

# CESSNA 441 CONQUEST II

inspections and upgrades  
will cost you, but you'll wind  
up with a highly efficient  
twin-engine turboprop

\_by Mark Huber

CESSNA AIRCRAFT







THE CESSNA 441'S CABIN HAS EXECUTIVE SEATING FOR SEVEN, THOUGH YOU CAN CRAM IN 11 PASSENGERS.

WEST STAR AVIATION

AIRPLANES COME APART IN MIDAIR for a variety of reasons. An errant pilot loses control or flies a model past its design limit, or unrepaired cracks and corrosion cause structure to fail. Fortunately, rigorous pilot training and aircraft maintenance standards make such events few and far between. Even rarer is the case when a design flaw brings down a relatively new airplane. Cessna, however, was facing that nightmare scenario in 1977 with its Model 441 Conquest II.

During the 1960s, the company had developed its 400 series of large-cabin piston twins; then, in 1972, it introduced the first Citation fanjet. But the 1973 Arab oil embargo and the continuing popularity of competing turboprops, such as the Beechcraft King Air, convinced Cessna to morph two of its piston twins—the

404 and the 421—into turboprops. The 441 is the larger of the two; the other is the Model 425 Conquest I. The 441 has executive seating for seven, although you can cram in nine passengers; it also has a top speed of 295 knots—higher with a popular engine modification—and a range of 1,200 to 2,200 nautical miles, depending on altitude and power setting.

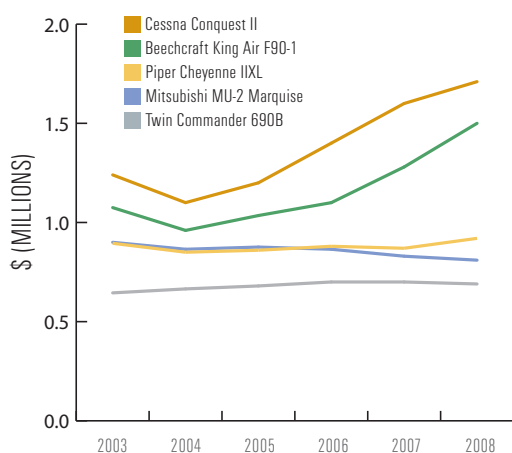
Customer deliveries of the \$895,000 Model 441 began in September 1977. Just two months later, the sixth airplane off the production line came apart over Greensboro, Ala., killing all seven aboard. The engines were working fine and weather wasn't a factor. That crash triggered the FAA's grounding of the entire 441 fleet—twice—between 1977 and 1979. Cessna ended up redesigning key tail-section components, retrofitting the entire fleet and providing customers with loaner aircraft. The program affected nearly 100 airplanes and still stands as one of the largest and most expensive factory field modifications of a business aircraft ever.

The 441 went out of production in 1986—the year of general aviation's modern nadir—after 362 were built. By then, the price of a new one had risen to \$1.795 million. Of the approximately 320 still flying, the average accumulated flight time is 8,000 hours. The average operator flies about 294 hours a year.

Used 441s hold their value well. In good condition, they still command \$1.2 million to \$1.7 million and many operators lavish their 441s with all the latest bells and whistles, including new paint, interior, video monitors, soundproofing and glass-panel avionics. Those upgrades can easily boost the investment past \$3 million—about the price of a new (but smaller) Cessna Citation Mustang entry-level twinjet.

"The airplane is in tight supply," said Jerry Griffith, a

### FAIR MARKET VALUE comparison of competitive aircraft



Source: Vref Aircraft Value Reference ([www.vrefpub.com](http://www.vrefpub.com))

## economics

### HOURLY DIRECT OPERATING COSTS

- Fuel (\$5.92 per gal): \$526.88
- Maintenance labor (at \$81 per hour): \$192.88
- Parts, airframe, engine, avionics: \$146.52
- Inspections, component overhauls, engine restoration: \$138.44
- Misc. expenses
  - Landing and parking fees: \$8.13
  - Crew expenses: \$30
  - Supplies & catering: \$24

**TOTAL VARIABLE FLIGHT COSTS PER HOUR: \$1,111.31**

Average speed: 270 knots

- Cost per nautical mile: \$4.12

### ANNUAL FIXED OPERATING COSTS

- Crew salaries (estimates)
  - Captain: \$79,300
  - Copilot: \$41,200
  - Benefits: \$36,150
- Hangar rental (typical): \$20,900
- Insurance (insured hull value = \$1.735 million)
  - Hull (1.02% of value): \$17,697
  - Admitted liability: \$4,000
  - Legal liability: \$12,250
- Recurrent crew training: \$12,600
- Aircraft modernization (avg per year): \$45,000
- Navigational chart service: \$1,961
- Refurbishing: \$9,720
- Computer maintenance program: \$2,400
- Aviation weather service (typical): \$700

**TOTAL FIXED COST PER YEAR: \$283,878**

### ANNUAL BUDGET—BASED ON 115,000 NM

(Utilization: 426 hours)

- Variable cost: \$473,418
- Fixed cost: \$283,878
- TOTAL COST (WITHOUT DEPRECIATION): \$757,296**
  - Per hour: \$1,778
  - Per nautical mile: \$6.59
  - Per seat nautical mile: \$1.10

**Total cost (without depreciation): \$757,296**

- Book depreciation (10% per year): \$173,500
- TOTAL COST (WITH BOOK DEPRECIATION): \$930,796**
  - Per hour: \$2,185
  - Per nautical mile: \$8.09
  - Per seat nautical mile: \$1.35

**Total cost (without depreciation): \$757,296**

- Market depreciation: \$69,400
- TOTAL COST (WITH MARKET DEPRECIATION): \$826,696**
  - Per hour: \$1,941
  - Per nautical mile: \$7.19
  - Per nautical seat mile: \$1.20

Source: Conklin & de Decker, Orleans, Mass.

## CESSNA 441 CONQUEST II COMPARED

Model	First Year Built	Variable cost/hour	Seats exec/max	Range (nm)	Max cruise (kt)	Max takeoff weight (lb)
BEECHCRAFT KING AIR F90-1	1979	\$1,370	6/8	1,040	265	10,950
CESSNA 441 CONQUEST II-10	1978	\$1,111	7/9	1,494	314	9,850
MITSUBISHI MU-2	1979	\$1,089	6/9	1,012	300	11,575
PIPER CHEYENNE IIIA	1984	\$1,493	6/9	1,240	305	11,200
ROCKWELL TWIN COMMANDER 690B	1977	\$1,279	6/7	942	285	10,325

Assumptions: All aircraft are 1984 models except the Commander, which is from 1979 (last year produced). Jet fuel \$5.92/gal; variable cost: fuel plus maintenance reserves and misc. expenses; four passengers; NBAA IFR reserve fuel; passenger weight 200 lb includes baggage; two pilots.

Cost source: Conklin & de Decker Life Cycle Cost  
Performance source: Conklin & de Decker Aircraft Performance Comparator, Orleans, Mass.

Tulsa, Okla. broker who specializes in the 441. Griffith cited its speed, range, fuel economy and comparably low engine maintenance costs as the chief reasons for its enduring popularity. "When you look at the amount of the investment, operating costs and capability, nothing else will do what this airplane does," Griffith added. A 441 with upgraded Honeywell TPE331-10 engines can take six passengers and their gear 1,200 nautical miles at speeds up to 311 knots at 35,000 feet—with an hourly fuel burn of 75 gallons. Down at 24,000 feet, it's even faster. Lighten the load and pull back the power and you can stretch a tank of gas out to 2,200 nautical miles, making 253 knots. The engines have a recommended time-between-overhaul (TBO) of 5,000 hours and cost about \$175,000 each to overhaul. Those are much better numbers than the ones for the Prattis that power King Airs and Cheyennes. The Prattis on a King Air B200 have a TBO of 3,600 hours, drink 25 gallons an hour more and cruise 20 knots slower. The Honeywell Dash 10s also give good short runway performance and get to altitude fast, powering the climb at a rate of 2,435 feet per minute.

Cessna made many product improvements and retrofit kits available for the 441 during its nine-year production run—and the aftermarket added others. Chief among these was the Dash 10 engine conversion pioneered by West Star Aviation in Grand Junction, Colo. Most of the fleet has been converted to Dash 10 power, and because of the superior performance and maintenance intervals, you simply do not want a 441 without it. The conversion typically is done when the original Garrett TPE331 engines are timed out or need a mid-life inspection; the cost is north of \$500,000 for two engines.

Stainless exhausts are another popular option and cost around \$5,000 per side. The original fiberglass exhaust area is prone to cracking.

Next come the propellers. If your 441 hasn't been converted to four-blade Hartzell propellers already, con-

sider it. The four blades yield 2.5 inches more ground clearance, reduce cabin noise, improve the climb rate by 200 feet per minute and add four to five knots of airspeed, according to Greg Thibodeau, airframe maintenance director at National Flight Services in Toledo, Ohio. Two new props, installed, run about \$65,000.

National also offers winglets for the 441. Installation requires eight to 10 days of downtime and painting costs \$14,000. Thibodeau said pilots report speed gains of three to five knots and that the winglets make the airplane "more stable about the roll axis."

Next come avionics. The factory-installed Cessna autopilots on this airplane are, to be blunt, junk—and about 70 percent of the 441s still flying have them. They are unreliable analog dinosaurs prone to failure, and parts are hard to get. Most 441s are flown single-pilot and you need a good autopilot to reduce pilot workload. Cessna figured this out eventually, installing Sperry SPZ500s on the last 20 airplanes out the door. Retrofits are primarily the Rockwell Collins APS-65 or the S-Tec 2100. Some operators already made the switch when they installed RVSM altimeters, which are now required to fly above 28,000 feet. A complete avionics upgrade of a 441 with an ancient panel will run about \$400,000 and that gives you everything—good autopilot, XM satel-



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## specifications

## CABIN DIMENSIONS

- Height: 4.3 ft
- Width: 4.6 ft
- Length: 14.35 ft
- Volume: 235 cu ft
- Door height: 4.25 ft
- Door width: 2.08 ft

BAGGAGE: 51 cu ft (internal)  
26 cu ft (external)

## TYPICAL SEATS:

CREW/PASSENGERS (EXECUTIVE): 2/6

## MAXIMUM WEIGHTS

- Takeoff: 9,850 lb
- Landing: 9,360 lb
- Basic operating: 6,200 lb
- Usable fuel: 3,183 lb
- Maximum payload: 2,300 lb
- Payload with full fuel: 542 lb

## performance

## RANGE (IFR NBAA 200 nm reserve)

- Seats full: 1,200 nm
- Ferry range: 1,720 nm

## RATE OF CLIMB

- 2,435 fpm

## CRUISE SPEED

- Max: 311 ktas
- Long range: 253 ktas

## SERVICE CEILING

- 35,000 ft

Source: Conklin & de Decker, Orleans, Mass.

THE FACTORY-INSTALLED AUTOPILOTS ON THE CESSNA 441 ARE UNRELIABLE AND PARTS ARE HARD TO GET, BUT AVIONICS UPGRADE, SUCH AS THE AVIDYNE ALLIANT INTEGRATED GLASS PANEL SYSTEM (LEFT), ARE AVAILABLE FOR RETROFIT.

lite weather, RVSM, GPS/comms and traffic and terrain avoidance. The Avidyne Alliant integrated glass-panel system is also available.

Making a big investment in a 30-year-old airplane is not without risk, and operators must adhere to a rigorous, recently mandated inspection program for all 441s. The initial inspection under this program is pricey, anywhere from \$120,000 to \$180,000 or more, depending upon what is uncovered. The engines, propellers, de-icing boots, tail and landing gear must all be removed. Once the boots come off, you cannot put them back on—you have to buy new ones. Ka-ching.

The interior also comes out of the airplane as part of this initial inspection. This is a good time to refurbish. Turboprop cabins are generally noisy places and the 441's is no exception. However, a 50-pound Flight Environments sound-dampening package can cut noise by up to nine decibels. In conjunction with an inspection, it takes a week to install and costs about \$25,000. New paint and interior averages \$75,000, unless you go crazy with cabin electronics.

The initial inspection takes four to eight weeks. Less intensive recurring inspections are required over the aircraft's life and will add \$50 an hour to direct operating costs. Cessna is also limiting the life of a 441's airframe to 22,500 hours (about 77 years of average use), but that limit applies only to aircraft flown commercially—although some insurers will also apply that standard to private-use aircraft.

Cessna claims the new inspection and life-limit rules are necessary. "Our main concern is corrosion related to the age of these airplanes," said Steve Howard, Cessna's manager of field service for propeller aircraft. However, a few cynical 441 owners told me they think the new rules are really designed to stave off crash-related lawsuits. In 1994, Congress eliminated aircraft manufacturers' product liability for aircraft that are more than 18 years old unless those aircraft are used for a variety of commercial purposes.



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The rules also don't cover lawsuits filed outside the U.S., where about one third of the 441 fleet resides.

But most 441 owners have taken the new inspections rules in stride and are using them as an opportunity to refurbish and add equipment, according to West Star's vice president of business development, Russ Williams. "They're not asking, 'How much?'" Williams commented. "They are asking, 'When can I get my airplane back?'"

Williams said there is a compelling reason for this. "No twin-engine turboprop that I know of is more efficient in terms of cost per seat mile and cost per hour," he explained. Not bad for a design that first took to the drawing board in 1974. ■

CESSNA IS LIMITING THE LIFE OF A 441'S AIRFRAME TO 22,500 HOURS—ABOUT 77 YEARS OF AVERAGE USE.

Mark Huber welcomes comments and suggestions at: [mhuber@bjtonline.com](mailto:mhuber@bjtonline.com).

### CESSNA 441 CONQUEST II SAFETY RECORD COMPARED (accident rates per 100,000 flight hours)

Model	All years (through 2007)		Last five years (2003-2007)	
	All Accidents	Fatal Accidents	All Accidents	Fatal Accidents
PIPER CHEYENNE	1.81	0.79	0.97	0.49
CESSNA 441 CONQUEST II	1.89	0.95	1.19	0.59
BEECHCRAFT KING AIR 90	1.97	0.61	1.24	0.41
ROCKWELL COMMANDER 690	3.46	1.3	1.69	0.85
MITSUBISHI MU-2	3.89	1.69	1.39	0.88

Source: Robert E. Breiling & Associates



### SUPPORT & SERVICE | CESSNA CONQUEST & COMPETITORS

Model	Overall Average 2008	Overall Average 2007	Authorized Service Centers	Factory Service Centers	Parts Availability	Cost of Parts	Aircraft on the Ground Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Aircraft Reliability
MITSUBISHI (MU-2, SOLITAIRE, MARQUISE)	9.17	N/A	9.27	9.49	9.25	8.12	9.38	9.09	8.94	9.32	9.64
HAWKER BEECHCRAFT (KING AIR)	7.14	7.07	7.26	6.75	7.21	5.67	7.22	7.01	7.46	7.42	8.11
CESSNA (CONQUEST)	6.61	5.88	7.38	6.54	6.29	6.00	6.09	5.22	6.92	6.27	8.07
PIPER (CHEYENNE)	5.96	5.97	6.88	4.00	5.82	5.41	6.05	4.50	5.75	6.06	7.82

Rating scale-1 to 10: 1-inadequate; 3-poor; 5.5-average; 8-good; 10-excellent. Ratings are for turboprops that are more than 10 years old.

Source: Aviation International News, 2008 Product Support Survey