UNLEASH THE POWER OF YOUR PC-12
WITH A HIGH-EFFICIENCY COWLING SYSTEM

SPEED COWL BY AMERICAN AVIATION, INC.

Since its introduction in 1989, the Pilatus PC-12 has become the best-selling single engine turboprop. It has a reputation for reliability, operational flexibility, and performance. Pilatus continued to improve on its original design by increasing the useful load, engine performance, and even adding an integrated avionics package.

After analyzing the PC-12's stock cowling, the engineers at American Aviation, Inc. identified areas that could be improved—specifically the ram air inlet and internal ducting. This analysis led to the design and manufacture of Speed Cowl. The cutting-edge design combines a cowl inlet which maximizes the recovery of high-velocity ram air and internal ducting that is aerodynamic minimizing air separation and flow losses of the high-velocity air to the engine's plenum. This results in higher available torque at the same ITT settings, which significantly improves the performance of the Pratt & Whitney PT6A-67 turbine engine.

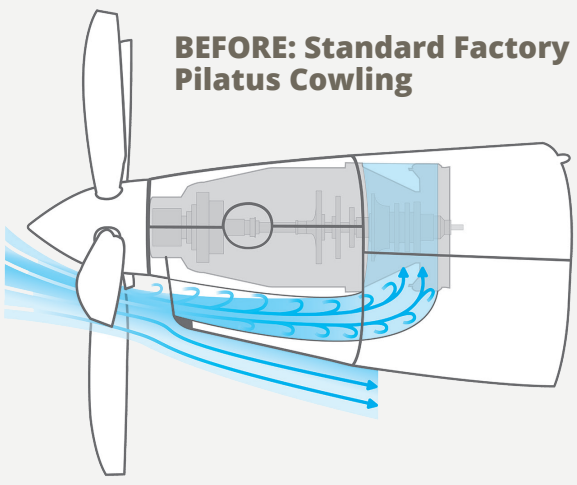
Speed Cowl has been flight tested in multiple flight configurations—climb, cruise at various altitudes, descent, with the inertial separator door open and closed—all at varied torque and ITT settings. During flight tests, the cruise true airspeed was shown to increase by up to 18 knots at FL280. Also, time to climb above FL180 was noticeably reduced due to the available torque increase. Performance improvements will depend on altitude, outside air temperature, and ITT settings.

INTERNAL AERODYNAMIC DESIGN

Internal Aerodynamic Design is a key factor in achieving optimal engine performance. The aerodynamic efficiency of the cowl inlet and ducting are measured on how well dynamic air pressure, created by the aircraft's velocity through the air, is captured at the cowl inlet and converted into static pressure around the engine's plenum. This static pressure is generally expressed as a percentage of what is known as ram air recovery. For instance, 100% ram air recovery would indicate that 100% of the dynamic air pressure is captured by cowl inlet and 100% of that is converted to static pressure at the engine's plenum. The higher the ram recovery percentage, the better the engine will perform.

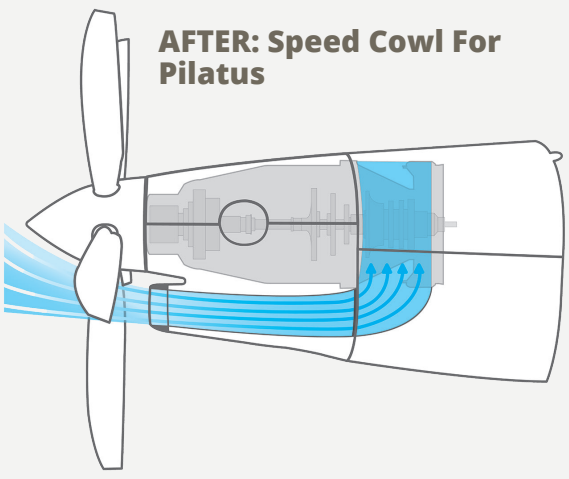
At a given interstage turbine temperature (ITT), there is a finite amount of energy that can be produced by a turboprop engine. This energy is shared by the two power absorbing sections of the engine—the compressor section, which compresses air for combustion, and the power section, which turns the propeller. By increasing the ram air recovery to the engine's plenum, less energy is used by the compressor section leaving more energy to drive the propeller.

BEFORE: Standard Factory Pilatus Cowling



Pressure from high-velocity ram air is reduced by turbulence caused by the shank of the propeller near the spinner. Also, the spinner directs much of the airflow to the lower lip of the inlet causing additional turbulence within the ducting. The result is a significant reduction in ram air recovery to the engine plenum.

AFTER: Speed Cowl For Pilatus



Pressure from high-velocity ram air is fully recovered at the cowl inlet and flows efficiently through the ducting to the engine plenum. This significantly increases ram air recovery to the engine plenum.

LET'S TALK PERFORMANCE

Ram air recovery percentage is the ratio of the measured static pressure around the engine's plenum compared to the dynamic pressure of the aircraft's velocity through the air. Higher ram air recovery percentage results in optimum engine performance. Here is the comparison:

Factory Cowling	Ram Air Recovery %
Climb	45.2%
Cruise	72.2%
Cruise w/ inertial separator open	22.2%

Speed Cowl	Ram Air Recovery %
Climb	99.9% (Increased by 54.7%)
Cruise	96.7% (Increased by 24.5%)
Cruise w/ inertial separator open	55.6% (Increased by 33.4%)

The improved ram air recovery produced by this new design dramatically increases aircraft performance. During climb, maximum torque (PSI) can be maintained longer. Transitional altitude, (the altitude where the PSI begins to drop off when maximum ITT is reached), is increased, allowing additional torque to be available throughout the remaining climb—resulting in reduced time to reach cruise altitude. At cruise altitude FL180 and above, a higher PSI can be maintained at normal ITT settings increasing the airspeed. Performance is also notably increased during flight into icing conditions with the inertial separator door open.

INSTALLATION

Speed Cowl is easily installed. First, remove the existing upper and lower engine cowling. Mount Speed Cowl to the fuselage making sure the exhaust outlet and inlet are aligned. Adjust the tension of the lower cowling latches as needed. Then, mount the top engine cowl to the Speed Cowl and adjust the tension of the upper cowling latches. Inspect the cowling for proper fit. The installation is complete.

Speed Cowl ships finished with a gray coat of primer paint, installation instructions, the STC paperwork and an inlet plug. An FAA approved repair station or certified mechanic with inspection authorization must complete and sign the installation and FAA paperwork and make the appropriate logbook entry. A copy of the STC must be added to the aircraft records, and the weight and balance must be recalculated and updated. Finish with paint to match the aircraft.

PLEASE NOTE

The initial price of Speed Cowl is $85,000. Speed Cowl was issued an FAA Supplemental Type Certificate (STC SA02651SE) on July 31st, 2019 for the Pilatus PC-12, PC-12/45, PC-12/47, and PC-12/47E. Performance improvements will depend on altitude, outside air temperature, and ITT settings.

EDMO

AMERICAN AVIATION INC

Speed Cowl is designed and manufactured by American Aviation, Inc. in Hayden Lake, ID and is distributed exclusively by EDMO Distributors, Inc. in Spokane, WA.
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