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WE FLY **PILATUS
PC-12 NG**

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READY FOR

ANYTHING



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- WE FLY -

PILATUS PC-12 NG

**WE TEST THE LEGENDARY SWISS
TURBOPROP IN ITS ELEMENT AT A SECRET
LANDING SITE — NO RUNWAY REQUIRED**

BY PIA BERGQVIST



I'M SITTING ON A REMOTE DRY LAKE BED IN UTAH, HAVING A FABULOUS CATERED LUNCH CONSISTING OF A VARIETY OF SCRUMPTIOUS FRESH BERRIES, SANDWICHES AND COOKIES. IT'S AS FAR FROM THE HUSTLE AND BUSTLE AS YOU CAN GET.

The faintest wind gust is audible, and each step I take on the fine-grained sediment creates a crunching sound. As I look up from the spread on the large picnic table, a wall of tan desert dust approaches. I cover my food and duck down under the table to shield myself from the sudden onslaught. Thirty seconds later the gust has subsided, the crystal-clear blue skies above reappear and the calm and quiet resumes. *Only in the desert can you get a surprise like that*, I think.

How did I get here? And where did all the fresh food come from? I arrived in one of the most versatile aircraft in the world — the Pilatus PC-12 NG — a large single-engine turboprop. Whether the plan is to travel quickly from point A to B, fly in executive comfort, carry massive amounts of cargo or land on a short dirt strip to get away from the masses, the PC-12 will do it all and do it well.

Nestled in the Swiss Alps, Pilatus has its headquarters at the Buochs Airport in Stans, where it opened its doors in 1939. The name of the company comes from Mount Pilatus, a mountain with several peaks as high as almost 7,000 feet, towering over the quaint town. The mountain's name originates from Pontius Pilate, whose body, legend claims, was disposed of in a lake on the mountain. Legend also has it that the intense storms that occasionally rise from the mountain stem from Pilate's restless ghost rising from the lake to wash the blood of Christ from his hands.

Pilatus' airplanes emulate the strength, power and beauty of the Alps. The company started out building the SB-2 Pelican, designed specifically for mountain flying, with terrific short field and climb performance capabilities. An immensely successful mountain-flying and STOL performer came along in 1959 when Pilatus introduced the PC-6 Porter. The company has also seen much success with military training platforms.

Pilatus is privately owned, and the leadership has made smart development decisions in its nearly 80-year history. As a result, the company has no debt and has never had to lay off any employees, says Thomas Bosshard, president and CEO of Pilatus Business Aircraft — a U.S. subsidiary based in Broomfield, Colorado. The most successful airplane the company has produced to date is the PC-12, but the recently introduced PC-24 twinjet may give it a run for its money.

The PC-12 was first introduced in 1994, when it received certification from both the Swiss Federal Office of Civil Aviation and the FAA. PC-12s are born in Stans, where the airframes are assembled and painted white, and avionics are installed along with basic insulation and the flat floor that contributes to the PC-12's versatility.

The naked airplanes then get a tour of Iceland, Greenland and Canada before landing in Broomfield to be outfitted per the customers' specifications. With the success of the PC-12 in the United States and the upcoming certification of the PC-24 "super versatile jet," which is expected to enter the market at the end of this year, the Broomfield facility is being expanded. A modern 118,000-square-foot completion center is being built on the west side of the runway, opposite the current headquarters, which are spread over 14 hangars and multiple offices in the Rocky Mountain Metropolitan Airport terminal.

Pilatus Business Aircraft's chief pilot Jed Johnson, vice president of marketing Tom Aniello and photographer Mitch Bowers picked me up at Camarillo Airport in Southern California to allow me to experience firsthand what the sleek yet sizable turboprop is all about. An older PC-12 happened to be parked next to us, making it easy to see the improvements made with the latest version, the PC-12 NG.

Since the PC-12 first rolled off the production line, it has gone through a continuous evolution. The company has played around with different sized winglets, the first of which were aptly named "biglets." Today's PC-12 has much subtler winglets — just a slight upward bend of the wingtips.

The original PC-12 was powered by a Pratt & Whitney PT6A-67B, which was rated at 1,520 shp reduced to 1,200 shp for takeoff and 1,000 shp for cruise. While the takeoff and climb power ratings have remained the same, the -67P that powers the PC-12 NG has 1,840 shp, allowing the airplane to produce maximum power at higher altitudes. The engine is not fadec-equipped, but has a torque limiter that helps prevent damage at full power. However, the pilot is responsible for monitoring the gauges. Beta range helps with short landing distance — as short as 2,170 feet over a 50-foot obstacle — and can provide up to 900 shp in reverse.

The turboprop engine of the PC-12 NG is wrapped in a



By far the most noticeable upgrade in the latest iteration of the Pilatus PC-12 NG is the five-blade Hartzell composite propeller, which gives a boost to the already impressive performance of the Swiss turboprop.

PHOTO COURTESY PILATUS

1. The PFD on Honeywell's Primus Apex suite uses an intuitive flight path symbol and, while not displayed, supports Honeywell's SmartView synthetic vision.

2. L-3 Technologies' Trilogy ESI-1000 serves as the electronic standby instrument. Its internal battery will keep going for an hour in case of a complete electrical failure.

3. A keypad and a cursor control device (not in view, behind the power control lever) manage the Honeywell Apex system along with PFD and MFD soft keys.

4. Two MFD screens can display maps, systems data, flight-plan information, weather, approach charts, environmental control status and much more.

5. While the main audio control panel is situated above the PFD, audio functions can also be managed through soft keys along the sides of the PFDs.

6. The autopilot control panel guides the Apex system to fly a three-dimensional flight path hands-free, including SBAS and WAAS approaches.

7. The engine start sequence in the PC-12 NG is conducted through switches in the overhead electrical control panel located just above the windshield.



Top: The most common executive configuration has six plush seats in the cabin ahead of an impressive cargo compartment.

Above: The massive cargo door makes it easy to load oversized items into the aft cabin and cargo compartment.

sleek composite cowling for good aerodynamics, and mounted at the front of a pressurized aluminum fuselage with retractable landing gear. The airframe's fatigue life is based on 20,000 hours, or 50,000 hours through Pilatus' Life Extension Program.

For this latest PC-12 NG model the Pilatus engineers switched out the hydraulically actuated gear for a simpler, quieter, lower-maintenance electrical system, and made several aerodynamic modifications to allow the airplane to add a few additional knots to its cruise speed. The aileron hinges were covered to reduce drag, the antennae were aligned under the belly, fairings

were improved and the scoop under the engine cowl was modified. LED lights were installed throughout to make the airplane more visible and to provide improved lighting inside the cabin.

One of the most impressive and noticeable recent mods is the addition of the five-blade Hartzell composite propeller. Its scimitar blades make the turboprop more efficient, improving the time to climb by about 10 percent. During our flight, we were climbing at 1,300 fpm at 13,000 feet, and through FL 250 the Pilatus was still cranking out 850 fpm. The new prop also emits less noise, which was evident inside the airplane, where we could have carried on a conversation without headsets while seated right behind the big PT6A. With the cabin being even farther away from the fire-breathing monster, passengers do not need to use a headset.

The leading edge of the composite prop is covered with nickel, and it has a stainless-steel mesh for extra protection. The construction is strong and durable enough that the propeller blades have no life limit. However, the propeller system has a 4,000-hour or six-year time between overhaul, whichever comes first. When metal propellers are overhauled, the leading edge sometimes gets shaved down to eliminate rough spots, a process that reduces the performance over time. But Hartzell's propeller never changes shape and therefore provides full performance over its life span.

With all the recent mods, the PC-12 NG gained 5 knots all in all, topping out at 285 kts. While 45 knots slower than the Daher TBM 930, that's a respectable speed considering its carrying capacity. However, Pilatus customers have asked for a faster PC-12. The answer was the PC-24, which will cruise at 425 kts while maintaining the DNA of the PC-12: short, unimproved runway capabilities; an oversize cargo door; a wide CG range; and a large, comfortable cabin. However, the turboprop will win big over the twinjet when considering operating costs.

Stepping into the PC-12 NG through the forward airstair door, which eliminates the need for the pilot to walk through the cabin, I was immediately lured into the cockpit, with its Honeywell Primus Apex displays. Two PFD screens — one for each cockpit seat — and two MFDs mounted on top of each other in the center of the panel make up the integrated avionics suite. Beneath the MFDs is a keypad and, behind the power lever, a cursor control device from which the pilot can manipulate the system. Many functions can also be selected through soft keys on the sides of the screens.

I found the Apex system to be a highly capable avionics suite, and while the logic is completely different from any systems I had played with before, it didn't take long to figure out. The menus are easy to use, and only a few clicks with the cursor control unit are required to make modifications or select an approach. One part I loved in particular was the flight-path marker on the PFD (most commonly used in military airplanes), which makes it easier to keep on track than the single-cue or dual-cue flight directors used in most

Below: The electrically actuated trailing link landing gear smooths landings on unimproved surfaces.

Opposite: Interns at the Pilatus factory in Stans, Switzerland, have a chance to get firsthand experience working on the airplanes.

civilian business aircraft. Wireless updates make the system management easier as well. My only beef with the Apex is that the data processing speed could use a boost.

The seats in the cockpit allow for multiple adjustments, and I easily positioned myself comfortably, high enough for good visibility over the nose. Johnson, who is 6 feet 4 inches tall, does not use the lowest setting on the seat, and he had ample headroom on the copilot's side. The cockpit is a full 5 feet wide, so there was no need to rub elbows. Design features that make the pilot and copilot extra comfortable include two cup holders on each side and a side pocket for an iPad, notepad, phone, glasses and more.

Aniello and Bowers had six plush seats to choose from in front of the massive standard cargo area, which has a 40-cubic-foot and 400-pound capacity. The luggage of four people, several bags of camera gear, a large picnic table and chairs, and a large cooler added up to about 200 pounds of stuff that was easily and quickly loaded through the oversize



PILATUS INSPIRES THE NEXT GENERATION

Pilatus has an extensive internship program in Stans, Switzerland, with about 110 apprentices at the headquarters at any time. This program is now being brought to Broomfield, Colorado. Pilatus Business Aircraft has selected a group of high school students in Broomfield to come for a week or two this summer. The top three candidates will start their apprenticeships in August. The kids will work 2½ days at the Pilatus facility and go to school 2½ days at Front Range Community College. Then they transition to three days of work and 1½ to two days of school.

About 70 percent of young adults do an apprenticeship, says Pilatus Business Aircraft president Thomas Bosshard. Apprenticeships are available in nearly all industries: banking, healthcare, insurance, hospitality management and much more. They are funded by companies and regulated by the government to ensure the standards are the same nationwide.

At Pilatus in Switzerland, the young adults do a variety of apprenticeships, such as logistics, polymechanics, automation, administration, IT and aircraft painting. They get paid a salary, and their schooling is paid for. "So they come out after three or four years with college credits, solid education, solid training and no debt," Bosshard says.

At the completion of the apprenticeship, some young adults go to university, some start working for Pilatus and others go to work for another company. "The whole principle is that you have to forget about your own company's interest," Bosshard says. "A young adult you train can go somewhere else, but someone who apprenticed for another company may end up at Pilatus. I'm a big believer in the concept."



cargo door, the opening of which is 4.4 by 4.3 feet. Had we needed more space, an extended cargo net allows for 80 cubic feet and 500 pounds of cargo.

Despite the heavy load in the back, there was no need to put a stand under the tail. The Pilatus is well-balanced and has a wide CG envelope. With full fuel, our take-off weight was 10,342 pounds — about 100 pounds below max gross. We would, however, have to burn about 400 pounds of fuel to get below our max landing weight.

We took off from Camarillo into 400-foot overcast skies. The temps were warm enough that we didn't have to worry about icing, and above the shallow layer of clouds near the Pacific coastline it was severe clear as far as we could see. Had there been potential for icing, the Pilatus would have pushed us through, with boots on the wings and tail, heated engine inlets and electrically heated windshield, prop and AOA vanes. The AOA vanes will activate a stall-warning horn and the stick shaker if the angle of attack becomes critical. If a recovery is not initiated, the stick pusher will reduce the angle of attack. The critical angle of attack is indicated on the speed tape and takes into account flap settings and icing conditions.

The fact that we had filled the fuel tanks

near the top would have allowed us to keep flying for a very long time. It took us 22 minutes to climb to 27,000 feet, where the pressurization system, which uses bleed air, kept the cabin at a comfortable 8,000 feet. Once leveled off, we could have kept flying for well over six additional hours. In fact, we could have kept flying nearly all the way to the Atlantic Ocean with the tailwind we had. Those who need to travel that far will appreciate the lavatory, which is located behind the copilot's seat.

Our mission was not a long-range flight, however. It was pure play. Our target was not even an airport. It was a secret lat-long point in Utah that took us to a spectacular dry lake bed surrounded by rugged, colorful rock formations.

We were not in a big hurry, so at 27,000 feet we set a normal cruise setting, which produced 261 kts in ISA+10 conditions — spot on with the PC-12's performance calculator app on the iPhone. Johnson said that in the approximate 700 hours he's flown using the performance calculator, it's been within a few knots and, over a trip, the flight-planned fuel-burn numbers are generally within 50 pounds of the actual numbers.

At 27,000 feet, the time of useful consciousness without the pressurization

PILATUS PC-12 NG

Price (typically equipped)	\$4.93 million
Seats (typically configured)	8
Engine	Pratt & Whitney PT6A-67P, 1,200 shp
TBO	3,500 hours
Propeller	Hartzell, composite, constant speed, 8.8 feet
Cabin Length	16.9 feet
Max Cabin Width	60 inches
Max Cabin Height	58 inches
Length	47.3 feet
Height	14 feet
Wingspan	53.3 feet
Wing Area	277.8 square feet
Wing Loading	37.6 pounds/square foot
Power Loading	8.7 pounds/shp
Max Ramp Weight	10,495 pounds
Max Takeoff Weight	10,450 pounds
Max Landing Weight	9,921 pounds
Max Zero-Fuel Weight	9,039 pounds
Max Payload (with pilot)	2,666 pounds
Max Usable Fuel	402 gallons/2,704 pounds
Takeoff Distance (over 50 feet)	2,650 feet
Max Rate of Climb	1,920 fpm
Pressurization	5.8 psi
8,000-Foot Cabin	26,000 feet
Max Operating Altitude	30,000 feet
Max Cruise Speed	285 knots
Fuel Flow (max cruise)	360 pounds/hour
Fuel Flow (long range)	263 pounds/hour
Range (high speed, NBAA reserves)	1,560 nm
Range (long range, 1,000-pound payload)	1,768 nm
Landing Runway (over 50 feet)	1,830 feet
V _{MO}	240 knots/Mach 0.48
Stall Speed (MTOW)	67 knots



Top: The flashy Ferrari-inspired paint scheme on the PC-12 NG demonstrator blended well with the desert landscape.

Above: The dry lake bed we landed on was as solid as concrete, but the PT6A engine and Hartzell prop stirred up an impressive amount of dust.

SUPER VERSATILE TURBOPROP

While the PC-12 NG shines in unusual environments, such as dry lake beds, grass strips and on dirt, its missions are as varied as its paint schemes. The first customer of the versatile turboprop was the Royal Flying Doctor Service in Australia, which still provides medical services in remote areas, where it operates more than 30 PC-12s along with other types of airplanes. RFDS will add several PC-24s to its fleet once they are ready to deliver.

With its large cargo door and sizable cabin, the airplane is ideal for emergency medical transportation, but it can do so much more. The executive configuration can seat up to eight passengers in the back. Up to four of those seats are quickly removable for those who want to load up oversized items, such as mountain bikes, ATVs, wild game or whatever your perfect adventure requires.

The configuration options range from a full aft cargo area to up to nine seats in the back. Fractional-ownership company PlaneSense on the East Coast and membership airline Surf Air on the West Coast have seen great success with their PC-12 fleets.

And if that's not enough, the PC-12 is also being used for law enforcement, charter, airlines, special military missions and more. It's worth noting that 70 percent of RFDS's and the Royal Canadian Mounted Police's PC-12 missions are to unimproved fields, such as gravel runways and even frozen lakes.

But 25 to 30 percent of the PC-12 fleet belongs to owner-operators who use the airplane for missions as varied as the surfaces of Mother Earth.

is only about three minutes. However, the PC-12 can get down quickly, using emergency descent procedures. With power to idle, gear down and a target of 180 knots, the airplane would drop at 8,000 to 9,000 fpm. I had seen this in FlightSafety's simulator in Dallas a couple of years back, and since we didn't want to make our passengers uncomfortable, we didn't do a real-life test.

In flight, I "poked and pecked," as Johnson called it, my way around the Primus Apex to get more familiar with it. A few features stood out. Amending a route requires only a couple of clicks on the cursor control unit, and you can review a proposed route without committing to the switch. Jet routes and airways are really quick to enter too, and you can use either an identifier or the name of a waypoint for the exit point. Another terrific feature is the track-based synthetic-vision display, which puts the runway in the center during instrument approaches even in a strong crosswind.

In about an hour and 45 minutes, we had been transported from the hustle and bustle of Southern California to a completely different landscape, far from the light pollution of any city. I wished we had brought some camping gear, since this would be the ideal place to watch the Milky Way. And with the PC-12 you could live large while camping, fitting any gear you would like to bring. Well, perhaps not an RV, but you get the point.

Landing on the lake bed was smooth thanks to the 14 inches of travel on the trailing link landing gear. The brown-red-and-yellow paint scheme on N1677 blended in well with Utah's desert landscape. The BMW Designworks interior was a subtle tan color to match the lake bed, with supple leather covering the seats that move forward and aft, inboard and outboard, swivel, and recline. The armrests, headrests and lumbar support are adjustable.

Many manufacturers offer a small number of paint schemes and colors to keep the fleet uniform. Pilatus offers customization at no charge. Owners can choose from several paint schemes and interior setups. However, if they want to go completely haywire with the paint schemes — a design that requires an airbrush artist to come in, for example — there will be additional charges.

To reduce the spec process and make life easier for the customer, options are now offered in packages. The only avionics suite offered for the new PC-12 NG is the integrated Primus Apex system. There are, however, several options within Apex, such as different levels of database coverage, Internet service and satcom. Aspen's connected cockpit for Pilatus allows for worldwide database updates in about 15 to 20 minutes without the need to plug anything in.

Returning to civilization at the PC-12 NG's U.S. home at the Rocky Mountain Airport near Denver after our short Utah adventure, I was not surprised at the success the Swiss manufacturer has had with its flagship turboprop. Over its 23-year history, the PC-12 fleet has accumulated more than 6 million flight hours, and by the time you read this, Pilatus will have delivered its 1,500th PC-12. 