

# Operator Survey: Falcon 900 in Intercontinental Operations

Operators agree the Falcon 900 is an economical, international speedster, but most also contend that climb performance at high weights could stand improvement.

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In tightly cloistered communities, such as high finance, there is said to be a tacit code of integrity among peers. Violators can expect to be exposed in short order by their fellows. Likewise, in the realm of executive aircraft, if promised attributes are found wanting, the word spreads quickly.

When Avions Marcel Dassault revealed at the 1983 Paris Air Show the development of the largest executive jet transport aircraft it had undertaken up to that point, the corporate aviation community accepted that the new machine would be an enhancement to international business travel just as pre-production promotional efforts claimed it would be. That acceptance was predicated partly on the French manufacturer's record of having produced a series of five business jet models, dating back to 1963, that had performed almost exactly as the operating manuals had predicted.

Designated the Mystere-Falcon 900, the aircraft described to prospective buyers in 1983 greatly resembled its three-engine Falcon 50 forerunner, which entered production in 1979. But with a wingspan only about 1.5 feet greater and overall fuselage length just 5.5 feet more than that of the Model 50, the Falcon 900 offered nearly twice the cabin volume (1,264 cubic feet versus 711.6 cubic feet), 16 percent more payload capability, five-percent faster maximum cruise speed, 13-percent higher max cruising altitude and a nonstop flight range more than 11 percent greater than the Model 50's.

Those attributes, it was boasted, would make the Falcon 900 a truly intercontinental business jet that would

compete effectively in performance and comfort with the Canadair Challenger 601 and the heavier, thirstier Gulfstream IV. Initial Model 900 marketing efforts therefore were directed toward companies with multinational interests. The Falcon 900 received FAA certification in March 1986, and U.S. deliveries began in December of that year. The first unit was placed in corporate service in January 1987.

Ironically, an earlier Falcon 900 user survey conducted by B/CA (see August 1988, page 56) indicated that a surprising number of North American companies appeared to have purchased the aircraft not because of its 3,900-nm cruise range, but because of its operational flexibility, its ability to operate safely into and out of landing strips little more than 4,000 feet long and to ply stage lengths from 300 to 3,500 nm with DOCs arguably equal to or better than those of its predecessor, the Falcon 50.

However, a B/CA telephone survey conducted this September revealed that the largest number of 900s based in North America today are performing the aircraft's originally intended primary mission—long-range, executive transportation. The aircraft encompassed in this survey had been in operation for periods ranging from about three to 44 months, with an overall average of a little more than 24 months. The operators still seem to marvel over the unique mission flexibility of the 900, but most of those interviewed tended to view the aircraft as a long-range transport, whether that meant transcontinental or intercontinental.

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### GOING THE DISTANCE

Some two-thirds of the 30 organizations on this continent that employ a total of more than 40 Falcon 900s were contacted for this survey. Only 30 percent of those companies said their aircraft seldom or never have been used for international operations. Of the remaining flight departments, almost half reported that between 15 and 30 percent of their Model 900s' total flight hours had been amassed on intercontinental travel.

That helps to account for the fact that the Falcon 900 fleet represents one of the more heavily utilized segments of business aviation in a relatively early phase. Falcon Jet Corporation in Paramus, New Jersey has calculated utilization rates on a moving average usage of 53 Model 900s for which it has a full year of data at more than 425 hours per aircraft.

Flight department managers, pilots and mechanics charged with responsibilities for internationally operated Falcon 900s were nearly unanimous in the opinion that the aircraft deserves the reputation it has gained as an exceptionally reliable, relatively trouble-free machine that is highly esteemed by passengers and flightcrews alike. Those who fly it on overseas missions generally agreed that when operated in accordance with the manufacturer's flight manual, the 900 performs precisely as the book says in terms of cruise speeds, altitudes and ranges under given environmental conditions. There was almost equal consensus, though, that at its full gross takeoff weight of 45,500 pounds, and with "ISA-plus anything" ambient temperatures, the Falcon 900's three 4,500-pound-thrust Garrett TFE731-5AR-C1 turbofan engines deliver a tad less performance than is desired.

The result is that few of the operators interviewed seem to regard the Falcon 900's 51,000-foot certificated service ceiling as realistic. Most reported normal cruise altitudes for both transcontinental and intercontinental missions at flight levels ranging from 390 to 430.

### FALLING SHORT?

The aircraft's modest climb performance was the most serious criticism made of its suitability for intercontinental operations. Our survey sample included pilots whose duties have taken them all over the world with the 900. Climb performance was deplored most commonly by those who fly frequently through north- and mid-Atlantic airspace, however. Increasing volumes of traffic there have led to establishment of the NAT system to enhance safety and expedite the flow of aircraft across open water. An estimated 80 percent of those interviewed indicated that North America/Europe/Middle East trips constitute by far the bulk of their international travel, although growing levels of business travel to the Pacific Rim and Australia were discerned as well.

The overwater track system was created primarily for

the benefit of commercial airlines. Most of those interviewed said they prefer to fly at altitudes above the track tops, if possible. The tracks are eastbound and westbound altitude assignments set up by controlling agencies in Canada and Scotland. They are based on jetstream flow, the troposphere level, weather, temperatures aloft and other factors. They change from day to day, normally extending from points near Gander, Newfoundland, to the vicinity of Ireland. Track tops usually are at about FL 370, but they may be placed as high as FL 400.

Eastbound from North America, Falcon 900 flightcrews reported that enough time and distance ordinarily exist to climb above track altitudes before reaching the affected airspace, even with gross takeoff-weight departures. Traveling westbound from Europe or England presents a different situation.

"Fully grossed, the 900 will climb direct to 35,000 feet, although the climb rate from mid-altitudes and above is not one that will pin you to the seat," said one pilot. "We've made a lot of trips at lower altitudes than desired simply because once you enter the track system, you're stuck. You're held at the pre-entry altitude and airspeed you were able to achieve until you exit [the track] at the other end," said one operator.

Added another: "If you can't get your optimum altitude, you won't get the range out of the airplane that you should. On our last trip from Paris to Teterboro we came across at 35,000 feet. As soon as we reached the North American coast, though, we climbed to FL 430, so we were able to complete the trip nonstop with ample remaining fuel."

A few Falcon 900 pilots indicated that when they're held to less efficient altitudes on that and other overwater routes, they restrict adverse wind legs to the manufacturer's recommended long-range cruise speed of Mach 0.75 and a flight plan duration of about eight hours, especially when departing Europe from an inland point. The majority, however, said they file and fly at Mach 0.80. They contend that if it necessitates an intermediate fuel stop, only a little more time is consumed than would result from the added air time required at economy cruise settings.

A chief pilot who has logged time in every Falcon model over the past several years claimed that despite the accepted accuracy of the manufacturer's recommended operating parameters, he has learned through experience that these figures could be more finely tuned. "For example, we believe that the Model 900's recommended long-range cruise speed may not be the best way to go," he said. "We find that if we cruise just a bit faster, at Mach 0.76 or 0.77, we get the same nm per pound of fuel burned but we get to our destination a little bit sooner."

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He also suggested that many of the complaints associated with the Falcon 900's climb and cruise characteristics may be attributed in part to pilot technique. Because familiarization and refresher programs do not include simulated flight above 10,000-foot altitudes, pilots may not be versed in phenomena above that level, he pointed out.

"If you get below the published climb schedule, you can get into trouble with this airplane," he said. "You have to stay on it or a bit faster, or when you get to your selected altitude you just sit there at climb Mach and do not accelerate to cruise speed. If higher airspeed and flatter climb are held, ATC might become upset with you, but you can get better acceleration at the top of the climb.

"We climb at Mach 0.75 and take a slow vertical velocity—sometimes only 300 or 400 fpm—for the final 2,000 or 3,000 feet," he continued. "Then, when the nose is lowered, the aircraft accelerates rapidly because it is so aerodynamically clean."

### MAJOR ASSETS

Aerodynamic efficiency was cited by many flight department managers as one of the Falcon 900's major assets for long-range operations. Policies followed by a substantial number of firms operating the airplane apparently favor speed over economy, and the 900's capabilities in that respect are reflected in data contained in the "International Operations Supplement" of B/CA's 1990 Planning and Purchasing Handbook (May 1990, page 86). Information charts there hypothesize international travel between three city pairs as performed by 15 turboprop and turboprop business aircraft. On all three routes, it is indicated that the Falcon 900 outperforms competitive aircraft in terms of speed and fuel consumption. It is also reflected there as one of just three corporate jets capable of flying the 2,992-nm London-New York route without intermediate fuel stops.

From the standpoint of fuel economy, the survey group reconfirmed that the Model 900 has few peers. The 19,000-pound fuel capacity helps to account for the aircraft's increasing utilization in international business flying, survey participants believe.

Although most companies are reluctant to reveal direct operating costs, such information is available. Data published by Al Conklin Associates, Incorporated of Orleans, Massachusetts indicate that the Model 900 fuel burn compares favorably with that of other Falcon family aircraft on 600-nm stage lengths. Conklin's figures reflect takeoff-to-landing fuel consumptions of 2,171 pph for the Falcon 900, 2,325 pph for the Falcon 50 and 2,251 pph for non-reengined Falcon 20 models.

For longer stage lengths, that comparison probably would be even more favorable to the 900. As a relative

factor, however, Conklin's research reveals a DOC of \$2.85 per mile for the Falcon 900, \$2.71 for the Falcon 50 and \$2.91 for the Model 20.

On fuel consumption, a worst-case scenario related to international travel was pointed out to B/CA during the course of this survey. A former operator in Australia had a problem with the 900's fuel boost pumps due to suspected fuel contamination. He discovered that the Garrett engines may not suction-feed at altitudes above 34,000 feet. Dassault consequently altered the flight manual to mandate immediate descent to 31,000 feet or lower in the event of booster pump failure. But the scenario established was this: If a Falcon 900 was flying a 3,310-nm leg at Mach 0.75 and FL 410 and lost all three boost pumps midway, a descent to 31,000 feet would result in a fuel consumption increase of only 400 lbs per engine over the remaining length of the trip.

High reliability was a Falcon 900 asset commented on by virtually every operator with whom we spoke. Approximately one-third of those interviewed indicated that in early phases of their intercontinental use of the airplane, they sent a mechanic along as an additional crewmember, particularly when on missions to more remote areas of the globe. Because of increased confidence levels derived from experience, though, few operators seem to be continuing that practice, although a substantial number still dispatch the 900 on international flights with a "fix kit" aboard, containing replacements for small items which experience has shown are most apt to fail.

No comparison could be made between the quality of manufacturer product-support programs offered in the United States and overseas, as few operators reported experiencing difficulties outside of North America that required them to seek technical assistance from the manufacturer.

### GROWING PAINS

As is the case with any new aircraft model, the first three and a half years of Falcon 900 operation have not been totally blemish-free. None of the mechanical problems occurring so far have resulted in issuance of airworthiness directives, however. Operators report general satisfaction with Falcon Jet Corporation, Dassault and system vendor responses to perceived shortcomings. And, the number of problem areas encountered reportedly has declined appreciably over the past year. The few grievances noted by operators surveyed included the following:

- ▶ Number-two engine S-duct distortion, attributed to an engine pressure situation. This difficulty apparently has been alleviated by strengthening the duct mounting brackets.
- ▶ Failure to achieve the advertised 3,000 landings on a set of wheels and brakes. Operators indicated that

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they don't believe anyone has come near that goal. A substantial number also expressed dissatisfaction with brake pedal pressure, difficulty in applying the brakes evenly on landing roll and the noisiness of braking action. A technician argued, however, that these complaints pertain to matters that are endemic to the aircraft's carbon braking system or to pilot technique. He felt that the series of service bulletins that have been issued should solve many of these problems.

► Electrical drain on the batteries during performance of the startup checklist that prevents the APU from starting properly. Dassault reportedly is considering installation of heavier batteries to counter these complaints, but at least one chief pilot/ A&P believes that is a backdoor approach. He would rather see the electrical system revised so that switches must be turned on to activate powerdraining sources instead of having to hunt down and deactivate them.

Generally, mechanics contacted believe the Falcon 900 is an easy airplane to work on, despite the dread many felt when it came on the market heralded as "an all-electric machine." Maintenance accessibility was described as good (except in a few instances where it was allegedly impeded by cabin interior installations), systems as well-diagrammed and labeled, and parts availability as satisfactory except for price, several said.

### SUM AND SUBSTANCE

From the passenger viewpoint, the Falcon 900 came on the market strongly touted as an excellent vehicle for long-range travel. If anything, the importance and popularity of its walk-around space, exceptionally quiet cabin, excellent environmental conditioning system, reclinable club chairs and large rear divan have increased as more companies have begun to employ the aircraft internationally. Most of the Falcon 900s encompassed by B/CA's survey were configured for 11, 12 or 13 passengers, but typical load factors for overseas travel ranged from three to six. Passenger cabin size therefore would no longer seem to be a determinant in trip length comfort. A more limiting factor, in the opinion of one captain, is the capacity of on-board toilet facilities.

In all, the sum and substance of remarks in favor of the Falcon 900 as a good airplane for international business requirements far outweighed the few criticisms leveled against it. Its future acceptance to accommodate an ever-increasing volume of intercontinental executive travelers therefore seems to be assured.

As a parting shot, each participant in this user's survey was asked, "If there were one thing that you could ask the manufacturer to do to improve the Falcon 900 for your purposes, what would it be?" The unvarying answer was, "Add more power." **B/CA**