

Airlines only claimed warranties on aircraft and parts if anything went wrong early in their life. Airlines now have to identify when a part falls under one of several warranties and how much to claim. IT systems are suited to address this challenge, and approaches to warranty management are reviewed.

Claim what you are owed - systems for warranty management

Aircraft are no different to any piece of equipment. We buy or rent it, and if something fails within the first 12 months we can usually claim some or all of the cost of the repair or replacement back from the manufacturer. Some equipment is sold with extended warranties, but these are often expensive and we decide to risk not taking them, in the hope that the item is reliable.

Aircraft are of course more complex, and their warranty arrangements have become multifaceted. There are several strategies that airlines can employ to manage the complexity of warranties and maximise financial outcomes. These

range from throwing manpower at the issue to applying computing power to automate the process. Whichever approach is taken, there is usually money to be made or saved.

Framing the issues

Outside repair and heavy maintenance account for the majority of maintenance costs for any airline. Some smaller airlines choose to put major rotables on power-by-the-hour (PBH) or exchange programmes in order to smooth the costs and give themselves some degree of predictability over maintenance costs. Sometimes the contract seems attractive,

but it still needs to be carefully monitored and controlled to ensure that the expected costs and services are actually delivered. For example, under an exchange programme, or performance-based logistics arrangement, where the original equipment manufacturer (OEM) or service supplier simply swaps an unserviceable part for a serviceable one, how does the airline prevent a rogue part from being returned time and time again to be installed and subsequently fail early again? Also, how does an airline protect itself from incurring penalty costs for turning in a part late against a contract?

Software systems are able to track and alert against these contract terms. Major assembly maintenance can usually be better managed and planned. An example of this is landing gear overhaul, where the warranties, including repairs, and contract performance, are not normally tracked and reported in smaller airlines. This is a lost opportunity to minimise costs. To do this properly, warranties have to be set up against each part. Some older systems have no provisions for setting up data at the individual part number level, and some lack the ability to handle multiple warranties. For example, a part may have a new warranty from the manufacturer and a warranty for a repair. In addition, if



Exeter-based low-cost carrier Flybe manages warranties through contracts, rather than using traditionally computer system approaches.

time since the last shop visit is not tracked in the system, a repair warranty cannot be processed. When aircraft go for third-party heavy maintenance checks, the airline may struggle to track and record all warranty issues during the visit.

Going organic

Based in the south-west of England, Flybe is now Europe's largest regional low-cost airline. It started operations in 1979 as Jersey European Airways, which was taken over in 1983 by Jack Walker's Walker Steel Group. The airline was then re-branded as British European in June 2000, and later shortened this title to Flybe on 18th July 2002, aiming to reposition itself as a full-service, low-fare airline. In November 2006, agreement in principle was reached for Flybe to acquire BA Connect, with the exception of the latter's services from London City Airport. The acquisition was completed in March 2007. Flybe is now owned by Rosedale Aviation Holdings (69%), Flybe staff (16%) and British Airways (15%) as a result of the acquisition of BA Connect. It has about 3,000 employees across its two divisions: the airline and Flybe Aviation Services.

Based at Exeter Airport, Flybe's fleet has now been rationalised down to 46 Bombardier Q400s, 14 E-195s (as launch

customer in the UK), and 10 ERJ-145s.

Through its acquisition of BA Connect, Flybe inherited the OASES system from Commsoft as one of its maintenance, repair and overhaul (MRO) software systems. Flybe, however, had already developed its own Oracle-based system and decided to run the two systems together to allow them to compare the pros and cons of each approach. "The home-grown approach has several advantages," says Stefan Kontorradis, engineering director at Flybe. "We developed the system over a number of years, and now have a wide-ranging system to support engineering, maintenance and materials. We are just in the process of adding a web front-end. The modules covered include technical records, stores, technical library, labour time and attendance, reliability and an operations library. The technical library function includes the ability to set up and track an engineering order, like an airworthiness directive (AD), from initial receipt to incorporation status reporting. One benefit of a home-grown approach is that we can make the system operate the way we want, so that we do not have to accept a generic approach. We can get changes when we want them, the way we want them."

Kontorradis has strong views on what he wants from an IT solution, and is

forthright in expressing what he considers to be the disadvantages of typical MRO software products available today. "Many times the vendors start off with a development that will meet the minimum requirements," observes Kontorradis. "I do not just want to meet the minimum requirements; I want to exceed them. If I believe the requirement needs challenging to make things simpler, and business processes can change as a result, then I will push for that too. My experience is that many software vendors follow customers but lack any real, substantial vision of their own. For me, things should be very simple and I want a software solution that works, not an overly-complicated beast that takes more effort to feed and look after than it produces benefits.

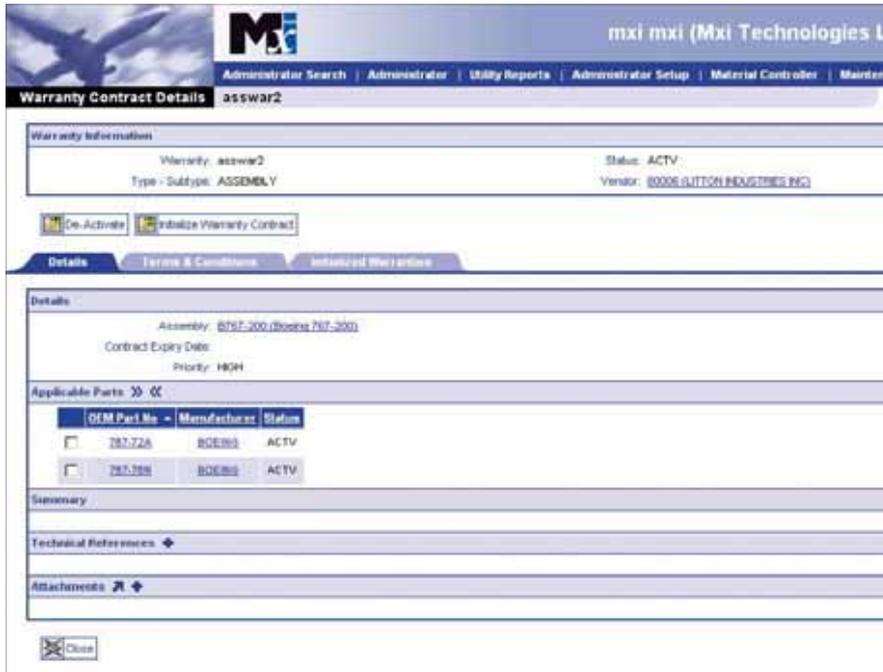
"I want a system with as much automation as is practical, without being at the 'bleeding edge' of technology," continues Kontorradis. "I prefer to be just behind the pioneers and learn from their mistakes. We did that at Flybe in many areas, such as the flight recorder, where we fitted a fully-wireless mini quick access recorder (QAR) system for flight operations monitoring. Many people thought we would never make such a simple system work, but we did and now others come to see how we did it."

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MXi's Maintenix system holds detailed warranty contracts at both an aircraft and a part level. Contracts can be nested together based upon priorities or terms & conditions.

An airline's perspective

"As far as warranty management is concerned," says Kontoravdis, "our approach has been broad and holistic. Flybe tends to get aircraft on 10- to 12-year leases, rather than buy them for life. This means that our aircraft tend to be new, or at least young. We aim to negotiate about 48 months' overall warranty with the aircraft lease, which means about 30-40% of the lease term, so that the aircraft will be under warranty for almost half of its life. We look at all the major systems and we try to get them on a PBH contract. This means typically the engines, auxiliary power units (APUs), landing gear and some other big-ticket items will be on a PBH. We take any warranties we have and give them to the PBH vendor. We are happy if they can administer the warranty and make some margin on the deal, so long as we are satisfied with the overall rate and other terms of the contract.

"The PBH failed units go back to the PBH vendor and we get a new serviceable unit. We do not hold a lot of stock which means that all I need is a good refill system, taken care of by our in-house Oracle system, to provide adequate insurance against uncertainty and unreliability. Our despatch performance indicates that this works well. So this approach covers the big items that are traditionally the first targets for PBH contracts. We then start looking to add other items, which are not normally in PBH contracts, to these agreements. Our experience has been that the PBH vendor will be keen to expand and take these additional items into the contract, because they will view this as an opportunity to make more money, if they manage the contract well. Some even see

it as a chance to develop a capability on an item and sell that management service back to the OEM.

"We also assess problem items, which are not covered under a PBH contract, and go straight back to the aircraft OEM looking to fix them through some sort of programme of work," continues Kontoravdis. "Since we are a significant customer for most of these vendors, we can normally arrange campaigns to fix issues, usually including the PBH vendor in the programme. Normally these campaigns will cover just the materials portion of the work, not just the labour.

"For a regional carrier the size of Flybe, this is not the complete answer and an IT solution can help. There will always be findings coming out of base maintenance and parts will be needed to fix unforeseen problems arising during operations," adds Kontoravdis. "In this case what I need is a report that identifies the parts I have to focus on. This report would firstly exclude PBH-contracted parts being issued, exclude any parts under specific warranty and exclude any parts under any 'special deal' I have in place. Finally, it would exclude parts that are less than \$100. Everything else that is issued, whether it is rotatable, repairable or indeed a consumable, I want to know about it so that I can take some action to stop having to use it. These are the parts I want an IT system to identify and manage."

The warranty department

Kontoravdis' ultimate aim is to get rid of the need to claim warranty at all. If he can get everything that breaks included in a set of PBH contracts, he will not need an army of people chasing payment and monitoring claims. In his

view engineers love going to meetings with OEMs and demonstrating that they are in the right and that someone owes them money. He would rather agree a sum of money in advance with the OEM, having done the work to set the rates at the right level to start with for both parties.

"Of course we are in some ways different to many operators," observes Kontoravdis. "We are moving towards operating two aircraft types: the E-195 and the Q400. While we have some common vendors, having new aircraft means that the requirements for warranty tracking are somewhat different to other airlines. My vision is similar to the way we manage daily operations and technical disruptions. I want a portal that tracks and automatically alerts me to something that breaks while it is still within the terms of its contracted warranty conditions."

Kontoravdis draws a parallel between his vision for a warranty management system and the current Flybe Technical Disruption System (TDS) spanning operations and maintenance. During the interview we see a live version in operation. Essentially, every time a Flybe flight is disrupted for technical problems, a new line is created in the TDS portal. In that portal, management can see the aircraft location, the issue, corrective action and a time for next update. If updates are not posted, the line turns red until an update is entered on the problem. "I envisage a warranty system like this for those contracts I still own," says Kontoravdis. "Just like the TDS, I want the OEM to also have access to the live data feed so that they can see warranty problems and receive e-mails when problems remain unresolved. I want the OEM to feel my pain when I feel it."

The software vendor's view

There are a number of companies selling complete, integrated MRO software suites. All have a warranty management module built into them to a greater or lesser extent. One vendor which has just released an enhanced warranty management capability is MXi. Its Maintenix product is used by several airlines, and since late 2008 some of its customers have had the chance to benefit from the new functionality.

"In the current economic climate, cutting costs is at the top of everyone's agenda," comments Evan Butler-Jones,

MXi's product marketing manager for Maintenix. "Maximising the opportunities to recover costs incurred when repairing or replacing inventory under warranty is critical in reducing overall maintenance and inventory costs. To achieve this, however, it must be possible to identify and monitor at all times the status of inventory under warranty.

"To make matters more complicated," continues Butler-Jones, "the terms and conditions of different warranty providers are, inevitably, quite different. This leads to an immense administrative burden to simply make an accurate assessment of the eligibility of a repair or replacement claim. With the recent release in late 2008 of an enhancement to Maintenix, many of the complexities of managing warranty eligibility and generating claims are simplified. The new warranty feature leverages the software's integrated design, providing tools to define warranty contracts, apply those terms and conditions to inventory, and, most importantly, recognise and act upon warranty claim opportunities.

"In the past, airlines have found that legacy MRO systems and traditional practices meant that most of the efforts made by their claims departments were

not in processing warranty claims and recovering monies. Rather, they were expending non-value-added time identifying what could in reality be claimed for under warranty, and gathering supporting data for the claim. The input-to-reward equation was a poor one. That said, warranty is of course a big financial issue for all airlines. I have been in hangars where an airline has a lot of new aircraft and there are posters everywhere screaming 'remember, everything is under warranty, claim it'. Airlines are not blind to the benefits of a sharp warranty policy. But it can be tricky to find out which parts are under which warranty if the aircraft are not brand new."

Some of the functionality provided by the new Maintenix warranty feature includes the ability to manage airframe, major assembly, and component-level warranties. It also has the ability to define a warranty contract, down to specific terms and conditions, such as what maintenance can be claimed and who is authorised to perform a repair under warranty. The automatic, 'on-the-fly' warranty evaluation allows continuous visibility into the warranty implications of maintenance. The system also works by providing an easy and automated application of warranty contracts to

inventory at time of receipt for a significant reduction in administrative overheads. It also issues alerts in the event that warranty opportunities are being missed. A good example would be in the event that maintenance is planned to be performed by a vendor not recognised under the terms and conditions of the warranty. The result is simple, integrated and real-time warranty claim generation, thereby removing the burden of research from the warranty claim department, so that they are free to process and chase payments.

Pain and gain

"With the new functionality," says Butler-Jones, "a part will automatically flag itself as being under warranty and route itself differently within the system, logging data as it goes in support of the claim that is about to be produced. This happens right at the point of failure and removal of the part from the aircraft by the technician. Data are sent directly to the warranty claim department, immediately reducing the research time burden. This means that staff can now focus their time on claiming, and not dragging data together. In fact Maintenix will auto-build the skeleton of the claim paperwork, even further reducing the

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workload. The system will know if the particular warranty covers labour or parts, or both, and present data accordingly.”

There are nevertheless some downsides to automating the warranty tracking process. “There is some initial pain to get through,” admits Butler-Jones, “as with all system automation. In order for the system to work effectively, a reference dataset needs to be established for each contract, and linked to each tracked part. Then, during daily operations, the system can check each part’s actual data against the reference, and spot when a part is under warranty and which clauses or conditions are applicable. Some of this initial data set-up can itself be automated at the time of system implementation, through various scripting techniques. But once operational, and particularly for repair warranty management, the system must be updated as parts are received back into the computer system from the repair vendor. Any new warranty contracts need to be added against that particular part. This will require additional overheads.”

Trendsetters

Flybe’s experience of managing warranties, and requiring less sophisticated IT systems to do so, is one trend that is likely to continue in these tough economic times. Investment funds are hard to come by and spending them on IT projects may be hard to justify in the short-term. The trend towards more PBH and performance-based logistics (PBL) arrangements has been around for a long time, but such arrangements are being increasingly favoured as they mature and organisations become more experienced and confident in the service levels. The drivers towards PBH, of course, differ from airline to airline. Stability of planned costs is one key

factor; no surprises in cost spikes when things start to go wrong. For smaller carriers in more remote parts of the world, the lure of guaranteed replacement parts and the availability of spares is hard to resist. But for larger airlines, especially those that have in-house JAR145 capabilities and more sophisticated engineering and management capabilities, the traditional model of purchase and claim warranty still works well. “The move towards PBH is still an opportunity for IT companies like ours,” says Butler-Jones. “The vendor who is offering the PBH or PBL contract still needs sophisticated tools if they are to manage the contract and make money, while delivering a high quality of service. For example, we have customers that offer whole aircraft support programmes, like Boeing on the Dreamliner, and equipment OEMs like in-flight entertainment providers which are offering more and more packages on a PBH-type arrangement.”

Missed opportunities

It is worth considering the investment-payback equation surrounding warranty management, not only in terms of absolute value, but also in terms of a pain-gain trade-off. The experience of many aviation consultants like SAKS and Airstream Consulting is that warranty management is never very good in an airline that either has no integrated MRO software system, or has an old legacy or a multitude of standalone solutions. Warranty is one of the first areas that a consultant, or a software vendor trying to sell a new solution, will look at in helping an airline make a business case for investment. And nine times out of 10 they will be absolutely correct. Even for small carriers, studies by Airstream Consulting show that several million dollars of

Software packages can be used to identify parts within a work package that are covered by warranties. The system can gather both part cost and labour data.

missed warranty claims go by every year. This is usually because the warranty conditions are very complex and the airline does not have the time or resources to research and collect the data. Or the warranty is buried in a maze of nested contracts, where for example a new part on an aircraft with a three-year warranty may also carry a 4,000 flight cycle repair warranty with the manufacturer of the component.

“Our experience is that less than half of the time spent by an airline’s warranty department is applied to processing claims,” points out Butler-Jones. “More than half is simply wasted effort chasing around and around for data and closing the loop on tying up a part and its warranty conditions in detail. Or indeed simply identifying which parts to start a claim against, and with which vendor.”

In summary

There are several approaches to the issue of improving warranty management. One approach, exemplified by Flybe, is to keep it simple. Putting all the warranties into a pre-agreed PBH arrangement passes the onus onto the PBH vendor to manage the warranty headache, leaving the airline to focus its skilled engineering resources on the daily disruption issues that will constantly and inevitably arise. There is no need for a complex IT system, simply a management by exception for parts that fall outside the majority of PBH coverage.

The other approach is to apply computing power to manage the headache in-house, and the potential to reap even more rewards than the blanket PBH strategy. All MRO software suites, to a greater or lesser extent, have the capability to manage warranty. Some, like Maintenix, have actively developed and enhanced this area recently and its customers are already benefiting financially from that new capability.

Warranties are written down in black and white. It is therefore easier to manage them and see savings quickly than to optimise the maintenance programme. As such, they represent low-hanging fruit for airlines that want to reduce maintenance costs. Warranty management should certainly be one of the quick wins in any business case made for new system implementation. **AC**

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