



## AIRCRAFT INFORMATION

# PANTHERA



## Introduction

This document is published for the purpose of providing general information about the Pipistrel Panthera.

Distributors/promoters and customers should familiarize themselves with this document to assist in their evaluation of this aircraft.

Should more information be required, please contact

Pipistrel d.o.o. Ajdovscina  
Goriska cesta 50a  
SI-5270 Ajdovscina  
Slovenia, EU.

[www.pipistrel.si](http://www.pipistrel.si)  
[www.pipistrel.eu](http://www.pipistrel.eu)  
[www.panthera-aircraft.com](http://www.panthera-aircraft.com)  
[www.pipistrel-usa.com](http://www.pipistrel-usa.com)

This document has been produced to provide general information about the Pipistrel Panthera Aircraft in April 2013. With the ongoing development of the aircraft Pipistrel reserves the right to revise this document whenever occasioned by product improvement, government/authority regulations or any other good cause.

### **Introduction**

The sky has opened-up like never before and borders are falling every day. The need of traveling long distance, quickly and efficiently has never been greater. Yet, who likes to be stuck at a big airport, going through long lines of security check to board the aeroplane to the point of call? Imagine a fast yet extremely economic aeroplane, which can take you and your friends, colleagues or business partners anywhere you want, whenever you want. Imagine an aeroplane, that can fully take advantage of small, short-runway airfields that you bring you closer to destination than ever and open a whole new world of opportunities. An aeroplane, designed meticulously to keep you safe, comfortable, is quiet and friendly to the environment.

An innovative aeroplane, which instantly catches attention.

Your quiet, high performance bubble of safety, your personal time machine. Panthera.

### **Project story**

Years ago, people said it is impossible to produce an aircraft light and streamlined enough to be safe and efficient. We did it. People said it is impossible to fly around the World in a small aeroplane without assistance. We did it. People also said it is impossible to produce an aircraft fast enough and efficient enough to be successful at the NASA Centennial Challenges. We went ahead and did what nobody did before – we won the NASA Challenges twice. Now they say it is impossible to make a practical electric-powered aircraft presently. We did it already back in 2007 with the first electric two-seater in the World. Clearly we see and do things differently and have a pioneering vision.

We do not imitate, we innovate!

Now, with a quarter of a century of experience, we are presenting a fast, safe, quiet and comfortable aeroplane, which can use runways shorter than ever before and go the full distance with four people aboard. An aeroplane, which is ready for the future and consumes 40% less fuel while going faster, further. This is our idea how a modern, four seats CS/FAR-23 certified aeroplane should be like. Panthera is making it a reality.

### **Innovation**

Panthera is designed by applying the most modern design and construction techniques, on top of 25 years of knowledge, experience and excellence in building aircraft.

Panthera's organic curves are a product of optimization through advanced, in-house developed computer tools, where each detail is designed to ensure minimum drag and maximum efficiency. This allowed for the Panthera to be designed and flown in a virtual environment with great degree of accuracy even before the first component was produced.

Using state of the art CAD tools, all the aircraft components were packaged into a minimum and therefore highly efficient shape, while keeping the passenger cabin spacious and comfortable. It is the first aircraft in its class to be designed to be comfortable for four passengers of any body type.

Realizing the complex shapes and structures of Panthera was possible only by using modern rapid prototyping/milling techniques. By directly translating the CAD models into complex shapes it is ensured that the predicted aerodynamic properties of the aircraft are realized, and that the structural integrity matches the results of the finite element predictions.

Attention to details is visible also when it comes to airframe components and equipment. The propeller and exhaust system, for example, are specially optimized to ensure minimum noise and maximum performance, reducing the aircraft's environmental footprint and increasing cabin comfort. Panthera also features all electric systems for component actuation. Its titanium trailing-link undercarriage, flaps and trim are all electrically operated, resulting in low weight and maximum reliability by removing the need for complex and heavy hydraulic systems. All internal and external lighting is realized using state-of-the-art LED technology, providing for better clarity, recognition and feel.

### **Performance**

Panthera achieves unprecedented efficiency through careful aerodynamic shaping, retractable titanium undercarriage, lightweight advanced composite structure, a tailor made propeller and a dedicated performance exhaust system. Efficiency does not only reflect itself in a low fuel consumption of just 10 gallons per hour at 200 kts, but is translated directly into more speed for the same power. No other four seat aircraft exists that flies this fast on the same engine! For the owner/operator this represents significantly lower operating costs and simplified maintenance.

The 1000 NM range is available with any payload, something which pilots of four seat aeroplanes have been wishing for. Robust design of the undercarriage and low overall weight allows for operations from short grass strips, taking you as close as possible to your desired destination. The engine is ready for the future, able to accept unleaded fuels and meeting the future environmental requirements. Hybrid and electric models further reduce the take-off noise footprint by taking advantage of the pure-electric take-off.

### **Configuration**

#### ***Panthera***

Powered by the modern, yet proven and reliable Lycoming IO-390 engine, Panthera is the statement of efficiency – cruising at 200 kts with a fuel consumption of only 10 gallons per hour instead of the »usual« 17 gallons of the competition. The powerful, yet lightweight engine can run also on unleaded fuel and is ready for the future! With its titanium trailing-link retractable undercarriage, Panthera is designed to take advantage of short, grass runways and maximize the comfort of operation on longer, hard surfaces. Payload and range is never compromised – with four people aboard, Panthera will easily reach destinations more than 1000 NM away!

#### ***Panthera Hybrid***

The 145 kW hybrid-electric powertrain, supported by the state-of-the-art battery system and range-extender generator unit, which is a special in-house development for the Panthera is a true revolution in aviation! The ability of noiseless, pure-electric take-offs and landings are coupled with uncompromised range characteristics. Short-field, powerful climb, extreme aero-efficiency and long-range, which are signature to Panthera are further enhanced with the revolutionary hybrid powertrain. Panthera Hybrid represents a quantum leap forward in thinking and will pave the way for the future of aviation!

#### ***Panthera Electro***

This version of Panthera with its pure-electric 145 kW powertrain is a treat for the high-tech enthusiasts and those to whom the environment matters. The goal is to demonstrate the ability of covering 400 km (215 NM), quietly, efficiently, with absolutely zero emissions and for a fraction of cost. The platform is open and ready to accept future generations of battery technologies, which will increase the operating range.

Electric flight is ready and Panthera Electro will hopefully shift the authorities to rightfully accept electric flight and enable clean, quiet and cheap flight.

### **Cabin comfort**

One of the major design points of Panthera is the state-of-the-art ergonomic cabin. All features provide superior comfort and usability for people of all sizes. Access is easy via three large gull-wing style doors, two in the front for pilot and copilot and one for the back row of seats. Pilot and copilot seats are adjustable, as are the rudder pedals. The central stick is ergonomic and provides the sporty feel signature to Panthera. Back seats are very wide and feature a 2+1 seating arrangement. There is a supersized – standard cabin luggage sized – cargo door, but the cargo can also be accessed from the cockpit during the flight! The interior is furnished with highest quality leather and LED lighting for exclusive feel and functionality. Climate is controlled thanks to the on-board air-condition with automatic ventilation. It will keep you cool during the summer and warm during the winter. Also special is the solar-powered ventilation which keeps the cabin cool when Panthera is parked outside in the sun!

### **Instruments**

The instrument panel is designed to embrace the pilot and provide ultimate sensation and outside visibility. The view from the cockpit is completely redefined by using a single pillar between the pilots – this way the visibility forward and sideways is free of obstacle, greatly increasing the safety of flight.

There are three functional areas on the full IFR panel, the upper back-up/annunciator area, the PFD/MFD area and the communication stack. The avionics are gathered around a Garmin G500 series PFD/MFD synthetic vision screen and the new state-of-the-art Garmin GTN series touch-screen Flight Management Systems. The ease of use and reliability of Garmin avionics is second to none, but the cockpit environment of the Panthera further enhances the experience. The GTN 750 and 635 dual COM/NAV feature full touch screen controls, which maximize screen size and allow for simplified navigation and graphical flight planning. Draw a path on the navigation screen with your finger and Panthera's full featured autopilot can follow it. It's magic! In addition, the fully integrated modular cockpit provides all terrain, traffic and weather alerts (in areas where applicable). Transponder and 3D audio-panel are integrated and courtesy of the Garmin GTN 750.

### **Materials and technology**

Each detail of Panthera's graceful lines has been thoroughly aerodynamically optimized using customized, state of the art computational fluid dynamics software, resulting in a smooth and clean shape. The specially designed wing airfoils are optimized for cruise efficiency and therefore speed, while at the same time ensuring high maximum lift and docile stall characteristics. Its instantly recognizable T-tail ensures low interference drag and helps improve spin characteristics by preventing the horizontal stabilizer from shadowing the rudder at high angles of attack.

Realizing Panthera's aerodynamic shape while still ensuring maximum safety and keeping the weight low would be impossible without the use of advanced next-gen materials. The majority of the structure of the aircraft is made from carbon-fibre composites, with antistatic materials and Kevlar used in areas where it matters. The retractable trailing-link undercarriage is built from titanium, giving it superior strength and energy absorption properties at minimum system weight. All actuation systems on the aircraft are fully electric, avoiding the need for complex and heavy hydraulics.

### **Safety**

Panthera is your personal high performance bubble of safety! As part of the rich serial equipment, Panthera features a full-airframe parachute rescue system, which was specially developed so it can be deployed and both low- and high speeds as well as low altitudes.

The cabin has been engineered as a safety cell/roll bar with built-in energy absorption zones, providing superior safety to the occupants in event of an accident. The seats and safety belts are engineered to latest +26G CS/FAR-23 certification standards. Immediately noticeable is the incredible view from the cockpit. By having just one central pillar, pilot's view forward and sideward is virtually unobstructed, thus greatly improving the safety of flight. The ergonomic cockpit comes with special annunciator panels, improving situational awareness when it comes to different aural and visual alarms (terrain, stall, overspeed, engine issues, etc.).

Panthera's performance also contributes to safety – the lightweight structure, powered by powerful engines mean that the you will reach safe speeds and altitudes much quicker than usual, reducing time spent in the »critical zones«. Special attention has been paid to realize the aerodynamic shape, which gives Panthera excellent handling at low speeds and superior stall/post-stall



## Pipistrel Panthera Information Pack

characteristics. Also important are tailored solutions to simplify maintenance, thus reducing the probability of mistakes occurring during the check-ups.

### Technical sheet

	Panthera	Panthera Hybrid	Panthera Electro
Category	Utility (+4.4 g)	Utility (+4.4 g)	Utility (+4.4 g)
Powerplant	Lycoming IO-390	Hybrid 145 kW	Pure electric 145 kW
Rated power	210 HP	195 HP (equivalent)	195 HP (equivalent)
Proportions			
MTOM	1200 kg / 2640 lbs	1200 kg / 2640 lbs	1200 kg / 2640 lbs
Useful payload	520 kg / 1145 lbs	270 kg / 595 lbs	200 kg / 440 lbs
Full fuel payload	345 kg / 760 lbs	n/a	n/a
Wing span	10.86 m / 35 ft 8 in	10.86 m / 35 ft 8 in	10.86 m / 35 ft 8 in
Length	8.07 m / 26 ft 6 in	8.07 m / 26 ft 6 in	8.07 m / 26 ft 6 in
Height	1.90 m / 6 ft 3 in	1.90 m / 6 ft 3 in	1.90 m / 6 ft 3 in
Wing area	10.9 m <sup>2</sup> / 117 sqft	10.9 m <sup>2</sup> / 117 sqft	10.9 m <sup>2</sup> / 117 sqft
Performance (MTOM)			
Stall speed (flaps extended)	109 km/h / 59 kts	109 km/h / 59 kts	109 km/h / 59 kts
stall speed (flaps retracted)	118 km/h / 64 kts	118 km/h / 64 kts	118 km/h / 64 kts
maneuvering velocity Va	248 km/h / 134 kts	248 km/h / 134 kts	248 km/h / 134 kts
Turbulence penetration Vb	324 km/h / 175 kts	324 km/h / 175 kts	324 km/h / 175 kts
VNE	407 km/h / 220 kts	407 km/h / 220 kts	407 km/h / 220 kts
Typical cruise speed (TAS)	374 km/h / 202 kts	263 km/h / 142 kts	218 km/h / 118 kts
Climb rate at MTOW	6.1 m/s / 1200 fpm	5.7 m/s / 1140 fpm	5.7 m/s / 1140 fpm
Takeoff run	365 m / 1200 ft	385 m / 1265 ft	385 m / 1265 ft
Takeoff distance (50 ft obstacle)	670 m / 2200 ft	700 m / 2300 ft	700 m / 2300 ft
Landing distance (50 ft obstacle)	570 m / 1900 ft	570 m / 1900 ft	570 m / 1900 ft
Range at cruise speed, 4 people aboard (incl. 45 min reserve)	>1900 km >1025 NM	1220 km 660 NM	400 km 215 NM
Service ceiling	6,100 m / FL 200	4000 m / FL 130	4000 m / FL 130





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Pipistrel reserves the right to revise the above data whenever occasioned by product improvement, government/authority regulations or other good cause.

All speeds are quoted as IAS unless noted otherwise.

Take-off and landing data valid for ISA sea level conditions.

Typical fuel flow for Lycoming IO-390 in cruise is 37 liters per hour / 10 USgallons per hour.

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