

Hydroplum to Super Petrel

HOWARD LEVY EXAMINES A NEW BRAZILIAN AMPHIBIAN.



The petrel is a seabird, but our story is about sea-going aeroplanes. In this case, the Petrel is a small two-place amphibian which has its roots in a single-seat ultralight called Hydroplum, which first flew in 1983. Built mainly of plywood, it was powered by a 40hp Hirth engine. Claude Tisserand of Corsica, the designer and builder, followed it up with a larger and more advanced, side-by-side, two-seater called Hydroplum II, powered by a 64hp Rotax 532. Tisserand sold plans for both aeroplanes, but the Société Morbihannaise d'Aéro Navigation (SMAN) of La Trinité-sur-Mer, Brittany, France, acquired the rights to the two-seat aircraft. This was given the name 'Le Petrel' and SMAN began turning out kits. The hull was fabricated in Kevlar reinforced epoxied fibreglass and the tail boom in epoxied fibreglass. The hull design was claimed to withstand

sea states of waves up to 0.6m. The wings use a NACA 2412 aerofoil, have tubular aluminium spars, a plywood wrap-around leading edge, and 24 main ribs in each wing. Tisserand had referred to the aeroplane as a 'sesqui-wing' but the span of the lower wing made it more of a biplane. The wings were covered with heat-shrunk Dacron,

"I BELIEVE THE 912S IS THE BEST ENGINE FOR THIS AIRCRAFT."

as were the wooden tail components. The nosewheel was fully castoring and retracted via a pull cord, while a crank raised the main undercarriage.

From the outset, a great deal of thought went into the idea of an aircraft that could be easily de-rigged and taken home on a trailer. According to Tisserand, it incorporated numerous assembly devices which made use of

ABOVE & BELOW The aircraft is available either completed or as a kit.

attach pins in place of nuts and bolts. Assembly/disassembly took 30 minutes and allowed the components to fit on a 4.58 x 1.83 x 2.06-metre trailer.

Seabird Aviation at Gahanna, Ohio, became a distributor for SMAN in 1990 after Seabird company president William McDermitt constructed the 14th kit Petrel at the SMAN factory. He had also planned to produce kits of the aircraft. However, there was a problem with the demonstrator after it was left in the water overnight secured by a rope around its tail boom. Water seeped into the hull in the undercarriage area and the aircraft sank up to its engine. The following morning it was pulled from the water by a tractor via the tail boom securing line. However, this may well have caused damage to the tail boom, which was not noticed. The tail boom later failed in flight and the aeroplane crashed.

In late 1989, Andre de Reynier and his Edra Helicentro organisation at Ipeuna, São Paulo, Brazil, acquired the South American distribution and manufacturing rights. He obtained plans and proceeded to build Petrels for customers. In 1991-1992 he switched from the original 64hp Rotax 532 engine to an 80hp Rotax 912. He also enclosed the cockpit and swept the wings. That version was produced until 1996, and when SMAN shut down operations, de Reynier acquired all rights to the Petrel design. At that time, his son Rodrigo, then 25, was studying for a degree in engineering at the Aeronautical University at São Paulo. He and his fellow students began to look at improving the Petrel's design, which resulted in the amphibian having the lower wing's span increased to equal the top wing, and all tips being squared. The upper wing leading edge was made more rigid, ailerons on the upper wing were slotted, and hinge points moved for smoother operation. The lower wing received a carbon spar, and fibreglass replaced the original plywood. Tip floats on the lower wing were moved inboard by 1.65m and attached to the spar. The hull width was also increased by 20cm to provide more flotation to accommodate larger passengers and heavier engines. Finally, the fuselage





The engine is the 100hp Rotax 912S fitted with a ground-adjustable three-blade Arplast Ecoprop.



The tailplane and rudder are wire-braced.

The comfortable cockpit is quite spacious.



was lengthened by 30cm for increased legroom, and to improve the CG as the fuel tank was moved from behind the seats to the upper wing leading edge. An optional 91-litre tank in the lower wing doubles the capacity. Customers also had a choice of tank material. As Mogas has 25% alcohol, it necessitated a polyurethane tank. If customers were planning to use Avgas, their aircraft required a fibreglass tank. Tanks could also be retrofitted.

Edra built three prototypes to US standards: No.1 had Petrel wings on the new fuselage; No.2 had a Subaru engine, and No.3 was production-configured with a 100hp Rotax 912S. "I believe the 912S is the best engine for this aircraft," de Reynier told me when I photographed the amphibian in 1999. This redesigned aeroplane

also became known as the Paturi, and by 1999 Edra had produced over 135, of which 65 were kits and 70 were completed aircraft. Customers came not only from all over Brazil and other South American countries, but also from Norway, South Africa, and Hawaii. In 1999, the production rate was five kits and one completed aircraft per month.

The kitted fuselage was originally moulded in three parts - two sides and the bottom - but Edra changed it to two sections, with the two sides already epoxied in place, plus the hull. However, the Paturi soon began to be delivered with the fuselage as a single component.

Production of the Paturi ended in 2003 and all efforts were directed into redesigning the Petrel to become a

Super Petrel. "The first Super Petrel was released in 2002, powered by an 80hp Rotax 912, but the 100hp Rotax 912S was also available. It has straight wings, and again a shortened lower wing," said Rodrigo de Reynier. "We have taken the best features of the Petrel and the Paturi and mixed them together, but also added some new features. The SP wings have 'wash out' at the tips and are fitted with new aerodynamic winglets, while the

SUPER PETREL

DIMENSIONS

LENGTH	5.97m	19ft 6in
HEIGHT	2.26m	7ft 5in
WING SPAN	8.9m	29ft 2in
WING AREA	15m ²	161.5 sq ft

WEIGHTS AND LOADINGS

EMPTY WEIGHT	315kg	694lb
MAX AUW	545kg	1,201lb
USEFUL LOAD	230kg	507lb
WING LOADING	36.3kg/m ²	7.43lb/sq ft
POWER LOADING	7.3kg/kW	12.01lb/hp
FUEL CAPACITY	80 litres	17.6 Imp gal

PERFORMANCE

VNE	97kts	180km/h
CRUISE	89kts	165km/h
STALL	30kts	56km/h
CLIMB RATE	1,000ft/min	5m/sec
SERVICE CEILING	10,000ft	3,050m

ENGINE

Rotax 912S liquid-cooled flat-four, producing 100hp (74.57kW) at 5,800rpm

PROPELLER

Arplast Ecoprop three-blade ground-adjustable

MANUFACTURER

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'Le Petrel' was powered by a 64hp Rotax 532. Note the open cockpit



RIGHT Edra produced over 135 Paturis, before production ended in 2003.

LEFT The main undercarriage legs are a sandwich of PVC foam and fibreglass. Suspension is provided by oleo-pneumatic shock absorption units.



LEFT The nose wheel is carried by a leg made of 4130 chromoly steel, while the fork is 6061-T6 aluminium. Springs absorb the landing loads.

stabilizer and wings have received new angles of incidence. The engine was also lowered by 12cm and inverted, resulting in a new engine thrust line. These changes have resulted in an aeroplane which is almost stall-proof, and whose glide ratio has risen from 7:1 to 10:1. It has also received new brakes and wheels, has a more luxurious interior, and is slightly smaller and lighter, with even better flight and water performance.

Almost 200 Super Petrels were produced and delivered to customers in Portugal, Norway, New Zealand, Congo, South Korea, Italy, Canada, and the United States between 1990 and October 2006, in both kit and ready-to-fly form. There is now a further modified Super Petrel for sale in 2007. This has a redesigned hull with 'cheeks' that increase hull volume by 0.5m², a modification which is claimed to provide lift and allow the aeroplane to skim the water much faster, resulting in a take-off in a maximum of 15 seconds with two aboard. It also has new half-span 26-litre leading edge wing tanks, plus a 15-litre header tank - or alternately two 40-litre internal wing tanks. Our subject, the first 2007 model, has polyethylene leading edge tanks. The empty weight of the new SP has decreased from 345kg to 315kg, by employing a new moulding process called resin transfer moulding, and lighter carbon fibre and aramid materials. Some parts which were



previously stainless steel are now made in aluminium or composites, and the new interior uses lighter materials and instruments.

The first 2007 Super Petrel is PU-LBA, and which is owned by Luciano Barichello, a former Paturi owner. PU-EMG is the second model built, being the company demonstrator and the 170th Petrel series airplane. A basic

ALMOST 200 SUPER PETRELS WERE PRODUCED.

ready-to-fly Super Petrel, powered by the 100hp Rotax 912S with a ground-adjustable three blade Arplast Ecoprop, sells for \$68,000, and includes a deluxe interior with basic instruments, VHF avionics, transponder, intercom and headsets. A kit is priced at \$26,980 and includes all the Brazilian-made parts, though not the engine, accessories, propeller, covering,

finishing, electrical system or avionics. At the close of the 2006 Aero Expo at São Paulo, Edra had orders for three kits and four ready-to-fly new model Super Petrels for customers in Canada, United States, Poland, New Zealand, Congo, and Lithuania. Since Edra began building the Petrel series, sales have been split 50/50 between kits and ready-to-fly aircraft. Edra's next project is to develop the Petrel to meet LSA standards.

Amphibian Airplanes of Canada, based at Squamish, British Columbia, has been marketing Edra Petrels as Seastars in Canada and the northern United States, and the Stone Engineering Company, a new organisation from Huntsville, Alabama, will handle sales in the southern USA. Three or four Super Petrels are expected to be flying in the US next year, built from kits shipped from Brazil two or three years ago.

BELOW The hull design is claimed to withstand sea states of waves up to 0.6 metres.

