

# 2017 Product Support Survey

Part 2: Engines

## What have you done for me lately?

by Nigel Moll

### GE

GE has focused on expanding its customer support footprint outside the U.S. this year, “with a strong focus on Europe. We added a regional account leader role based in Munich. We also added a field service engineer in London to support the new BAS Biggin Hill facility. GE continues to take technical training to our customers and partners: this year we have conducted onsite training in Germany and London to strengthen CF34 technical capabilities in the region,” according to Tom Hoferer, general manager of commercial service and support for business and general aviation at GE Aviation.

The top three finishers are separated by just a tenth of a point each, as they were last year, but **AIN** readers again this year name GE as the best provider of support for the engines that power their business jets, in this case the CF34s found on 600-series Challengers and the Lineage 1000. GE slid slightly to an overall average score of 8.3 from its 8.4 first-place score last year. Rolls-Royce and Williams switched rankings this year, with R-R rising to second place (with the same 8.2 it scored last year) and Williams falling to third with a score of 8.1 (down from 8.3 last year). Pratt & Whitney Canada comes in fourth with 8.0 this year, up from 7.9 last year. Honeywell takes fifth place this year with 7.8, down from 8.1 last year, and CFE is last with 7.4, down 0.2 from 7.6 last year.

Among makers of turboprop engines, the rankings remain unchanged: Honeywell is still king of the hill with a score of 8.6 for support of the TPE331, down from 8.8 last year. Pratt & Whitney Canada keeps second place for PT6 support with 7.7, up slightly from last year’s 7.6. Safran Helicopter Engines (the former Turbomeca) is last with 7.0, down from 7.3 last year. ■

## 2017 Overall Average Ratings of Engine Manufacturers

	Overall Average 2017	Overall Average 2016	Ratings Change from 2016 to 2017
<b>Turbofan</b>			
GE	8.3	8.4	-0.1
Rolls-Royce	8.2	8.2	0.0
Williams	8.1	8.3	-0.2
Pratt & Whitney Canada	8.0	7.9	0.1
Honeywell	7.8	8.1	-0.3
CFE	7.4	7.6	-0.2
<b>Turboprop/Turboshaft</b>			
Honeywell	8.6	8.8	-0.2
Pratt & Whitney Canada	7.7	7.6	0.1
Safran Helicopter Engines (Turbomeca)	7.0	7.3	-0.3

“We continue to expand partnerships to enhance customer support and AOG response. We recently added CFM56 support for Boeing Business Jets and Airbus Corporate Jets to our Aviall partnership agreement. This will allow us to improve AOG response with flight-line LRUs and critical material to our 24-hour target for material on dock. The expanded relationship will also provide dedicated spare engine support for our BBJ customers.”

Last year GE introduced a program for CF34s on Challengers that combines retrofit of wireless quick-access recorders with prognostic engine analytics and flight operations quality assurance (FOQA) analytics from GE company Austin Digital. “The new analytics allow us to breathe digital life into the CF34 and, combined with our OnPoint program, bring predictive capability and enhanced reliability to the engine.”

### HONEYWELL

Honeywell launched the MyAerospace Technical Knowledge Center to provide 24/7 access so customers can quickly and efficiently troubleshoot aircraft with videos and informational articles. “Everything we are doing to improve technical

service, parts support and AOG response is centered on reducing customer effort,” according to senior director of customer and product support Paul David. “We are hosting 45 operator forums this year and expanding our customer and technical support presence in the field. We are listening to customers through our new customer connect program, through industry survey feedback and through our global customer committee to make significant enhancements to our communications and tools.”

Honeywell customers can now sign engine or APU bailment agreements online. The smart flow rental worksheet is populated by the service center, and the rental bank will populate the smart bailment agreement (which has been upgraded with auto-fill pricing) and send for eSignatures, reducing the time it takes to ship a rental.

Launching this month, Honeywell’s location-based direct access mobile application (free from the Apple App store and Google Play store) will help maintenance departments and technicians, pilots and operators get instant 24/7 access to technical and AOG support and quickly locate the nearest Honeywell-authorized



service centers and dealers and get status on open orders.

Honeywell has recreated the MyAerospace portal to simplify online ordering and tracking processes, improve maintenance performance at repair sites and equip customers to manage repair and overhaul more efficiently. Using the improved self-service resource at any time, Honeywell customers can more easily order parts, book repairs and search for product information. As a result, says Honeywell, first-call resolution is “on the rise.”

With the MyAerospace Portal updates that they specifically requested, customers can manage their orders with less effort and in less time using a customized search engine that remembers their history and preferences. They can monitor their shipments through graphs that group orders by status, allowing them to track repairs, spares and exchange orders; they can also view repair details, update shipping information and download certifications from a desktop or mobile device. Honeywell says it is

reducing the number of steps required online by 20 percent, with a 50-percent improvement in turnaround time.

The latest engine in the company’s lineup, the HTF7700L for the Citation Longitude, was certified in August. The HTF7000 series has on-ylon standard maintenance and no hard time engine removals, reducing down times. With 3.4 million flight hours logged by almost 2,000 production engines, the HTF7000 is demonstrating what Honeywell claims is best-in-class dispatch reliability at “greater than 99.9 percent.” The company is deploying more HTF7000 service technicians in the field. For minor maintenance, partners such as Duncan Aviation, Dallas Airmotive, Turbine Engine Specialists, Jet Aviation and StandardAero provide regional support. Dallas Airmotive Brazil has renewed its HTF agreement for line maintenance to support operators in that region; Honeywell Phoenix Repair and Overhaul and StandardAero Augusta provide heavy maintenance support. The StandardAero test cell in Augusta, Ga., will be on line this fall.

## 2017 Average Ratings by Individual Engines

		Overall Average 2017	Overall Average 2016	Ratings Change from 2016 to 2017	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
<b>Turbofan</b>														
Rolls-Royce	AE3007	8.5	8.5	0.0	8.0	8.4	8.5	7.8	8.8	8.8	7.7	8.7	8.5	9.3
GE	CF34	8.3	8.4	-0.1	7.6	8.2	8.3	7.4	8.5	8.7	7.9	8.8	7.7	9.5
Pratt & Whitney Canada	PW500 series	8.2	8.0	0.2	7.6	7.7	8.4	6.6	8.6	8.6	8.2	8.8	7.4	9.3
Rolls-Royce	BR700 series	8.2	8.1	0.1	8.5	8.4	8.5	7.0	8.5	8.6	7.3	8.4	7.5	9.3
Pratt & Whitney Canada	PW600 series	8.1	8.4	-0.3	8.2	8.6	8.3	7.0	7.8	8.6	8.6	8.2	7.0	8.8
Rolls-Royce	Tay	8.1	8.4	-0.3	8.4	8.5	8.1	6.3	8.5	8.5	7.2	8.4	7.5	9.4
Williams	FJ44	8.1	8.3	-0.2	8.5	7.4	8.0	7.8	7.7	8.8	8.2	7.7	8.1	9.1
Pratt & Whitney Canada	JT15D	8.0	7.5	0.5	7.7	7.8	8.3	7.2	8.3	6.7	8.5	8.4	7.5	9.3
Pratt & Whitney Canada	PW300 series	7.9	7.8	0.1	7.4	7.9	8.1	7.2	7.8	8.2	7.8	7.9	7.5	8.9
Honeywell	TFE731	7.8	7.9	-0.1	7.1	8.3	8.3	7.0	7.8	7.9	7.7	7.8	6.7	9.0
Honeywell	HTF7000	7.8	8.3	-0.5	7.8	8.5	8.0	7.0	7.9	7.9	7.4	6.5	7.8	8.7
CFE	CFE738	7.4	7.6	-0.2	7.1	7.8	7.4	6.1	8.0	7.3	7.9	7.8	6.9	7.9
<b>Turboprop/Turboshaft</b>														
Honeywell	TPE331 turboprop	8.7	8.9	-0.2	8.7	8.9	8.5	7.1	8.9	9.0	9.3	9.5	8.0	9.5
Pratt & Whitney Canada	PT6T/B/C turboshaft	8.0	8.0	0.0	6.3	7.0	8.1	7.2	8.3	8.2	8.2	8.5	8.6	9.0
Pratt & Whitney Canada	PW200 series turboshaft	7.7	NA	NA	7.6	8.0	7.7	6.5	7.1	7.4	8.5	8.0	7.8	8.5
Pratt & Whitney Canada	PT6A turboprop	7.6	7.6	0.0	6.7	7.6	8.0	6.1	7.4	7.9	7.8	8.1	6.7	9.3
Safran Helicopter Engines (Turbomeca)	Arriel	7.2	7.5	-0.3	6.5	7.4	6.8	6.0	6.5	7.1	7.6	8.2	7.0	8.3

Companies listed in order of 2017 overall average. Ties listed alphabetically by manufacturer.

### PRATT & WHITNEY CANADA

P&WC has 62,000 engines in service with 12,800 customers, and in May this year it launched a digital engine services platform that provides preventative, data-driven maintenance management and consulting services. The service is being rolled out first to PW300 engine customers on P&WC's Eagle Service Plan (ESP) pay-per-hour maintenance program and will be expanded to the PW800 next. Supported by technicians and data analysts who examine fresh flight data from sources such as P&WC's Fast (full-flight data acquisition, storage and transmission) prognostics system, the service conducts daily reviews of customer data, so that requirements can be addressed proactively during scheduled maintenance.

Fast is now providing "near-real-time, high-density, full-flight data after each mission" for 2,000 P&WC engines on business jets, helicopters and regional airliners—a 50-percent gain in the past 12 months.

Recent enhancements to Fast: on-board event detection and crew alerts; automated power assurance checks on PT6C-67C-powered AW139 helicopters; and turbine creep counting on PT6A-140-powered aircraft. Half of all Q400s in use around the world are equipped with Fast. In May, P&WC announced the availability of Fast on PT6A-powered King Airs, joining other types such as the Falcon 7X, ATR 72, Citation Latitude and Caravan EX.

After trials on 5,000 customer engines, P&WC



has begun the commercial introduction of an oil analysis program that “provides high visibility into the health and proficient operation of the engine without intrusive inspections. It detects tiny metal traces within engine oil enabling the identification of deterioration of specific oil-wetted components such as gears, bearings and seals. The technology is now calibrated for the G200 (PW306A), Phenom (PW617), Caravan (PT6A-114/114A), TBM (PT6A-64/66D) and PC-12 (PT6A-67B/67P).

“It is worth noting that the PT6A is the only turboprop engine certified for single-engine instrument flight rules (SEIFR) for commercial passenger service in North America, Europe, Australia and New Zealand.”

Some 20,000 users are enrolled on MyP&WC Power, and the company continues to add features and functionality to the portal; 16,000 maintenance crews, mechanics, service centers and operators

access the 500 P&WC technical manuals available through MyP&WC Power every week. “Offline, we have transformed our parts distribution centers to provide 24/7 in-office spares support for engines and APUs. And we have made available 40,000 new and used P&WC engine parts for purchase online, which can be delivered anywhere in the world within 24 to 48 hours.” P&WC has streamlined the administrative process to accelerate shipment times for rental engines.

Starting this year, P&WC’s 100 field support representatives are equipped with a new system that allows for remote “virtual” collaboration with customers through a live, interactive audio-visual link. Called Onsite, the system makes for swifter diagnosis and resolution of issues in the field. These initiatives are among the topics covered in a company blog called Airtime, which provides technical maintenance tips and expert talk and is receiving several thousand views each month.

---

One of P&WC's pay-per-hour maintenance plans covers 10,000 engines, and "data shows that the right plan can sustain the residual value of an aircraft—in some cases by \$2 million after five years."

In the past year, P&WC made it easier for ESP Gold customers to upgrade their coverage to ESP Platinum. To drive availability and aircraft maintenance autonomy, all ESP Platinum customers with PW307A/D- and PW308C-powered aircraft are receiving a flyaway kit of key components that are replenished as they are used at no additional cost.

As the PW800-powered Gulfstream G500 approaches entry into service, "we have delivered an all-inclusive coverage plan centered on a preventive philosophy. Our PW800 ESP program, in which customers can enroll now ahead of aircraft delivery, provides proactive actions and service to maximize availability and retain residual value, and is backed by a worldwide 24/7 action team providing field support, engineering and operations specialists to ensure smooth and optimized flight operations."

In the past 12 months, P&WC has added three programs to the P&WC Smart maintenance service and enhanced several of the 30 existing programs, which guarantee fixed costs for major engine maintenance. The program offers engine upgrades, exchanges and flat-rate overhauls. For the second year consecutively the number of customers has tripled and customer orders have doubled.

## ROLLS-ROYCE

"Our strategy for 2017 focuses on enhancing the entire customer experience with R-R, and to do that we have developed exciting digital tools to streamline the customer interaction with us," according to Andrew Robinson, deputy senior v-p of services for civil aerospace and v-p of business aviation.

"Working with our Corporate Customer Council (C3), which links customers directly to the R-R teams responsible for delivering services, we have focused our initiatives on our global stores, lease

engines, on-wing services, the authorized service center (ASC) network, technical publications, the customer portal and engine health monitoring (EHM). Some highlights:

"For globally distributed material, a store in Shanghai was added to our existing stores in Los Angeles, Atlanta, Pooler [Ga.], Indianapolis, the UK, Frankfurt, Dubai and Singapore. Inventory at all store locations has grown and our spares ordering process has been streamlined."

R-R added lease engines to the BR725 and Tay 611-8C pools, bringing the total lease pool to 162 engines stored in Los Angeles, Atlanta, Savannah, Indianapolis, New York, Amsterdam, Dubai and Singapore.

According to Robinson, "Complex engine-specific expertise is required around the world, which is why we expanded our investment in factory-trained on-wing specialists, who provide mobile repair and AOG recovery services, and in specialized tooling." This investment includes capability to perform engine manual repairs, borobending techniques, and electrical harness and nacelle services. The on-wing team expanded its international capability to Luton, Dubai and Singapore, and there are now 55 dedicated business aviation technicians in 16 locations.

In AOG events and those requiring a mobile response team, "the specialist on-wing technicians are supplemented by our authorized service centers. Joining this network over the past year are Duncan Aviation in Lincoln, Provo and Battle Creek; Bombardier Biggin Hill; and TAG Aviation in Farnborough, UK. In our Embraer network we have added Embraer Fort Lauderdale, Mesa, Windsor Locks, Melbourne and Paris; and ExecuJet Tianjin. R-R has expanded the network's capabilities at Ruag for the BR710-A2, and at Jet Aviation Basel for the AE3007A. R-R now has 72 authorized sites around the world. The company has explored the art of the possible in the Internet of Things (IOT) arena by developing an authorized service center portal that simplifies and automates many of the business transactions between ourselves and our ASCs through a visually appealing and intuitive interface."



R-R continues to work with OEMs to develop automatic downloading for engine health monitoring data, which “removes the burden of manually downloading and transmitting data monthly, while allowing us to be more proactive in monitoring your engines, and enabling us to identify trends before they may cause operational issues,” said Robinson.

### SAFRAN

From its own customer satisfaction surveys, Safran Helicopter Engines (the former Turbomeca) recognized the need to implement online services to improve the efficiency of and access to the support it provides. “The customer portal and our range of web services now comes with a new layout to facilitate navigation and new features such as dashboards and easy-to-create requests,” the company said. “Customers can now track online their asset’s

MRO status, AOG and standard exchange deliveries and the warranty process.”

This summer the company launched Web-IETP on the portal, making interactive electronic technical publications available 24/7 on all types of tablet and operating system. “The main advantage of this new, user-friendly service is that it offers at any time the latest versions of each document. It also comes with an intuitive 3D graphic interface and enhanced cart functionalities.”

Last month, Safran introduced a new engine health monitoring service. “Safran expert maintenance recommendations are available online, from any device. Many parameters are gathered automatically and continuously by an onboard system, designed by our data collection partners. Engine life can thus be extended, with early detection, prognosis analysis and maintenance plan



## SAFRAN

customization for significant cost and time savings for the customer.”

With 12 front offices, 100 field representatives and technicians, 100 customer support managers and representatives, and 40 certified maintenance centers worldwide “and continued investments, we have maintained our high level of performance and have achieved many remarkable results: 98 percent of AOG requests answered within 24 hours for the fifth consecutive year; 98 percent of standard exchange deliveries dispatched on time for the third year in a row; 97 percent of spare parts dispatched within five days for the last 18 months; average repair time for the Arriel and Arrius is now less than 50 days. The improvements are largely based on investments that ensure

a leaner and more efficient process in all of our repair centers. New machinery has been acquired, and we have adopted processes that save time and money for our customers.”

Safran says its Customer Councils and Top 5 Irritants process have been instrumental in driving improvement plans. “This year, our Customer Council meetings were conducted, as always, on each continent. Fifty irritants have been solved in collaboration with customers.” One recent achievement is the resolution of leaks on the Arriel 1 fuel control unit. By collecting operator feedback and detailed information on their experiences, Safran was able to analyze the root cause and propose different solutions that were then evaluated by customers. “For this specific

issue, two new seals were developed and implemented, and the leaks have been significantly reduced.”

Safran says mean time between failure has improved on average by 50 percent for the complete engine range over the last five years. “Our engine maintenance programs have been reconfigured to match the aircraft scheduled maintenance, meaning that customers are able to plan their missions and maximize availability. On the Arriel 1E2, around one third of the maintenance periodic limits have been removed and others have been extended. On the Arrius 2B2, maintenance has been reduced by 15 percent, on the Arrius 2F by 50 percent and on the Makila by 40 percent.

“In the context of the current market and economic conditions, it has been extremely important that our customer services provide flexibility and adapt to specific customer needs. For our civilian customers that own up to five helicopters, a new range of services was launched last year called 5Star Plans. Operators can choose from five levels of service, covering scheduled and/or unscheduled events. These plans are sold exclusively by our network of certified maintenance centers and distributors. In just six months, contracts have been signed all over the world.”

For civilian operators with more than five helicopters, specific flexibility options help them sustain their operations and coverage during difficult times. For customers not under such contracts, Safran has introduced other cost-reduction measures, for example the use of repaired parts in maintenance, a choice that grew by 50 percent last year.

## SURVEY RULES AND 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 manufacturers of business aircraft, avionics and engines 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 also sent a postcard invitation with login credentials to the survey website.

The survey website was open from May 1 to June 9. Respondents were asked to rate their aircraft’s engines and to indicate the region where these products are normally serviced. 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 time, 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**—ease of use, formats available, timeliness of updating.
- **Technical Reps**—response time, knowledge, effectiveness.
- **Cost-per-hour Programs**—cost versus benefits, ease of administration.
- **Overall Product Reliability**—how the product’s reliability and quality stack up against the competition.

Respondents were also asked to recognize individuals who have provided them with exceptional product support and service. The full list of these people is available online at [www.ainonline.com/above-beyond-2017](http://www.ainonline.com/above-beyond-2017).

The 2017 **AIN** Product Support Survey aircraft results were published in the August issue, and the avionics results were featured last month. ■



## WILLIAMS

Williams trains mechanics in-house at its headquarters in Michigan. “We know our engines best, and we transfer the required knowledge to those who maintain them. All of our authorized service centers have personnel who have been trained at our facility,” according to Steve Shettler, v-p of product support. The company notes that a growing number of owners and operators are taking an engine training course. “It’s a condensed version of training to familiarize owners and operators with what is required to operate and maintain our engines. This helps them communicate with maintenance personnel when scheduled maintenance is needed, since they, too, are familiar with the maintenance items.

“Our maintenance videos—20 percent more of them since last year—walk through the tasks outlined in our maintenance manual, which helps

refresh mechanics if some time has passed since they have done a given task. We always have technical advisors available to help with maintenance if further assistance is needed beyond the video.”

The company enhanced its website to allow all customers to see open and complied service bulletins. “Customers can see which bulletins apply to their specific engine serial numbers. They can also pull up and view the actual service bulletin documents with the click of a mouse. Our TAP Blue maintenance program gives our customers reasonable and predictable operating costs, raising the resale value of the aircraft and providing owners with peace of mind and no surprises. Key program coverage: major and minor scheduled inspections; unscheduled repair; all Service Bulletins (mandatory, recommended and optional); foreign object debris (FOD) repair; corrosion repair; and forgiveness of minimum annual utilization.” □