

# ENGINE UPGRADES

Up, Up and Away...

# Faster!

By Floyd Allen



An engine upgrade can improve your airplane's takeoff performance.

Since the dawn of time, man has wanted to go faster. The Greeks lauded and rewarded with olive wreaths the fastest man afoot at their Olympic games, horse racing became the “sport of kings,” Chuck Yeager took to the air in the Bell X-1 in October of 1947 to break the sound barrier, and

each year thousands of pilots/owners upgrade their engines.

“You have to remember,” Edwin Black, global sales director at Blackhawk Modifications in Waco, Texas, opened, “that one of the main reasons people own airplanes is to get to places faster. It only stands to reason that this desire

will prompt many pilots to make arrangements to get to places even faster once they have owned their airplane for a while.”

Black, whose company works with the Cessna 425 Conquest I and the Cessna 208B Caravan, can help pilots do just that. Armed with an STC from the FAA,



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the company replaces the Pratt & Whitney PT6A-112 with a Pratt & Whitney PT6A-135A in the Conquest I with most favorable results.

“With all things equal,” Black explained, “there is a 30 knots improvement from the 112 to the 135A, and that is a very positive difference.”

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Apparently, pilots agree with him. Thus far, Blackhawk has upgraded one of every five airplanes produced, raising the horsepower at the pilot's disposal from 450 to 750!

"The upgrade we offer," O & N Aircraft Modifications, Inc.'s owner, Myron Olson, shared, "doesn't offer quite the horsepower differential that Edwin's company does, but the results appear to be even better." O & N, which is located in Factoryville, Pennsylvania, while working with P210s and T210s, raises horsepower from 310 to 450 and increases speed by 50 knots. The new engine it installs is a turbine, which not only gives more power but tends to be more reliable, as well.

"When we replaced the engine in our 172 back in 2002," Phil Sanders, owner of Triple S Repairs in Kingman, Arizona, and a pilot for some 40 years, offered, "we went from 145 hp to a Franklin with 220 hp, which allowed us to increase in speed from 110 mph to 160 mph. Equally impressive," Sanders continued, "was the fact that our climb rate went from 500 fpm to 1,400 fpm."

"Phil's right," Parrish Traweek of PC Aircraft in San Manuel, Arizona, agreed. "When you put in a larger engine and get more power, it not only allows you to cruise at a higher rate of speed, but it gives better performance for liftoff and climb. At an airport with a shorter runway, this can be almost as important. Be

aware, though, that this increase in power may give you several things to consider that can, at first, be overlooked."

The issues that Traweek alluded to are, in fact, relatively subtle, but most important. For instance, if you put in a larger engine, you are adding weight to the craft and creating a situation where, theoretically, you could have a balance issue. Obviously, those firms and individuals that do the upgrade are aware of this and make the necessary alterations to compensate for the issue.

Another consideration Traweek mentioned was the fact that the larger engine and extra weight can affect the range you can expect when you fill up



With more power, cruising speed is increased, which allows you to reach your destination more quickly.



A good time to upgrade is when your current engine is ready for overhaul.

your tanks. “This can be offset by putting on larger tanks,” Traweek explained, “but you do want to keep this in mind if ‘range’ is a consideration in the flights that you typically make.”

Two other considerations that may enter into the decision of whether or not to upgrade are the cost and time factors.

“Well,” Sanders recalled, “when we changed out our engine back in ’02, the total cost was right around \$50,000. We had a number of modifications, but that was the total expense we incurred.”

“Phil makes a good point,” Black said. “When we make the conversion on the Conquest I, a pilot can expect to pay around \$600,000 for both engines. Now, since the engines are larger, this means that the entire front of the airplane gets revamped. The cost here includes all new components, including the props, and the fact that we recertify horsepower level for the airframe.”

Olson said his upgrade is similar in nature. The cost, which is in the \$900,000 range, includes the fact that everything in front of the firewall will be new. Further,

the pilot gets new paint, a new interior, and new air conditioning, as well.

The time needed to accomplish an upgrade varies according to the craft and engines being dealt with. This can range anywhere from a couple of weeks to two to three months.

Now that you know a little about the cost and time investments, when should one consider making an engine upgrade?

“Well, I would certainly suggest that you don’t wait until your current engine goes bad,” Olson suggested.

“No doubt,” Black interjected, a big smile in his voice. “At Blackhawk, we feel that there are a couple of times when you should seriously consider an upgrade.” Black’s first suggestion is to upgrade when you simply need more power to allow your airplane to do more of what you bought it for.

“I hear that,” Traweek agreed. “I haven’t met a pilot yet, even those who are flying

F-16s, who don’t want more power!”

“Sometimes,” Sanders offered, “the power is not just wanted, but needed. The climatic conditions here in the Southwest create the concern of ‘density altitude,’ and the extra power improves the safety factor at takeoff.”

Another ideal time to consider an upgrade is when the original engine approaches its overhaul inspection time.

“In the case of the Conquest I,” Black explained, “it can easily cost \$400,000 to overhaul both engines. For \$600,000, you can have two brand new, and superior, engines.”

The realization that upgrading may very well be a better investment than simply overhauling is exemplified by the fact that, in the past nearly 30 years, Blackhawk Modifications has accomplished some 300



A benefit of a larger engine is a faster rate of climb.

aircraft alterations and expects to do another 60 or so this year; since 1994, O & N Aircraft Modifications, Inc. has done more than 100!

So, if you want to experience the thrill of additional thrust, want to increase the safety factor at takeoff, want to cruise at a higher rate of speed, or want to increase the overall performance of your airplane, an engine upgrade may be for you. ✈️

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