KING AIR C90GTi


PHENOM 100

CITATION MUSTANG

King Air C90GTi

How does a turbo compare with a jet? **by Michael Chase**

In this month's Aircraft Comparative Analysis, we provide information on a mixture of pre-owned business turboprops and jets in the $2.8-$3.6 million range with the purpose of valuing the pre-owned Hawker Beechcraft King Air C90GTi aircraft - a twin-engined business turboprop aircraft.

Can a business turboprop compete against the entry level business jet? We'll consider the productivity parameters - payload/range, speed and cabin size, and also cover current and future market values. The field in this study includes two business jets from last month's Comparative Analysis, the Cessna Citation Mustang and the Embraer Phenom 100.

BRIEF HISTORY

The King Air family has been in continuous production since 1964 - the longest production run of any civilian turboprop aircraft in its class, outlasting all of its previous competitors.

The line comprises a number of models. The Model 90 King Air was conceived as the Model 120 in 1961. In May 1963, Beechcraft began test flights of the proof-of-concept Model 87, a modified Queen Air with Pratt & Whitney Canada PT6A-6 engines.

The Model C90 was introduced in 1971. ›

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Raisbeck: The Leader in Performance and Payload Upgrades for C90GTi

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RAISBECK ENGINEERING

TABLE A – PAYLOAD & RANGE

Model	MTOW (lb)	MAX Fuel (lb)	MAX Payload (lb)	Avail Payload w/Max Fuel (lb)	MAX Fuel Range (nm)	MAX Payload w/available Fuel IFR Range (nm)
King Air C90GTi	10,100	2,573	2,032	437	981	178
Citation Mustang	8,645	2,580	1,200	600	n/a	716
Phenom 100	10,472	2,804	1,312	580	1,245	711

DATA FROM CONKLIN & DE DECKER, JETNET & B&CA, MAY & AUG 2009 OPS PLANNING GUIDE

CHART A – CABIN VOLUME

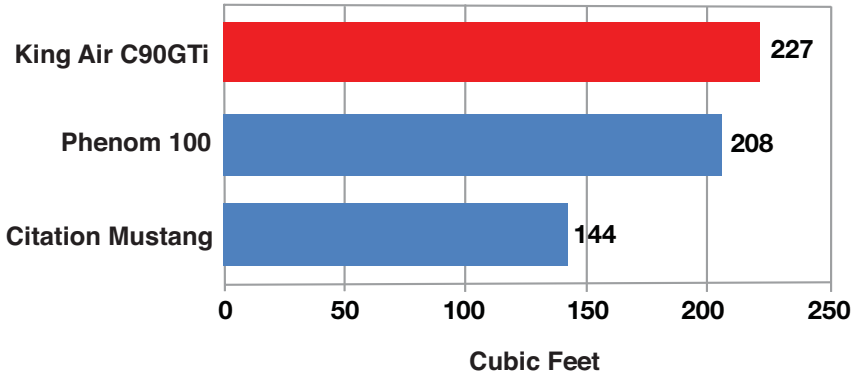
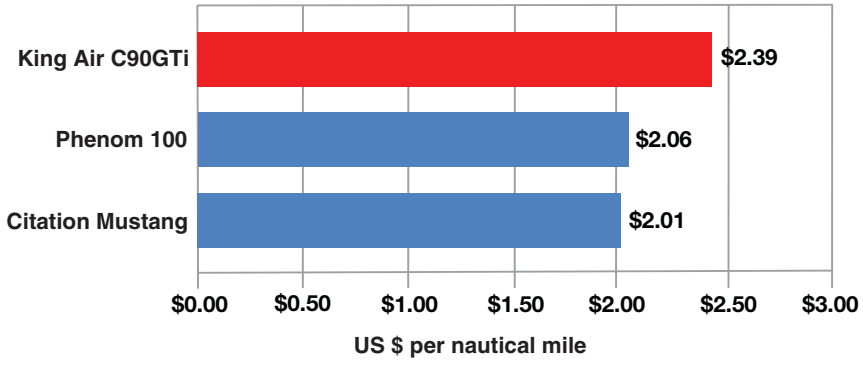


CHART B – COST PER MILE*



* 1,000 nm mission, 800lbs payload

The C90 changes over earlier models included: wingspan increase (by 4ft, 11in); MTOW increase (by 350 lbs); PT6A-20A engines.

In July 2005, Beechcraft introduced the C90GT. The C90GT was fitted with 750shp PT6A-135As, flat rated to the same 550shp as the earlier King Airs. This engine change increased performance due to lower operating temperatures, improving both cruise speed and climb rate. C90GT deliveries commenced at the beginning of 2006.

Then in 2007, Beechcraft announced the Model C90GTi, the updated version of the C90GT, featuring the Rockwell Collins Proline 21 avionics package previously only offered for the B200 and B300 King Airs. Deliveries commenced in 2008 after 97 C90GTs were delivered to customers during the previous two years.

Today, the C90GTi, powered by two PT6A-135A engines and the Collins Pro Line 21 Avionics suite (with three 8x10' LCDs), also includes a 48 cubic feet in-flight accessible, pressurized and heated baggage area plus a private aft lavatory.

PAYLOAD AND RANGE

The data contained in **Table A** (top, left) is published in the B&CA, May 2009 issue, but is also sourced from Conklin & de Decker. As we mentioned in past articles, a potential operator should focus on payload capability as a key factor. The King Air C90GTi 'Available payload with Maximum Fuel' at 437 lbs compares to 580 pounds for the Phenom 100 and 600 pounds for the Cessna Mustang aircraft.

CABIN VOLUME

According to Conklin & de Decker, the cabin volume of the King Air C90GTi at 227 cubic feet is the largest in the field compared to the Phenom 100's at 208 cubic feet, and is over 50% larger than the Citation Mustang at 144 cubic feet (see **Chart A,** centre, left).

POWERPLANT DETAILS

As mentioned previously, the King Air C90GTi is powered by two Pratt & Whitney Canada PT6A-135A engines. The other aircraft in the field are also powered by P&WC.

Using data published in the May 2009 B&CA Planning and Purchasing Handbook and the August 2009 B&CA Operations Planning Guide we will compare our aircraft. The nationwide average Jet-A fuel cost used from the August 2009 edition was $4.25 per gallon at press time, so for the sake of comparison we'll chart the numbers as published.

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COST PER MILE COMPARISONS

Chart B (bottom, left), which details 'Cost per Mile', compares the King Air C90GTi to its competition factoring direct costs and with all aircraft flying a 1,000nm mission with an 800 pound (four passengers) payload. The King Air C90GTi at $2.39 cost per mile is more expensive to operate than the Phenom 100 (at $2.06) and the Mustang (at $2.01) per mile.

TOTAL VARIABLE COST COMPARISONS

The 'Total Variable Cost', illustrated in **Chart C** (top, right), is defined as the cost of Fuel Expense, Maintenance Labor Expense, Scheduled Parts Expense, and Miscellaneous trip expense. The total variable cost for the King Air C90GTi at $610 is less than the Phenom 100 at $672, but more than the Mustang at $606 per hour.

PRODUCTIVITY COMPARISONS

The points in **Chart D,** (centre, right) center on the same aircraft. Pricing used in the vertical axis is as published in the B&CA August 2009 Operations Planning Guide and Vref. The productivity index requires further discussion in that the factors used can be somewhat arbitrary.

Productivity can be defined (and it is here) as the multiple of three factors:

1. Range with full payload and available fuel;
2. The long range cruise speed flown to achieve that range;
3. The cabin volume available for passengers and amenities.

The result is a very large number so for the purpose of charting, each result is divided by one billion. The examples plotted are confined to the aircraft in this study.

A computed curve fit on this plot would not be very tight, but when all business aircraft are considered the "r" squared factor would equal a number above 0.9. Others may choose different parameters, but serious business aircraft buyers are usually impressed with Price, Range, Speed and Cabin Size.

After consideration of the Price, Range, Speed and Cabin Size, we can conclude that the King Air C90GTi Business Turboprop as shown in the productivity index (Chart D) is productive among the two Entry Level business jet in this comparative field. With a 270kts cruise speed, the C90GTi is competitive with the new generation of Very Light Jets over short to medium distances, while providing a larger cabin.

CHART C – VARIABLE COST

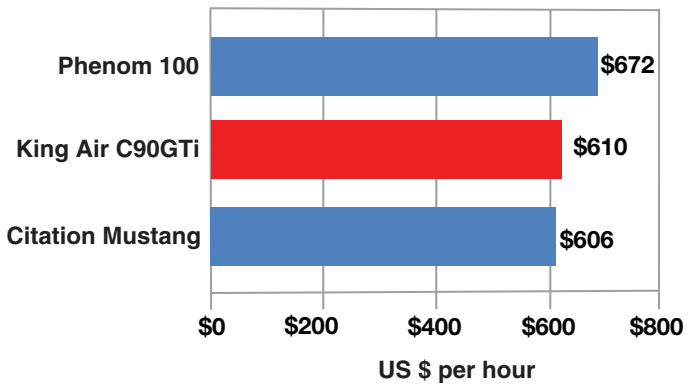

CHART D – PRODUCTIVITY

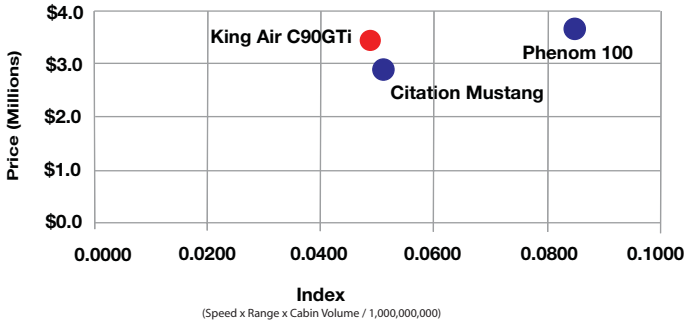

TABLE B – COMPARISON TABLE

Model	Max Cruise	Cabin Volume CuFt	Max P/L w/avail Fuel Range (nm)	Vref Retail Price $M New	In - Operation	% For Sale
King Air C90GTi	270	227	437	$3.3m	92	3.2%
Citation Mustang	340	144	600	$2.8m	238	6.7%
Phenom 100	390	208	580	$3.6m	50	4%

DATA COURTESY OF CONKLIN & DE DECKER; ORLEANS, MA, USA; JETNET; 2009 OPERATIONS PLANNING GUIDE B&CA AUG. 2009

Table B, (bottom of previous page) contains the average retail prices from Vref for each aircraft. The average speed, cabin volume and maximum payload values are from Conklin & de Decker and B&CA magazine. The number of aircraft in-operation and percentage "For Sale" are from JETNET as of the end of October 2009.

LOCATION BY CONTINENT

The major based-at locations for the King Air C90GTi are in North and South America, where a combined 78% of the fleet resides, see **Table C** (top right), and Europe, where a further 16.3% of the fleet is based.

SUMMARY

Within the preceding paragraphs we have touched upon several of the attributes that business aircraft operators value. There are other qualities such as airport performance, terminal area performance, time to climb performance, and maximum transition altitude levels that might factor in a buying decision, too, however.

The Hawker Beechcraft King Air C90GTi fares well among its competition - depending on mission requirements, so those operators in the market should find the preceding comparison of value. Our expectations are that the King Air aircraft will continue to do very well in the pre-owned market. ■

TABLE C – LOCATION OF AIRCRAFT BY CONTINENT

LOCATION OF AIRCRAFT BY CONTINENT							
MAKE/ MODEL	AFRICA	ASIA	OCEANIA	EUROPE	N. AMERICA	S. AMERICA	TOTAL
King Air C90GTi	2	2	1	15	49	23	92
Percentage of Fleet	2.2%	2.2%	1%	16.3%	53.3%	25%	100%

› **For more information:**

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KING AIR C90GTi UPGRADE

As many in the industry will know, upgrade options exist for the King Air C90GTi, enhancing some of its numbers to make it even more competitive within its field. Further to offering highly competitive performance over short and medium distances, the Raisbeck EPIC modified C90GTi offers enhanced overall operational flexibility with increased airports the aircraft can operate into and out of, and more payload offered - narrowing some of the advantages entry level jets offer.

Raisbeck Engineering's EPIC package includes four-blade Quiet Turbofan Propellers (performance props); Dual Aft Body Strakes; Gross Weight increase (see right); AFMS; and optional Crown Wing Locker System; all systems also being available separately (although only the EPIC package includes the new AFMS).

Currently, there are two fully equipped Raisbeck EPIC C90GTi aircraft in operation (Raisbeck's props were just certified recently, with EASA certification expected imminently at print time). Many C90GTi operators also have one or more Raisbeck systems installed on their aircraft. Raisbeck is in Vref and Bluebook for its installed price, thus, it says, raising the aircraft value accordingly.

› **More information from www.raisbeck.com**

The table below outlines the 'before and after' performance numbers of a C90GTi with an EPIC upgrade:

KING AIR C90GTi	BEFORE UPGRADE	AFTER UPGRADE
MTOW (lbs)	10,100lbs	10,500 lbs
Max Fuel (lbs)	2,573lbs	2,573 lbs
Max Payload (lbs)	2,032lbs	2,432 lbs
Avail payload w/ Max Fuel	437 lbs	837 lbs
Max Fuel Range (nm)	981 nm	1,124 nm
Max payload w/avail. Fuel IFR Range (nm)	178 nm	406 nm
Take off Distance over 50ft @ MTOW	2,400ft	2,110ft (EPIC)
Cabin Volume	227 Cu Ft	244 cubic feet (w/Crown Wing Locker System)
Max Cruise Speed	270 kts	270 kts
Hourly Operating Cost*	$2.39	$2.39
Variable Hourly Cost	$610	$610

* 1,000NM MISSION WITH AN 800 LBS PAYLOAD.