

# Pilatus PC-21, Switzerland

## A top-notch, tailored cockpit visualization system

### Customer

**Name:** Pilatus Aircraft Ltd.  
**Location:** Stans, Switzerland  
**Revenue:** approx. 342 million €  
**Employees:** 1399  
**Website:** www.pilatus-aircraft.com

### Challenges and opportunities

- meet enhanced training needs of modern air forces over the next 30 years
- flexible solution that allows customization
- minimize through-life cost

### Barco solution & services

- 4 Cockpit Head Down Displays (CHDD-6.8/1)
- 2 Multi-Function Displays (MFD 6.8/1)

### Why Barco

- high-quality products and services
- open and modular architecture plus flexibility in the development process
- cost competitiveness



customer experience

**”** *The displays have the high-quality look and feel to echo the superior brand image of the PC-21, at a good through-life cost.*

*Bruno Cervia, Head of Engineering New Projects*

With its PC-21, Switzerland-based aircraft manufacturer Pilatus wanted to build a trainer that would meet the challenges of training top pilots for the 21st century. A full-featured visualization solution for the glass cockpit was one of the key elements. Barco's proposal responded fluidly to Pilatus' needs.

The PC-21 tandem cockpit is fitted with six Barco displays, used as primary flight and navigation displays. Bruno Cervia, Head of Engineering New Projects: "Barco is synonymous with high quality, both in its products and in its services." Test Pilot Bill Tyndall is especially impressed by the high readability and reliability of the Barco displays. Both men praise Barco's responsiveness and their flexibility throughout the development process and call their cooperation a true partnership.

From 2008 onwards, the Singapore as well as the Swiss Air Forces will be flying high with Barco. And there's more Barco on the agenda: the avionics system for the next-generation PC-12, designed by Honeywell, will be fitted with Barco displays.

**BARCO**

Visibly yours

# Barco helps propel Pilatus aircraft into the 21st century

The maiden flight of the Pilatus PC-21 prototype on 1 July 2002 was a hallmark in the history of Pilatus Aircraft Ltd. Promoted as the fastest turboprop trainer ever built, the PC-21 is an entirely new aircraft design, developed from the ground up. Its ambitious goal: to meet the enhanced training needs of modern air forces over the next 30 years. One of the showpiece items of the advanced trainer is its all-glass cockpit featuring a cutting-edge visualization system, named Barco.



## Advanced cockpit visualization

Ever since the company was founded in 1939, the Pilatus trademark has stood for Swiss quality and innovation. The all-new trainer aircraft the company started to develop in 1999 would – it was claimed – be a credit to the Pilatus brand. The new turboprop had to display a superior aerodynamic performance, moving into territory which, up till then, had always been the preserve of jet aircraft. Designed to optimize training efficiency, the plane had to integrate a powerful and flexible training system that would allow both basic, advanced and fighter lead-in training – a first for turboprop training aircraft. A third requisite was cost-related: the life-cycle support cost could not exceed existing turboprop benchmarks.

Quite early in the development stage, Pilatus outlined the requirements for the new plane's cockpit visualization system. The choice for LCD screens was obvious. "We're moving into an era in the training world where we have to meet the requirements of operational fighter pilots, who have a complex task in system and information management. To prepare people for operational aircraft we had to replace the old, mechanical displays by electronic ones that are easy to change and manage," said Bill Tyndall, Pilatus' Test Pilot who first took the PC-21 into the air. A chance meeting with a Barco representative, back in 1999, soon led to a first brainstorming session between Pilatus and Barco in Stans. With many more to follow...

## Great flexibility required

Pilatus' wish list for the cockpit display system was a long one: easy integration, a high resolution, full night vision goggle compatibility, low mass and a low through-life cost. On top of that, the displays had to be flexible, thereby allowing Pilatus to meet customer-specific requirements. "Every air force has its own particular requirements and the PC-21 displays had to be customizable to cater to these needs," Bruno Cervia, Head of Engineering New Projects at Pilatus, explained. "If our customer wants a PC-21 that integrates specific mission software or an autopilot function, the display should be adapted to provide for this." Barco, though quite new in customizing off-the-shelf displays to military specifications, fully succeeded in responding to these complex requirements. Its interesting proposal and promises of flexibility made it easy for Pilatus to cut the knot: Pilatus would partner with Barco to develop the PC-21's cockpit visualization system.





## Maximum optical performance

Bill Tyndall has been flying the PC-21 throughout the testing phase, from 2002 to 2005, and is still conducting rigorous tests. To him, it's the technical pluses – especially the optical performance – that sets Barco apart from its competitors. "The displays are very bright, even with incident sunlight, which is a must in an all-glass cockpit. I did this test once: if I put my hand in front of the display I can't even see a shadow. On top of that, the screens are easy to work with and I can rely on them at all times. It's simply the finest set of displays I have ever seen. The best proof of all? Test pilots are very, very critical, and yet, we never complain about Barco," Tyndall laughed.

## Unique setup with 6 Barco displays

The resulting setup is unique. In order to have a high level of flexibility, Pilatus segregated the safety-critical from the operational environment. A stepped tandem cockpit where both student and instructor have their own displays ensures the best of training environments. Front and rear cockpits can be fully uncoupled, so that the instructor can access the training modes and sensor data unavailable to the trainee pilot.

Each cockpit features three 6-by-8 inch Barco active-matrix LCD screens, integrating Barco's dedicated software. The primary flight display in the middle visualizes vital information, such as flying speed, altitude, attitude, turn and slip and navigation information. The multi-function displays provide a wide variety of page formats, including master systems pages, engine instrumentation and crew alerting functions, checklists, moving map, simulated stores management, tactical display, etc.

## Top-quality manufacturer

Barco helped with the complete system integration, tailored to Pilatus' requirements, and the process was a smooth one. Barco's flexibility, their responsiveness and short development times and the exceptional degree of support exceeded Pilatus' expectations. Bruno Cervia recalled: "An example of Barco's exceptional service delivery is the implementation of a recovery program to help complete full licensing of the product, something that was not foreseen. If we need a piece of software to demonstrate certain functional features of the display system, Barco is ready to help and develop it, even before the plane is sold."

"Of an equally high quality is the solution itself. The displays have the look and feel to echo the superior brand image of the PC-21. And we've experienced no problems at all with the display system since its installation, which proves its reliability," he continued.



## Interaction and communication

And then there's the human aspect. Cervia: "Our relationship with Barco is a true partnership. We openly discuss technical issues and together look for possible solutions out-of-the-box." Tyndall agrees: "There's excellent communication and interaction. As Barco considers us an aircraft expert, their engineers are genuinely interested in our remarks, experiences and pick our brains for new market developments to integrate into their new avionics displays."

Pilatus' satisfaction with Barco's expertise has been proven again, recently. The avionics system for the next-generation PC-12, designed by Honeywell, will be fitted with Barco displays.

## The experts



### **Bruno Cervia**

*Holding a master degree in aeronautical engineering, Bruno Cervia joined Pilatus 21 years ago, when he was involved in the aerodynamic design of the PC-12 general aviation aircraft. As the "Head of Engineering - New Projects", he started the development of the new PC-21. After having developed and certificated the PC-21, he is now deeply involved in the final customization activities and handover to the launch customers.*



### **Bill Tyndall**

*Bill Tyndall joined the Royal Air Force in 1959 as a radio apprentice and started pilot training in 1962. He joined Pilatus in 1983 as an instructor, production test and demonstration pilot, after 16 years as a fighter pilot and flying instructor. Since 2000, Bill Tyndall has been a project and development pilot for the PC-21. He has a total of 9600 flying hours, has been a Pilatus Test Pilot since 1990 and a PC-21 Project Test Pilot from its inception.*

## Pilatus

Established in 1939, Pilatus Aircraft Ltd. is currently world market leader in the manufacture and sale of single-engine turboprop aircraft. It is the only Swiss company that develops and produces private and training aircraft. At its headquarters in Stans, Switzerland, Pilatus is licensed to maintain and perform upgrades on a variety of aircraft. This service is complemented by three independent subsidiaries in Altenrhein (Switzerland), in Broomfield (Colorado, USA) and Adelaide (Australia). With over 1100 employees at its headquarters, Pilatus is one of the largest employers in central Switzerland and is active in the promotion of almost 100 apprentices in seven different vocations.



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