PERFECTING PERFECTION

Even if you have the perfect aircraft, modifications can make it even better. To help you make the right modification choice, Marc Grangier has vetted some of the leading providers

LAUNCH
Blackhawk's XP140-powered Cessna Caravan (left). Raisbeck Engineering unveils new Composite 5-Blade Swept Propeller (right).

For many operators, upgrading an older aircraft just makes sense. But don't take our word for it, just ask Elliott Aviation Senior Appraiser Jim Becker. According to him, there are several reasons why an owner/buyer may choose to invest in a decades-old airplane. In some cases, it's an operator who has owned their aircraft for many years. "Their aircraft is a known entity to him, he knows its maintenance and operational history and are comfortable with the aircraft's performance and operating costs," says Becker. "He usually doesn't have a foreseeable change in his typical flight mission, and by keeping his older jet, he doesn't need to re-train his flight crew on a different aircraft type."

Another reason is to get better performance than the original OEM aircraft through improved aerodynamic devices, new engines or upgraded avionics. The economic factor must also be taken into consideration. "If an operator can have better performance with their current aircraft than with a new off-the-shelf aircraft, and at a fraction of its sales price, one can understand why this isn't a hard decision," adds Becker.

The hard decisions, however, come when deciding who to pick to perform the modifications - the OEM? A third party?

According to Textron Aviation, when two upgrade packages look the same on paper and even on the delivered aircraft, it's important to verify that they return the same value. Engines and avionics from different service providers can deliver different performances. For companies that work independent from the aircraft manufacturer, such modifications as winglets or paint may offer little more than aesthetic value as their designers don't have the knowledge and intellectual property to deliver the full intended benefits of the modification. On the other hand, the OEM and its partners can create interior and exterior upgrades that are designed and tested to add to the aircraft's performance, efficiency, integrity, longevity and resale value. Therefore, one must make sure that each upgrade is optimized to add value. To help you make the right modification choice, BART has vetted some of the leading providers:

Advent Aircraft Systems

Advent Aircraft Systems' principal product line is the patented Advent eABS anti-skid braking system for light turbine aircraft equipped with either un-boosted or power brakes. The Advent eABS product line utilizes GPS/digital technology to meet requirements for both new aircraft in development and the retrofit market. The Advent eABS is currently certified for the Eclipse EA500/550, King Air B300 and B200.

According to Advent Aircraft Systems Managing Director Ken Goldsmith, there are numerous aircraft in backlog from Advent dealers, representing over 134 aircraft. "When installed, the STC enables improved braking in all runway conditions without the risk of flat spotted or blown tires," he says. "Furthermore, it gives one the ability to confidently apply the brakes immediately after touchdown or in situations where hard braking is desired, such as a rejected takeoff."

Last May, the company added the Pilatus PC-12 to its growing list of aircraft STC'd for its eABS anti-skid braking system. The STC applies to all models of PC-12, provided the aircraft is equipped with a WAAS enabled GPS, such as the Honeywell Apex, Garmin or IS&S WAAS GPS products. The eABS is lightweight (27 pounds installed) and comes with all required installation hardware. Downtime is minimal and requires no changes to the existing PC-12 brake system.

So why isn't Pilatus installing the system on all its aircraft? According to Advent Vice President of Marketing and Sales Thomas D. Grunbeck Pilatus can, if they decide, install the system at the factory. "They are well aware of the system, installation and technology based on discussions we have had with them for some time," he says.

Aviation Partners

As Aviation Partners grows its in-service retrofit programs, it is enjoying increasing interest in its various winglet upgrades. The company offers its Split Scimitar Winglet (SSW) retrofit for the Boeing BBJ, along with its Blended Winglet retrofit for the Dassault Falcon 900, 2000 and 50 families, as well as the Hawker 800 series. "The last few months have seen a marked increase in inquiries, and commitments for our various business jet winglet products," says Aviation Partners Vice President of Sales and Marketing Gary Dunn.

The company's first 'High-Mach' Blended Winglets, designed and certified in collaboration with Dassault Falcon Jet, are now flying on approximately 50 percent of all Falcon 2000 series and 30 percent of all 900 series aircraft in service. API Blended Winglets are also standard equipment on Dassault's 2000LX/LXS/S and 900LX models, and are available for retrofit to any in-service 2000, 900 and 50 series aircraft. In addition to the improvements in climb performance, range increase, and fuel burn reduction at cruise, the Blended Winglets provide a more modern aesthetic and increased residual value.

"With High-Mach Blended Winglets, your Falcon will fly faster at any given fuel burn," says Dunn. "In fact, you can cruise at .80M for approximately the same fuel burn as the standard airplane cruising at LRC. In addition, you will climb faster to cruising altitude, step climbs will be reduced or eliminated for most trips, and optimum cruising altitude will be up to 1,500 feet higher - which could free you from traffic and weather for more direct ATC routing."

Blackhawk Modifications

Last July, Blackhawk Modifications and Metal Innovations announced that they were teaming up to revitalize aging Cessna Caravans with the Caravan Reset Program. This program allows Cessna Caravan operators to reset their aircraft to like-new standards for a fraction of the cost of a new airplane.

Following several years of development, Metal Innovations is now offering a pending FAA approved STC for the comprehensive Caravan reset. The new Cessna 208 Special Inspection Document (SID) Reset program provides operators with a cost-effective solution to mitigate costly downtime brought on by the substantial inspection schedule associated with aging aircraft. Coupled with the Metal Innovations Cessna 208 SID Reset STC, the new 867 SHP Blackhawk XP140 Engine+Upgrade delivers like new performance across the flight envelope. The PT6A-140 is the same engine that is installed on the production Caravan EX model.

Last summer, Blackhawk Modifications also celebrated completion of certification flight-testing for its newest STC project: the XP67A Engine+ Upgrade for the King Air 350. At FL280, ISA+ 20°C day, max cruise, 13,000 pounds, the Blackhawk XP67A Engine+ Upgrade delivers 332 ktas versus 292 ktas for a stock King Air 350 – for a cruise speed increase of 40 ktas. Under the same conditions, the Blackhawk XP67A Engine+ Upgrade climbs from sea level to FL350 in just 18 minutes, versus 45 minutes for the stock King Air 350.

As if this all wasn't impressive enough, Blackhawk has further plans in the works. Early next year the company will equip and certify a King Air 300 with the XP67A Engine+ Upgrade, which includes two factory-new Pratt & Whitney Canada (P&WC) PT6A-67A engines and new 5-blade composite propeller assemblies and spinners from MT Propeller.

Raisbeck Engineering

Raisbeck Engineering recently launched a new Composite 5-blade Swept Propeller for the King Air 350, in collaboration with Hartzell Propeller. Utilizing Swept Blade technology as an integral part of its design, together the two companies have developed and certified an advanced Structural Composite 5-blade Swept Propeller made of carbon fiber. STC approval is expected before the end of the year, with production by Hartzell immediately following.

This new propeller maximizes thrust, thus increasing performance while reducing noise. Other benefits include: unlimited blade life, reduced maintenance costs with six years/4,000 hours TBO, three years/3,000-hour warranty, increased takeoff acceleration and better landing deceleration and accel-stop. The Composite 5-blade Swept Propeller provides a total weight savings of 47 pounds compared to the current OEM propeller installed on the King Air 350.

ACHIEVEMENT
RUAG Aviation and Piaggio Aerospace complete first retrofit Magnaghi Aeronautica landing gear upgrade (top). Bombardier CRJ 200 (below).

Jet Aviation

As the global air ambulance market is presently growing at a rate of approximately 10 percent per year, many business jet operators are eyeing this new market. One of those companies is Jet Aviation. Known worldwide for its completion and refurbishment works on large business aircraft, the company has developed an STC to modify, among others, Embraer Legacy 600s and 650s for medevac use.

Recently, the Jet Aviation Basel facility was awarded two medical evacuation conversions: A Legacy 600 was converted for a customer in Asia and a Legacy 650 for a customer in the Middle East. Jet Aviation's STC ensures short reconfiguration cycle periods and extreme flexibility in the operation of these aircraft. Both will serve as medevac and VIP charter aircraft as, thanks to Jet Aviation's modifications, they can be converted from VIP charter aircraft to medical evacuation aircraft within just a few hours. As VIP charter aircraft, the two Legacy's will each accommodate up to fourteen passengers. When converted for medical evacuation, the Legacy 650 will present four patient stretchers and loading systems, while the Legacy 600 will support two.

As an Authorized Service Center for Embraer Legacy 600 and 650 aircraft, Jet Aviation's facility in Basel is approved to provide these aircraft with full maintenance, refurbishment, modification and upgrades (RMU), including warranty and AOG support.

MODIFIED
Jet Aviation Medevac conversions for Legacy in Basel (left). Honeywell Primus Elite system DU875 LCD Citation Elite X (right).

Bombardier/Asset Management Group

For the Bombardier Asset Management Group, remarketing and converting old regional aircraft into business jets makes sense. Established in 1994 to address the need for fleet replacement of older regional aircraft, the company's focus is the management and remarketing of Bombardier's previously owned commercial aircraft portfolio, specifically the CRJ Series and Q-Series/Dash 8 product lines.

For AMG, used CRJ200's are ideal for corporate conversions, offering a compelling mix of the latest generation of design, efficient fuel burn, and ultra large cabin size. Operators can enjoy the luxury of an ultra large-cabin aircraft with six-hour non-stop range, all for the capital and operating costs of a small to mid-size cabin business jet. A converted CRJ offers over 30 percent more usable cabin space than a comparable new super-large business jet, while fuel burn and capital cost are up to 30 and 40 percent lower respectively. Based on airline proven technology, operators will also enjoy exceptional reliability, along with a well-established worldwide aftermarket and support infrastructure.

Bombardier is currently working with several completion companies to convert its out of production commercial airliners, among which include MET, FlyingColours, Comlux, Capital Aviation and JetCorp.

Finnoff Aviation Products

Finnoff Aviation Products was founded for the development, certification and sales of products designed to enhance the performance of the Pilatus PC-12. Today, it offers the installation of a new Pratt & Whitney engine, an IS&S Cockpit/IP Flat Panel Display System, or a five-bladed MT Propeller. Thanks to the installation of the latest P&W PT6A-67P engine, speed is increased by up to 15-20 kt and climb rate is also improved. To improve performance even further, Finnoff Aviation offers the installation of a new five-bladed MT Propeller to replace the PC-12's original four-bladed propeller.

RUAG Aviation/Piaggio Aerospace

RUAG Aviation and Piaggio Aerospace recently completed the very first installation in retrofit of a Magnaghi landing gear upgrade on a customer Piaggio P.180 Avanti II. The new upgrade replaces the aircraft's existing landing gear with Magnaghi landing gear – incorporating a digitally controlled steering system. This is the same landing gear system as fitted to the Avanti EVO, the latest generation of the P.180. The Magnaghi landing

gear system improves ground handling, reduces pilot workload and cuts maintenance costs thanks to a 15,000-cycle/15-year overhaul interval, compared with the 6,000-cycle/12-year schedule of the current landing gear. In addition, a proximity sensor system for NLG and MLG positioning increases reliability and further reduces the need for maintenance.

Honeywell

Many Learjet 45 or 40s still have cathode ray tube displays (CRT). To upgrade their cockpit with new liquid crystal display (LCD) flat panels, Honeywell is offering to install its Primus Elite DU-875 LCD flat panels through its Honeywell Protection Plan/HAPP, a maintenance program offering full coverage for all Honeywell avionics at more than 600 authorized sales and service centers worldwide. With HAPP, customers can avoid unplanned maintenance costs, downtime, and unnecessary stress – all with no-charge loaners and 24/7 AOG emergency service.

The Primus Elite LCD was specifically developed as a CRT form/fit/function upgrade. It enhances pilot decision-making while reducing crew workload through the use of an upgraded user interface where the available graphical information is displayed in the pilot's primary field of view. In addition to operational crew benefits, the upgrade offers significant opportunity for the operator to reduce cost of ownership through increased display reliability, reduced weight, and support for paperless terminal charts and maps. Even if the old CRTs are still functioning, yet their operator wants to replace them for new DU-875s, Honeywell is offering a trade-in credit.

Universal Avionics

Universal Avionics and Chicago Jet Group have received EASA approvals for multiple retrofit Future Air Navigation System (FANS) STCs, including for the Challenger 600, 601, and 604; Dassault Falcon 2000, 2000EX, 900, 900EX, 50 and 50EX, and the Gulfstream G100, GII, GIII, GIV and GV. According to Universal Avionics, these approvals offer European-based operators access to STC solutions that haven't been available to them until now.

The retrofit installations include Universal Avionics FANS solution, featuring the company's UniLink UL-800/801 Communications Management Unit, SBAS-Flight Management System, and Cockpit Voice Recorder. Universal Avionics FANS solution also includes CPDLC and ADS-C functionality, along with provisions for ADS-B Out and European CPDLC initiatives (ATN B1 CPDLC). Earlier this year, Pro Star Aviation received FAA approval for the amendment to STC ST00158BO, which adds upgraded single or dual Universal Avionics Flight Management Systems (FMS) for Satellite-Based Augmentation System (SBAS)-capability. The newly amended STC applies to Cessna Citation 550, 550 Bravo, 560, 560XL and 560XLS series aircraft.

Flying Colours

The Flying Colours Corp. avionics team recently completed its first installation of the Honeywell JetWave Ka-Band satellite communications system. Work on attaching the LRU's, radome and tail mounted antenna was finished at the company's Peterborough, Ontario facility in July, making it one of the first Bombardier Aerospace Authorized Service Facilities to fit the system. The connectivity upgrade was part of a wider Bombardier Global Express aircraft cabin refurbishment project, which was completed at the end of July. The installation of the high-speed data delivery system will ensure that the undisclosed Global customer can enjoy the same level of avionics and connectivity as purchasers of brand new Bombardier Global aircraft. The avionics upgrade forms just one part of a major overhaul for the Global Express aircraft, which included a pre-buy review, maintenance inspections, full interior and exterior refurbishment, IFE upgrades and a floor plan modification.

Earlier this year, Flying Colours completed the world's first executive jet refurbishment incorporating pre-engineered cabin components manufactured by Austria-based INAIRVATION. The 2003 Bombardier Classic Global Express underwent a complete internal and external overhaul at the Flying Colours Peterborough, Ontario facility. INAIRVATION supplied pre-engineered side ledges with the Lufthansa Technik nice® HD Cabin Management and Inflight Entertainment system (CMS/IFE) already incorporated. In addition, a completely new Gogo ATG 5000 high-speed data system was also installed to improve existing cabin connectivity.

StandardAero

As mentioned in the last edition of *BART*, StandardAero recently achieved another STC for the first Honeywell

EQUIPMENT
Universal Avionics SBAS-FMS Family over Cessna 560 XL (left). StandardAero JetWave on Falcon 900 (right).

CATERING
Lufthansa Technik's Induction Cooking Platform allows to freshly prepare gourmet dishes on board.

JetWave Ka band global high-speed broadband connectivity solution available today for Gulfstream G-IV operators. In November of last year, StandardAero received a similar STC for a JetWave system for Falcon 900/B/C/EXs. The company completed its first STC for this Gulfstream G-IV installation last June, and the system included an exclusive high-performance Ka radome, available through its partnership with the experts at Communications & Power Industries (CPI) LLC's Radant Technologies Division. The STC, which includes a radome and installation kit, is available on the market today.

StandardAero continues to work with leading Ka band technology partners to provide operators advanced internet technology programs to enhance connectivity for domestic and international aircraft operators. JetWave is the exclusive hardware that connects business jets to Inmarsat's Global Xpress (GX) Ka band satellite network, providing Jet ConneX service to the cabin. StandardAero's new radome design can accommodate either the AMT-700 or AMT-50 antenna along with the JetWave antenna.

"We are excited to make this technology available to G-IV operators and expect a very positive response from the community," says StandardAero President of Business Aviation Marc McGowan. "We look forward to making additional announcements with this technology in the very near future."

Daher/Garmin

Daher is now offering avionics kits to upgrade all TBM models equipped with G1000 – including the TBM 850, TBM 900 and some modernized TBM 700 – to the Garmin G1000 NXi next-generation integrated flight deck configuration. The system change will replace the flight deck arrangement on G1000-equipped TBM 850s and TBM 900s with Garmin's successor configuration, the G10000 NXi. This involves a change-out of the two primary flight displays, the multi-function display and the control keypad, along with new software and database installations. The upgrade kits will be available beginning January 2018. The company says it expects to see a large share of the 347 TBM 850/TBM 900s currently equipped with the G1000 version being converted to the new system.

Lufthansa Technik

Last July, Lufthansa Technik started tests with the requirements of the European Technical Standard Order (ETSO) for their Induction Cooking Platform, bringing the option of preparing fresh food on board within reach. Simultaneously, Lufthansa Technik is planning to create a service bulletin for the installation of the Induction Cooking Platform, with a prime focus on ease of installation.

The Induction Cooking Platform offers several advantages for preparing fresh food on board. Depending on the customer's catering requirements, the on-board chef can use a pan, toaster or pot to prepare a culinary masterpiece. The multiple capabilities ensure effective workflows to meet the minimal workspace available in typical aircraft galleys. Cooking smells are eliminated with the integrated fume hood and odor filter system. A smart pot containment system both covers and holds the applications securely in place during all phases of preparation and cooking – in particular during turbulence. With dimensions of just 287 x 570 x 269 millimeters (ARINC size 4 and installation variants) and a weight of just 13.5 kilograms, the platform fits into any aircraft galley.

DART Aerospace

DART Aerospace announced its partnership with Bell Helicopter on the design and development of an emergency flotation system (EFS) STC for the Bell 505 Jet Ranger X helicopter. This system, which will be co-marketed by both Bell Helicopter and DART, should be certified by Transport Canada in early 2018 and, shortly thereafter, applications will be submitted to other foreign aviation authorities, including the FAA and EASA.

Earlier this year, the company released the market's first utility basket STC designed for the Robinson R66 Turbine helicopter. Built from corrosion-resistant stainless steel and featuring a simple, safety improving, self-locking handle that assures lid closure and secures cargo during flight, this new heli-utility basket is now FAA and EASA approved. According to DART Aerospace, it is the first R66 cargo expansion solution on the market and is perfect for carrying golfing gear, skis and snowboards, hunting equipment, and tools.

"Modifying an existing aircraft gives its owners and operators the opportunity to refurbish their aircraft to like-new conditions for a fraction of the cost of a brand-new aircraft," says Blackhawk President and CEO Jim Allmon. "Not only does it give the owner an impressive return on investment, it also provides the operator with impressive performance that is the same or better than factory-new aircraft."

Considering the trend of conversions and upgrades, there's no doubt that there is a significant market ahead. For Jet Maintenance Solutions CEO Darius Saluga, another too obvious to ignore trend is the need for modifications driven by passengers who demand faster and more reliable cabin connectivity and personalized entertainment systems – not to mention of course improved performance, which indeed remains top-of-mind.