FINANCIAL ANALYSIS

OF THE BLACKHAWK KING AIR 200
SUPER XP_{61} ENGINE UPGRADE

INTRODUCTION

Blackhawk Modifications, Inc. has an engine modification program to upgrade the PT6A-41 engine of the King Air 200 to a PT6A-61 engine. This engine upgrade offers several advantages

- More power at altitude
- Faster cruise speed at altitude
- Potential for enhanced resale value

The PT6A-61 conversion may include the optional Raisbeck EPIC package. More information on the Raisbeck modifications can be found by contacting Blackhawk or by visiting the Raisbeck web site at www.raisbeck.com.

Note: The costs and assumptions used are typical estimates based on known costs and market conditions. These calculations do not represent any financial guarantee of return.

600 NM Trip	King Air 200	Blackhawk King Air 200 Super XP_{61}
Engine	**PT6A-41**	**PT6A-61**
Raisbeck Mods	No	Yes=EPIC
Altitude	FL 260	FL 280
Temperature	ISA	ISA
Power Setting	Normal	Normal
RPM	1900 RPM	1800 RPM
Cruise Speed at Altitude (KTAS)	*264*	*307*
Fuel Flow at Altitude (GPH)	91	101
Trip Time	*2 hr 16.2 min*	*2 hr 3.6 min*
For 100,000 NM Utilization per Year		
Flight Hours per Year	378.3	343.3
Gallons Fuel Used per Year	34,425	34,673
Cost per NM	$4.47	$3.96

Even though the fuel burn is slightly higher with the XP61, the cost per NM is 11% less.

ENHANCED PERFORMANCE

At cruise, the PT6A-41 produces 2,230 ft/lbs torque up to 14,000 feet[1]. The PT6A-6[1] engine generates the maximum 2,230 ft/lbs torque up to 26,000 feet[2]. This added torque manifests itself in faster climbs, higher cruise speeds and better take-off performance on significantly warmer than standard days.

We calculated a 600 NM trip with four passengers and NBAA IFR fuel reserves for a 200 NM alternate. Cruise altitude was 26,000 feet at 1800 RPM. The trip was calculated based upon the standard operating performance of the King Air 200.

The PT6A-61 powered King Airs, with their more powerful engines, can easily fly the trip at 28,000 feet with a power setting of 1800 RPM and normal cruise. At this altitude and power setting, the KA 200 is flying at almost its M_{mo} speed.

With the engine modification and the additional performance of the Raisbeck enhanced performance, the modified King Air cruises 43 knots faster compared to a standard King Air 200.

[1] Beechcraft Super King Air 200/200C performance, page 5-65
[2] Engineering data for Maximum Cruise, 1700 RPM, ISA conditions.

OPERATING COSTS

While the PT6A-61 engines offer more power, it comes without increasing the nominal Hot Section Inspection and Overhaul budget.

ENGINE SET-ASIDE

PT6A-41	Cost	Interval	
Mid-life	$34,500	1500 hrs	
2nd or 3rd Overhaul	$375,000	3000 hrs	
Total for two engines	$819,500		$273.16 per hour set-aside

Blackhawk Super XP_{61}	Cost	Interval	
Mid-life	$40,000	1800 hrs	
1st Overhaul	$325,000	3600 hrs	
Total for two engines	$730,000		$202.78 per hour set-aside

Using the *Conklin & de Decker Life Cycle Cost* data, we calculated the average hourly costs for a King Air 200 with and without the modifications using hourly set aside above. This then assumes the PT6A-41 engines have been accruing for their LLP since new.

The costs calculated were 10-year averages for the following items:

- **Fuel.** Fuel burn was calculated for a 600 nautical mile trip using the manufacturer's aircraft performance manuals. It was assumed that four passengers plus bags (200 lb each) were on board, fuel reserves were based upon an NBAA IFR 200 NM alternate. Standard conditions (ISA), no-wind were used.
- **Maintenance Labor.** This is the labor required to accomplish scheduled and unscheduled maintenance on this aircraft.
- **Parts.** This is the cost of parts required to accomplish all unscheduled and minor scheduled maintenance on this aircraft.
- **Inspections.** This covers set-asides for the estimated cost of major airframe inspections.
- **Engine Restoral.** The hourly set-aside allowance for the engine Hot Section Inspection and Overhaul at TBO.
- **Parts Guaranteed Mx Plan.** N.A.
- **Airframe Guaranteed Mx Plan.** N.A.
- **Avionics Guaranteed Mx Plan.** N.A.
- **Component Overhaul (All).** This covers set-asides for the estimated cost of major component overhauls. This includes the propellers.
- **Life Limited Components (All).** This covers set-asides for the estimated cost of major life limited components.

The average *Non-fuel Variable Costs* were calculated and then the fuel savings were calculated separately. The variable costs are detailed in Appendix A and are:

	King Air 200	Blackhawk Super XP_{61}
Non Fuel Cost/Flight Hour	$783.65	$659.07

WHEN TO DO THE CONVERSION?

The typical cost of the Blackhawk Super XP61 conversion is $895,000 installed (engines plus installation parts & labor). This price also includes the trade-in value of the PT6A-41 engine cores. Avoided would be the $819,000 overhaul expense of the PT6A-41 engines.

Conversion at Overhaul

(2) PT6A-41 overhaul avoided	($819,000)
(2) PT6A-61 conversions	$895,000
Net Cost	**$76,000**

At overhaul, the net cost to the King Air 200 owner is $76,000. Plus the PT6A-61 engines come with the full new warranty.

If done prior to overhaul, Blackhawk offers a $50 per engine hour credit for the time remaining until overhaul. Assuming the conversion is done at mid-life:

Conversion at Mid-life

(2) PT6A-41 mid-life avoided	($69,000)
$50/hr Engine credit	($150,000)
(2) PT6A-61 conversions	$895,000
Net Cost	**$676,000**

If done at mid-life, the net cost to the King Air 200 owner is $676,000. Plus the PT6A-61 engines come with the full new warranty.

While the cost seems substantial compared to waiting until the PT6A-41 overhauls are due, these costs and savings ignore the added value in the market of a PT6A-61 powered King Air 200 and substantial yearly operational savings.

Fuel Cost/Gallon	$4.36
King Air 200-41	
NM Flown/Year	100,000 NM
Hours	378.3 hrs
Variable cost/hr—no fuel *(Maintenance reserves, misc. costs)*	$783.65
Fuel cost/hr (91 gph)	$396.76
Average variable cost/hr	**$1,180.41**
TOTAL variable Cost/year	**$446,549**
King Air 200 Blackhawk Super XP_{61}	
NM Flown/Year	100,000 NM
Hours	343.3 hrs
Speed Advantage at Cruise	43 KTAS
Variable cost/hr—no fuel *(Maintenance reserves, misc. costs)*	$713.98
Fuel cost/hr (101 gph)	$440.36
Average variable cost/hr	**$1,154.34**
TOTAL variable cost/year	**$396,284**
Annual Operating Cost Savings	
Stock vs. Blackhawk Super XP_{61}	**$50,265**

With the Blackhawk engine conversions on the King Air 200, expected annual operating cost savings is $50,265. Even though it takes more fuel to gain the added speed and power of the PT6A-61 engine, the cost per nautical mile is less due to fewer hours accumulated.

POTENTIAL FOR ADDED RESALE VALUE

The Blackhawk 200 program is still relatively new. There have been enough sales of the King Air 200_{XP} and $C90_{XP}$ conversions to draw a conclusion.

A popular aircraft value reference, *Vref,* in their appraisal points for the King Air C90 adds $625,000 to the aircraft value for Blackhawk conversion[3]. That price happens to be the *full cost of the conversion* with no discount. For the 200 engine conversion, Vref adds **$895,000** for the Blackhawk Super XP61 engine conversions. We used this enhanced value as the baseline for our calculations.

[3] *Vref* for Windows, 2009 — Spring 2009.

It is not reasonable to assume that an operator will perform the conversion just to sell their King Air immediately afterwards. However, if required, there is a very high likelihood of enhanced value should that occur.

For the Return on Investment analysis we used the following considerations:

- Conversion at mid-life with a net conversion cost of $676,000.
- Four years operation at 100,000 NM per year with operating cost savings.
- A reduction in the enhanced value of the King Air 200's added value of 5% per year estimated market depreciation (i.e. the added value of the conversion declines at 5% per year).

Return on Investment	Blackhawk Super XP$_{61}$	Total Operating Cost Savings	Return
Enhanced value			
At Conversion	$895,000		
After Year 1	$850,250	$77,755	$928,005
After Year 2	$807,738	$155,510	$963,248
After Year 3	$767,351	$233,265	$1,000,616
After Year 4	$728,983	$311,020	$1,040,003
		Initial Investment	($676,000)
		Added Residual Value	$728,983
		Operating Costs Saved	$311,020
		Excess return over initial investment if converted at mid-life	**$364,003**

CONCLUSION

Our analysis shows that for a King Air 200 operator whose next engine overhaul is due, an engine upgrade to the PT6A-61 is the preferred alternative in terms of aircraft performance and cost. The operator need not wait until that overhaul to realize the financial advantages of this program, which are significant.

APPENDIX A KING AIR 200 VS. BLACKHAWK SUPER XP_{61}

Direct Cost (average)	Used Hawker Beech King Air 200	Used Hawker Beech King Air 200 Blackhawk Super XP_{61} with EPIC
Fuel	$396.76	$440.36
Fuel Additives/Lubicants	-	-
Maintenance Labor	$242.31	$242.31
Parts	$188.15	$188.15
Inspections	$48.06	$48.06
Engine Restoral	$273.16	$202.78
Engine Guaranteed Mx Plan	-	-
Part Guaranteed Mx Plan	-	-
Airframe Guaranteed Mx Plan	-	-
Avionics Guaranteed Mx Plan	-	-
Component Overhaul (all)	$19.65	$20.01
Life Limited Components (all)	$12.32	$12.67
Other Services	-	-
Flight HourCost	-	-
Fixed Cost	-	-
Landing/Parking Fees	-	-
Crew Expenses	-	-
Small Supplies	-	-
Total Direct Cost per Hour/10 yr. avg.	**$1,180.41**	**$1,154.34**

Calculated with Conklin & de Decker Aircraft Cost Evaluator (Win)
Type of Operation: Corporate; Program Length: 10 years