PRODUCT SUPPORT SURVEY 2014

PART 3: ENGINES

Williams and Rolls-Royce share jet honors, while Honeywell leads in turboprop sector

by Nigel Moll (narrative) and David Leach (data and charts)

Jet Engines

Among manufacturers of turbofans for business aircraft, Williams retains the number-one slot in product support but is not alone at the top this year, sharing the honors with Rolls-Royce, which moves up from the number-three slot it held last year.

Rolls-Royce and Williams both scored 8.0 this year, representing a drop of 0.1 for Williams and a gain of 0.2 for Rolls over last year. Honeywell takes second place with 7.9, up from 7.8 last year. CFE, GE and Pratt & Whitney Canada all tie for third this year with 7.6. CFE moves to third from fifth and 7.3 last year; GE drops to third this year from second last year; and P&WC climbs to third this year from fourth last year.

In the individual turbofan type rankings, Honeywell's HTF7000 series is still top dog, with 8.1 this year versus 8.3 last year. In close second is the engine that made the greatest gain this year–the Rolls-Royce BR700 series, which ranked tenth last year with 7.6 and jumped to second this year with 8.0. Also scoring 8.0 and tying for second place are the R-R Tay (which also placed second last year with 8.2) and the Williams FJ44 (up from third with 8.1 last year). Tying for third are the Honeywell TFE731 (up from seventh last year) and the R-R AE3007 (down from second last year). Two P&WC turbofans tie for fourth: the PW500 series (up from seventh last year) and the PW600 series (up from sixth last year). The GE CF34 takes fifth place again this year with 7.7 (down from 7.9 last year). Tying at sixth with 7.6 are the CFE738 (up from 7.3 and tenth last year) and the P&WC PW300 series (up from 7.5 and ninth last year). Taking seventh place is the P&WC JT15D with 7.2 (down from 8.0 and fourth place last year).

Turboprop Engines

The rankings this year for who provides the best support among the makers of turboprop engines for business aircraft, according to **AIN** readers, are in exactly the same order as last year. Honeywell retains the top spot, followed by P&WC, Rolls-Royce and Turbomeca. By turboprop engine model, the TPE331 remains at the top spot with a score of 8.5, up 0.1 from last year. In second place is the P&WC PT6A, followed by its PW200-series stablemates in third place. P&WC's PT6T/B/C turboshaft comes in fourth. In fifth place is the Rolls-Royce 250 turboshaft, and the Turbomeca Arriel turboshaft finishes sixth.

Engine manufacturers outline product-support initiatives

Regardless of the verdicts handed down by **AIN**'s readers in this survey, all the companies tasked with supporting the engines they built have a story to tell about how they have worked over the past 12 months to improve their performance in this endeavor. Support is crucial for keeping the customer satisfied and, probably more than any other factor, it shapes an engine builder's reputation in the market.

Rolls-Royce

CorporateCare, Rolls-Royce's fixed-cost-per-flying-hour engine maintenance management program for new and in-service BR725, BR710, Tay and AE3007 engines "enhances asset value and liquidity, mitigates maintenance cost risk and protects against unforeseen costs and unscheduled events anywhere in the world." Some 1,500 aircraft are now covered by CorporateCare around the world and more than 70 percent of new aircraft delivered with Rolls-Royce engines are enrolled in the program.

"Aircraft buyers increasingly recognize the risk transfer benefits and increased asset liquidity that CorporateCare brings in a market where pre-owned aircraft sales are busy–something that brokers have confirmed to us directly. Our analysis shows that CorporateCare-enrolled aircraft sell twice as quickly as those outside the program," said the engine maker.

Rolls-Royce has seen rapid growth in its network of authorized service centers: at the start of 2012 there were nine, but by the end of that year the number exceeded 30. By the end of last year there were 54 contracts, and by the end of this year Rolls expects to have 84 authorized service centers under contract.

"This growth will take place across our global footprint, in all our key service regions, including Asia, the Middle East, South America and the U.S. We are committed to ensuring our customers have trained people with tooling and spare parts near them, wherever they fly."

Rolls-Royce's dedicated operational service desk (OSD) in Dahlewitz, Germany, has enhanced its 24/7 coverage with new policies, procedures and protocols "to improve responsiveness and raise operational availability. Examples include better accountability and communications within the OSD teams–including better visualization to simplify operations such as a live global map identifying which customers require support and how that support is being delivered. We are already seeing the benefit; we have significantly reduced the number of missed trips and we have significantly improved our AOG response times."

Rolls is developing its network of parts distribution centers and recently opened a new one at Los Angeles (LAX) with stocks for BR710 and BR725 engines.

The company plans to establish more parts centers in the Middle East, Asia and South America this year. "We are in the process of positioning our lease engine assets in strategic regions around the world, which will also enable us to respond much more quickly to any engine-change requirements.

"We now have a mobile repair team ready to respond globally to On Wing Care (OWC) specialist/complex issues. We plan to further add to this service by placing some key OWC specialists nearer to our customers in Europe, the Middle East and Asia. This will enable customers to benefit from having our specialists in the region, with all the required tooling and material to rescue an AOG," the company told **AIN**.

Williams International

"We have been focusing on ensuring owners have no worries when operating our engines." To accomplish this, Williams introduced "significant enhancements to our Total Assurance Program (TAP). We created TAP Blue, which provides an unlimited-duration warranty with coverage beyond that offered anywhere else in the industry."

Coverage includes all Service Bulletins (mandatory, recommended and optional); FOD damage; corrosion; minimum annual utilization forgiveness; major and minor scheduled inspections; and unscheduled repair.

Williams says it sees minimizing customer downtime as another way to maximize the value of its engines. "Focus has been placed on turnaround times in our repair station to ensure customers can maximize their flight operations. Most actions done in our repair station are turned quickly enough that engine rentals are not required; this allows customers to come into service centers only one time by eliminating the return trip to exchange a rental engine. This will continue to be an area of focus in the future."

As noted last year, "training requirements and support to the authorized service network continue to be a priority. These facilities and their employees directly affect the operation of owners' engines by ensuring routine maintenance is done correctly. Having skilled mechanics who are well trained and informed is crucial to smooth daily operations for owners and operators."

Honeywell, CFE

Similar to the Honeywell Direct Access mobile application that was released late last year (http://aerospace.honeywell.com/MobileApp), the Honeywell Global Customer Committee is again using members' input to shape connectivity solutions. "When these pilot advisors on our Global Customer Committee (GCC) told us they needed better access to Honeywell's technical resources, we responded. The new Honeywell Pilot Gateway (http://pilots.honeywell.com) is a one-stop shop for our technical publications, pilot guides and familiarization videos, all organized by aircraft make, model and system type." The tool also allows pilots to provide feedback, report technical problems and ask Honeywell experts operational questions. A mobile app will soon allow pilots to receive alerts and updates specific to requirements with a few taps on a screen.

Honeywell has been working to improve reliability in the TFE731-20/40/50/60 and HTF7000 series. Specifically: improved-durability fan stator designs for the AS907/HTF7000 and TFE731-20/40 have been certified and will enter spare part service early next year. Both the TFE731-20/40/50/60 and the AS907/HTF7000 series have used composite fan bypass stator designs since their inception. "These strong, lightweight designs have performed well. When replacement is required, however, it is commonly the result of leading-edge erosion. New, more erosion-tolerant designs have been introduced that use a full metal wrap of the leading edge rather than the previous metal mesh. These new designs will enter spare part service in early 2015."

Honeywell is introducing turbine airfoil inspection criteria and repairs that will extend the lives of these components, and the process will be completed by year-end. "Turbine airfoil replacement is a common maintenance cost driver for most turbine engines. Honeywell is addressing this on the TFE731-20/40/50/60 by introducing to the maintenance manuals revised inspection criteria and repairs." The company expects to complete these changes by year-end.

TFE731-20/40/50/60 accessory gearbox seals are being upgraded to hydrodynamic carbon. "Oil leaks at accessory gearbox pads can be a recurring reliability challenge. Honeywell has had success in these types of location with hydrodynamic carbon seal designs and has recently introduced them to the TFE731-20/40/50/60 accessory gearboxes."

Honeywell has drawn on human-factor design principles to reduce the number of tools required to perform maintenance tasks on the HTF7000. Historically, more than 30 different hand tools were required to perform maintenance tasks and this has now been reduced to only 13.

Honeywell says it continues to expand the global Spex asset pools of electronics and mechanical parts/services to improve aircraft availability. "Strategic planning for regional demand is key to enabling the rapid delivery of both mechanical and electrical components across the globe. Planning for the right parts in the right location continues to enable the 94-percent on-time-to-request (OTTR) performance demonstrated with an average exceeding 2,000 shipments per month." Honeywell arrives at the figure of 94 percent by dividing the number of orders delivered on time by the total number of orders due and multiplying that number by 100 percent. "The requested delivery date is the date the customer sets to receive the material at its facility, not a negotiated date."

Compared with the previous three-year period, parts inventory has increased by 6 percent in Europe, the Middle East, India and Africa and by 66 percent in Asia-Pacific.

For Honeywell, AOG resolution "remains a key focus to ensure a high level of customer satisfaction during our operators' time of need. Further enhancements to visual controls, cross-training plans and adopting lean manufacturing principles to manage information that yielded positive improvements in 2013 continues this year." Although it handled more volume than in 2013, "the AOG team continues to perform at a high level of efficiency and has received the highest ranking of Honeywell customer service representative groups for customer feedback through our Net Satisfaction Score surveys in 2014."

Honeywell explains what it means by "adopting lean manufacturing principles to manage information" thus: "By thinking of information in terms of physical products, we can better assign cycle time and turnaround time controls to AOG requests. By leveraging proven manufacturing push and pull concepts, we can better control the flow of information and measure productivity at a granular level and not just overall throughput. Continuous improvement efforts are focused on the areas where we identify waste in the process and maximize our capacity through incremental workflow adjustments depending on demand hour by hour within our defined work stream."

GE

Thanks to guidance and input from its Customer Advisory Council, GE learned that its Customer Web Center (CWC) and diagnostic reports were too complex and has revamped both. The new myGEAviation.com, to be introduced soon, "provides a customizable portal directly linked to the customer's assets for easy access to all GE documents such as technical publications, fleet highlights and so on. You will be able to personalize the site for your needs and reach the information you seek with very few clicks versus the CWC. We are designing the new site with updated technology so that it will no longer have to be taken down for system upgrades."

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2014 Engine Manufacturer Ratings

	Overall Average 2014	Overall Average 2013	Overall Average 2013-2014
Turbofan			
Rolls-Royce	**8.0**	7.8	0.2
Williams	**8.0**	**8.1**	-0.1
Honeywell	7.9	7.8	0.1
CFE	7.6	7.3	0.3
GE	7.6	7.9	-0.3
P&WC	7.6	7.7	-0.1
Turboprops			
Honeywell	**8.1**	**7.9**	0.2
P&WC	7.6	7.7	-0.1
Rolls-Royce	6.9	7.1	-0.2
Turbomeca	6.4	6.3	0.1

** Companies are listed in order of their 2014 overall average. Ties are listed alphabetically. **Bold** indicates highest number in each category.*

Rating Scale:

1 2 3 4 5 6 7 8 9 10

Inadequate Poor Average Good Excellent

Survey Rules & Methodology

As with **AIN** Publications' previous annual Product Support Surveys, the objective this year was to obtain from the users of business jets, turboprop airplanes and turbine-powered helicopters statistically valid information about the product support provided by engine manufacturers over the last year and to report this information to our readers. The ultimate goal of the survey is to encourage continuous improvement in aircraft product support throughout the industry.

This survey was conducted via a dedicated website, created by **AIN** from the ground up to provide improved ease of use and to encourage greater reader participation.

AIN emailed qualified readers a link to the survey website and questionnaire. In total, 21,584 readers were invited to participate in the survey. The survey website was open from May 1 to June 13. Respondents were asked to rate individual engines and provide the primary region of service and whether they used factory-owned or -authorized service centers, or both. Respondents were also asked to rate, on a scale from 1 to 10, the quality of service they received during the previous 12 months in the following categories:

- **Factory-owned Service Centers**–cost estimates versus actual, on time performance, scheduling ease, service experience.
- **Authorized Service Centers**–same as above.
- **Parts Availability**–in stock versus back order, shipping time.
- **Cost of Parts**–value for price paid.
- **AOG Response**–speed, accuracy, cost.
- **Warranty Fulfillment**–ease of paperwork, extent of coverage.
- **Technical Manuals**–response time, knowledge, effectiveness.
- **Technical Reps**–response time, knowledge, effectiveness.
- **Cost-per-Hour Programs**–Cost vs. benefits, ease of administration.
- **Overall Product Reliability**–How the product's overall reliability and quality stack up against the competition's.

Respondents were also asked to recognize individuals who had provided them with exceptional product support and service. The list of these people is available online at www.ainonline.com/above-beyond-2014.

The 2014 **AIN** Product Support Survey results for engines are published in this issue; the aircraft results were published in August and the avionics results were published in September. For information about the survey methodology and for answers to other questions about the survey, please contact David Leach, **AIN** director of finance and new product/online development, at dleach@ainonline.com. *–R.R.P.*

PRODUCT SUPPORT SURVEY 2014

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Diagnostic reports will be more user-friendly, providing "an easy-to-read actionable summary that identifies any items that need to be addressed in a simple format."

To keep pace with an uptick in international flights, GE has expanded its support footprint by 17 percent with the addition of Jet Aviation Singapore, Jet Aviation Basel and Metrojet in Hong Kong as authorized service centers and by deploying field service personnel in Europe, Asia and the Middle East.

GE says its AOG responsiveness metrics "continue to trend upwards. Over the past 12 months, 95 percent of all AOGs were resolved in less than four hours. For everyday support, our 95-percent on-time to customer request metrics highlight the emphasis we place on providing customers with timely service."

GE launched the GE Beacon, a 24-hour customer service and support smartphone app, in 2012 and since then it has been downloaded by 1,600 customers, who are getting "a response time of less than 10 minutes."

The CF34 continues to rack up an enviable reliability record, and in this year's survey it ties for first place (with the Rolls-Royce Tay) with a score of 9.4 in the "overall engine reliability" column. GE metrics give the engine 99.99-percent reliability. GE Aviation's hourly engine maintenance cost program, OnPoint, is enjoying growing popularity. More than 40 percent of GE-powered business jets are now signed up for OnPoint, versus 20 percent five years ago. "Additionally, aircraft valuation companies attribute up to a $2 million increase in residual value for customers with an OnPoint service agreement on their engines."


GE CF34

Pratt & Whitney Canada

Pratt & Whitney Canada (P&WC), which supports more than 50,000 corporate, general aviation, regional airline and helicopter engines operating in some 200 countries, says it continues to push forward in the corporate market both from a product and service perspective. On the product front, there is "significant activity" around the PW300 series with the introduction of the improved PW308C, which has a greener combustor, for the Falcon 2000S/LXS; the PW307D for the Falcon 8X; the PW307B for the Learjet 85; and the PW306D for the new Sovereign+ and Latitude.

P&WC says that its customers tell the company the three things they expect above all else are product performance, speed and ease of doing business. "Each and every year, P&WC looks to institute changes that will provide a positive impact on these three pillars."

Ease of Business

Building on last year's initiatives, P&WC says it continues to refine its Customer First Centre with the introduction of a customer relationship management system that integrates all aspects of its frontline support. "This totally redesigned system incorporates the best practices from the industry in a comprehensive package that focuses on streamlining customer interactions. A further extension of this philosophy is the introduction of integrated event management with the aircraft OEMs to ensure rapid and seamless service where everyone is aware of the situation and the plan."

Survey responses received from thousands of current users, says P&WC, suggest that "good progress is being made in further refining the technical publications section of the customer portal." Responding to their feedback, P&WC "has addressed concerns and has introduced enhanced features improving functionalities. As a result portal traffic is up by 20 percent over the last 12 months."

P&WC has recently introduced a Platinum level of coverage for the ESP program offered to Falcon 7X operators. It adds inclusion of routine periodic inspections, corrosion repair, low-utilization inspections, renewal of technical publications and enhanced engine trending and performance margin analysis above and beyond the standard maintenance coverage. There is also "increased front-line capacity for ESP Program customers."

P&WC is offering an extended warranty program on the PT6A, to further enhance the goal of predictability for the operator. Operators can now benefit from a 500-hour or one-year extension (whichever occurs first) to the basic engine warranty for new engines.

In May, two maintenance facilities were added to the network, and they will be on line by the end of the year to offer enhanced MRO support on PT6T, PT6C, PW200 and PW210 engines in the Middle East and in North America.

Speed

P&WC says it is taking steps to expand and locate services closer to its customer base for faster support deployment. The company is expanding its international footprint and service coverage with the continued ramp up of its Asian hub in Singapore. Front-line capacity is being bolstered with the addition of in-region customer managers and customer engineers. These people augment the fully staffed, 24-hour Customer First Centre.

To provide added support to European, Middle East and African customers, P&WC has opened a distribution center for rental engines in Frankfurt, Germany.

On the turboshaft front, P&WC is offering a zero-time exchange program for select PW200 models at predetermined pricing. This saves the operator one removal and installation and provides a "no-surprises environment" when it is time for an engine overhaul.

P&WC has introduced an upgrade package for the PT6C-67C to improve its performance in hot and harsh environments. It has also developed and put in place repair capabilities for new engine models such as the PT6C-67E and PW210.

The Cessna Caravan can now be equipped with P&WC's fully automated flight acquisition storage and transmission (Fast) system, which automatically collects engine management unit and flight data recorder files for the engine and transmits them over the cellular system when the aircraft lands. "This greatly assists in AOG prevention, engine-condition trend monitoring and data administration."

Turbomeca

"'We keep you flying' is our commitment," says Turbomeca, "and behind these four words there is a strong message and promise to customers. Along with this promise, a value-based strategy has also been put into place that has been built around four core values: safety, reliability, proximity and innovation."

Safety

The manufacturer says there have been zero uncommanded in-flight shutdowns on Turbomeca-powered single-engine aircraft since 2012.

With the objective of bringing to the helicopter industry the same level of safety enjoyed by the commercial aviation world, "in which [parent company] Safran is an important actor, Turbomeca has continued to implement SMS (safety management system) throughout its MRO activities and plans to extend these initiatives to production activities next year."

Reliability

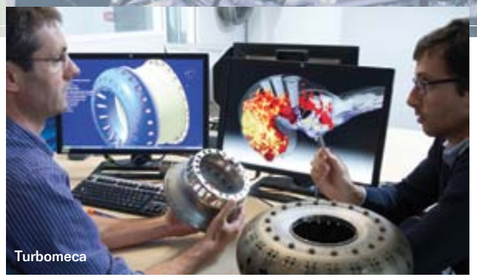
Turbomeca says it has made progress with engine reliability in three areas:

"TBO extensions and alignments (the Arriel 1D1 and Arriel 1E2 and their accessories have seen TBO increases of 20 percent over the last few years); mean time between failure (a 60-percent improvement has been achieved since 2005, in particular on the Arriel 1, Arriel 2 and Arrius 2F. For example, the Arrius 2F reached an MTBF of 7,000 hours last year); and FCU-HMU availability (a 10-percent increase in production has enabled us to reach a 92-percent worldwide service rate)."

Two more objectives are in place to continue the improvement of Turbomeca's support in this area: "95-percent service rate for our Pool assets by the end of this year; and 50-day turnaround time by the end of next year, a continuation of our pursuit to decrease repair cycles, which have already reduced by 30 percent between 2011 and 2013."

Turbomeca offers two packages, Support By the Hour (SBH) and Global Support Package (GSP), to bring civil and military operators visibility on maintenance costs and peace of mind in terms of planning and budgeting.

SBH can cover scheduled maintenance (overhauls, for example) as well as unscheduled events such as engine or accessory repairs, limiting exposure to unexpected expenses. It carries a fixed cost per engine flight hour and is linked to the number of hours an operator flies. Customers can also choose the availability, logistics and financial services they wish to include in their contract.


Turbomeca

GSP contracts can include automatic stock replenishment, scheduled and unscheduled maintenance coverage, on-site expertise and customized daily technical support, fleet management, maintenance procedure and technical publication optimization, training and stock management.

Both SBH and GSP are tailor-made programs developed with customers to answer specific

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2014 Ratings by Category and Type of Engine

		Overall Average 2014	Overall Average 2013	Ratings Change 2013 to 2014	Factory Service Centers	Auth. Service Centers	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Cost per Hour Programs	Overall Engine Reliability
Turbofan														
Honeywell	HTF7000	**8.1**	**8.3**	-0.2	7.7	**8.3**	8.1	**6.8**	7.8	**8.5**	7.8	7.8	**8.1**	9.3
Rolls-Royce	BR700 series	8.0	7.6	0.4	**8.3**	8.1	8.0	6.2	**8.3**	8.4	7.2	**8.4**	7.5	9.3
Williams	FJ44	8.0	8.1	-0.1	7.6	7.6	**8.4**	6.7	8.2	8.4	7.7	8.3	7.5	9.2
Rolls-Royce	Tay	8.0	8.2	-0.2	**8.3**	8.2	8.2	6.1	**8.3**	8.4	7.0	8.2	7.5	**9.4**
Rolls-Royce	AE3007	7.9	8.2	-0.3	7.4	7.3	8.0	**6.8**	8.2	8.3	7.1	8.2	7.6	9.1
Honeywell	TFE731	7.9	7.7	0.2	7.4	8.0	7.8	6.4	7.9	8.1	7.9	8.2	7.6	8.9
P&WC	PW500 series	7.8	7.7	0.1	7.7	7.8	7.8	6.6	8.0	8.0	7.9	8.1	7.3	8.5
P&WC	PW600 series	7.8	7.8	0.0	7.9	8.0	7.8	6.6	7.9	7.9	7.9	7.9	7.3	9.0
GE	CF34	7.7	7.9	-0.2	7.2	8.0	7.8	6.2	7.6	7.4	7.4	8.0	7.4	**9.4**
CFE	CFE738	7.6	7.3	0.3	7.3	7.7	7.6	6.4	7.9	7.6	**8.1**	7.9	6.5	8.6
P&WC	PW300 series	7.6	7.5	0.1	7.5	7.6	7.5	6.1	7.6	7.9	7.8	7.6	7.0	8.7
P&WC	JT15D	7.2	8.0	-0.8	6.8	6.9	7.4	5.9	6.9	7.3	7.6	7.7	6.4	8.7
Turboprop & Turboshaft														
Honeywell	TPE331 turboprop	**8.5**	**8.4**	0.1	**9.0**	**8.9**	**8.1**	**6.8**	**8.6**	**8.7**	**8.9**	**8.9**	**6.8**	**9.6**
P&WC	PT6A turboprop	7.7	7.8	-0.1	7.6	7.8	7.9	5.8	7.6	7.9	7.9	8.1	6.6	9.2
P&WC	PW200 series turboshaft	7.6	7.8	-0.2	6.8	7.1	7.5	6.6	7.9	7.5	8.0	7.7	7.7	8.6
P&WC	PT6T/B/C turboshaft	7.5	7.5	0.0	6.8	6.9	7.5	6.2	7.5	8.0	8.1	7.7	**6.8**	8.6
Rolls-Royce	250 turboshaft	7.1	7.0	0.1	7.6	8.2	7.5	6.1	6.7	6.3	7.5	7.4	5.9	7.4
Turbomeca	Arriel	6.5	6.6	-0.1	6.0	6.4	6.2	5.1	6.7	6.4	6.6	7.3	6.0	7.7

** Companies are listed in order of their 2014 overall average.*
Ties are listed alphabetically.
***Bold** indicates highest number in each category.*

Rating Scale: 1 (Inadequate) 2 3 4 5 6 7 8 9 10 (Excellent)

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needs, and the prices depend on the engine type and age.

Proximity

With its support footprint spanning five continents and employing 2,500 people in 12 different countries, Turbomeca says its customer support services are "close to customers, to provide them with commercial and technical services as near as possible to their operations."

Innovation

Turbomeca is developing Boost (Bank of Online Services and Technologies), a variety of online services "designed to smooth and facilitate maintenance operations and airworthiness tasks and assist operators in maintenance planning and configuration management." The services are built around two main functions: the electronic engine logbook and the web-IETP (online engine technical publications that are linked to the engine logbook). Future services already in the works include tools for advanced troubleshooting and engine health monitoring. These first web services are currently being tested by customers and will be available next year.

CFM*

CFM International's CFM56 (nearly 27,000 delivered to date) has racked up a stellar 99.98-percent departure reliability rate, as well as industry-leading time on wing. Business-jet operators (mostly BBJs) benefit from the worldwide network CFM has established to support airline operations. This network includes approximately 150 field service engineers in more than 50 countries to provide day-to-day support and technical guidance, augmented by a team of customer support managers who track fleet trends, liaise with the engineering teams, work with line maintenance service providers and oversee bigger initiatives.

Some of its continuing initiatives to support business jet operators include streamlining the process by which new customers are brought on board; customizing low-utilization guidelines specifically for these operators to provide airliner levels of reliability with minimal maintenance burden; and providing access to CFM's flight operations team.

CFM says it continues to enhance its three 24/7 Aviation Operation Centers in China, France and the U.S. with streamlined processes combined with responsiveness metrics to exceed customer expectations. These facilities field more than 6,000 inquiries annually, and the company says its response time is averaging 2.8 hours. The customer website makes available support tools, including a technical library, parts ordering and warranty processing, combined with enhanced search capabilities.

CFM operates four training facilities: in Cincinnati; Guanghan City, China; Hyderabad, India; and Paris, France. It has added and expanded online training for CFM56s.

CFM also maintains what it describes as the most open aftermarket support network in the industry. There are 45 CFM-licensed overhaul and repair facilities in 13 countries, of which nearly 30 percent are GE/Snecma joint venture and allied shops. In addition, CFM's parent companies operate six repair locations. The company also maintains a pool of more than 200 spare CFM56s, positioned at 13 locations worldwide for rapid response. ❑

**Insufficient responses for inclusion in survey data, but CFM's response is included here for completeness.*

Correction

The overall average for Cessna (Citation) in the Newer Business Jets section of the "Combined Overall Average Ratings of New and Older Aircraft" chart (**AIN**, August, page 22) should have read 7.5 instead of 7.3. ■