

PC-21

TWENTY-FIRST CENTURY TRAINING



PILATUS

A NEW TRAINING SYSTEM

Over the last half-century, front-line aircraft have evolved in a slow, evolutionary sense in outright aerodynamic performance. However, in terms of integrated mission systems, designers have embraced the massive performance growth of digital computing.

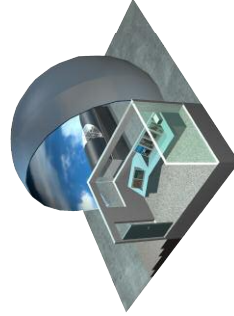
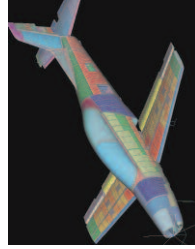
Military trainers must keep pace with technological advancement and changes in emphasis from pure piloting to mission management skills. This must be done cost effectively. Key drivers for success in the new market place are low acquisition and life-cycle costs but these must be supported by innovative approaches to risk transfer and a portfolio of structured finance options.

Cost-effectiveness is the essence of the **PC-21**

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Pilatus Aircraft's newest turboprop product, the PC-21, has been developed and certified as a completely new training system with the objective of meeting the expectations of modern air forces over the next 30 years, both in terms of capability and life-cycle cost. To enable this, the PC-21 fulfils the following core objectives:

- A superior aerodynamic performance when compared with any other turboprop trainer on the market:
 - moving into what was exclusively jet territory
- A more powerful, flexible and cost-effective integrated training system than any other jet or turboprop trainer:
 - extending the training envelope from Basic Training through to Advanced and Fighter Lead-In Training
 - Incorporating avionics capable of emulating specific front-line mission systems with easy upgradability
- A life-cycle support cost not exceeding current turboprop benchmarks:
 - using the latest development and production technology as well as integrating modern maintainability concepts to control cost and quality



THE PC-21 TRAINING CONCEPT

The PC-21 is equipped to take a larger proportion of the flying training syllabus by enabling students to learn not only handling skills but also complex mission management tasks. With sophisticated avionics capable of emulating front-line mission systems, it provides the ideal environment to develop capacity and skills by loading the student with complex systems operation and realistic tactical scenarios.

By providing a broad employment envelope, the PC-21 integrated training system can:

- eliminate and replace other aircraft types from the training fleet
- substitute expensive jet hours with the significant operating savings of an advanced turboprop
- channel students earlier by focussing on relevant core skill development
- reduce the number of transitions in the training system
- focus on front-line skills thereby increasing the quality of graduates
- provide maximum flight safety during realistic training scenarios

PILOT'S PERSPECTIVE

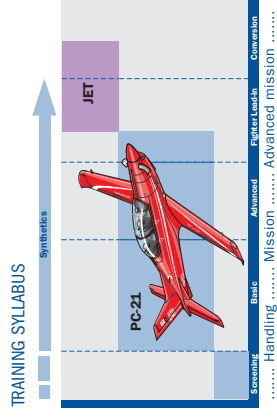
At the end of 2004, the PC-21 was certified in accordance with the US Federal Aviation Regulations (FAR), Part 23. FAR 23 has been supplemented by more relevant regulations such as US DOD MIL-STD and UK MOD DEF-STD regulations for specific areas like handling qualities, fatigue (damage tolerance) and birdstrike.

Extensive PC-21 customer flight evaluation since 2002 has provided much feedback on its fitness for purpose as a training platform. Comments include the following:

- "... the PC-21 has been developed as a trainer, it is not an off-the-shelf aircraft with an off-the-shelf avionics upgrade"
- "...with the high wing loading the bad weather ride is excellent"
- "...the roll rate and lateral control system/forces are excellent"
- "... the cockpit ergonomics are superb"
- "... visibility from both front and rear seat is excellent"
- "... the aircraft has proven its capability for tactical and basic fighter manoeuvre (BFM) training"
- "... the aircraft is performing better than any other turboprop trainer in the world"
- "... largest anthropometrical range in its class"

The PC-21 training system is ideal for:

- Basic training
- Tactical navigation training and planning
- Mission system management
- Simulated air-to-ground and air-to-air engagement
- Simulated electronic warfare training
- NVG training
- Embedded simulation and emulation



A MODERN COCKPIT FOR MAXIMUM TRAINING VALUE

Systems integration is at the core of the PC-21 cockpit design philosophy with a specification that includes:

- Three NVG-compatible 6 x 8 inch active-matrix liquid crystal main displays (AMLCD) comprising:
 - the primary flight display (PFD)
 - two multi-function displays (MFD), complemented by
 - a secondary flight AMLCD and an engine monitoring AMLCD in each cockpit
- Head-up display (HUD) with up-front control panel (UFCP) in the front cockpit and a HUD repeater and UFCP in the rear cockpit
- Flight management system (FMS) in each cockpit
- Autopilot
- Mission data recorder (MDR)

Inputs to the mission system are made via the MFD soft keys, UFCP and hands-on throttle and stick (HOTAS).



EMBEDDED SIMULATION AND TRAINING

The PC-21 cockpit not only provides the student with the appropriate tools to learn and develop relevant skills but also the perfect airborne 'classroom' for the instructor. The Embedded Simulation and Training suite provides:

- Cross-platform cockpit emulation
- Weapons simulation
- Stores management system
- Simulated radar and electronic warfare (EW)
- Datalink

The cockpit avionics can be 'split' so that the instructor can manipulate the student's display data. This allows the following capabilities:

- Simulated non-flight safety critical system failures
- Data degradation
- Synthetic air-to-air radar target generation
- Synthetic EW generation
- Datalink management
- Tactical situational display



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PERFORMANCE

The PC-21, in the aerobatic configuration¹, has the following performance under international standard atmospheric (ISA) conditions:

Take-off distance to clear 50 ft (15 m) obstacle at sea level	725 m	(2,380 ft)
Landing distance to clear 50 ft (15 m) obstacle at sea level	900 m	(2,953 ft)
Rate of climb at sea level	4,250 ft/min	
Time to climb to 10,000 ft	2 min 35 sec	
Maximum operating speed (V _{mo})	370 KEAS	(685 km/h)
Maximum horizontal speed at sea level	323 KTAS	(598 km/h)
Maximum horizontal speed at 10,000 ft	337 KTAS	(624 km/h)
Stall speed		
- flaps and gear up (V _S)	92 KEAS	(170 km/h)
- flaps and gear down (V _{SO})	81 KEAS	(150 km/h)
g loads (0 flap)	Aerobatic	Utility
- Maximum positive	+ 8.0 g	+ 5.0 g
- Maximum negative	- 4.0 g	- 2.5 g
Sustained g at sea level ²	3.7 g	

¹ Typical weight of 2,950 kg (6,504 lb). ² Mid fuel weight of 2,700 kg (5,952 lb)

WEIGHTS

Basic empty weight (depending on configuration)	2,280 kg	(5,026 lb)
Maximum take-off weight, aerobatic	3,100 kg	(6,834 lb)
Maximum take-off weight, utility	4,250 kg	(9,370 lb)

FEATURES AND 3-VIEW

Scimitar five-blade graphite propeller

Pressurized, stepped, tandem cockpit with birdstrike resistant canopy

O-O ejection seats

Anti-g system

On-board oxygen generating system (OBOGS)

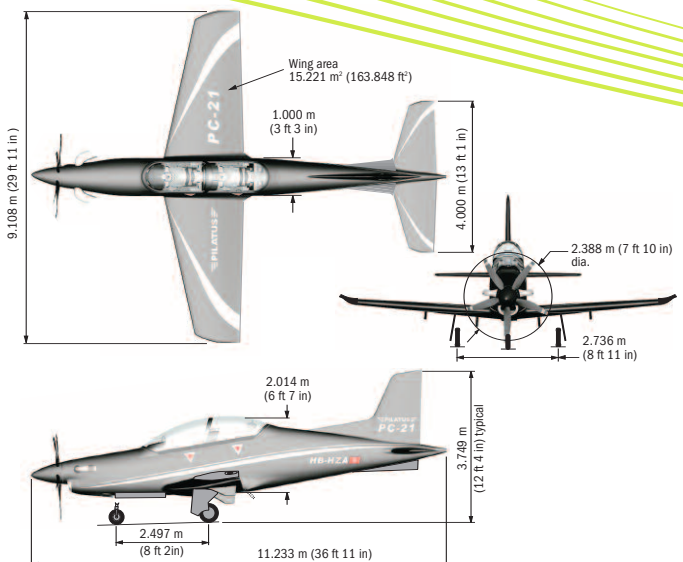
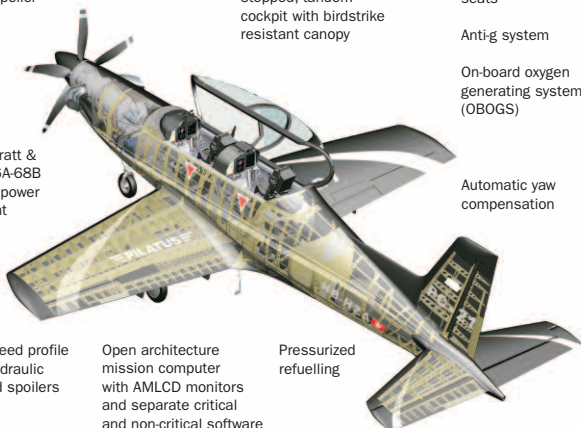
Automatic yaw compensation

1600 shp Pratt & Whitney PT6A-68B engine with power management software

8 g, high speed profile wing with hydraulic ailerons and spoilers

Open architecture mission computer with AMLCD monitors and separate critical and non-critical software

Pressurized refuelling



PILATUS AS PARTNER

Pilatus Aircraft Ltd was founded in 1939 in Stans, Switzerland and exports business aircraft and military training aircraft worldwide. An integrated logistics support organisation currently serves 31 military customers providing tailored support over the full life cycle of the products.

For the PC-21, considerable effort has been made to address aircraft availability. This has been achieved by providing a logistics support organisation based on technological efficiency and cultivating partnerships with customers and suppliers.

Reliability and maintainability is a key area where the PC-21's new design has significant advantages. The latest maintainability concepts are incorporated in the new platform with high quality components and improved accessibility.

Up-to-date technology is used to provide accurate and interactive logistic support data in real time to customer and suppliers. This enables Pilatus to provide optimised technical and material support for your product throughout its life cycle - all contributing to reduced turn-round times and **very low** maintenance man-hours per flight hour.

