



# 2007

## AIN PRODUCT SUPPORT SURVEY

### PART THREE | ENGINES

by Nigel Moll

**W**hile it is the cold, hard numbers that decide our readers' verdict on how well companies support the products they sell, it is the readers' written comments that flesh out the picture and help those companies identify where, in their customers' opinions, they could improve. We invited readers to provide feedback beyond merely assigning numerical values to the quality of support they received for engines, and their experiences over the past year are presented here.

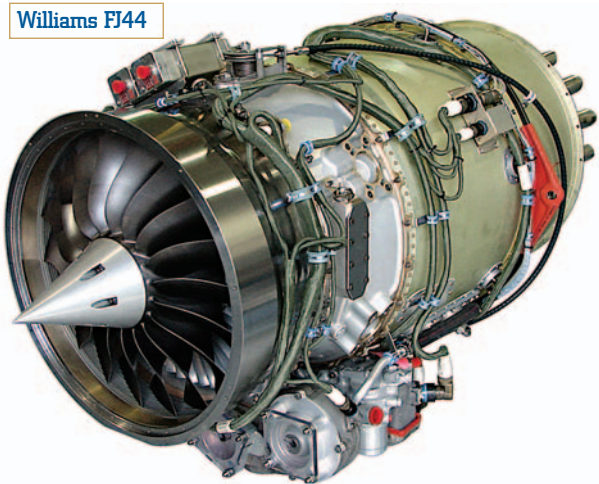
Our survey suggests that operators are generally satisfied with the support they receive for their engines, and the comments that follow are indicative of their excursions (positive and negative) from that middle course.

#### Williams

Williams edged out Rolls-Royce this year, in a reversal of last year's closely fought result. With CFM (last year's winner) excluded this year for insufficient responses (*see box item on page 38*), Williams assumes the throne. Readers, however, did not have a lot to add in words beyond their numerical assessments of the Walled Lake, Mich.-based manufacturer of the FJ44 turbofan. "Nobody seems to care about these motors" and "Excellent engine and service all around" were the extremes. "Marshalls [UK] has been fine on the routine inspections and so far that is all we have needed."

Factory service and parts elicited no great highs or lows, although one operator noted that parts are "scarce." "Power by the hour" program is first

Williams FJ44



#### Engine Manufacturer Rankings

(in order of the highest 2007 ratings)

Turbofans	2007	2006	Change from 2006*
Williams	8.16	7.29	▲11.93%
Rolls-Royce	8.05	7.30	▲10.27%
Rolls-Royce			
Deutschland	7.79	7.24	▲7.6%
CFE	7.77	7.16	▲8.52%
Honeywell	7.74	6.40	▲20.94%
P&WC	7.53	7.02	▲7.26%
General Electric	7.21	7.11	▲1.41%
Turboprops/Turboshafts			
P&WC	7.58	7.05	▲7.52%
Rolls-Royce	7.34	6.62	▲10.88%
Honeywell	7.15	6.52	▲9.66%
Turbomeca	5.98	5.94	▲0.67%

\* The ratings scale for the Product Support Survey changed this year. In previous years, the rating scale was 1 to 9. This year, it was changed to 1 to 10 to conform with other AIN surveys.

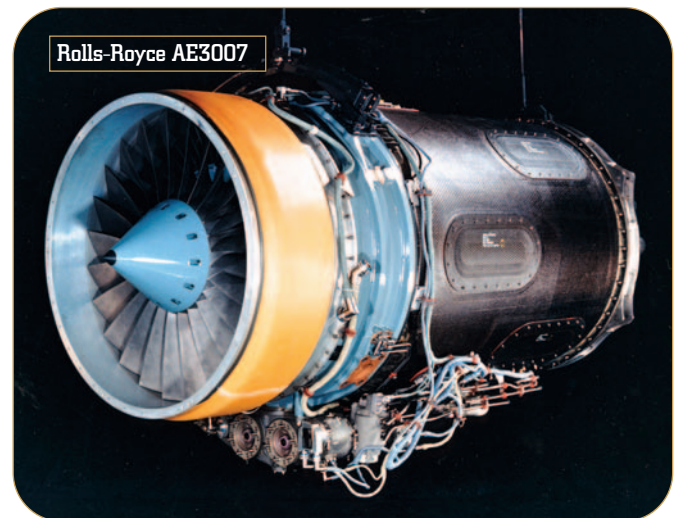
class. It covers everything and does not give the boss a heart attack every time we go in for an inspection." On AOG response, warranty fulfillment and technical manuals, verdicts ranged from "great" through "good" to "poor," with positive outnumbering negative. Tech reps gained more positive reviews than negative, too. Other than some gripes about the FADEC electronics, operators are pleased with the reliability of their FJ44s.

#### Rolls-Royce & Rolls-Royce Deutschland

A Canadian AE3007 operator did not specify which authorized service center it used but held it in high regard: "Fan blade damage occurred. Technician traveled to our base and repaired damage within two days. Excellent service."

Standard Aero as a provider of AE3007 support received plenty of praise: "A first-class organization, capable of handling anything with the AE3007. AOG and road response is excellent"... "Standard Aero provides fantastic service for these engines. Their service record is second to none"... "Excellent service from Standard Aero in Knoxville. This organization is the best"... "Standard Aero did an engine change in less than 24 hours for warranty work. Outstanding teamwork!"

For the Spey, "Dallas Airmotive completed our midlife inspections this past summer [2006], and we

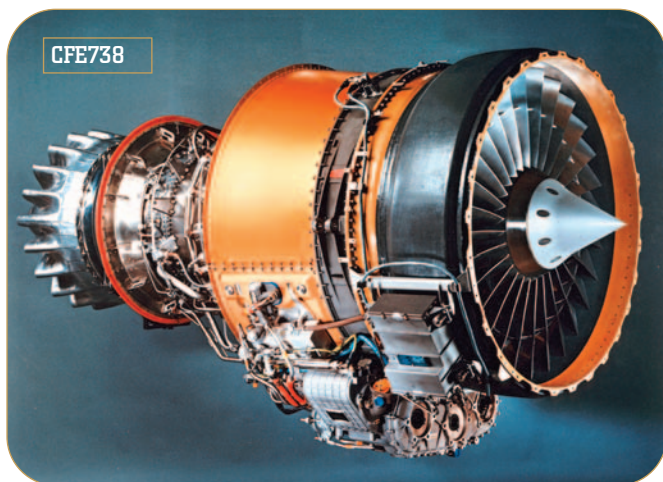


were pleased with the final product. Both engines have performed flawlessly ever since"... "General Dynamics and Dallas Airmotive do a good job."

Tay operators wrote, "Millville is great with any support or help needed"... "Took two years and three engine changes to correct errors in midlife inspection. Dallas Airmotive stood by their work and took responsibility to make this right...eventually."

BR710: "Almost no trained support"... "Gave most categories a 9 because I have yet to have a problem with the engines. Can't really comment on something that hasn't been a problem."

Of factory service centers, AE3007 operators said, "Excellent support from Citation service center"... "It's hard to deal when you own only two engines"... "Rolls Canada does a good job, dispatches techs as needed for off-site maintenance." For the Spey, "GDAS is a joke. Not the place to go for these engines"... "Gulfstream Dallas was



knowledgeable and worked our issues well.” For the Tay, “We had R-R Canada send technician to our home base and were impressed with expertise and efficiency”... “Excellent...good...best place to go.”

BR710 factory service “tends to be more expensive if the airframe OEMs that are qualified do the work [than if] the engine OEM people do the work.”

Among many “excellents” and “goods” for all Rolls engines, a few responses for parts availability were more expansive. AE3007: “availability out of Indy is decent but need an easier process for ordering parts”... “Need more [in the Mediterranean region]” Tay: “With the minimal experiences we have had with parts availability, we have had some delays in getting some parts.”

BR710 operators are generally satisfied (“Excellent in the UK”) but not all: “Not very good if outside their warranty program”... “Limited in low-failure parts”... “Parts orders have to go through your tech rep, which takes time and slows down

AOG orders”... “Poor. Parts support is available for those operators who pay extra for CorporateCare program. All others must order their parts from international sources. Terrible.”

For the cost of parts, AE3007 comments ran the gamut, from “average” and “acceptable” to “expensive, especially the Goodrich parts.” The Spey, too, ranged from “a lot of good vendors out there with good prices” through “good” to “extremely expensive, especially since parts bought from R-R then go through distributors that add their 100-percent markup.” Similar sentiments for the Tay, and “always tough with the boss.”

Rolls-Royce is generally highly regarded for AOG response, but there were a few dissenters among BR710 operators. “‘Terrible’ is a positive spin to this issue”... “Rolls is difficult to work with when getting technical variances”... “Poor because we are not on CorporateCare.”

Rolls received almost universally high praise for warranty fulfillment, with a lone “OK” as the least enthusiastic commentary. A BR710 operator noted that “everything is black-and-white for Rolls. No gray areas here!” Said another, “We’re on CorporateCare. The fact that I can call one number and have everything taken care of is such a relief. Granted, there is a cost for this relief but, given the places my Global travels, the cost to set up a repair or component removal would be a logistical nightmare.”

Praise was scarce for R-R technical manuals: “Not very easy to find anything. End up calling a service rep for info”... “Challenging to determine applicability of service bulletins due to odd serializing of engines”... “It took R-R three months after

aircraft was delivered to me to get access to Aero-manager. I still do not have manuals on CD yet. Absolutely not acceptable to be operating [AE3007s] three months without manuals”... “Extremely difficult to use. Hard to find info, revisions are frustrating when deciphering what goes where”... “CD-ROM... Have you tried using these?!” The consensus for R-R engines old and new is that the manuals are hard to navigate and use.

There was almost universally high praise for Rolls’ tech reps, and a few were mentioned by name. “Perry Siler is the best in the business. He works for Keystone Engine Services [Model 250]”... “Mary Cote and Yves Martin are both good”... “Gordon Aitken out of Dallas is always there when we need him. He works great with Bill Sciscoe, the Bombardier FSR, ensuring our issues (if any) are resolved quickly”... “Jen Laing—great tech rep!”

On overall engine reliability, “It’s a Rolls. What do you expect?” was one comment among many “excellents,” and that about sums it up for the whole line of engines from this storied manufacturer, along with this, from a Tay operator: “Although the R-R engines’ propensity to leak oil seems odd for a modern turbofan, they are incredibly reliable. These engines are not highly stressed on the GIV and they just work and work and work. What more could one ask for at 30 West?”

#### CFE

Landmark in Springfield and Duncan Aviation in Lincoln got good reviews for CFE738 work; parts availability is generally good, but one operator said there are “not enough loaner engines.” Tech reps got mixed reviews: “Not impressed”... “Rarely used but always available”... “Our local rep is a

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## 2007 RATINGS

Manufacturers are listed in the order of their 2007 overall averages.

	2007 OVERALL AVERAGE	2006 OVERALL AVERAGE	PERCENTAGE* CHANGE	AUTH. SERVICE CENTER	FACTORY SERVICE CENTER	PARTS AVAILABILITY	COST OF PARTS	AOG RESPONSE	WARRANTY FULFILLMENT	TECHNICAL MANUALS	TECHNICAL REPS	OVERALL ENGINE RELIABILITY
<b>Turbofan Engines</b>												
ROLLS-ROYCE (AE3007)	<b>8.22</b>	7.43	10.58%	<b>8.29</b>	<b>8.24</b>	<b>8.42</b>	7.08	8.27	<b>8.52</b>	7.51	8.37	9.10
HONEYWELL (HTF7000)	8.19	—	—	8.26	7.74	7.57	7.30	<b>8.38</b>	<b>8.52</b>	<b>8.37</b>	8.44	8.84
WILLIAMS (FJ44)	8.16	7.29	11.88%	7.92	7.87	8.24	<b>7.62</b>	8.09	8.37	7.92	8.11	8.94
ROLLS-ROYCE (Spey)	8.01	7.08	<b>13.13%</b>	7.83	7.61	8.10	6.46	8.17	7.86	7.86	<b>8.57</b>	<b>9.35</b>
ROLLS-ROYCE (Tay)	7.99	7.39	8.09%	7.80	7.99	7.94	6.49	8.24	8.13	7.46	8.23	9.31
RR-DEUTSCHLAND (BR710)	7.79	7.24	7.58%	7.70	7.71	7.43	6.34	7.75	7.95	7.26	8.32	9.21
CFE (CFE738)	7.77	7.16	8.47%	7.77	7.51	7.47	6.57	8.00	8.40	7.72	7.90	8.48
HONEYWELL (TFE731)	7.73	7.02	10.16%	7.80	7.61	7.70	6.45	7.80	7.93	7.67	7.87	8.60
P&WC (PW Series)	7.60	7.11	6.95%	7.61	7.52	7.55	6.27	7.55	7.81	7.67	7.87	8.44
P&WC (JT15D)	7.43	6.93	7.25%	7.34	7.32	7.64	5.80	7.47	7.40	7.56	7.52	8.68
GE (CF34)	7.36	7.11	3.49%	7.61	7.21	7.16	5.94	7.13	7.47	7.32	7.14	8.95
<b>Turboprop/Turboshaft Engines</b>												
P&WC (PT6)	<b>7.62</b>	<b>7.05</b>	8.09%	<b>7.76</b>	<b>7.47</b>	7.09	6.08	<b>7.54</b>	<b>7.45</b>	<b>7.74</b>	7.63	<b>8.95</b>
ROLLS-ROYCE (250)	7.31	6.62	<b>10.41%</b>	7.41	6.76	<b>7.32</b>	<b>6.27</b>	7.41	7.28	7.51	<b>7.68</b>	8.41
HONEYWELL (TPE331)	7.09	6.52	8.79%	7.52	7.08	7.31	6.00	7.05	6.16	6.95	7.00	8.46
TURBOMECA (all models)	5.98	5.94	0.66%	6.09	6.00	5.33	4.75	5.39	6.26	6.10	6.61	7.09

\* Ratings in previous surveys were based on a one-to-nine scale. This year’s survey scale is based on one to 10.

**Bold type** indicates the highest rating in each category.



### How the Survey Was Administered

This marks the second year the **AIN** Product Support Survey was administered electronically by Forecast International of Newton, Conn. Again, it has been a success, primarily because the easier-to-complete Web-based questionnaire produces more results—the goal of every survey.

In all, more than 14,000 subscribers were contacted and asked

to complete a survey, and approximately 1,450 returned, via mail, fax or the Web site, a completed survey. Roughly an additional 150 rated something—an aircraft, an engine or avionics—without finishing the survey. This equates to a better than 10-percent response rate, an increase from last year’s high. In the statistician’s world, a 10-percent response to a survey is regarded as remarkable.

While the bulk of the survey was similar to last year’s, there were a few major changes this year. The rating scale was expanded from one to nine to one to 10. The primary purpose of the change was to align the scale with **AIN**’s FBO survey, and that change is reflected in the manufacturers’ scores this year. To be included, engine OEMs had to receive at least 30 responses. ■



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Honeywell TPE331



Honeywell TFE731-60

good guy. I just never see him”...  
“Excellent. Our tech rep is always ready to assist in the rare case we have a problem. Knowledgeable and experienced”... “They need to get more involved with operators and make a lot more visits to operators.”

CFE gets high praise for what really counts—overall engine reliability, other than “Aside from some early glitches with fuel-filter and chip-detector warnings (which turned out to be nothing) we have had a great experience with this engine” and “Anti-ice system needs to be improved, as it’s not so reliable.”

### Honeywell

The TFE731, TPE331 and HTF7000 qualified for inclusion, but the ATF3, ALF502 and LTP/LTS101 did not receive enough responses to be factored into Honeywell’s ranking.

Operators reported service as good or above from all authorized service centers engaged to conduct both TFE and TPE work. Factory service centers earned generally favorable reviews, peppered with a few complaints: “Like to sell parts... Had an oil leak issue that went on for six months after a CZI. Missing a trip and grounding the airplane finally got their attention and they came to our facility and fixed the problem”... “Need to improve their turnaround time for delivery”... “Not the greatest response.”

On parts availability, many Honeywell customers were happy enough that “good, very good, excellent” or “good, big improvement” sufficed, but a few less content TFE731 operators were more talkative: “We are on MSP, but parts still not easy to get”... “Parts are difficult to procure directly from Honeywell; best to order from service center”... “Honeywell needs to do a lot of work in this area”... “Honeywell has some serious issues in its supply of parts”... “There are some parts that have held up work on our engines but since we had a loaner engine from MSP it didn’t affect our schedule”... “Normally excellent, but DEECs can be a problem”... “Had to wait for several weeks for parts while [the airplane was] in for repairs due to

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a carbon seal failure"... "Fuel controls for the -60 are high failure and always hard to get"... "Not good at all"... "Dash 20 inventory is below par"... "Have had wrong part sent"... "Critical parts are getting hard to come by." And for the TPE331: "Not so good for older engines"... "More parts are becoming hard to find."

On AOG response: to boost

the excellents and goods, Honeywell's HTF7000 support earned "Honeywell's 'go' teams are fantastic. The support from Phoenix is superb." TFE731 AOG response is highly regarded too, including one "Much better in 2006 than before," but with a couple of exceptions: "The only good parts in the customer service network are Field Service and Lee Kir-

choffer, who is my customer support manager. Unfortunately, by the time Lee gets involved it's already too late"... "AOG does not mean much to Honeywell."

Warranty fulfillment drew favorable and enthusiastic comments except for "Have to argue with them on performance issues and jump through a lot of hoops to get them to agree to fix engines that have recurring issues"... "Honeywell would rather 'bully' customers into its MSP program than cover faulty parts under warranty." Technical manuals are generally well received, save for a few complaints about navigability.

All the HTF7000 respondents were impressed with the tech reps, except for one, who was simply "Not impressed." TFE731 tech reps are highly regarded, and particularly "Clark Rogers is a tremendous asset"... "Russ Formica is a great rep. He knows the product and shares information"... "Homer Shiroma stayed on top of the problem [oil leak when parked for more than seven days] continuously for two months until we were able to isolate it, at which time they corrected the issue at no cost to us. I still get a call from time to time to see how the engines are performing. These folks have really done a great job with their customer service." Honeywell can't please them all, however: "A weak issue for Honeywell. They should issue a list of tech reps around the world"... "Not great"... "Poor"... "Have to know who to call"... "A lot of the TPE331 guys are gone and you have to know who to call at Honeywell or contact one of the service center guys."

On overall reliability, Honeywell drew generally high praise. For the HTF7000: mostly excellent or very good, but a couple of respondents were more expansive. "The reliability of the HTF7000 is far superior to any other Honey-

## CFM International

Backbone of airliner propulsion, CFM took the top spot in last year's survey but this year received insufficient responses to be included. That said, however, the few responses we did receive gave the manufacturer high praise for its support of the CFM56, the engine that powers the 737-based Boeing Business Jet, BBJ2 and BBJ3. The CFM56 and its manufacturer earned "good" or "excellent" in most categories, and one operator said that the cost of parts (perennially a source of complaint about most manufacturers) was "reasonable." —N.M.



Pratt & Whitney Canada JT15D-5D

well engine at this point"... "We waited five months for a replacement gearbox (it was leaking through the case casting)."

The TFE731 has outgrown its early nickname (said one respondent, "The days of using the term Garrett Grenade are now gone") and gets generally good reviews for overall reliability other than persistent complaints about carbon seals.

#### Pratt & Whitney Canada

Dallas Airmotive, Duncan Aviation, Premier, Stevens and Epps all got good reviews for their support of the P&WC engines they handle (JT15Ds, PW-series turbofans and/or the PT6). Comments were generally favorable, but some operators were more expansive on the factory service centers: "Cessna centers knew the engines

they are very good"... "West Virginia facility took an extremely long time to overhaul our engine"... "Our experience [PW-series engine] was lacking communication and cooperation"... "Had a little glitch with a set of overhauls but their response was excellent and follow-up was first rate"... "Complete hot-section inspection with P&WC representatives. Cost overruns were excessive and many issues working out extended charges, warranty, labor hours and parts exchange rates"... "Poor communication with customer on work in progress."

P&WC earned generally high praise for parts availability, with some exceptions: "Poor in Argentina [PT6]"... "No [PT6] LRU parts available in São Paulo, Brazil"... "Pratt had a hard time coming up with parts for a hot section that was very expensive.

[JT15Ds], but never felt we got the service we got from the old Kal Aero"... "Not impressed by the 'legal' directives the factory people apparently must abide by"... "Citation Service Center in Long Beach is the worst—avoid at all costs"... "Hot section teardown twice because factory installed a part backwards twice. Flew airplane to factory to save time. Never again!"... "Bombardier Wichita does all of our engine work because

Engine parameters are always kept conservative and yet the hot section was really expensive"... "Very poor [PW series]. I can't wait 60 days for critical parts"... "Not always so good. End up getting parts from Cessna [PW series]."

Parts costs elicited the usual scattering of emotions: "Way too high!...continues to amaze...as expected...way out of line... pretty high, but for a bulletproof product [PT6], I don't mind paying for the peace of mind...compared to the Honeywell and Rolls-Royce powerplants on our other aircraft, this engine [PT6] seems like a bargain...getting ridiculous [PW series]... N/A—we are on Eagle Service Plan...in line with any jet engine...yikes, hold onto your wallet...terrible—highest cost for an engine [PW series] of this class ever experienced. This is a P&WC problem that needs to be addressed."

On AOG response, positive comments far outweighed negative, but one dissatisfied operator expanded: "Typically parts don't arrive on flights as promised. No follow-up from source as to disposition of parts. In one instance the [airline] flight was cancelled the night of shipment and we found out the next morning after we had a crew in position awaiting delivery. P&WC was showing that the part was delivered, yet they had been notified the night before that Northwest cancelled the flight."

Opinions were varied on warranty fulfillment, spanning the range from outstand-

ing to "always an argument." "Very good on Pratt-manufactured parts but not very good on vendor items such as fuel control units...Poor—burdensome system...P&WC will absolutely not budge even when you're just slightly out of warranty. They offer no help, only charge. This is quite disappointing, especially on an uncommon failure that was just 60 days past warranty expiration."

Respondents generally like Pratt's tech manuals, with some exceptions: "Not the best. One area is parts referencing. P&W has one number, Cessna has another, and depending how you order the part determines how the part is billed"... "CD-based manuals are poor at best"... "Damage criteria for the fan on PW535As do not exist. Overhaul manual does not exist for this engine"... "Indexing is difficult for the average user."

Tech reps: "They are the best. Their product knowledge is unsurpassed"... "Never once met the tech rep for this engine [PT6]"... "Excellent. Best service I have come across in any industry"... "We were considering a contingency extension for HSI on our PT6A-42s to align with a scheduled phase inspection. Our P&W field office rep was virtually non-responsive when voice mails were left for him. We finally gave up on the extension idea and contacted Dallas Airmotive for our HSI"... "Slow to return phone calls and don't always arrive when expected, based on previous appointment times"... "Tech

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support from Toronto couldn't be better."

P&WC garners high praise for overall engine reliability. Some expansions: "For us a 10 but I still have questions about dual engine [JT15D] flameouts"... "Outstanding,

rock solid, bulletproof [JT15D]"... "Pratt is having some issues with corrosion of the intermediate case and it affects a lot of engines [JT15D]. There doesn't seem to be any relief from Pratt for this costly part"...

"The reliability of a PT6 is legendary"... "Don't know how [PT6] reliability could be better"... "Best turboprop engine made [PT6]. They just run forever. Never a problem. They almost talk to you." On the PW series, generally good, except: "Had to do an HSI early for cracks internally"... "Some issues with starting problems"... "I feel there is an issue with the ignition couplers and possibly the plugs too. We're concerned with potential failures due to the tracking problems, and I think development of a more reliable connector should come sooner rather than later. The oil leaking from the generator shaft is another complaint, and

we'll attempt to apply the repair when we can. Very inconvenient at the present time."

## General Electric

The CF34 qualified for inclusion, but the CF700 and CJ610 did not receive enough responses to be factored into GE's ranking.

MTU and Indianapolis Jet Center earned good comments for their CF34 work, and factory CF34 service was generally favorably regarded except for "Good at what they do, limited in capability. GE needs more airframe capability at its service center"... "The Strother facility has good people, but is obviously not strongly supported by its corporate parent"... "Costly"... "Good engine overhaul, but documentation/paperwork not up to industry standards"... "Great difficulty with proper accounting of costs during factory overhaul." Other than one "[parts are] a hassle to procure," GE gets good marks for parts availability and, for parts cost, the usual sprinkling of "good," "fair" and "excessive." AOG response is also generally good.

GE got good comments for CF34 warranty fulfillment, and, among plenty of goods, very goods and excellents, some gripes about the CF34 tech manuals: "Temporary Revision system is not good. Web site access and user-friendliness is bad"... "Difficult to navigate on CD, poor presentation"... "Slightly difficult to navigate, but I must reserve the comment because of the lack of my using the system. It is rare that I need to refer to an engine manual in my operation"... "The electronic update process is pretty cumbersome"... "Manuals appear to cover it all; they are just hard to navigate. Support from India does not appear to be knowledgeable about the product." CF34 tech reps ranged from excellent to invisible.

Operators were impressed by the reliability of the CF34: "Practically bullet-proof"... "No negative information except concern about core-lock issues"... "What a great engine"... "Most reliable engine I have operated in my 28-year career"... "Like the Energizer Bunny, it just goes and goes and goes"... "We have had to cancel only one flight in six years due to an engine problem. Not bad for six years, but still not a 10"... "Appears to be dwindling. On-condition or task-oriented maintenance started out good, but I'm spending more and more money on ADs. I guess one way to look at it is that I'm glad no parts have departed my engines"... "Excellent. GE has its service act together."

GE well illustrates the value of the survey respondent comments, since despite their generally positive tone, the CF34 ended up last among turbofans in the cruel, unyielding world of numbers.

## Turbomeca

Turbomeca trails its competitors by the widest margin in the survey, but operators like the engines' reliability. Comments on all segments of the survey were short and varied but added little insight beyond the numerical scores. □

*This year's survey was devised by AIN's editors and designed and administered by Newtown, Conn.-based Forecast International in full collaboration with AIN. The results from the aircraft portion ran in August, and the results from the avionics portion ran last month.*