A new aircraft should employ modern construction techniques for many reasons.

The cockpit's carbon-aramid composite safety cell helps to protect you and your passenger. The engine mount and carbon fuselage attach points reduce the possibility of engine intrusion into the occupant's safety cell.

Standard four–point harnesses along with crushable elements of the fuselage construction absorb energy and reduce possible loads to the pilot and passenger. Strong winshield uprights and massive upper construction complete the protective environment. Fuel tanks are sensibly located in the wings, well away from the occupants. Numerous improvements to the CTLS fuel system are incorporated to give proper fuel flow even in extreme conditions while maintaining the safety of single lever operation.

The wide speed range and high structural margin of the CTLS give you peace-of-mind even peace-of-mind even in the strongest conditions. Tested and certified to perform up to 600 kg (1,320 pounds) with a generous safety margin, the CTLS can take the load and haul it, too!

The CTLS has been subjected to numerous static tests and complete flight–testing as a part of certification to major Airworthiness Standards including ASTM–FAA Light Sport Aircraft requirements and German LTF–UL 2003. Each CTLS is fully flight tested by our engineering test pilots and flown again after being reassembled and checked by factory–trained experts in the country of destination.

Production

Production of the CTLS is performed in Ukraine by our young and highly motivated staff near the Black Sea resort area of the Crimea. Along with development of the original CT, our own R&D and manufacturing company was created. We are constantly expanding our production facility and staff to meet the growing demand. Ukraine has a strong aviation culture going back to the beginning of manned flight. Major airframe and component manufacturers are now sourcing engineering and manufacturing in Ukraine to take advantage of low production costs as well as one of the world highest engineering educational standards.

The balance of safety and performance is attained through rational design, well–organized manufacturing and the use of dependable Western materials.

CTLS was designed and tested using the most advanced CAD programs available and these systems are also applied in production of the aircraft.

We are proud to be at the vanguard of aviation technology and a leader in bringing that structural and aerodynamic technology to the light plane industry.

Durability

A modern airplane should be built with modern technology. Carbon fiber–epoxy aircraft construction offers unparalleled strength, durability, corrosion and fatigue–resistance. Despite high material and labor costs, carbon fiber construction is being used more widely every year. Due to its advantages, carbon fiber construction has been adopted for many new military and commercial aircraft replacing older aluminum & rivet construction. Repair costs with carbon fiber construction are typically far less than those for conventional metal or tube and cloth aircraft. New core foam which is now used is much more resistant to environmental damage. Repairs can be locally performed around the country.

The CTLS is finished in a two–part polyurethane paint, which is very UV–resistant. Beautiful and easy to take care of, the CTLS polyurethane finish will last years when properly maintained.

Structure

The CTLS structure is made from the very latest carbon fiber construction with rigid foam core and epoxy matrix using vacuum technology. All supporting structure consists of carbon and/or Aramid fibers, and since 2008 a new foam core material is used in exposed areas to provide improved resistance against weather, fuel and chemicals. All materials used in the construction are from Western suppliers and correspond to either DIN or Aviation standards. The CTLS wing surfaces are post cured at 80 °C (176 °F) as it is customary in aircraft construction.

The 1.24 m (49") cabin width of the CTLS has been increased in length to fit very tall and smaller people equally well. People with heights of 1.55 to 2.00 m (5' 1" to 6' 6") sit more comfortably than ever. More storage space in the cockpit is provided by a new convenient jacket shelf for in–flight access and bigger outside baggage doors now give better access for bulky items stored aft of the cockpit. Two new windows in the rear give the cockpit a more open feeling and improve rearward visibility.

Large gull–wing doors held up by gas struts make entering and taking your seat easy. Three–point latches and door seals keep you secure inside. Comfortable seats with molded foam padding and pneumatically adjustable seat cushion and lumbar sections offer incomparable comfort and easy adjustment in height and length. From these seats, the remarkable visibility of CTLS will give you the feeling that you are in a helicopter with a sweeping view of the world.

The new engine installation reduces vibration and cabin noise is reduced further.
Full dual controls and centrally located throttle quadrant are features of this ergonomically arranged cockpit. Easy to reach storage space and convenient map holders are thoughtfully provided. Standard ventilation and heating allow CTLS flying in all seasons.

The CTLS allows up to 50 kg (110 lb) of baggage (total) to be safely stored in the dual storage compartments aft of the cabin area.
If you are finding it hard to find a Light Sport Airplane that fits you, try the CTLS. We think you will be pleasantly surprised.

The new engine mount and control system design was developed with service and repairs in mind. The CTLS requires only a minimum of maintenance. At our Service Centers you can have this work done by our properly trained staff. You can also participate in a two–day owner–training course at one of our Flight Design Service Centers. This course will enable you to do simple maintenance yourself supported by our detailed maintenance manual and parts manual supplied with each CTLS.

Our local Service Center technicians are available for specialized work and repairs or to assist local mechanics on the basic maintenance of the CTLS.

CT safety cabin design

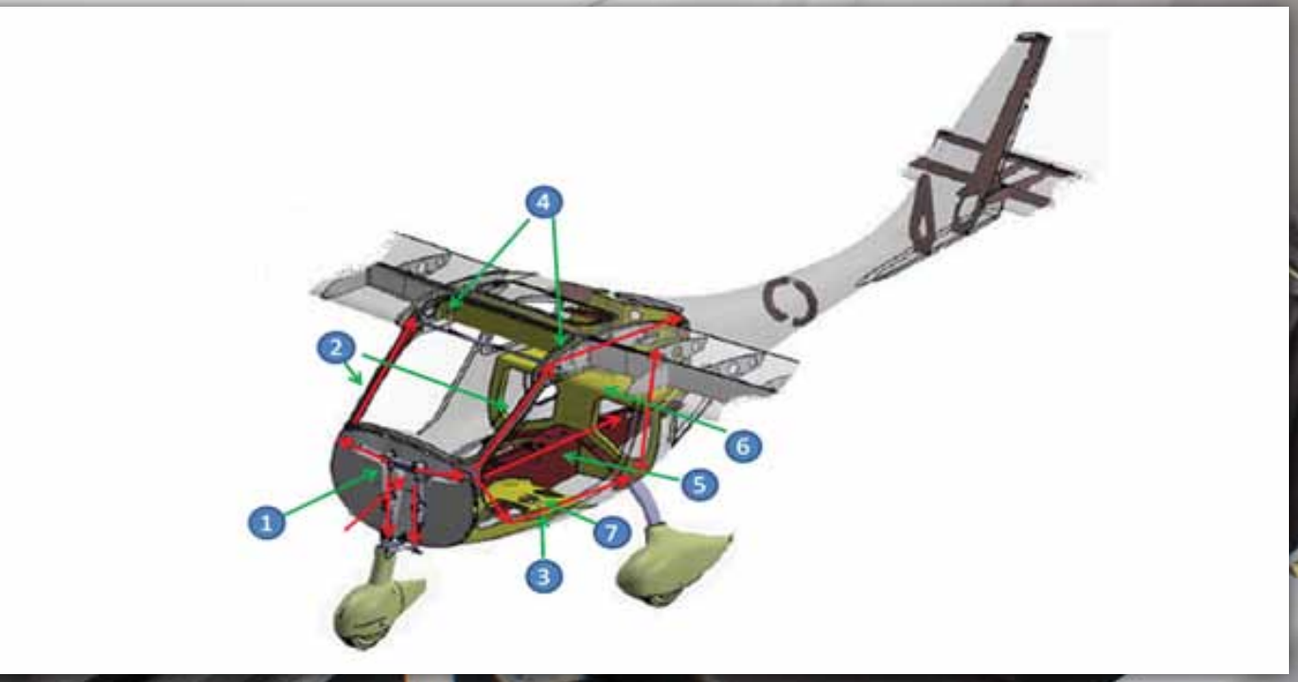
The design of the CTLS carbon fiber cockpit has been intentionally done following reliable design principles known from the passenger cabins of modern cars, where crash loads are transferred through the passenger area to the crash–zones at the end of the vehicle, so that the cabin remains stable while the energy is absorbed in the periphery areas.

Looking at the CT models safety cabin you can find all key car design features as well.

The following illustration generalizes the force flow in the CTLS:

- Forces are introduced in a crash from the engine and nose gear through the big engine mount (1) into a strong A–pillar (2) and to the center tunnel (5).
- The door sill (3) is designed to transport the loads backwards and into the sandwich composite shell.
- The fuselage root rib area (4) is designed as a stiff roof rail to transports the loads backwards.
- The middle of the cabin is stiffened with a tunnel (5) that extends from the nose gear attachment area to beyond the luggage compartment.
- The cabin is closed at the end with the main bulkhead (6) that serves together with the door sill as B–pillar. All longitudinal elements extend to and beyond this main bulkhead.
- The floor section below the seats is designed with “Pyramids” (7) installed to the cabin floor, supporting the seats and stiffening the floor.
- The inner laminate of the cabin skin is done in Aramide, providing best occupant protection against splintering. The outer skin is designed as carbon fiber providing maximum stiffness and strength.

The suitability of this design has been proven in service now for 14 years. Accident history shows that the cabin provides a maximum of occupant protection even in a severe crash.



Glider towing

Since the beginning of the glider towing tests in Europe, the CTLS has shown surprising aptitude. The climb speed is just right for comfortable climbs with gliders under tow. The CTLS has demonstrated this even on grass with a fixed pitch propeller.

Engine data

Three models, three engine choices: CTLS/912S, CTLSi/912iS or CTLSt/912t

Depending on your specific requirements and preferences, choose either the well–proven, industry–standard Rotax 912S, developing a reliable 100 hp with twin carburetors, or the new fuel–injected, Rotax 912iS, featuring a robust 100 hp with the fuel–air mixture precisely computer–controlled for ultra–smooth power delivery, more even and useful torque, reduced emissions and improved fuel economy. The 912iS modern fuel–injection also results in surer, easier starts, lower maintenance and lower operating costs all the way to its 2000 hour TBO. For flying in “hot and high” conditions, where a normally–aspirated engine will be challenged to maintain power at altitude, Flight Design offers the advantages of turbo–charging with the Rotax 914t, able to maintain its 115 hp in altitude. However you fly, Flight Design has engine power choices best suited to your exact requirements.

- 100–hp Rotax 912S with slipper clutch and 2.000hrs. TBO
- Slipper clutch
- 1352 c.c. 10.5 : 1 compression ratio
- Gearbox: 2.43 : 1 reduction ratio
- Fuel: Premium unleaded auto fuel or 100 LL Avgas

- 100–hp Rotax 912iS with electric fuel injection and 2.000hrs. TBO
- Slipper clutch
- 1352 c.c. 10.5 : 1 compression ratio
- Gearbox: 2.43 : 1 reduction ratio
- Fuel: Premium unleaded auto fuel or 100 LL Avgas

- 115–hp Rotax 914T with turbo charger, turbocharge control unit and 2.000hrs. TBO
- Slipper clutch
- 1211,2 c.c. 9.0 : 1 compression ratio
- Gearbox: 2.43 : 1 reduction ratio
- Fuel: Premium unleaded auto fuel or 100 LL Avgas

Standard equipment

- Airframe parachute
- Garmin GTR 225 Com, GTX 327 Mode C and GPS AERA 510 XM:
  - Radio Garmin GTR 225 installed with antenna
  - Transponder Garmin GTX 327 Mode A/C installed with antenna
  - Altitude Encoder ACK A30
  - GPS Garmin AERA 510XM with USA database
  - ELT Kannad AF Compact 406 MHz
  - Intercom PM 3000 A with aux music input and connection to GPS Audio
  - Push–to–Talk buttons on each control stick
  - Two Headset Telex Echolon with plug connectors next to the seats
- Flight and engine instruments (ASI, altimeter, UMA advanced analog: RPM, CHT, EGT, Volt meter, Hobbs)
- Advanced three–blade composite propeller
- Adjustable sport seats (fore–aft & height) with headrests
- Electric flap control with LED pre–selection system -12° (-6° USA) to +35°
- Four–point harnesses
- Two large baggage compartments
- Extra wide cabin doors with gas spring
- One–piece windshield with light green tinting
- Two wing tanks with 130 l (34 gallon) total capacity
- Composite main landing gear: 4.00 - 6” main wheels with hydraulic disc brakes, steerable nose wheel 4.00 - 6”
- 10 cool standard graphic patterns
- Complete document package includes: Flight, Maintenance and Parts Manual

One way to get more people involved in your club is to lower the cost and offer exciting new aircraft. With rental and training allowed by the FAA on Special Light–Sport Aircraft, the CTLS is the right choice for flying clubs and fractional ownership applications. With the new CTLS even less experienced pilots can enjoy the thrill of flying this exciting Light–Sport Aircraft after a proper training session.

The further you fly–the more the CTLS superiority shows. With the CTLS's new long–range comfortable seats and large baggage compartments, countrywide flights become an achievable and affordable adventure! The CTLS gives you the performance and freedom to make your flying dreams a reality!

Operating costs

CTLS was built to get up and go. With low fuel consumption and low operating costs, you can afford to fly as much as you want.

For USA customer

Hours per year	100	250	350	500	750
Total direct operating costs	$ 34.50	$ 34.50	$ 34.50	$ 34.50	$ 34.50
Total indirect operating cost no hull insurance	$ 20.15	$ 14.54	$ 13.47	$ 12.67	$ 12.05
Total indirect operating cost	$ 50.83	$ 26.81	$ 22.24	$ 18.81	$ 16.14
Total operating cost including hull insurance	$ 105.48	$ 75.85	$ 70.21	$ 65.98	$ 62.68

For Europe customer

Hours per year	100	250	350	500	750
Total direct operating costs	38.13 €	38.13 €	38.13 €	38.13 €	38.13 €
Total indirect operating cost no hull insurance	20.15 €	14.54 €	13.47 €	12.67 €	12.05 €
Total indirect operating cost	43.25 €	23.78 €	20.07 €	17.29 €	15.13 €
Total operating cost including hull insurance	101.53 €	76.45 €	71.67 €	68.09 €	65.30 €

Flight schools & photography

Remarkably slow landing speed, controllability and rugged landing gear make the CTLS the right choice. Due to its modern strut–less (cantilevered) wing design and contemporary good looks, the CTLS is the right choice for Flight Schools seeking a way to attract new students. In Europe this change is already happening for many light plane schools. A revolution in personal flying in the USA is now underway with the Light–Sport Category!

Without a strut to block the view non–commercial aerial photography is a joy. An optional 16.5 x 25.4 cm (6-1/2 x 10") photo window is available, too. With its roomy cabin and superb visibility the CTLS is an ideal aircraft in the agricultural world for the inspection of animals and crops and other not–for–compensation survey tasks.

* With its short field performance and rugged optional tundra gear, a careful landing for inspection is easily performed.
* Get approval from local authorities on legality of all unusual or commercial operations.

Cockpit options

1	PS Engineering PM 3000 intercom
2	Transponder Garmin GTX 327 Mode A/C
3	Radio Garmin GTR 225
3a	Radio Garmin GTR 225A 8,33 kHz (optional)
3b	Radio Garmin GNC 255A 8,33 kHz NAV/COM (optional)
4	Altimeter small (57mm), analog
5	Airspeed indicator small (57mm), analog
6	Trutrak FD–Pilot 2–axis + VS / GX Pilot (optional)
7	Dynon SkyView SV D700 — 7"
8	GPS Garmin AERA 500 / 510 XM
9	Analog engine instrument UMA
10	Hobbs hour counter
11	ELT 406 MHz
12	GPS Garmin AERA 795 / 796 XM
13	Garmin GTN 650 (optional)
14	Garmin GTN 750 (optional)
15	Garmin GMA 240 audio panel
16	Dynon Double Screens Dynon SkyView SV–D1000 — 10"
17	Garmin Double Screens G3X PFD / MFD — 7"
18	Transponder Dynon SV–XPNDR 261 Mode S
19	Transponder Garmin GTX 23 ES - Mode S
20	Dynon Autopilot 2–axes (optional)

Design

Wave 1

ORACAL 951 series		070	Black
ORACAL 951 series		209	Maize yellow
ORACAL 951 series		032	Light red
ORACAL 951 series		090	Silver grey

Wave 2

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		070	Black
ORACAL 951 series		032	Light red
ORACAL 951 series		090	Silver grey

The colors reflected on the brochure are only approximations of the original colors.

Wave 3

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		509	Sea blue
ORACAL 951 series		026	Purple red
ORACAL 951 series		093	Anthracite

Wave 4

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		509	Sea blue
ORACAL 951 series		070	Black
ORACAL 951 series		093	Anthracite

The colors reflected on the brochure are only approximations of the original colors.

Wave 5

ORACAL 951 series		026	Purple red
ORACAL 951 series		509	Sea blue
ORACAL 951 series		090	Silver grey
ORACAL 951 series		093	Anthracite

Storm 2

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		070	Black
ORACAL 951 series		032	Light red
ORACAL 951 series		090	Silver grey

Storm 1

ORACAL 951 series		070	Black
ORACAL 951 series		209	Maize yellow
ORACAL 951 series		032	Light red
ORACAL 951 series		090	Silver grey

Storm 3

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		509	Sea blue
ORACAL 951 series		026	Purple red
ORACAL 951 series		093	Anthracite

The colors reflected on the brochure are only approximations of the original colors.

The colors reflected on the brochure are only approximations of the original colors.

Storm 4

ORACAL 951 series		811	Sahara beige
ORACAL 951 series		509	Sea blue
ORACAL 951 series		070	Black
ORACAL 951 series		093	Anthracite

Storm 5

ORACAL 951 series		026	Purple red
ORACAL 951 series		509	Sea blue
ORACAL 951 series		090	Silver grey
ORACAL 951 series		093	Anthracite

The colors reflected on the brochure are only approximations of the original colors.

Classic 1

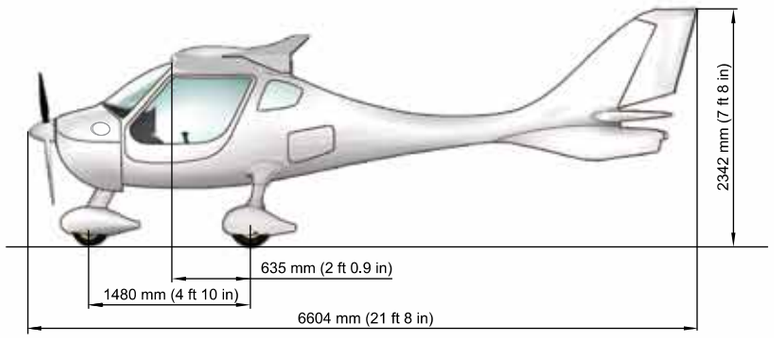
ORACAL 951 series		093	Anthracite
ORACAL 951 series		032	Light red
ORACAL 951 series		090	Silver grey

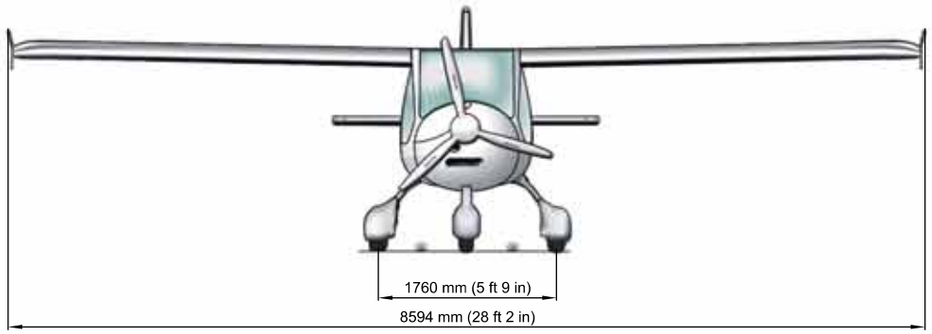
Classic 2

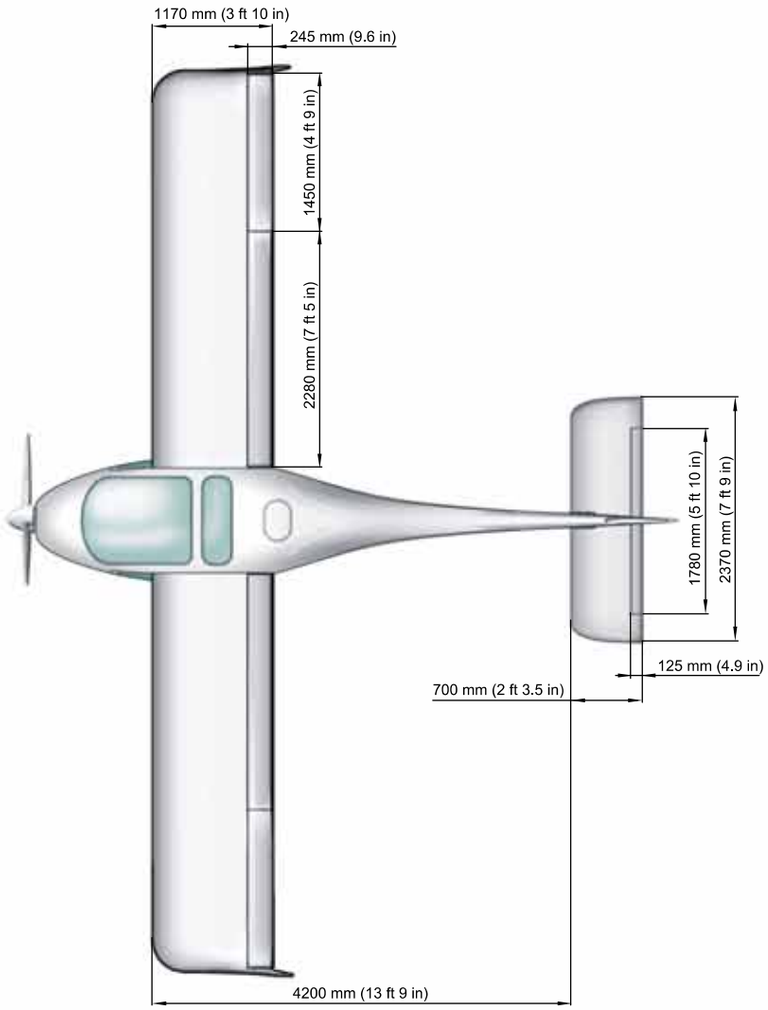
ORACAL 951 series		032	Light red
ORACAL 951 series		509	Sea blue
ORACAL 951 series		090	Silver grey

The colors reflected on the brochure are only approximations of the original colors.

Technical information







Geometry		
Max. length	6604 mm	21' 8"
Max. height	2342 mm	7' 8"
Wing span	8594 mm	28' 2"
Areas		
Wing	9.98 m^2	107.43 ft^2
Stabilator	1.60 m^2	17.20 ft^2
Vertical tail	1.41 m^2	15.16 ft^2
Aspect ratios		
Wing	7.29	
Stabilator	3.51	

Performance at MTOW

	472,5 kg | 1039.5 lbs		600 kg | 1320 lbs	
VH: maximum horizontal speed	240	km/h	240	km/h
VNE: maximum permissible airspeed (red line)	300*	km/h	300*	km/h
Take-off run (flap +15degree)	140	m	250	m
Take-off distance over 15 m obstacle	250	m	450	m
Max. range (30 min reserve)	2000	km	1800	km

*The never–exceed speed (VNE) demonstrated during flight testing is 300 km/h but is limited in the individual case by the ballistic recovery system installed or national regulations.

Weights and Dimensions

Typical empty weight (equipped with rescue system)	326 kg	717 lbs
Max. take-off weight	600 kg	1320 lbs
Fuel capacity	130 l	

Flight Design GmbH
Administration & Sales
Seestrasse 30
D-73230 Kirchheim u. Teck/Nabern
Tel.: +49(0)7021 / 80460-0
E-Mail: info@flightdesign.com
Web: www.flightdesign.com

Notes

Edition: March 2013