THE POTENTIAL PILOTS ARE THERE. CAN YOU TRAIN THEM COST-EFFECTIVELY?

Pilatus Aircraft Ltd was founded in 1939 and 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. Pilatus, which is headquartered in Stans, Switzerland, 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 a workforce of over 1100 at its head office, Pilatus is one of the biggest employers in Central Switzerland. Pilatus additionally provides training for almost 100 apprentices in nine different professions – job training for young people has always been a very high priority at Pilatus.
GROUND-BASED TRAINING SYSTEMS

A comprehensive set of training products is available covering all aspects of ground-based training. From the simplest type of training aid, such as an aircraft silhouette through to a full flight simulator, all Pilatus training equipment is of the highest quality and is designed to support an integrated and progressive learning process.

Curriculum planners and instructors have a wide range of equipment to choose from when preparing courses or planning schedules and can easily accommodate the varying rates of student learning.

Pilot Training Documentation designed to support the customer’s syllabus, includes management documents, aircraft manuals, student and instructor training manuals and a comprehensive set of flying training documents.

Synthetic Training Aids complement the ground-based training systems and support classroom training. Items include various two- and three-dimensional aircraft models, sectioned assemblies and interactive systems models and plastic cockpits.

Computer-Based Training supports conventional classroom training and in some areas can replace instructor-led training. Over 200 hours of courseware is available. The courseware includes aircraft type-specific and ab initio training, computer animated aircraft systems and equipment operation.

Synthetic Training Devices are designed to support effective and safe aircraft operation. Various procedure trainers complement pilot and technician training allowing students to practice normal and emergency procedures with no risk and at minimal cost. Equipment ranges from training aircraft assemblies, part-task trainers and various levels of cockpit procedure trainers through to full flight simulators with visual and motion cueing systems.

Personnel Training can include initial, continuation and refresher courses; all designed to train flying and ground crew to safely operate and maintain the aircraft. Depot-level training courses are also available for aircraft structure, assemblies, systems and survival equipment, and conversion training courses are available for pilots, logisticians/officers and technicians.

THE PILATUS PC-21 IS A COMPLETELY NEW TRAINING SYSTEM DEVELOPED TO MEET THE REQUIREMENTS AND EXPECTATIONS OF MODERN AIR FORCES FOR THE NEXT 30 YEARS; BOTH IN CAPABILITY AND LIFE-CYCLE COST.

THE PC-21 HAS BETTER AERODYNAMIC PERFORMANCE THAN ANY OTHER TURBOPROP TRAINER ON THE MARKET. IT IS ALSO SUPPORTED BY A MORE POWERFUL, FLEXIBLE AND INTEGRATED TRAINING SYSTEM THAN ANY OTHER JET OR TURBOPROP TRAINER BUT STILL HAS LIFE-CYCLE SUPPORT COSTS EQUAL TO CURRENT TURBOPROP BENCHMARKS.
PERFORMANCE

THE PC-21 IS AS BENIGN AND EASY TO FLY FOR THE AB INITIO STUDENT AS IT IS CHALLENGING AND SATISFYING FOR THE ADVANCED PILOT PREPARING FOR THE FRONT LINE.

EQUIPPED WITH A PRESSURISED COCKPIT, AIR-CONDITIONING, AN ANTI-G SYSTEM AND ON-BOARD OXYGEN GENERATION, THE PC-21 PROVIDES A COMFORTABLE MODERN TRAINING ENVIRONMENT.

THE 1600 SHP PRATT & WHITNEY PT6A-68B ENGINE AND FIVE-BLADE GRAPHITE PROPELLER PUSH THE SPEED AND CLIMB RATE OF THE PC-21 INTO AN AREA THAT WAS, UNTIL NOW, EXCLUSIVELY JET TERRITORY.

A DIGITAL POWER MANAGEMENT SYSTEM AND AUTOMATIC YAW COMPENSATION MAKE THE PC-21 EASY TO FLY IN THE CIRCUIT, WHILE STILL PROVIDING THE PERFORMANCE REQUIRED FOR Advanced TRAINING.

THE CAPABILITIES OF THE PC-21 MAKE IT IDEALLY SUITED TO A VERY WIDE TRAINING ENVELOPE. IT CAN BE USED FROM DAY ONE IN THE TRAINING SYSTEM ELIMINATING THE NEED FOR AN ELEMENTARY FLYING TRAINING FLEET BUT ALSO BRIDGES THE PERFORMANCE GAP BETWEEN TRADITIONAL TURBOPROP TRAINERS AND EXPENSIVE LEAD-IN FIGHTERS. THE PC-21 THEREFORE PROVIDES SIGNIFICANT ADVANTAGES OVER TRADITIONAL TURBOPROPS AND JET TRAINERS.

THE PC-21 IS CAPABLE OF SUSTAINED LOW-LEVEL SPEEDS IN EXCESS OF 320 KTS; HYDRAULICALLY-ASSISTED AILERONS AND ROLL SPOILERS CAN PRODUCE FIGHTER-LIKE RATES OF ROLL IN EXCESS OF 200° PER SECOND. IT IS THEREFORE POSSIBLE TO DOWNLOAD MORE TRAINING FROM FIGHTER LEAD-IN TRAINERS TO THE PC-21 THAN TO ANY OTHER TURBOPROP TRAINER IN THE WORLD.
THE PC-21 IS THE ONLY TRAINING AIRCRAFT IN ITS CLASS ACTUALLY DESIGNED IN THE 21ST CENTURY. THE TECHNOLOGY USED IN THE PC-21 IS OPTIMISED TO PROVIDE THE MOST FLEXIBLE TRAINING SYSTEM IN THE WORLD. THE COMBINATION OF A MODERN, INHERENTLY EFFICIENT AIRCRAFT, WITH AN AVIONICS SYSTEM THAT CAN ADDRESS CURRENT AND FUTURE TRAINING DEMANDS ENABLES AN AIR FORCE TO RESPOND TO EVER CHANGING FRONT-LINE REQUIREMENTS DESPITE INCREASING PRESSURE ON TRAINING BUDGETS.

THE PC-21 AVIONICS SYSTEM IS A PILATUS DESIGN AND THERE IS NO RELIANCE ON THIRD-PARTY INTEGRATORS OR EXPOSURE TO STATE CONTROLS. PILATUS HAS USED MODERN AVIONICS STANDARDS AND AN OPEN-SYSTEM ARCHITECTURE TO ALLOW TRAINING SYSTEM DESIGNERS MUCH GREATER SCOPE FOR INNOVATION, ADAPTATION AND CHANGE. UPGRADERS ARE NOT RELIANT ON THIRD-PARTY LICENSES AND ARE COST EFFECTIVE OVER THE PRODUCT LIFE CYCLE.

THE REVOLUTIONARY, FULLY-DIGITAL GLASS COCKPIT ENVIRONMENT OF THE PC-21 IS CAPABLE OF EMULATING FRONT-LINE TYPES. THIS FLEXIBILITY HELPS TO SHORTEN THE TRAINING PROCESS AND INCREASES THE OVERALL SUCCESS RATE.
THE PC-21 HAS BEEN DESIGNED FROM THE OUTSET TO HAVE A PREDICTABLE COST PROFILE OVER ITS LIFE CYCLE. MODERN MATERIALS, A FULL-SCALE FATIGUE ANALYSIS AND AN INNOVATIVE DESIGN CONCEPT HAVE RESULTED IN AN AIRCRAFT THAT IS IDEAL FOR BOTH CONVENTIONAL AND PERFORMANCE-BASED OPERATIONS.

THE ADVANTAGES OFFERED BY EXPANDED-ENVELOPE TRAINING COUPLED WITH THE RELIABILITY AND MAINTAINABILITY ADVANTAGES OF A MODERN DESIGN REDUCE LIFE-CYCLE COSTS AND INCREASE VALUE FOR MONEY WHEN COMPARED WITH OLDER TURBOPROP OR LIGHTWEIGHT JET AIRCRAFT.

TRAINING NEEDS ANALYSIS STUDIES HAVE SHOWN THAT THE COST OF TAKING A STUDENT TO WINGS GRADUATION COULD BE REDUCED BY OVER 50%.
THE LATEST GENERATION FIGHTER, TRANSPORT AND HELICOPTER AIRCRAFT ARE ALL CHARACTERISED BY VASTLY INCREASED MISSION SYSTEM WORKLOADS. AS A RESULT, STUDENT PILOTS NEED TO BE EXPOSED TO A REALISTIC COCKPIT ENVIRONMENT AT THE EARLIEST STAGES OF THEIR TRAINING.

THE PC-21’S EXPANDED TRAINING ENVELOPE ALLOWS STUDENTS TO BE INTRODUCED TO PROFILES THAT WERE PREVIOUSLY ONLY POSSIBLE WITH EXPENSIVE JET TRAINING; MAKING IT EASIER FOR AIR FORCES TO TAKE THE NEXT GENERATION OF STUDENT PILOTS THROUGH TO A SUCCESSFUL OPERATIONAL CONVERSION.

THE PC-21’S PERFORMANCE AND FLEXIBILITY COMBINE WITH AFFORDABILITY TO PROVIDE A NEW LEVEL OF TRAINING EFFECTIVENESS. GREATER TRAINING EFFECTIVENESS RESULTS IN FEWER TOTAL TRAINING HOURS, HIGHER GRADUATION RATES AND ULTIMATELY PILOTS REACHING THE FRONT LINE SOONER AT LESS COST.
The PC-21 is designed not merely to satisfy the requirements for basic and advanced military pilot training but to provide enhanced training for all aircrew in the following roles:

- Mission planning and tactical navigation training
- Mission system management and civil flight management
- Electronic warfare training
- Air-to-air radar intercepts and weapons employment
- Air-to-ground radar training and weapons employment
- Night vision goggles operation

This is achieved by extensive use of embedded simulation and emulation and the use of datalink.

The PC-21 training system includes the ability to adapt the aircraft avionics to the requirements of each phase of training. The front and rear cockpits can be decoupled for independent operation or to allow the instructor to access training modes and sensor data not available to the trainee.

Aircraft displays, navigation sensor performance, system modes and simulated weapons status can all be modified by the instructor to increase training effectiveness and meet the needs of individual students.

The ability to download elements of operational conversion unit flying (night vision goggles, basic radar interception, smart weapons, etc.) to a far less expensive platform makes the PC-21 an excellent tool for air forces needing to rationalise and improve their training.
MISSION PLANNING AND DEBRIEFING

Integral to the PC-21 training system, the mission planning system (MPS), together with the mission debriefing system (MDS), forms a complete mission support system (MSS) facilitating mission planning, data loading, mission recording and debriefing.

Mission planning at a ground-based station can be uploaded via the mission data recorder to the aircraft. Data delivery and recording is automatic from power on to engine shutdown. To enable full mission playback after flight - for debriefing, training or analysis - the system records all display input data, including full colour head-up display (HUD) and cockpit audio, with provision for event markers where required. The mission planning, data loading, mission recording and debriefing systems are fully compatible with other elements of Pilatus’ ground-based training systems, such as flight training devices/simulators.

The MPS reflects the concept of the integrated training system allowing aircrew to prepare missions for both the PC-21 aircraft or the simulator. Mission pre-flight studies can be carried out and missions rehearsed.

The system incorporates a database of aircraft weight, balance and performance plus airfield data.

The MPS allows the user to specify frequency tables, air-to-air, air-to-ground and electronic warfare scenarios, datalink and weapon configuration in the mission data.

Planning tactical routes and scenario construction, the system automatically calculates timing, fuel usage, terrain avoidance clearance (safety heights) and digital map configuration. The MPS can be interfaced with existing tactical as well as metological data.

The MDS supports the instructor in the post-sortie analysis of PC-21 recorded mission data and in reinforcing key learning points from the training sortie. It allows users to perform tasks such as mission debriefing and mission events reconstruction. It also provides a reliable indication of student performance on solo sorties. Digital information is derived from aircraft raw data and all mission system data is recorded, regardless of the display selection in either cockpit.

The MDS consists of three modules:

• Audio/video (A/V) debrief system, providing a synchronized replay of recorded audio and HUD video from aircraft or simulator missions. The MDS accommodates up to four participant aircraft, each with an associated removable memory module (RMM) to be connected to the debrief system. The A/V debrief software opens up to four windows and each participant may select which recorded video is displayed and how it is displayed. Advanced editing functions allow the user to archive essential data while discarding unwanted data.

• Three-dimensional (3D) view providing 3D debrief capability to the MDS by presenting a dynamic 3D representation of recorded aircraft or simulator sorties. Each sortie participant is represented by a platform-specific 3D aircraft model which is displayed within a gaming area database. This provides accurate geographic and relative positions of all participant aircraft and any other scenario features available to the system through the RMM or its internal database (e.g. airport locations, routes). Several views are available in this module, one of them permits the user to see the HUD video superimposed on a 3D scenario.

• Cockpit displays view (CPV) provides an enhanced debrief capability to the MDS. It regenerates the front cockpit displays from data recorded to the RMM during the mission. The software allows the user to regenerate/view any display page, even if the pilot did not select it during the sortie.

Furthermore, the MDS can display the list of events generated during the flight with specific pilot actions (e.g. pickle press, trigger press, event marking button press...).

The user can then select the desired event and jump directly to that point to proceed with the debriefing.

The RMM is the storage device used to transfer data between the MPS, aircraft, simulator and MDS.

EMBEDDED SIMULATION AND EMULATION

The aircraft is equipped with radar simulation software and an integral datalink system. These can be used to teach radar techniques and simulated weapons employment against either on-board computer generated targets or against another aircraft. This type of training on the PC-21 can significantly reduce expensive jet training time.

The PC-21 can simulate almost any weapon found on the latest generation of fighter aircraft. Realistic tactical training can be carried out without the extra costs associated with practice weapons and air-to-ground weapons ranges. This offers the possibility, for example, of simulating beyond visual range (BVR) missile training, utilising a simulated radar picture without the need for another aircraft as an airborne target. Radar-to-visual intercepts and multiple target engagements can be conducted with any similarly equipped aircraft. For air-to-ground training, the PC-21 provides continuously-computed release point (CCRP) and continuously-computed impact point (CCIP) delivery modes, a synthetic air-to-ground radar and a ‘no-drop’ bomb scoring system (NDBS).
AVIONICS

A COCKPIT FOR MAXIMUM TRAINING VALUE

Systems integration is at the heart of the PC-21 cockpit design philosophy. As an advanced trainer aircraft, the cockpit display and control systems are configured closely to those of the latest generation front-line aircraft. Trainees are exposed to a realistic cockpit environment at the earliest stages of their training. This enables aircrew to acquire skills that are of direct relevance to front-line aircraft right from the start of their training.

DISPLAYS AND INDICATORS

Each cockpit instrument panel includes the following active matrix liquid displays (AMLCDs):
- One smart primary flight display (PFD)
- Two multi-function displays (MFD) driven by the open-system mission computer (OSMC)
- One secondary flight display (SFD)
- One engine monitoring display (EMD)

The PFD provides a full set of flight information, including attitude, airspeed, altitude, vertical speed, and horizontal situation. The SFD provides flight information essential for cross-reference and continued safe flight in case of PFD failure. Each MFD provides access to a multitude of systems and mission management pages, including engine, fuel, tactical situation (with or without moving map underlay), stores management, radar and instructor pages.

The EMD continuously provides essential engine and related systems information for continued safe operation in case of OSMC failure. A head-up display (HUD) in the front cockpit and a HUD repeater in the rear cockpit complement the display suite.

COMMUNICATION

The communication system meets the requirements for instrument flight rules (IFR) operations and comprises the following major components:
- Two U/VHF transceivers
- A transponder
- An audio management unit (AMU)
- An automatic dependent surveillance-broadcast (ADS-B) receiver
- An emergency locator transmitter (ELT)

The two U/VHF transceivers provide AM and/or FM secure voice communication in the 118 to 400 MHz frequency range. The 30 – 88 MHz tactical band is available as an option.

The transponder provides modes 3/A, C and S (elementary surveillance compliant) and supports ADS-B operations. The AMU performs audio management for the radios, controls intercommunication and generates aural warning tones. Intercommunication is voice activated.

The ADS-B receiver provides a datalink capability. The ELT transmits on three frequencies (1211.5/243/406 MHz), when activated. A navigation interface is available as an option.

NAVIGATION

The multi-sensor navigation system supports two distinct roles: military tactical operation and civil navigation. It includes the following equipment:
- Inertial reference system (IRS) integrated with a global positioning system (GPS)
- Digital air data computer (ADC)
- Two VOR/ILS radio navigation receivers
- Distance measuring equipment (DME)
- Optional tactical airborne navigation (TACAN) transceiver
- Radar altimeter

The open-architecture mission computer and large AMLCDs confer a number of advantages over the analogue generation. AMLCDs have higher mean time between failure (MTBF) rates and are configurable to changing display requirements. Changes in processor technology do not require a re-write of the software and a change in the training needs or functionality is quick and inexpensive. Evolution in display technology can be accommodated by changing screens.

The combination of a high performance turboprop engine (hydraulically assisted ailerons and roll spoilers) and low lift coefficient results in a high lift/drag ratio which minimizes fuel consumption and noise emission. The combination of a high performance turboprop engine and low lift coefficient results in a high lift/drag ratio which minimizes fuel consumption and noise emission.

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The ADS-B receiver provides a datalink capability. The ELT transmits on three frequencies (1211.5/243/406 MHz), when activated. A navigation interface is available as an option.

MISSION

The mission system provides advanced embedded simulation capability, including air-to-air radar, air-to-ground radar, electronic warfare, stores management and weapon delivery. It comprises the following major components:
- Open system mission computer (OSMC)
- Master cockpit selector switch (instructor switch)
- Up-front control panel (UFCP)
- Mission data recorder (MDR)

The UFCP is the primary control for the communication and navigation equipment. It is also used for master mode (navigation, air-to-air and air-to-ground) selection and data entry. The FMS provides backup control for this equipment.

Hands-on throttle and stick (HOTAS) functionality is incorporated into the controls in each cockpit in order to maximize hands-on flying.

The MDR is used as a storage device for uploading data, including digital maps from the MPS to the aircraft and as a mission recording device during flight for replay on the MDS. The MDR uses a removable memory module (RMM) for data transfer.

The instructor sets the instructor switch to match his student’s training environment from the instructor page.
TECHNICAL OVERVIEW

PROPULSION
To meet the need for the performance, flexibility and the reliability required of a trainer aircraft, the PC-21 is powered by a 1600 shp Pratt & Whitney Canada PT6A-68B coupled to a five-blade Scimitar graphite propeller.

The combination of a high performance turboprop engine (which minimizes fuel consumption and noise emission) with a sophisticated power management system (PMS) makes the PC-21 extremely easy to handle at low air speeds while still providing the power required for high performance.

HANDLING
The PC-21 aircraft design ensures safe, benign, reproducible spin and stall characteristics and the flight controls have been optimised for ease of operation and effectiveness. Extensive wind tunnel testing during the design and development stage ensure that the aircraft responds perfectly to every control input.

The fully-balanced and harmonized flight controls are augmented by spoilers for roll control. The combination of hydraulically assisted ailerons and roll spoilers produces outstanding roll performance with maximum roll rates in excess of 200°/sec, unique in this class of aircraft.

A selectable auto-yaw-compensation device compensates for the yaw effects from engine power and speed changes.
Cockpit and Environment

The PC-21 offers a new dimension of training in the avionic and cockpit environment found in today’s latest generation front-line aircraft. The cockpit incorporates the latest developments in ergonomic design. Large, high-resolution active matrix liquid displays provide clear visual flight and systems data with easy push-button selection while the head-up display and up-front control panel enable the pilot to concentrate on the external situation and mission data inputs. The visual outlook for both the student and the instructor are particularly good. The one-piece canopy has no metal arch in the front cockpit and this is achieved without making any compromises on bird strike protection for the aircrew.

Environmental control and a pressurized cabin maximise crew comfort and the ejection seats offer a zero-zero capability and provide an excellent seating position.
SAFETY

When it comes to aircrew safety, there is no compromise. The aircraft’s structure has already completed full-scale fatigue testing. The wing, tail and canopy are designed to withstand bird strikes at high cruise speeds. The cockpit has an on-board oxygen generating system (OBOGS) and an anti-g system installed to minimise the effects of high g forces encountered during tactical training and aerobatic flying.

Martin Baker Mk CH16C ejection seats provide a means of escape from maximum operating speed down to zero airspeed and from the maximum operating altitude down to ground level. Each seat has an integrated emergency oxygen system and personal survival pack.

TYPE CERTIFICATION

Pilatus has always undertaken the task of providing civil certification for its military training aircraft. This provides a baseline for the military registration process and allows the opportunity to use civil maintenance procedures. The civil certification also allows the aircraft to be provided on private finance, output-based contracts, similar to Commericially Owned Military Registered (COMR).

Further assurance of the aircraft’s technical standards and airworthiness is provided by the rigorous inspection and testing required for type certification. The PC-21 is certified for day/night flight, IFR/visual flight rules (VFR) operation and certified to US federal Aviation Regulations, Part 23 including Amendments 23-1 through 23-54, in the acrobatic category.

Type certification for the PC-21 was awarded by the Swiss Federal Office for Civil Aviation in December 2004.
### DIMENSIONS AND GEOMETRY

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing Span</td>
<td>9.108 m</td>
<td>29 ft 11 in.</td>
</tr>
<tr>
<td>Horizontal Tail Span</td>
<td>4.000 m</td>
<td>13 ft 1 in.</td>
</tr>
<tr>
<td>Fuselage Length</td>
<td>11.232 m</td>
<td>36 ft 11 in.</td>
</tr>
<tr>
<td>Fuselage Width</td>
<td>1.002 m</td>
<td>3 ft 3 in.</td>
</tr>
<tr>
<td>Propeller Diameter</td>
<td>2.388 m</td>
<td>94 in.</td>
</tr>
<tr>
<td>Wing Projected Area</td>
<td>15.221 m²</td>
<td>168.848 ft²</td>
</tr>
<tr>
<td>Aspect Ratio</td>
<td>5.120</td>
<td></td>
</tr>
<tr>
<td>Mean Aerodynamic Chord</td>
<td>1.783 m</td>
<td></td>
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### OPERATIONAL DATA

#### DIMENSIONS AND GEOMETRY

<table>
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</table>

#### WEIGHTS

<table>
<thead>
<tr>
<th>Weight Type</th>
<th>Acrobatic</th>
<th>With Stores*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Ramp Weight</td>
<td>3,120 kg</td>
<td>6,878 lb</td>
</tr>
<tr>
<td>Max. Take-Off Weight</td>
<td>3,100 kg</td>
<td>6,834 lb</td>
</tr>
<tr>
<td>Max. Landing Weight</td>
<td>3,100 kg</td>
<td>6,834 lb</td>
</tr>
<tr>
<td>Max. Zero Fuel Weight</td>
<td>2,750 kg</td>
<td>6,063 lb</td>
</tr>
<tr>
<td>Max. Weight of Stores</td>
<td>1,150 kg</td>
<td>2,535 lb</td>
</tr>
</tbody>
</table>

#### CENTRE OF GRAVITY RANGE

<table>
<thead>
<tr>
<th>Category</th>
<th>20% - 28% MAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acrobatic with Stores*</td>
<td>20% - 28% MAC</td>
</tr>
</tbody>
</table>

#### SPEEDS

Equivalent air speeds (EAS) at max. operating weights in acrobatic configuration:

- Max. Operating Speed ($V_{MO}$): 370 kt
- Max. Operating Mach No. ($M_{MO}$): 0.72 M
- Maneuvering Speed ($V_{J}$) Ailerons: 370 kt
- Maneuvering Speed ($V_{J}$) Rudder, Elevator: 220 kt
- Max. Speed with Flaps and/or Landing Gear Extended ($V_{FL}$, $V_{FT}$, $V_{LE}$): 180 kt
- Stalling Speed (Idle Power) at MTOW (3,100 KG):
  - With Flaps Take-Off, Gear Down ($V_{s1}$): 86 kt
  - FLAPS LAND, GEAR DOWN ($V_{s0}$): 81 kt

#### ALTITUDE

- Max. Operating Altitude: 25,000 ft
- Service Ceiling: 38,000 ft

#### OPERATING TEMPERATURE

- Min: –55° C (–40° C Oil Temperature for Engine Starting)
- Max: +50° C

#### LOAD FACTOR

<table>
<thead>
<tr>
<th>Factor</th>
<th>Acrobatic</th>
<th>With Stores*</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Landing Gear Up and Locked or Down and Locked:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Positive</td>
<td>+8.0 g</td>
<td>+5.0 g</td>
</tr>
<tr>
<td>Max. Negative</td>
<td>–4.0 g</td>
<td>–2.5 g</td>
</tr>
<tr>
<td>With Flaps Extended in Take-Off or Land Position:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. Positive</td>
<td>+4.0 g</td>
<td>+4.0 g</td>
</tr>
<tr>
<td>Max. Negative</td>
<td>0 g</td>
<td>0 g</td>
</tr>
</tbody>
</table>

* All data is provisional
## PERFORMANCE FIGURES

### TAKE-OFF AND LANDING

<table>
<thead>
<tr>
<th></th>
<th>Take-Off Ground Roll, Sea Level</th>
<th>Take-Off Distance to Clear 15 m (50 ft) Obstacle, Sea Level</th>
<th>Landing Ground Roll, Sea Level</th>
<th>Landing Distance to Clear 15 m (50 ft) Obstacle, Sea Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>490 m</td>
<td>725 m</td>
<td>600 m</td>
<td>900 m</td>
</tr>
<tr>
<td></td>
<td>1,608 ft</td>
<td>2,380 ft</td>
<td>1,969 ft</td>
<td>2,953 ft</td>
</tr>
</tbody>
</table>

### CLIMB

<table>
<thead>
<tr>
<th></th>
<th>Max. Rate of Climb at Max. Power Available:</th>
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</thead>
<tbody>
<tr>
<td>Sea Level</td>
<td>4,250 ft/min</td>
</tr>
<tr>
<td>10,000 ft</td>
<td>3,325 ft/min</td>
</tr>
<tr>
<td>20,000 ft</td>
<td>2,125 ft/min</td>
</tr>
</tbody>
</table>

|                                    | Max. Horizontal Speed, Based on Max. Power Available: |
|                                    | Sea Level                                          |
|                                    | 323 KTAS                                           |
| 10,000 ft                          | 337 KTAS                                           |
| 20,000 ft                          | 334 KTAS                                           |

### CRUISE

|                                    | Max. Horizontal Speed at Normal Cruise Power: |
|                                    | Sea Level                                      |
|                                    | 308 KTAS                                        |
| 10,000 ft                          | 310 KTAS                                        |
| 20,000 ft                          | 306 KTAS                                        |

### SUSTAINED LOAD FACTOR

|                                    | At a Typical Weight of 2,700 kg with Half Fuel: |
|                                    | Sea Level                                      |
|                                    | 3.7 g                                           |
| 10,000 ft                          | 3.0 g                                           |
| 20,000 ft                          | 2.1 g                                           |

### ROLL RATE

Max. Steady Roll Rate in Acrobatic Configuration is 200°/s at 10,000 ft, at all speeds above 250 KEAS.

The performance figures above are valid for the following conditions:
- International standard atmosphere (ISA)
- Calm wind
- Typical aircraft weight of 2,950 kg unless otherwise specified
- Propeller speed 2,000 rpm
- Airframe in new condition, standard antenna installation
- Environmental control system on
RELIABILITY AND MAINTAINABILITY

The PC-21 is supported by a dedicated customer support organisation within Pilatus that serves more than 30 military customers worldwide. In addition to the experience of turboprop trainer operations built up over the past 30 years, significant improvements have been made for the PC-21 by focussing on the following elements:

- Designed-in supportability
- Cost-effective operation
- Through-life support – performance-based contracting

DESIGNED-IN SUPPORTABILITY

The benefits of the PC-21 integrated logistics support programme are a result of significant analysis and design effort. Demanding availability targets were set and advanced logistical analysis tools were used to optimise supportability, cost and technical requirements. To achieve this, design engineers, field service experts and manufacturing specialists collaborated to promote an open exchange of knowledge and experience. This ensured that operational factors were taken into account during the design process as well as systems, maintenance and logistic support requirements.

System design and choice was not only based on technical analysis but also on the experience of producing and supporting over 2,300 Pilatus turboprop aircraft sold worldwide. Pilatus has cultivated partnerships with customers and suppliers which enable us to provide tailored support for the full life cycle, ensuring an optimised flow of data, technical services and materiel.

COST-EFFECTIVE OPERATION

The PC-21 is designed to reduce the cost of ownership of the entire training system. This has been achieved by providing greater capability at turboprop benchmark acquisition cost and by significant provisioned life-cycle cost reductions. With this combination of user value and a broad operational envelope, PC-21 operators can:

- Eliminate other aircraft types from the training fleet by using the PC-21 as a basic trainer
- Replace expensive jet hours
- Identify weak students more quickly by focussing on core skills earlier
- Shorten the training process by minimising the number of unnecessary transitions in the training system caused by training students on different platforms

- Focus on front-line skills by emulating front-line functionality

Improvements in cost-effectiveness and rationalisation of the training system can be enhanced by modern contracting frameworks. The PC-21 is designed for availability or capability-based contracting where the fleet may be financed privately and training is charged by the flying hour or other key performance indicators. Pilatus is providing this service today and this model can be supplemented with in-country industrial participation.

THROUGH-LIFE SUPPORT

- PERFORMANCE-BASED CONTRACTING

With increasing global pressure on defence budgets and the desire to achieve the maximum value for money, many air forces are seeking more innovative ways to support their aircraft fleets. Additionally defence ministries are investigating new ways to manage complex systems and optimise value for money.

To support this change, Pilatus has developed performance-based contracting, an advanced contracting framework specific to the PC-21 training system. The aim is to ensure that the operating air force receives an affordable product that meets its explicit performance criteria. This is achieved by contracting for an integrated support package that focuses on overall output requirements, delivering a target availability, rather than separating discrete input measures such as parts, maintenance and technical services.

The performance-based contract transfers the burden of aircraft control, output risk and associated costs throughout the product life-cycle to the prime contractor, enabling the customer to concentrate on operations. Contracts are conducted in close cooperation with the contracting authority, allowing transparency of information and clear lines of accountability which compromise on airworthiness or safety. Key availability drivers are actively managed and cover outputs such as mission success, flying hours, supply support and technical airworthiness.
The development of a completely new aircraft has enabled Pilatus to bring the combined knowledge and experience of flight and ground instructors as well as training system specialists to the design team to enable concurrent development of the aircraft and training systems. This results in an integrated training package which is designed from the beginning to be tailored to suit customers’ needs and syllabi and enables the objectives of modern pilot training to be met.

Preparation on the ground saves perspiration and failure in the air; by the time students fly, they should be fully conversant with avionics functionality. The PC-21 ground-based training system (GBTS) translates student learning into an airborne context.

PILATUS TRAINING SYSTEMS

THE POTENTIAL PILOTS ARE THERE.
CAN YOU TRAIN THEM COST-EFFECTIVELY?
GROUND-BASED TRAINING SYSTEMS

A comprehensive set of training products is available covering all aspects of ground-based training. From the simplest type of training aid, such as an aircraft silhouette through to a full flight simulator, all Pilatus training equipment is of the highest quality and is designed to support an integrated and progressive learning process.

Curriculum planners and instructors have a wide range of equipment to choose from when preparing courses or planning schedules and can easily accommodate the varying rates of student learning.

**Pilot Training Documentation** designed to support the customer’s syllabus, includes management documents, aircraft manuals, student and instructor training manuals and a comprehensive set of flying training documents.

**Synthetic Training Aids** complement the ground-based training systems and support classroom training. Items include various two- and three-dimensional aircraft models, sectioned assemblies and interactive systems models and plastic cockpits.

**Computer-Based Training** supports conventional classroom training and in some areas can replace instructor-led training. Over 200 hours of courseware is available. The courseware includes aircraft type-specific and ab initio training, computer animated aircraft systems and equipment operation.

**Synthetic Training Devices** are designed to support effective and safe aircraft operation. Various procedure trainers complement pilot and technician training allowing students to practice normal and emergency procedures with no risk and at minimal cost. Equipment ranges from training aircraft assemblies, part-task trainers and various levels of cockpit procedure trainers through to full flight simulators with visual and motion cueing systems.

**Personnel Training** can include initial, continuation and refresher courses; all designed to train flying and ground crew to safely operate and maintain the aircraft. Depot-level training courses are also available for aircraft structure, assemblies, systems and survival equipment, and conversion training courses are available for pilots, logistics/officials and technicians.
Pilatus Aircraft Ltd was founded in 1939 and 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. Pilatus, which is headquartered in Stans, Switzerland, 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 a workforce of over 1100 at its head office, Pilatus is one of the biggest employers in Central Switzerland. Pilatus additionally provides training for almost 100 apprentices in nine different professions – job training for young people has always been a very high priority at Pilatus.