Business & commercial Aviation
OPERATOR SURVEY

Operator Survey: Beechjet 400A

Comfort, speed and Collins avionics earn accolades. Parts costs, quality control growing pains and ECS draw sharp rebukes.

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Business airplanes inevitably are a tradeoff between passenger comfort, airplane performance and operating cost. People who operate Beechjet 400A airplanes generally believe they have opted for the best blend of these qualities in a light jet.

Beech Aircraft's very own, made in Wichita business jet is now more than two years old and the operators with whom we spoke generally accord it high marks. Every-day flyers pointed out that the generous cabin affords passengers more usable room than its competitors. They also like its 400-plus-knot cruise speed and its ability to climb directly to FL 410 when fully loaded.

Pilots rave about the Beechjet 400A's Collins Pro Line 4 integrated avionics package, commenting that the large format display tubes and FMS 850 flight management package make the airplane easier to fly than most other light jets.

The refinements found in the Beechjet 400A, though, are the product of many years of honing this jewel-in-the-rough into its present form. The process has been an ongoing challenge, actually having its origins in Beech's approach to marketing business jet aircraft.

Beech wanted a business jet to call its own for more than 25 years. However, the firm elected to concentrate on becoming the dominant manufacturer of turboprops.

Therefore, the company decided to look into adopting a jet instead of creating one from scratch. The firm briefly flirted with French and British business jet makers in the 1960s and 1970s before settling into a serious courtship with Mitsubishi in the mid-1980s. The effort culminated with Beech acquiring Mitsubishi's MU 300 Diamond in 1985.

This venture would prove to be quite a challenge for the airplane's new parent, because the original Diamond design didn't have the range, performance or cabin configuration to be competitive with its cross-town rivals made by Learjet and Cessna.

Role reversal between American and Japanese companies is most unusual. Usually it's the Americans who invent some hot new technology that the Japanese subsequently wind up perfecting for the consumer. Such was not the case with the Diamond. Mitsubishi had prodigious engineering and heavy manufacturing capabilities, but lacked the expertise to build a competitive light business jet. Beech would take on this role, focusing its assets and experience on transforming its newly adopted progeny into a mature airplane.

How well has Beech done? We talked to about one-third of the firms that have operated Beechjet 400As during the past two-plus years. Here is what operators told us.

COMFORT AND PERFORMANCE

As previously mentioned, there is near unanimous praise from the Beechjet 400A operators with whom we spoke regarding the generous cabin space for the

passengers. Beech didn't make the 400A's interior any larger than those of previous versions of the airplane, but the firm's designers reworked the interior to make much better use of the available space. Beech also changed the fuselage fuel tank configuration to create more interior room for the passengers.

Earlier Diamond and Beechjet 400 airplanes typically were configured with a three-place aft divan, center club section and a forward lavatory. Beech reconfigured the cabin to accommodate club and three-quarter seating, as shown in the interior diagrams and photographs. The lavatory was moved to the aft section of the cabin. The lavatory seat in all 400A airplanes is equipped with a seat belt and certified as a passenger seat.

The club and three-quarters is the most popular cabin configuration, according to our survey, but Beech also offers seven and nine passenger seat interiors as well as the popular eight seat floor plan.

Operators were quick to comment about the cabin's oval shape, saying that it provided more room for passengers than the more circular cross section of a Learjet or a Citation.

Many operators surprised us with reports of average passenger load factors of five to seven people, an unusually high number for a light jet. Most others reported an average load factor of three to four people, about what we expected in this class of aircraft.

Beechjet 400A airplanes are used for relatively short trips. Most respondents said they fly 350- to 500-nm legs, with block times of 1+00 to 1+30. On short trips, operators report that they climb into the high 30s for cruise and block the aircraft at 400 knots true. Longer trips allow operators to climb into the low 40s and result in block speeds of about 420 knots.

The Beechjet 400A has enough fuel and speed to fly more than 1,600 nm with reserves, but most operators said they are more comfortable planning trips no longer than 1,200 to 1,350 nm. They reported average fuel burns from about 1,250 to 1,350 pph.

People who operate the 400A say the airplane lives up to their performance expectations and that the aircraft meets or exceeds the flight manual projections.

BEECHJET 400A VS. COMPETITION

According to survey respondents, the Beechjet 400A's main competitors are the Citation II and V, and 30-series Learjets. Cabin volume was most often cited as the reason they bought the Beechjet 400A, but many who looked at the Citation II and even the peppy Citation V wanted more speed. One operator crowed, "The 400A will run the wheels off a Citation."

In truth, a Beechjet 400A saves about eight to 10 minutes on a typical 400-nm mission compared to a Citation II and beats a Citation V by five to seven minutes over the same distance. Its 400knot cruise speed can shave more than 30 minutes from long-range trips compared to a Citation II and it can arrive as much as 15 minutes sooner than a Citation V. It also burns less fuel than either of the Citations.

The Beechjet 400A's cruise speed is closer to that of a 30-series Learjet, but its Pratt & Whitney Canada JT15D-5 engines burn more fuel than the miserly AlliedSignal TFE731 turbofans of the Learjets.

Comments of many operators reflect their previous business aircraft operating experience. Former users of smaller airplanes raved about the 400A's Collins Pro Line 4 avionics. They especially liked the large format EFIS displays. One said tongue in check, "The [primary flight] display ruins my instrument scan. Everything I need to watch is in one place."

(The Beechjet 400A's standard avionics package is fitted with a two-tube EFIS that has a combination Electronic Attitude Director Indicator/Horizontal Situation Indicator flanked by separate altimeter and airspeed instruments. The optional three- and four-tube configurations come with left- and right-side Primary Flight Displays with integral air data read-outs.)

Respondents also liked the Collins FMS 850 flight management system and the hand-eye coordination design of the Pro Line 4 avionics package as configured for the Beechjet 400A. Cockpit engineers, according to Beech, were well aware of the need to place knobs, switches and buttons close to the displays and functions they control. "We just couldn't get anything like this avionics package in other light jets we considered," explained one operator.

KUDOS AND CRITICISMS

Most of these operators also praised Beech for high standards of assembly quality, systems dependability, and climb and cruise performance. One relatively low utilization operator said, "We could fly this airplane 1,000 hours per year."

Operators with larger airplane experience had different impressions of the 400A. They appreciated its operating economy, high maximum landing weight that permits fuel to be tankered from stop to stop, and overall aircraft climb and cruise performance.

Almost all operators liked the Beechjet's stability, especially in IMC. Praise for the aircraft's handling characteristics wasn't so uniform. "It has bomber-like handling characteristics" said one former Falcon Jet pilot. "It seems to not have enough roll authority at slow speeds in turbulence." said another. "It's no Learjet [in roll response]," echoed a third operator.

Such comments are to be expected because of the aircraft's roll control design. It doesn't have ailerons,

relying solely on manually actuated spoilers for roll control. Eliminating ailerons reduces adverse yaw tendency during brisk roll maneuvering, but gives the airplane a heavier feel than a combination of ailerons and spoilers, or ailerons alone.

Beech officials responded that the airplane was designed to have the feel and stability of a larger airplane. There are no plans to change the flight control system of the airplane. (The spoilers-only roll control system caused no problems during the original certification of the airplane and no accidents or incidents have been linked to deficiencies in roll control.)

Operators lauded Beech for the level of support and service provided by the factory and dealers. That was the good news. Then came the bad news. Some survey respondents thought that such superb support was the minimum necessary to keep their airplanes flying. For example, one operator said, "Our pilots packed overnight bags for one-hour flights. They didn't know when they next would be stranded because the airplane might break."

Another operator rebuked Beech for failing to secure the brackets of a bleed air piccolo tube in a wing leading edge. And another said that metal shavings left in the console after manufacturing caused electrical short circuits. Yet another airplane had cockpit switches that were miswired. The operator remarked, "How could the factory test pilot have flown the airplane without noticing such obvious problems?"

Beech acknowledged that some early airplanes were the victims of poor quality control. The company responded by reorganizing its manufacturing process into work teams, not unlike quality circles, that have greater autonomy and more power to make changes to iron out such inconsistencies in assembly quality. New airplanes should be much less susceptible to such manufacturing maladies because of such process changes, claims Beech.

INHERENT DESIGN GRIPES

Three prominent Beechjet 400A inherent design problems are beyond the control of folks on the assembly line. First, operators reported that hot and cold weather extremes tax the environmental control system beyond its heating and cooling capacity. Additionally, there is insufficient airflow to the cockpit, they griped. Operators also noted that the AlliedSignal air cycle machine (ACM) hasn't been all that reliable.

Beech and AlliedSignal recognize these as legitimate concerns. The companies are looking at reliability enhancements for the ACM. However, Beech has no plans to increase the volume of the air flow by enlarging the air ducts or installing recirculation fans.

United Beechcraft, Incorporated (UBI) at Atlanta-Fulton County Airport currently offers Supplemental Type Certificated (STCed) heating and cooling packages for Beechjets. UBI can install an electric cabin heating package and also a vapor cycle (freon) air conditioning system. Beech will offer an optional vapor cycle air conditioner, similar to the UBI kit, in early 1994.

The reliability of pitch trim actuators was a second major concern of operators. Beech now is stocking replacement units with a more robust design, but there is no early exchange program to preempt such failures before they occur.

The third frequently heard gripe was the loudness of the cockpit aural warning system. Beech officials commented that the high background noise levels in early Diamond and Beech 400 airplanes required relatively loud aural warnings to meet the minimum sound contrast level for certification. But, Beech installed much more effective soundproofing in the 400A, dropping the interior noise levels by five to eight decibels. That resulted in much more audible aural warnings—from one end of the airplane to the other.

Variability in the warning sound volume from system to system is another problem, according to Beech. The firm is exploring changes to the system to resolve the annoyance.

Beech responded to operator complaints about the cost of maintaining and repairing the Shinko Electric Company starter-generators that were originally fitted to the Beechjet 400A. Beech switched to a Lucas design that costs less to retrofit than the Shinko units cost to overhaul.

UTILITY AND OPERATING COST

Most operators in our survey said they fly their Beechjet 400A's 350 to 400 hours per year, but a few fly 550 to 700 hours annually. The crew multiple for the average operator is 1.0 to 1.5 people. The 600- to 700-hour-per-year operators have a crew multiple of 2.0 or more, which is more appropriate for such high utilization.

Most operators thought that the flight manuals and maintenance documents were well-written. A few operators commented that high density altitude airport operations brought out a weakness in the flight manual performance data. If they had their druthers, the flight manual would have included more detailed information on ECS off (environmental control system) on takeoff performance, especially in the second segment climb charts and it would have included flaps up takeoff charts. One previous Beechjet 400 operator remarked that the earlier aircraft's manuals had more complete performance charts. But, such piqued comments were not heard from most operators.

Maintenance people had plenty of opinions about the 400A. The airplane is sold with a one-year subscription

to the Computerized Aircraft Maintenance Program (CAMP) System with which most operators were satisfied. Some opted not to use a computerized records system and at least one uses a program written by the operator's own personnel.

Mechanics thought the Beechjet 400A could have been better designed for access to parts. They say they bruise knuckles and strain muscles reaching for components and wished for Western logic in the layout of systems.

Relatively high parts costs was another frequent complaint. This was heard from a broad range of operators, including firms that operated fleets with heavy jets. One company said, "We ordered a specially configured interior cabinet from Beech's own supplier and paid $2,600 for it. The factory wanted $12,000 for the original part.

Beech said that it is aware of this concern and that an attempt is being made to hold down price increases. Company officials, however, have not announced plans to lower the cost of replacement parts.

Most Beechjet 400A airplanes are still covered by the factory warranty—five years/5,000 hours on the airframe and Beech manufactured components, two years on the avionics, 1,000 hours on the engines and one year/1,000 hours on other airframe or system parts not made by Beech.

Most operators report a direct operating cost of $650 to $800 per hour, although a few boosted this number to more than $1,000 to build a reserve for unforeseen maintenance.

PROGRESS VS. PERFECTION

Beechjet 400A operators freely expressed their displeasure with some aspects of owning and operating their aircraft, but most of them also were enthusiastic proponents. Would they advise another firm to buy a Beechjet 400A? "You would be hard pressed to beat this airplane," said one. "We are very pleased," said another. A half dozen respondents just said, "Buy it!".

Beech faces formidable competition when the Learjet 45 arrives in little more than two years, according to some 400A operators. But, today Beech owns a specific niche in the light jet market that no other manufacturer can challenge. For now, the Beechjet 400A offers the biggest cabin cross section in its class plus sprightly cruise performance that rivals the most spirited light jet contenders. And as Beech continues to improve the 400A, customer loyalty will only become stronger. **B/CA**