The Pilatus PC-12 NG

Safety by Design – Proven in the Air

Getting to Know the Facts

- Benefits of SETP
- Proven Operations
- The Pilatus PC-12
- Real World Experience
- Fleet Statistics
- Safety by Design
- Engine Reliability
- Training
- Hard Numbers
- Safety Record

What is the PC-12 NG?

The Pilatus PC-12 NG is a high performance, single-engine turboprop, pressurized multi-mission aircraft certificated in the normal category.

The standard aircraft is approved for operation in day, night, VFR, IFR, and known icing conditions.

It was certified in 1994, under the rigorous criteria defined by FAA Part 23, including all Amendments applicable at that time.

Why Be Single?

As compared to twin-engine turboprops, jets, and helicopters, single engine turboprop aircraft provide:

- Lower acquisition costs
- Lower maintenance costs
- Reduced recurring operating expense for fuel
- No asymmetrical thrust scenario
- Reduced pilot workload
- Simpler systems to operate and maintain
- Lower carbon emissions
- Ability to carry greater payloads relative to their basic operating weight

Safety by Design is a Core Pilatus Value

- Pilatus is the world's leading manufacturer of single-engine turboprop aircraft
- Safety is paramount in every aircraft we build
- Safety philosophy extends into training, operations, and maintenance

Safety by Design is a Core Pilatus Value

- Conservative Swiss design, engineering, and construction philosophy of quality and precision
- Pilatus has been building aircraft for over 70 years
  - Generations of "lessons learned" built into each aircraft
  - Reputation for rugged, reliable, safe aircraft
  - Human factors design, predictable handling
  - Easy to use, dependable

Who Owns and Flies the PC-12 NG?

- Corporations
- Private Individuals
- Police and Government Authorities
- Fractional Programs
- Charter Operators
- Air Ambulance Services
- Regional Airlines
- Cargo Transporters

Trusted by Demanding Customers

- Major Fleet Operators of the Pilatus PC-12
  - The Royal Canadian Mounted Police
  - The U.S. Department of Defense
  - PlaneSense Fractional Ownership Program
  - AirSprint Fractional Ownership Program

Lives Depend on the PC-12's Safe Operation

- Fleet Operators of Air Ambulance PC-12s
  - The Royal Flying Doctor Service of Australia
  - Red Cross Air Mercy Service of South Africa
  - Native American Air Services
  - Air Methods Corporation
  - St. Charles Medical Center
  - Ornge

The Royal Flying Doctor Service

- Through 2011, the Australian fleet of RFDS PC-12s have accumulated 238,756 hours with 250,000 landings
- The RFDS operate 33 PC-12s, including 13 NGs
- RFDS PC-12s routinely fly into sparsely populated desert regions, remote locations at night, and on cleared public roads

The Pilatus PC-12 Fleet

- 1,130 PC-12s delivered since introduction
- Total fleet time exceeds 3.5 million flight hours
- High time PC-12 exceeds 21,000 hours
- Daily operations in remote and harsh environments
- 73 PC-12s operating in dedicated air ambulance service
  - 489,000 flight hours
  - Fleets based in US, Canada, Australia, South Africa, Brazil

Certified to Modern Safety Criteria

Aircraft	Certification Basis
PC-12	**FAR 23, 1994, through Amendment 42**
King Air C90B	CAR 3, 1959/81/91
King Air B200	FAR 23, 1973/80
Citation I	FAR 25, 1971
Citation II	FAR 25, 1971
Citation V	FAR 25, 1971/89

PC-12 Inherent Safety Characteristics

Design Feature	Safety Contribution
• Outstanding range/payload	Less likely to overload or approach low fuel condition
• Wide CG range	Risk of loading out of CG is significantly reduced
• Cabin pressurization	Ability to fly over bad weather
• Excellent glide ratio	From 30,000’ can glide for 32 minutes within 90 miles radius
• Low stall speed	Less energy to dissipate at landing
• Anti-Ice/De-Ice protection	All weather safety
• Conventional flight controls	Simple, proven mechanical design

The PC-12’s strong performance leads to safer operations

Modern Certification Level Icing Protection

- FAA/FOCA/Transport Canada certified for flight into known icing conditions
  - Testing conducted in Iceland using natural ice and shapes/forms
- Fully Ice Protected
  - Flush-mounted, pneumatically-operated leading edge boots on wing and horizontal tail
    - Incorporates findings from the 1994 American Eagle "Roselawn" accident by utilizing extended chord length boots for additional wing upper surface ice protection
  - Electrically heated windshields, engine inlet, individual propeller blades, pitot-static system, angle of attack probes

Protection for Passengers and Crew

- Seats dynamically certified to the latest Head Impact Criteria requirements per FAR 23.561/23.562
- Crew and passenger seats designed for enhanced load ratings
  - Cabin seats feature 16g rating
  - Crew seats are rated to 23g
  - Meets or exceeds many commercial jetliner standards
- No fuel or hydraulic lines run through cabin area
  - Minimized risk of a cabin fire in the event of an impact

Structural Integrity by Design

Design Feature	Safety Contribution
• Single-engine design	Engine & structure in nose form energy absorbing, protective crumple zone
• No fuel lines in cabin	Reduced chance of hazardous / flammable fluids in cabin
• Solid aluminum construction	Enhanced cabin integrity
• Landing gear and tires designed for unimproved airfields	Robust design increases landing options in an emergency
• Wing designed for slow approach and stall speeds	Provides more decision making time for pilot during landing phase and a lower energy state on landing

In the event of a forced landing, the PC-12 design provides maximum survivability

Wing Designed for Performance and Safety

- Main Spar, Auxiliary Spar, Ribs and Stringers constructed of proven conventional aluminum alloys
  - Composites used only in secondary structure
- High-Lift design with flush riveting, provides a 16:1 glide ratio
- Fowler flaps provide slow stall speed of 67 kts and approach speed of 84 kts
  - Slower speeds provide pilot with greater reaction time
  - Less energy to dissipate at landing
  - King Air B200 stalls at 75 kts and approaches at 103 kts
- Active stall protection with stick shaker/pusher system
  - Warns of stall by shaking yoke 8 kts below stall speed
  - Prevents stall by pushing yoke forward 2 kts before stall
  - Common in commercial jetliners

Redundancy for All Critical Systems

Feature	Safety Contribution
• Dual generators plus battery(s)	Triple redundancy of electrical system
• Fuel system includes 2 motive flow pumps, 2 boost pumps, and 2 engine driven pumps	Triple redundancy of fuel system
• Dual-motor pitch trim with warning system	Reduced chance of runaway pitch trim or takeoff with improper trim setting
• Hydraulic power w/ backup accumulator, and manual mode	Hydraulic system for gear only; manual deployment easily accomplished with pump handle
• High visibility lighting system; 2 landing lights, taxi light, 2 pulsating recog lights, strobes, dual beacons, and nav lights	Easily seen by other aircraft and illuminates runways at night

Advanced Electrical Power System Design

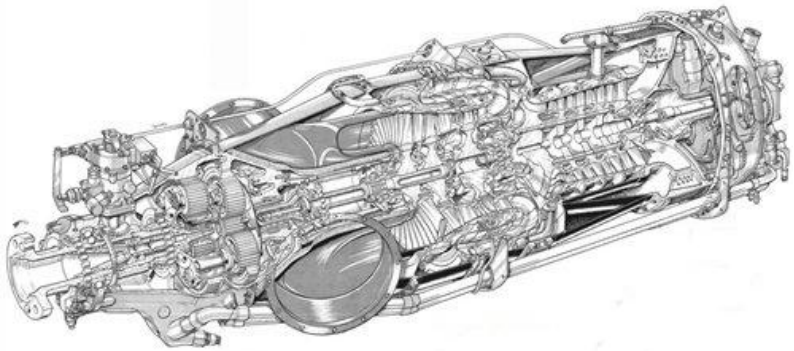
- Power Generation and Distribution System
  - Segregated #1/#2 system
    (balanced generation, dual channel distribution)
  - 2 x 300 Amp. Generators
  - 2 Batteries (28VDC, 42A)
  - EPS (Emergency Power System)
  - Standby bus for initialization (FMS, radios)
  - Modularised installation
  - Automatic load shedding in case of failures
  - Indications in dedicated avionics window

Fuel System Designed for Simplicity and Safety

- Automatic Fuel Balancing
  - Reduces Pilot Workload
  - Eliminates “Dry-Tank” Possibility
  - No Asymmetric Balance Issues
- Triply Redundant Fuel Delivery
- Only Two Fuel Tanks – one in each wing
- No complicated transfer calculations or procedures

Reliable Pratt & Whitney PT6A Engine

- More than 37,759 PT6A Turboprop Engines Delivered
- 327,892,640 Flight Hours Accumulated
- The reliability of modern turbine engines is so high that an engine malfunction is rarely the primary contributor to an accident or incident
  - As of September 2011, the In-Flight Shutdown Rate for the Pratt & Whitney PT6A fleet is 1 in 538,130 flight hours



Continuous Monitoring of Engine Health

- One year of engine trend monitoring provided free of charge
- Records engine speed, interstage turbine temperature and fuel flow
- Allows early detection of:
  - Hot section deterioration
  - Hot starts
  - Faulty fuel nozzles
  - Dirty or eroded compressors
  - FOD damage
  - Bleed leaks
  - Instrument error

- Engine data analyzed within 8 business hours of receipt and operator is notified immediately if significant change is noted

What If the Engine Does Stop Turning?

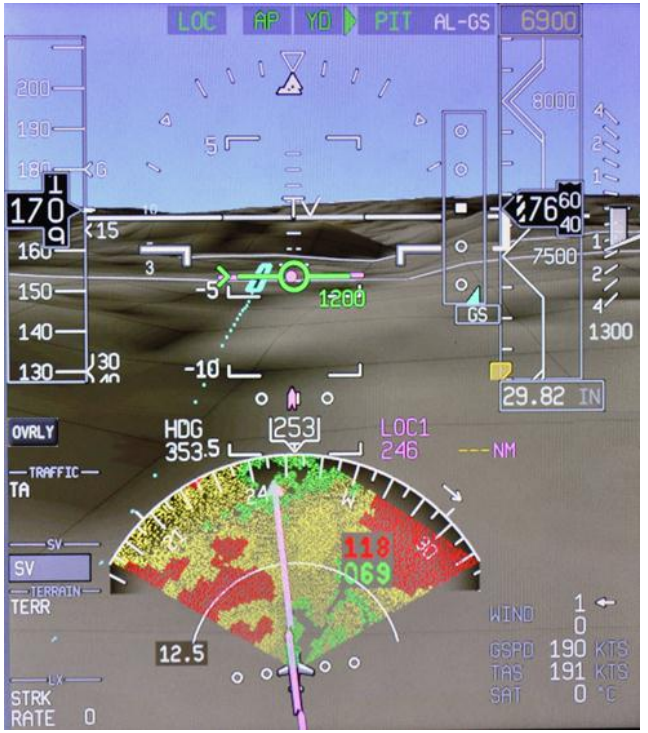
- The failure of an engine in a twin at low altitude during takeoff creates an asymmetric thrust condition that is often unrecoverable
- The failure of an engine in a single at low altitude during takeoff results in a controllable glide
  - At any altitude above 1,000 feet, the Pilatus PC-12 can turn back and glide to a landing at the departure runway
  - Below 1,000 feet, the pilot glides to a landing straight ahead
- In a single cruising at altitude, an engine shutdown results in a controllable glide
  - From and altitude of 30,000 feet, the Pilatus PC-12 can glide for 32 minutes and reach any suitable landing area within a 90 mile radius

“Big Iron” Professional-Grade Avionics

The Honeywell Primus Apex Avionics Suite in the Pilatus PC-12 NG

State-of-the-Art Navigation and Situational Awareness

- Integrated Modular Avionics Suite
  - Four 10.4” LCD displays with bezel soft buttons
  - Exclusive Pilatus track ball controller on center pedestal
  - Digital auto pilot, COM/NAV radios and ADAHRS
  - Software based options
  - SmartView™ Synthetic Vision
- L3 Electronic Standby Instrument
  - Fully independent backup display for attitude, speed, altitude, heading



Primus Apex Includes Many “Big Iron” Features

- Primus Epic operating system, architecture and bus system
- Primus Epic 12-slot dual channel MAU with Modules
- Integrated FMS application based on Primus Epic
- Interfaces with existing PC-12 systems
- “Dumb” Display Units
- New equipment (controllers, ADAHRS, GPS, radios etc.)
- Legacy equipment (DME, TCAS & TAWS, radar altimeter etc.)
- All system indications on Primus Apex displays

Simplified and Automated Environmental Systems

- Digital Environmental Control System
  - Single controller for ACS, VCCS and electrical Heaters
  - Dual zone temperature control (Cockpit & Cabin)

- Digital Cabin Pressure Control System
  - Integrated outflow valve with digital controller
  - Pressure relief valves
  - Inputs via APEX (FMS)

PC-12 Maintenance Programs

- 100 or 150 hour inspections
  - Over 90 items / areas are inspected every 100 hours
- Annual Inspection
  - Includes all 100-hr items plus an additional 56 items
- Progressive Inspections (for high utilization operators)
  - Standard inspection items grouped in six phases
  - Phases include all 100-hr and annual tasks
  - All six phases completed within 1,200 hrs or 12 months, whichever comes first

A Well Trained Pilot is the Best Safety System

- Flight training included with the purchase of a new aircraft
- Professional training conducted by SIMCOM
- PC-12 Simulators in Orlando, FL and Scottsdale, AZ
- Wide-Screen visual motion simulators
- Instruction by career aviation educators
- Training program approved by all major insurance companies
- FlightSafety International is currently building a Level D PC-12 simulator for their Dallas facility

Thorough and Comprehensive Initial Training

- Initial Training Program:
  - 7 days
  - 20 Hours of Simulator Flight Instruction
  - 20 Hours of Class Room Instruction
- Training Syllabus Covers:
  - Powerplant Management
  - Systems Management
  - Normal Procedures
  - Emergency Procedures
  - High Altitude Flight
  - Anti-ice and De-ice Systems Management

PC-12 Recurrent Training

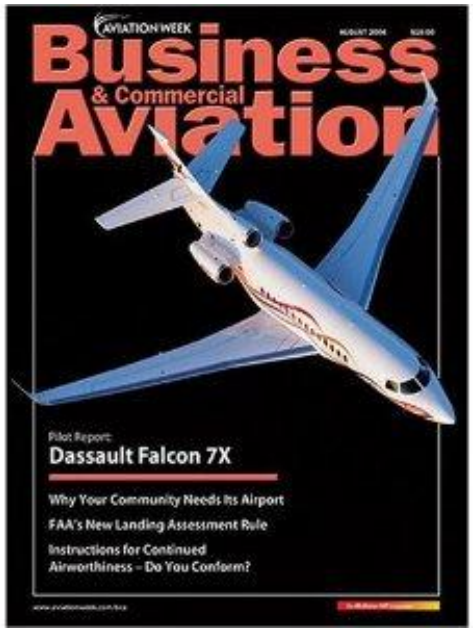
- Recurrent Training Program:
  - 3 days
  - 12 Hours of Simulator Flight Instruction
  - 12 Hours of Class Room Instruction
- Training Syllabus Covers:
  - Emergency Procedures
  - Fuel Management
  - Powerplant
  - Systems
  - Anti-ice and De-ice systems
  - Flight Profiles

Pilatus Owners and Pilots Association (POPA)

- 600 members representing 290 aircraft
- Unique relationship between POPA and Pilatus creates powerful working partnership
    - Pilatus advisors sit on POPA board of directors
    - Mutually beneficial direct communication and feedback
    - Operator concerns quickly identified and resolved

Independent Confirmation of Safety

- "An engine failure-related accident in a twin is four times more likely to cause serious or fatal injuries."
  - Richard Aarons, Safety Editor at Business & Commercial Aviation, citing an NTSB report in FAA Document FAA-P-8740-25 AFO-800-1079



- Due to their proven reliability and safety record, the FAA approved commercial IFR operations for single-engine aircraft in 1998

Independent Confirmation of Safety Record

Comparative Accident Data

U.S. & Canadian Fleets -- Aircraft Introduction through 2011

	Single Engine Turboprops	Twin Engine Turboprops
Cumulative Flight Hours	11,900,918	53,676,611
Accidents	225	1,066
Per 100,000 Hrs	1.89	1.98
Fatal Accidents	87	374
Per 100,000 Hrs	0.63	0.70

Data source: Breiling, Robert E., *Single Turboprop Powered Aircraft Accident Analysis,* Robert E. Breiling Associates, Boca Raton, FL, February 2012.

Independent Confirmation of Safety Record

Robert E. Breiling Associates, Inc. has been compiling and analyzing aircraft accident data since the 1960s

- Annual Report on Turbine Aircraft Accidents, published February 2012
- U.S. & Canadian Registered Aircraft

	Piper PA-46TP	**Cessna CE-208**	**Socata TBM700/850**	**Pilatus PC-12**
Fleet Size	343	877	392	726
Hours Flown	508,576	7,947,805	661,140	2,463,748
Accidents	26	138	26	20
per 100,000 hrs	**5.11**	**1.74**	**3.93**	**0.81**
Fatal Accidents	9	50	11	8
per 100,000 hrs	**1.77**	**0.63**	**1.66**	**0.32**
Accidents due to Power Loss Mechanical Malf / Failure	2	17	2	3
Fatal Accidents due to Power Loss Mechanical Malf / Failure	0	0	0	0

Independent Confirmation of Safety Record

Comparative Accident Data

U.S. & Canadian Fleets – Aircraft Introduction through 2011

	PC-12	Twin TPs	Business Jets
Cumulative Flight Hours	2,463,748	53,676,611	US / World
Accidents	20	1,066	
Per 100,000 Hrs	0.81	1.98	0.83 / 0.96
Fatal Accidents	8	374	
Per 100,000 Hrs	0.32	0.70	0.21 / 0.29

Data sources: Breiling, Robert E., *Single Turboprop Powered Aircraft Accident Analysis,* and *Annual Business Turbine Aircraft Accident Review*, Robert E. Breiling Associates, Boca Raton, FL, February 2012.

Summary of Key Points

- Single engine turboprop aircraft have an extensive track record of safe operation in commercial operation
- Loss of engine power is an extremely rare event with modern turboprop aircraft
- Actual accident statistics show that single-engine turboprop aircraft have a better safety record than their twin-engine counterparts
- The Pilatus PC-12 has one of the lowest accident rates of all turbine powered aircraft
- Inherent design elements, active training, and professional maintenance all contribute to the PC-12’s outstanding safety record
- The benefits of single-engine turboprop aircraft significantly outweigh the real and perceived risks

The Pilatus PC-12NG

Safety by Design…Proven in the Air