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quality—cultural traits that Pilatus flaps on with its "relentlessly Swiss" advertising slogans.

SimCom training

It had been several years since I'd flown a PC–12, so I signed up for pilot recurrency training at Pan Am SimCom's Scottsdale, Arizona, training center. The idea was to re-familiarize myself, check out SimCom's latest PC–12 simulator, and then fly on a delivery flight. The Pilatus factory is in Stans, Switzerland—a stone's throw from Luzerne—and Pilatus' U.S. facility is at Broomfield, Colorado's Jeffco Airport (KBJC). That's a trip of about 3,500 nautical miles—more than enough to relearn the PC–12's ropes. And re-fly the North Atlantic route I'd last flown in 2001.

push-button switchlights. The engine chip detector, which senses metal particles in the engine and annunciates a warning on the caution and warning system (CAWS) panel, also was redesigned to make in-flight warnings. Previously, chip annunciations would only show up when the airplane was on the ground. A rotary microphone switch now lets the crew immediately switch from the headset- to the oxygen-mask microphone; before, the pilot had to change the microphone plug from the "microphone" to the "mask" jack when the oxygen mask was donned. Another of the many improvements was an engine condition monitoring system (ECMS) that samples engine parameters every five seconds. This information

PHOTOGRAPHY BY MIKE FIZER

Pilatus *odyssey*

A brand-new PC–12, put through its paces

BY THOMAS A. HORNE

With total sales now pushing the 600 mark, Switzerland's Pilatus Business Aircraft Limited's PC–12 has proven to be one of the most popular turboprop singles ever. In 2004—the last year for which there are complete records—Pilatus sold 70 of these 1,200-shaft-horsepower, big-cabin multipurpose airplanes. The company expects it will have delivered 80 PC–12s in 2005, and projects upping its production rate to 90 airplanes per year in 2006.

The PC–12's size and ambiance account for much of its success. It can be configured for use as a 10-seat miniairliner; a pallet-eating cargo hauler; an air ambulance; and even what Pilatus calls its "Spectre" variant—a camera-toting surveillance platform for law enforcement, aerial mapping, and search-and-rescue purposes. But it's the executive version of the PC–12 that garners the most sales.

In this configuration, most customers opt for six seats, a refreshment center,

and a forward lavatory. The cabin's 17-foot length and 5-foot width make for gobs of legroom for those passengers who enjoy fully articulating, fashionable seats and interiors designed by BMW Designworks USA in San Diego. The cabin doors also give the PC–12 a definite Transport category look and feel. There's a big-jet-style airstair door up front, and a cavernous, push-button-operated cargo door in the aft fuselage. Massive aft baggage space, too. It all adds up to the impression of substance and quality—cultural traits that Pilatus harps on with its "relentlessly Swiss" advertising slogans.

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SimCom's Scottsdale site features a "series-10" PC–12 simulator; simulators for previous versions are at SimCom's Orlando, Florida, facility. The series-10 versions of the PC–12 kicked in with serial number 401 (the 301st PC–12, which was built in late 2001) and have a number of cockpit improvements. For example, the engine control; lamp, pusher, and fire-detection test; ice protection; and lighting switches—rocker switches located on the pilot's subpanel in series-9 airplanes—were moved to the overhead panel and made into push-button switchlights. The engine chip detector, which senses metal particles in the engine and annunciates a warning on the caution and warning system (CAWS) panel, also was redesigned to make in-flight warnings. Previously, chip annunciations would only show up when the airplane was on the ground. A rotary microphone switch now lets the crew immediately switch from the headset- to the oxygen-mask microphone; before, the pilot had to change the microphone plug from the "microphone" to the "mask" jack when the oxygen mask was donned. Another of the many improvements was an engine condition monitoring system (ECMS) that samples engine parameters every five seconds. This information

PHOTOGRAPHY BY MIKE FIZER

can then be downloaded to a laptop computer for engine trend analysis monitoring.

The three-day course began with a review of hot- and hung-start procedures, plus some engine-problem scenarios during takeoff. That's when you first get a good look at SimCom's excellent wraparound visual system. I found that it more than made up for the simulator's lack of motion. When the view outside begins to move, the psychosomatic cues kick in and your brain plays right along.

Pilatus' signature, a huge aft baggage door and forward lavatory.

Then it was time for some engine-out practice. While the PC–12's 1,200-shaft-horsepower Pratt & Whitney PT6A-67B engine has an exemplary reliability record, the airplane is still a single, so practice we must. Virtually all of the sessions began with my simulator instructor, Steve Drange, saying, "Now this has never happened in the real airplane." The first drills simulated a loss of power after takeoff. And that's when you realize one of the airplane's really strong suits: It's a great glider. Drange said that the PC–12 has a 2.7-to-1 power-off glide ratio at maximum gross weight—not bad at all for a 9,920-pound airplane. He chopped my power as I passed through 1,300 feet after takeoff; then I followed his advice: Keep the angle of attack (AOA) indicator—located on the left edge of the ship's Honeywell Bendix/King EFIS 40 electronic attitude direction indicator—centered for best-glide speed, then immediately roll into a 45-degree bank, extend flaps to the 15-degree position, hit the nonessential bus override switchlight (this provides power to the hydraulic power pack should the number-one generator go offline), then lower the landing gear when you've got the field made. It takes between 400 and 700 feet of altitude to turn around, and on all but one occasion (including a power loss at 400 feet agl) I made a successful 180-degree turn and landed on the runway with plenty of room.

Other low-altitude emergencies involved those that cause rapid pitch-downs. All have fast, simple fixes. For pitch or roll-trim runaways, for example, you hit the corresponding trim-interrupt switches on the center console. For an inadvertent stick-pusher (a stall-protection system that automatically lowers the nose when the stall angle of attack is detected) activation, hit the yoke-mounted pusher-interrupt push button.

The operation of the MOR (manual override) lever also takes some space in the curriculum. The MOR is for use in the very, very rare case when the conventional power lever is rendered inoperative. This has happened when air leaks occurred in the fuel control unit, causing engine power to roll back. To solve the problem, unstow the MOR lever (it's right next to the power lever) and slowly shove it forward. Soon, fuel flow is restored. In reality, reports indicate that this problem has happened only six times in the PC–12's history—with only one (successful) off-airport landing on a road.

Other simulated problems with rare real-life probabilities—generator failures, loss of cabin pressure, EFIS (electronic flight information system) failures, and more—followed, topped off with a realistic "smoke in the cockpit" drill. "Oh, I dropped my whiskey bottle," joked Drange. "And I think it fell into the avionics bay!" Soon, "smoke" issued from beneath the instrument panel and the vents. It didn't take but a second or two for me and my co-trainee—John Price—to don our oxygen masks and make an emergency descent. The "smoke" was created by a small amount of vegetable oil dropped onto a heating element, then blown through the cockpit by a small fan. Some simulations—such as an extreme short-field, soft-field (the PC–12 is approved for operations on unimproved runways) landing with an obstructed (i.e., a telephone pole) final approach—showed just how versatile the airplane can be.

The meat and potatoes of the sim sessions are many, many instrument approaches and procedures. I logged six ILS approaches (three to minimums, each with a missed approach and hold, plus one partial-panel approach), four back-course approaches, two VOR approaches, and three GPS approaches.

LSZC to BIRK

Pilatus' newly expanded factory is at the base of a mountain, hard by a two-lane highway in the small town of Stans and next to the Stans Airport (International Civil Aviation Organization identifier: LSZC. The L is the prefix used for airports in areas in the southern half of Europe). It was there that I met Urs Frischknecht, one of Pilatus' ferry pilots. We discussed the route we'd take, did a thorough preflight, then supervised the loading of the airplane's interior components—which are the standard-issue cabin seats and their associated gear, packed up in crates and footlockers. The interior would be installed in Colorado. Our airplane was serial number 658—the 558th PC–12—and our call sign would be PCH 658 for the duration of the trip. Meanwhile, the airplane's Swiss registration—HB-FSS—was painted on the tail.

Frischknecht set out the company rules for babying a new airplane. Instead of trusting the torque limiter, we'd set takeoff power by manual adjustment, rather than pushing the power lever full forward to the mechanical stop. Also,

PCH 658 had a ferry avionics suite that included a Bendix/King KLN 90B. During completion at Pilatus-U.S., most customers opt for dual Garmin 530s to go with this standard-issue Bendix/King EFIS 40 setup.

cruise power would be set so as not to exceed 720 degrees Celsius (the maximum continuous limit is 760 degrees). Finally, we'd avoid using reverse thrust after landing, to prevent accidental engine ingestion of any dirt or other debris.

PC–12s leave the factory with finished cockpits, but unfinished cabins and exteriors. The usual term for an airplane just rolled out of the factory is "green," a reference to the color of the chromate primer used as a base coat on so many new airplanes. But Pilatus paints its "green" airplanes white. And a look down the huge cabin revealed insulation panels, tiedown gear, the cargo, and not much more. The interior and paint job will be completed at Pilatus Business Aircraft's completion center, located next door to the U.S. corporate headquarters at Jeffco Airport.

Prestwick, Scotland, refueling stop.

Taxiing away from the factory, I spied the Hobbs meter: 2.2 hours. We waited for a break in the traffic, crossed the highway serving Stans—yes, we crossed a public road—then taxied to Stans' Runway 7L.

After that it was full power, wait for 80 knots, and rotate into a 1,200-fpm climb at the V_Y of 120 knots. The weather was severe-clear, so often a rarity in Europe—and especially welcome after days of flooding rains had brought much of central Europe to a standstill. We leveled first at Flight Level 180, then at our final cruise altitude of FL240. Up there, we wended our way to Prestwick, Scotland (EGPK—the E prefix being used in northern Europe), via the Willisau, Hochwald, Luxeuil, Rolampont, Boursonne, Brookmans Park, and Pole Hill VORs. All of this was entered into the ship's Bendix/King KLN 90B. That's the factory-issued GPS, and a Honeywell Bendix/King KMD 8000 Integrated Hazard Awareness System (IHAS) multifunction display, KFC 325 autopilot, EFIS 40, RDR 2000 weather radar, and dual KX 165A nav/coms helped round out PCH 658's panel. The KLN 90B, I was told, would most likely be swapped out for a Garmin GNS 530/430 GPS/nav/com setup during the completion at Jeffco. The 90B likely would be sent back to Stans for fitting on the next ship.

Up at FL240, we enjoyed a magnificent view. Paris, and its Charles de Gaulle and Le Bourget airports, and the White Cliffs of Dover slid by as we clocked a very respectable 289-knot groundspeed, thanks to a 33-knot tailwind. After we crossed the English Channel, though, the weather took a turn for the worse. A low northwest of

Scotland was sending a dense undercast our way. After Pole Hill, it was vectors for Prestwick's Runway 13 ILS/DME approach. But the weather wasn't at all bad by northern United Kingdom standards: 2,000 scattered, 7,000 broken in light rain, and 10-plus-kilometer visibility. Total time for this leg was three hours, 13 minutes.

Then it was time to file the flight plan and get the weather for the next leg to Iceland, gas up, add Prist (an anti-fungal and anti-icing spray additive) while fueling, and check the oil level. That's easy to do on a PC–12 because a sight glass measures oil level in green and red bands. It also indicates how many quarts low the engine might be. PCH 658's oil level was smack-dab in the middle of the green. The final preflight preparations included the donning of survival suits—a clumsy proposition in my case, since my rental suit was on the small side. Frischknecht, who was in the Swiss special forces and runs a parachute school—Para Centro (www.paracentro.ch)—in Locarno, slipped right into his custom-fit suit.

The 720-nm leg to the Reykjavik Airport (BIRK—the B prefix is used for Scandinavian airports) would take us three hours, thanks to strengthening headwinds at our cruise altitude of FL220. We turned in 250-knot true airspeeds, but the southerly winds gave us huge headwind and crosswind components—at one time the EFIS 40's electronic horizontal situation indicator showed a 62-knot direct crosswind! The route took us over Benbecula VOR, then RATSU Intersection, Ellidavatn NDB, and thereafter a descent into Reykjavik.

A few thoughts about this leg kept popping up in my mind, from my earlier days flying piston singles across the Atlantic at altitudes below 10,000 feet (sometimes well below). One was the way you'd be told "radar contact lost" as soon as you flew 100 or so miles away from Iceland or Scotland. Then, in anticipation of the inevitable loss of radio contact, you'd be issued the next frequency. Time would drag on, you'd hear other high-flying airplanes talking back and forth, and you'd wonder when you'd make contact with the next airspace controller. It's a very lonely feeling sometimes.

But it all goes away when your call-up is finally answered. Especially when Scottish Control calls you back. There's that lilt in the accent, and a native English speaker! And there's that strange quality to Scottish's radio transmissions. Once a ferry pilot made a little drawing in anticipation of talking to Scottish. It was a picture of a man's head yelling into a megaphone. He even made the wavy lines to indicate the yelling. And across the room was an old-fashioned microphone on a small table. "That's Scottish," he said with a smile. And he was right. The transmissions sound like someone far away, yelling across a tiled bathroom.

But on this flight, at a regal 24,000 feet, there are no line-of-sight problems with VHF radio transmissions. Radio contact is maintained all the way from Scotland to Iceland, and it would stay that way for the rest of the trip. On this leg, I looked down on the broken cumulus formations, up in clear, smooth air. In a piston single I'd be down in those clouds, fighting the turbulence and ice—probably without an autopilot. Not today!

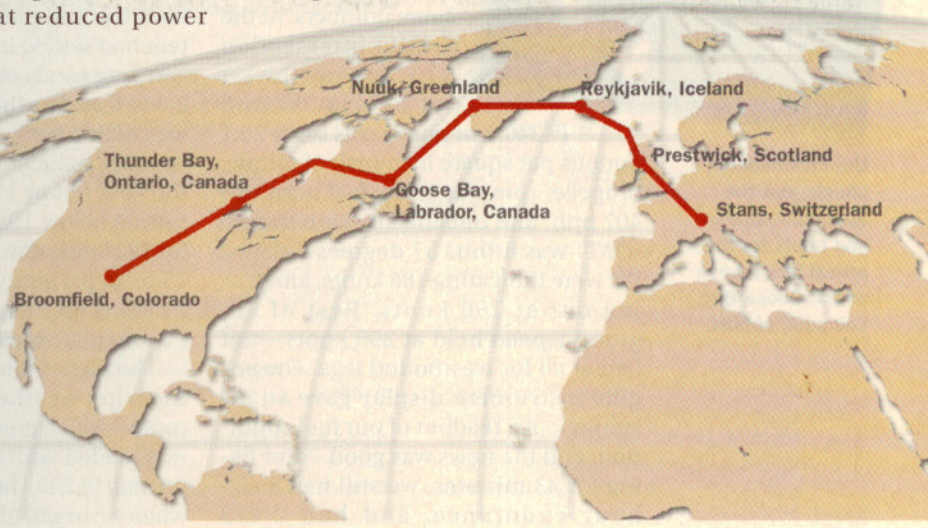
Our luck with the weather held in Reykjavik. It was 2,500 broken with 10-kilometer visibility and winds out of 330 at 10, gusting to 15. The landing on Runway 31 was a piece of cake. We rolled it on so nicely it hardly seemed like we touched down. The PC–12's trailing-link gear makes any landing a breeze. If you can land a Cessna 182, you can land a PC–12. In style. And in a good crosswind too.

The day ended with a stay in the Hotel Loftleidir, which offers a view of the ramp you just parked on. We turned in early, because we knew that the next day would be the hard day: Reykjavik to Thunder Bay, Ontario—a trip that usually takes two intermediate stops and consumes 11 hours of flight time.

On approach to the Nuuk, Greenland, airport (top), and a charter aircraft next to our refueling location at the base of Nuuk Tower.

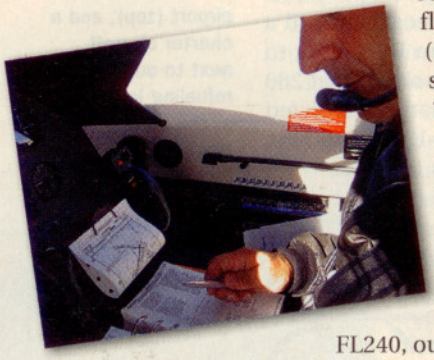
BIRK to CYQT to KBJC

By 7 a.m. the next day, the winds aloft forecasts posed a dilemma. Could we make it nonstop from Reykjavik to Goose Bay, Labrador, Canada? The PC–12 can cruise at 260 KTAS in the upper 20s, but the latest information predicted headwind components of 30 to 50 knots. PC–12s are nothing if not long-legged (nine-hour endurances and 2,000-nm ranges with IFR reserves are possible at reduced power



Most U.S.-bound PC–12s end up fitted out like this—with the roomy executive interior—as would PCH 658. A flat floor and ergonomically correct seats by BMW Designworks USA give passengers all the comforts you'd expect in a business jet costing much more.

settings), but this leg would be 1,400 nm, and if the winds were stronger than forecast we'd be faced with minimal fuel reserves—or worse—while crossing the Davis Strait in the home stretch. We decided to fly to Nuuk, Greenland, (BGGH) instead—a smallish airport some 770 nm away.



Urs Frischknecht checks out the approach plates and briefs for the arrival procedures at the Goose Bay, Labrador, airport.

That leg lasted three hours exactly. En route, I jotted down some numbers. At the GIMLI Intersection (192 nm northwest of Reykjavik) and FL240, our power was set at 30.1 pounds per square inch (psi) of torque; propeller rpm was 1,700; fuel burn was 407 pph; and outside air temperature (OAT) was minus 37 degrees Celsius. We were indicating 185 knots, and truing out at 260 knots. Best of all, groundspeed held at 259 knots—not bad at all for westbound legs. The engine instrument display gave an instantaneous readout of our fuel condition, and the news was good. After flying for 43 minutes, we still had a six-hour endurance, and had 2,453 pounds (about 366 gallons) of fuel still in the tanks. We would land with three hours of fuel reserves.

Nuuk, also known as Godthab, features a runway that is seemingly carved out of the side of a cliff. On our approach, a fog bank lurked off the departure end of the runway. After the landing, it slowly enveloped the airport during fueling, but slid up the fjord to clear the area for our departure.

The flight to Goose Bay Airport (CYYR) was another three-hour leg, and the eastern fringes of a large low-pressure system had settled into Labrador for our arrival. Goose was advertising winds out of the east and light rain, with ceilings at 2,400 feet. For the intercept to the ILS to Runway 8, power was dialed back to 33 psi, and airspeed went to 200 knots. Another reduction to 23 psi let the speed drop to 170. Drop the gear below 177 knots, lower the flaps to the 15-degree setting below 163 knots, then use power to adjust airspeed for 120 knots down the final approach course. On short final, 15 or so psi gets you around 100 knots, then it's a matter of bleeding off more speed for a touchdown at 80 knots or so. Piston single speeds, no?

The flight from Goose to Thunder Bay Airport (CYQT) was the trip's weather leg, hands down. The first part of this route—which crossed northern Ontario and the James Bay—was loaded with rime and mixed icing. In the initial climb, passing FL230, the OAT was at minus 12 degrees C, and that's when we began to pick up ice. The PC–12's minimum airspeed

for icing conditions is 130 knots indicated, or no slower than a centered AOA pointer. At that speed we climbed at a mere 300 fpm in our attempt to top the clouds. The inflatable deice boots worked well, first at the one-minute inflation interval, then at the three-minute interval, but the unprotected parts of PCH 658 collected enough ice to slow us down. Our opened inertial separator—a trap-doorlike flap that diverts ice and other particles away from the engine intake—also helped to rob us of some power. At FL280 it was minus 23 degrees and the ice wasn't building anymore. We were still in the clouds, but occasionally there were breaks. By the time we reached the James Bay, the system was sliding behind us.

That low-pressure system, by the way, was the last gasp of Hurricane Katrina. What started as a tropical vortex fed by warm seas finished its life as a Canadian icemaker!

There's not much to say about the rest of the leg, the arrival at Thunder Bay, and the final route to Jeffco. By the time we landed at balmy Jeffco, PCH 658 had 23.8 hours on the Hobbs meter. We'd spent 21.4 hours flying the crossing, and the airplane performed superbly. We'd flown each leg at near-maximum takeoff weights, averaged 260-knot groundspeeds (not bad at all for westbound legs across the North Atlantic), had no squawks, and at every destination we landed with at least three hours of fuel reserves. What's more, it was a comfortable ride, although I understand that new PC–12s will come with new Ipeco pilot seats that articulate and adjust to more positions, and include adjustable armrests, lumbar support, and thigh supports.

Other improvements to PC–12s starting with serial number 684 include a 540-pound hike in maximum gross takeoff weight; a corresponding increase of 350 nm in range with more than three passengers; aileron tabs for roll force reductions; a new winglet design for better crosswind control, and roll force and drag reduction; and a more streamlined dorsal fin for additional drag reduction. There will be changes to cabin lighting, too. Oh, and an $80,000 base price increase, to $2.792 million. That's the first price increase since 2001, Pilatus points out, in spite of a 26-percent drop in the value of the U.S. dollar against the Swiss franc.

What happened to the interior? Much of it is in those footlockers. Ferry aircraft come with this bare-bones look—shed in favor of a lux treatment at the Jeffco completion center.

Pilatus Business Aircraft's President Thomas Bosshard, Marketing Vice President Thomas Aniello, Marketing Manager Mike Haenggi, and Aircraft Project Coordinator Liz Williams were on hand to greet us as we taxied up to Pilatus headquarters. So was U.S. Customs, which made Frischknecht and me stay in the airplane until the agents were finished inspecting it—and our passports and paperwork. Then it was off to lunch and a minicelebration of the latest PC–12 delivery. On average, two airplanes a week make the journey from Stans to Jeffco.

Many thanks to Pilatus for yet another memorable crossing, and will the owner of serial number 658 please give me a call when you receive your airplane? I'd like to see the interior all dolled up, sans footlockers. AOPA

E-mail the author at tom.horne@aopa.org.

i Links to additional information about Pilatus PC–12s may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

SPECSHEET

Pilatus PC–12

Average equipped price: $2.979 million

Specifications

Powerplant.....Pratt & Whitney PT6A-67B, 1,200-shp
Recommended TBO .....3,500 hours
Length.....47 ft 3 in
Height .....14 ft
Wingspan .....53 ft 3 in
Wing area .....277.8 sq ft
Wing loading .....35.7 lb/sq ft
Power loading .....8.2 lb/shp
Seats 8-11
Cabin length (cockpit/cabin divider to rear bulkhead) .....16 ft 11 in
Cabin width .....5 ft
Cabin height .....4 ft 10 in
Standard empty weight .....5,867 lb
Max ramp weight .....9,965 lb
Max takeoff weight.....9,920 lb
Max useful load.....4,098 lb
Payload w/full fuel .....966 lb
Maximum landing weight.....9,920 lb
Fuel capacity, std.....
.....407 gal (402 gal usable)
2,704 lb (2,693 lb usable)
Baggage compartment volume.....40 cu ft
Cabin volume, weight limit...330 cu ft, 3,300 lb
Baggage area volume, weight limit.....
.....34.3 cu ft, 400 lb

Performance

Takeoff distance over 50-ft obstacle..2,300 ft
Max demonstrated crosswind component
Flaps 0.....30 kt
Flaps 15.....25 kt
Rate of climb, sea level, flaps 15.....200 fpm
Max cruise speed/range w/NBAA 100-nm alternate fuel rsv (fuel consumption)
@ High-speed cruise, 22,000 ft
.....270 kt/1,416 nm (399 pph/59 gph)
@ Max range setting, 30,000 ft .....
.....202 kt/1,953 nm (226 pph/34 gph)
Max operating altitude.....30,000 ft
Sea-level cabin .....13,200 ft
Landing distance over 50-ft obstacle .....
.....1,830 ft

Limiting and Recommended Airspeeds

V_R (rotation), flaps 15 .....79 KIAS
V_X (best angle of climb).....110 KIAS
V_Y (best rate of climb) .....120 KIAS
V_A (design maneuvering) .....170 KIAS
V_{FE} (max flap extended), flaps 15.....
.....163 KIAS
V_{LE} (max gear extended) .....236 KIAS
V_{LO} (max gear operating)
Extend .....177 KIAS
Retract .....177 KIAS
V_{MO} (max operating speed) .....236 KIAS
M_{MO} (max Mach number) .....Mach .48
V_{S1} (stall, clean) .....91 KIAS
V_{SO} (stall, in landing configuration).....
.....64 KIAS

For more information, contact Pilatus Business Aircraft Ltd, Jeffco Airport, 11755 Airport Way, Broomfield, Colorado 80021; telephone 303/465-9099; fax 303/465-9190; www.pilatus-aircraft.com.

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.