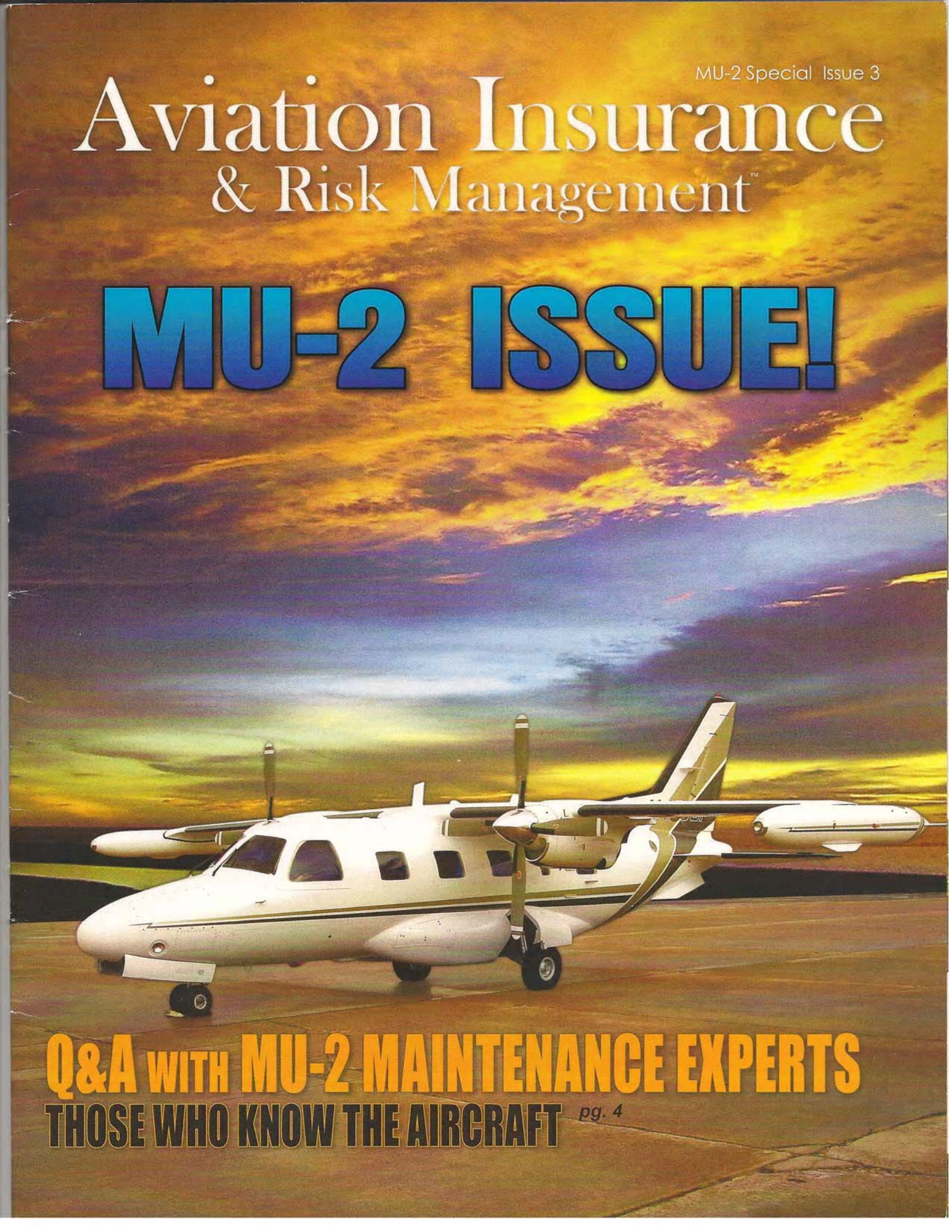
MU-2 Special Issue 3

Aviation Insurance & Risk Management™

MU-2 ISSUE!



Q&A WITH MU-2 MAINTENANCE EXPERTS

THOSE WHO KNOW THE AIRCRAFT

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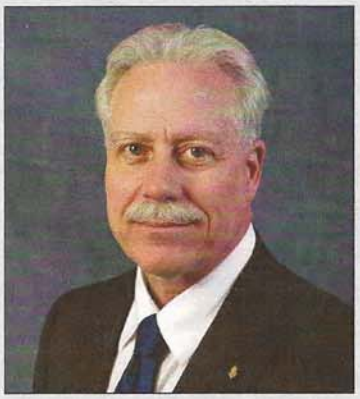

Brent Anderson

Over the course of his 30-year aviation career, Brent Anderson has gained experience in the areas of airport management, flight school ownership, piloting aircraft for business use, ownership of personal aircraft, and aviation insurance sales. As an airport manager, Brent directed all phases of airport operations, including airline and general aviation fueling services, aircraft maintenance, airfield operations, and airport planning and development. He owned a federally approved international flight school for 20 years and was extensively involved in training operations. Brent holds a commercial airman's certificate with multi-engine and instrument ratings, and is also a certified flight instructor. He has more than 5,000 accident-free flight hours in aircraft ranging from Bonanzas to Barons to King Airs. Brent is a senior vice president as well as an aviation insurance specialist.

Q&A

WITH MU2 MAINTENANCE & SUPPORT EXPERTS, THOSE WHO KNOW THE AIRCRAFT

Interviewed By Brent Anderson

Whether we are discussing flying the space shuttle, a Piper Cub, or something in the middle, aviation is about managing the risk associated with speed, gravity, and money. Aircraft owners and pilots try to go as fast as possible without hitting something too hard, fly as high as possible without falling back to earth, and do both of these things while retaining as much of their financial resources as possible. It's been said that most things are done three ways – fast, right, and cheap. You can only pick two.

When we think about the risk involved with corporate or personal turbine aircraft ownership, our thoughts first go to safety. But, a more complete definition of "risk" would include injury, property damage, and financial loss. Financial loss can manifest itself by way of operating expense, depreciation, or legal liability. To manage this risk, we purchase insurance, complete training and safety programs, and practice good operating techniques. But despite all we do, there remains an inherent risk in just owning and operating an aircraft.

There has been a good bit of discussion about the training of pilots flying the MU-2. Certainly, frequent and good quality pilot training is essential for managing the risk of operating an MU-2 – or any aircraft. There has also been quite a bit of discussion about the insurability of the MU-2. Underwriters and the aviation marketplace typically look at pilot training as one of the most important

factors affecting the risk and the insurability of the MU-2.

As aircraft owners, however, we also need to evaluate maintenance issues, factory support, and how these issues affect our risk of personal and financial loss. What expenses might I need to plan for during the course of my ownership of this type of – and this particular – aircraft? What is the risk of not being able to get parts that I need for repair or to maintain airworthiness? How might that affect the value of my aircraft? What do I need to consider when making purchase decisions in order to minimize the expense of aircraft ownership and maximize my return on investment? In this MU-2 Special Edition of Aviation Insurance & Risk Management magazine, we will focus on the management of maintenance risk. Joining us in this discussion will be four true experts in the acquisition, operation, and maintenance of the MU-2.

Mike Laver, with Air 1st Aviation Cos., Carolina Turbine Support, and Aiken Aviation, Inc., in Aiken, S.C., has over 25 years' experience in MU-2 sales and maintenance support of all models of the MU-2. Since 1998, Air 1st has operated a fleet of MU-2s over 4,000 hours per year.

Mike Noblin is an A&P and IA, a licensed pilot, and a Mechanic examiner, having worked in aviation maintenance for more than 33 years. He is presently the Maintenance Manager with MidSouth Aviation, Inc., in Murfreesboro, Tenn., overseeing the maintenance of many makes of corporate turboprop and jet aircraft, with extensive experience in the MU-2 line. Mike has written numerous articles for MITS magazine, a technical periodical about the MU-2.

Bob Kidd is the Director of Operations with Air 1st Aviation Companies of Oklahoma, a FAR Part 135 certified operator and owner of 13 MU-2 aircraft used for on-demand commercial cargo carriage, with dispatch capability 24 hours per day / 365 days a year.

Joe Megna is the Director of Maintenance with Jet Air Group, in Green Bay, Wis. Jet Air operates a full-line maintenance department with expertise in the MU-2. Its capabilities include an in-house turbine shop, specializing in Honeywell, Pratt & Whitney, GE, and Williams turboshaft and jet engines.

Manufacturer's Product Support and Parts Availability

Question: Are you experiencing any product support issues with the MU-2?

Bob Kidd – From an operational standpoint, Mitsubishi does an excellent job of communicating with owner/operators through the Web site and the PROP program. This support is second to none.

From a maintenance standpoint, they have not had adequate technical support from the manufacturer in the last 15 to 18 years. Product support is being done by service centers or people familiar with the aircraft. Engineering assistance is through Mitsubishi Dallas, but it ends up coming from Japan. This is a time-consuming process. People end up relying on what is available or through people that have worked on the aircraft in the past.

Joe Megna – For the most part, no. There are many experienced people out there if help is needed. Mitsubishi and Turbine Aircraft Services are very helpful if information is requested. I must say that in the future that may not be the case. Many of the key people are getting older or moving on to other manufacturers.

Mike Laver – Product support is satisfactory. They have a lot of programs. Updates on manuals are good.

Mike Noblin – No, I have not; Mitsubishi is very unique and really supports their product. They are first class.

Question: Are parts readily available to fully support the MU-2?

Joe Megna – Yes, there will always be the part that must be brought in from Japan. I feel that those parts are generally taken from the Structural Repair Manual. The common wear and tear items are here. If Mitsubishi doesn't have them, the Service Centers or other parts support companies will. But, there are some other vendor items that are becoming scarce, such as autopilot components, air cycle machine components, fuel probes, and indicators, to name a few. In many cases, you will have to send in two or three items to make one good one, and there are only so many cores. This can drive up the repair costs.

"The MU-2 is not a maintenance hog. They are built like tanks." Mike Laver

Mike Laver – For the most part, they are. Some items have up to a 90-day lead time. If the item is high usage, it is available. If the item is low usage, it has some lead time, and if the item is no usage, it's not available. But when you are operating an airplane, you need all of the parts to be available. If the part is not available, they sometimes suffer a little longer, which is not good, or they get used parts. The parts that are in the most demand are: starter generators, boost pumps, flap jack nuts, and landing gear drive shafts.

Bob Kidd – Yes and no. Day-to-day usage parts are available through Mitsubishi. These are parts manufactured or designed and built under a licensing agreement. Non-Mitsubishi parts come through parts supply vendors. No overhauled parts are available through Mitsubishi. One factory-approved facility and several FAA-approved facilities work on various components.

Structural parts are a problem. These are manufactured as needed, and there is a long lead time out of Japan. Many operators are going to serviceable and used parts, for which there is an adequate supply still available. Exercise caution when using serviceable parts. Be sure to get as much history as possible on the parts so you know what is being put on your aircraft.

Mike Noblin – Everything is usually readily available. About a year ago, there was a problem with getting cooling turbine parts for the Airesearch unit, and Mitsubishi is looking into that. Serviceable parts are still strong in the aftermarket.

Question: What, if anything, would you like to see Mitsubishi change with regard to their involvement with the MU-2?

Mike Noblin – Nothing. The Japanese are all about honor. They manufactured the aircraft and are committed to supporting it until the last one is gone. They really support their product. Even when the aircraft was sold to another manufacturer, they took it back and are committed to supporting the fleet. It's awesome to see.

Bob Kidd – They should be more proactive in the maintenance area. They respond to questions and issues that come up, but there is very little involvement on reducing operating costs and product improvements or lifting some of the manufacturer's restrictions on maintenance criteria. Most of the MU-2s are flying less than 200 hours per year by owner/operators, and the inspection criteria are based on an aircraft that is assumed to fly 400 to 500 hours per year. For example, props are a five-year calendar overhaul or 3,000 hours. But most that are overhauled actually have less than 1,000 hours when sent in, having reached their calendar limit. All of this adds to the cost of operation.

Maintenance personnel training needs to be expanded; old service center network personnel are great, but many of the new techs don't understand the history of the aircraft.

Joe Megna – First of all, I feel that we are very fortunate to have the support of Mitsubishi. Considering the number of aircraft flying, we have excellent support. We maintain other manufacturers' aircraft with little to no support – especially on an out-of-production aircraft. The ideal wish would be to have Mitsubishi restart production of the aircraft, with product improvements. Product improvements will mainly be accomplished through STCs. My wish is for the continued support of Mitsubishi concerning current and future improvements.

Mike Laver – I wish there was more retrofitting available for the MU-2. I would like to see retrofit autopilots, for example. The current autopilot dates back about 30 years, and the cost of maintaining it has become very high now.

I wish they would go to the operators and ask what they would like in an updated MU-2.

MU-2 Maintenance and Service

Question: What are the most difficult and most often occurring maintenance issues that MU-2 owners deal with?

Mike Laver – The MU-2 is not a maintenance hog. They are built like tanks. There are no structural issues. The maintenance program is more demanding now. The only issue is sometimes extra maintenance causes more maintenance. They need to relax on the calendar items.

Mike Noblin – I would say as the fleet has aged, it would be windows. There is an airworthiness directive on the windows. Operators should understand that this is a good AD and was necessary because, over time, the windows become over-polished and too thin, which can lead to cracks. Mitsubishi has new windows for replacement, which are better than new, and supply is not a problem.

Bob Kidd – Five-year calendar prop overhaul and complying with the maintenance requirements per the manual when the aircraft has not been flying much. It is sometimes difficult for owners to justify complying with some of these requirements when they feel like they are not needed.

Joe Megna – The most difficult would be propeller overhauls. It seems like the five-year requirement is reached long before the 3,000-hour requirement. The average hours in the five-year time span are 400 to 600 hours, with many well under 400 hours. Another issue is the calendar inspection requirements, such as the 100-hour or one-year, 200-hour or one-year, 600-hour or three-year items (which is the biggest of the three). I feel that the inspections are important and necessary, but the calendar requirement ends up being the deciding factor, which translates into increased costs – especially for the propellers.

Question: What are the top three maintenance items you consider mandatory that an owner needs to address, regardless of cost?

Mike Noblin – My biggest concern is fuel nozzle maintenance. I would like to see the fuel nozzles cleaned on a 200-hour basis instead of a 400-hour basis. Fuel nozzle maintenance is a lot cheaper than hot-end overhaul work and will help extend the life of the engine. In winter, make sure the airplane is lubed with products compatible with cold weather. The program has been pretty well-perfected. Mitsubishi did recognize the need for inspections every year and changed the program, and it works very well.

Joe Megna
1) Autopilot System.
2) Engines – proper rigging and indication.
3) Deice and anti-ice systems.
The auto pilot and engine rigging helps to reduce workload on those IFR flights into congested airspace. A proper operating anti/deice system keeps you from having safety issues. Those are my top three, many other areas to consider.

> **"There are many experienced people out there if help is needed; Mitsubishi and Turbine Aircraft Services are very helpful if information is requested. I must say that in the future that may not be the case. Many of the key people are getting older or moving on to other manufacturers."**
>
> **Joe Megna**

Mike Laver
1) Make sure the engine is in good condition and rigged correctly.
2) Make sure the propellers are on a good program and balanced.
3) Make sure the avionics and instrumentation are well-maintained. If the airplane has updated avionics, then there is usually no issue.

Costs have increased because of calendar maintenance; therefore, your operating costs are higher. With a low annual usage, the cost per hour is very high. Costs to operate have doubled in the past three years.

Bob Kidd
1) Loss of engine performance through power degradation and improper rigging.
2) Deicing equipment by conducting proper maintenance and replacement of deicing equipment is a necessity even though it is expensive.

3) The general wear items such as jack screws and jack nuts. This aircraft is largely mechanical and electrical and normal wear needs to be addressed to prevent problems.

Question: What items do owners avoid dealing with, in order to try to keep maintenance costs down?

Mike Noblin – Some may try to get away with delaying the overhaul on three-bladed props. For the three-bladed props, they may be low hours, but after several years, there can be corrosion problems that need to be dealt with. On four-bladed props, this is less of an issue because they have a calendar limit regardless of hours.

Bob Kidd – Not really much. Seeing some that are deferring the inspections and not doing them as often as they should.

Joe Megna – Engines are, by far, the most expensive component on the aircraft. Owners try to keep the costs down when major engine inspections are due. The second items are propellers, due to the calendar intervals (five years). The AD on the four-bladed propellers and the way the Hartzell Service Bulletin is worded require the propeller to have a five-year or 3,000-hour overhaul interval, whichever occurs first. Deice boot and windows also rank high on the list. The operator must understand that the maintenance provider is required by the FAA to comply with these items.

Question: For a new MU-2 buyer, what are some items that they should look for and be aware of during a pre-buy inspection?

Bob Kidd – They need to know the background of the facility they are asking to do the pre-buy inspection, which should be done as a 100-hour inspection. The aircraft logbooks should be reviewed by someone that is familiar with MU-2 aircraft. Windows are not as big of an issue now that there is an STC available for cabin windows. Since the AD was issued, the windows are being inspected during 100-hour and aren't as much of an issue as they once were.

Mike Laver – Look for high-dollar items such as:
Windshields – when they were changed?
Cabin windows – How thick are they? Have they been polished? Do they have any crazing?
Deice boots.
How long has the air cycle machine been in the airplane?
Who has performed the maintenance on the airplane?

Joe Megna – First of all, there is no such inspection as a pre-buy. A complete inspection would be my recommendation (100/200/600/one-year/three-year). That inspection would generally cover 90 percent of the aircraft. The other 10 percent would fall into non-destructive testing inspections, as required. Items I would look for before the inspections:
1) Logbook status sheets. Are the records in good order?
2) Deice boots.
3) Window condition. Have they been polished before?
4) Engine times and cycles.
5) Damage history.
6) Heated windshields. Proper operation and delamination, along with any visibility problems.
7) Has the aircraft been maintained to the manufacturer's standards and is it current?
8) Who has maintained the aircraft?

Mike Noblin – We don't do pre-buys. We do 100-hour inspections. The buyer needs to go to a shop that knows Mitsubishi. The shop should understand that the buyer wants to know more than just what would be revealed in a normal 100-hour inspection. The buyer needs to know what will be happening with the airplane down the road that is going to cost him in the next several years. The buyer wants a projection of his cost on the airplane in the future. If he is buying an airplane that needs AD compliance on the fuel controllers, at a cost of $35,000, he needs to know this. If turbine wheels are coming up on 500 cycles and will need to be replaced, he needs to be able to plan for this over the next year or two and be informed of the costs to properly maintain the airplane.

Question: How would an MU-2 operator be able to tell a good maintenance operation from a bad one?

Joe Megna – Do your homework and ask for references. There are a lot of good shops out there and not all are affili-

ated with Mitsubishi or are Service Centers. I would recommend that the shop you select be an FAA Certified Repair Station. A CRS is governed by the FAA and, in general, the CRS must have technicians that are trained to a standard, and they must have technical data (manuals), proper tooling, and test equipment to maintain the aircraft being worked on. All Mitsubishi Service Centers are CRSs.

The MU-2 owner/operators are a very close-knit group; there are many Internet resources and gatherings along with NBAA and the PROP seminars where you can gather this information. The main caution is not to only look at price but what are you getting for the price. If a maintenance facility has an inexpensive inspection flat rate, ask why. In our 40 years of MU-2 experience, we know how many man hours the factory-approved inspections require with MU-2 trained personnel. We should all be using the same maintenance criteria.

Mike Laver – Contact other owners and get referrals. All service centers should have the same standards. They seem to be trying to outdo each other. We use two service centers now to make sure nothing gets missed. The airplanes are better maintained this way.

Mike Noblin – Talk to other operators to get their opinions. Mitsubishi owners are a tight group and will share information regarding reputable maintenance facilities. Maintenance operations earn reputations and the best advertising is customer referrals. It isn't the certificates that hang on the wall that make a good shop.

Bob Kidd – Ask about the reputation of the facility. Research the facility and their capability as there is always word-of-mouth information regarding satisfaction or dissatisfaction with the facility. The shop doesn't necessarily need to be a factory-approved service center. Many FAA-approved repair stations are not factory-approved service centers but are great maintenance shops.

Question: What about foreign object damage? Is the MU-2 susceptible and what is the prevailing cause?

Bob Kidd – Engine FOD is very infrequent. The design of the inlet makes it very rare to get anything into the engine. The prop absorbs most of the impact damage. Ninety-nine percent of that is caused by heavy reversing after landing, which pushes the material or debris up in front of the aircraft; then you drive through it. This can cause prop damage and excessive prop wear.

Joe Megna – I have seen some FOD to the belly of MU-2 aircraft, mostly minor, and mainly from unimproved runways. As far as engine FOD, we see very little, except for bird ingestion. The intakes having good clearance, there is little chance for the engine to ingest foreign objects from runways or taxiways. If anything, I'd be concerned with propeller damage from FOD. The MU-2 does have very good prop tip clearance, but the occasional wheel chock or tie-down rope could pose a problem. With any propeller strike or ingestion of FOD into the engine, the manufacturers have inspections that must be followed.

Mike Laver – The engines sit high and FOD is generally not an issue. Don't use excessive reverse thrust. There is more wear and tear on prop blades when you use reverse thrust.

An Insurance Advantage

In the underwriter's world, one of the predominant causes of loss with turbine aircraft is foreign object damage (FOD). The frequency of loss and the cost of repair can lead some insurers to include a separate FOD deductible. In some cases, insurers will adjust rates upward or decline certain aircraft risks due to a poor experience with FOD claims on turbine-powered aircraft. With this testimony from leading industry maintenance experts, the underwriting community can more readily accept the MU-2 without the fear of FOD. An aircraft such as the MU-2 that minimizes the incidence of FOD can be a much more profitable client.

Mike Noblin – I have been maintaining the MU-2 for 32 years and have seen only four or five FOD cases in my career. Mitsubishi engines sit up high and seldom pick things up to cause damage. Sometimes we may get an owner reporting a bird strike and are not sure where it hit, but when you talk to a passenger and listen to them tell about the bad smell in the cabin, you will know where to go look.

Question: Previously there was an emphasis on proper aircraft rigging. Have you seen any problems in this area?

Joe Megna – Yes. Proper rigging of engines, propellers, flight controls, and landing gear is essential in all aircraft. In rigging the engines, the technician must have a good starting point – that is, the basic rigging must be correct. The airframe engine controls must mesh with the basic engine rigging, and the propeller blade angles must mesh with the engine rigging. The problem is that the technician may try to take the shortcut and go directly to the final adjustment. This will only cause delay in getting the engines rigged. Before you let any technician rig any part of your aircraft, ensure that he or she has the training and tooling to accomplish the task.

Mike Laver – There is an AD on this now, and it seems to have covered it well. There doesn't seem to be any problems with it now.

Mike Noblin – In some instances, we have seen the torque system miscalibrated. There is now an AD addressing that. There is a new AD being proposed reinstating the inspection of the torque system and making sure the flight manual is up to date. It takes an earlier AD and makes it more comprehensive.

In its product support survey for 2008 and 2009, *Aviation International News* ranked Mitsubishi the highest overall average in newer and older turboprop aircraft manufacturers' product support. This survey included such items as parts availability, cost of parts, AOG response, warranty fulfillment, technical manuals, technical reps, maintenance tracking programs, and overall aircraft reliability.

Quite remarkable when you consider the aircraft has been out of production for 25 years!

As the fleet has aged, Mitsubishi has kept up with what needs to be done to the airplane. When they changed the program so you had to have 100/200 hours every 12 months, this was great.

Other rigging issues, and another AD, concern flight idle fuel flow. Check it every 100 hours. It can be a problem during landing – allowing one engine to go into beta and the other one does not. If the airplane is properly rigged, you should be able to land it and go into reverse and pretty much put your feet on the floor. This is not an issue with just the MU-2 but is true for most turboprops.

There were issues with nose down autopilot command problems. A few ADs came out of that.

There are only a few ADs that are actually on the airframe and Mitsubishi components. Most issues concern other components such as engines, props, and autopilots. It's a great airplane.

Bob Kidd – Not many anymore. Rigging is pretty straightforward if you follow the Honeywell and Mitsubishi procedures. Some people don't understand the interface between the engine and airframe. To make these match, you must rig the engine and rig the airframe and then rig the airframe to the engine.

Question: Do you see any major issues on the horizon with regard to maintaining airworthiness MU-2 aircraft?

Bob Kidd – No. There may be problems for the 135 operators obtaining an FAA check ride as there are not any flight examiners in the FAA doing this anymore. Most pilots are training per the SFAR requirement, and the results have been remarkable due to the SFAR required training.

STCs and modifications available are third-party equipment and the service centers, maintenance facilities, and manufacturers of the equipment, who are doing an adequate job of upgrading the aircraft. The -10 is a good upgrade but expensive. As for manufacturers' improvements, I don't see where they can really do anything to help. They need to support what they have and let the state-of-the-art equipment be provided by third-party vendors. The aircraft was engineered 40-plus years ago, and even in Japan, they no longer have those people around to provide this kind of engineering.

Mike Laver – The vendor list is dropping off. That is why we need retrofitting of affordable digital instrument packages and Freon air cycle machines. These things are out there; Mitsubishi just needs to get behind the product. The airframe, engine, and props will run forever. With new gages and instrumentation, there should be no problem with the airplane going for a long time.

Mike Noblin – No, I do not. There was a time when Beech owned the Type Certificate that I felt its time was limited to maybe 10 more years. But Mitsubishi took the airplane back and that was 25 years ago. Mitsubishi will support this airplane until the last one is flown.

Joe Megna – The MU-2 is a great buy right now. I have seen very good aircraft being sold at what I feel are remarkable prices. The cost to maintain these aircraft is only going to increase. With concerns by the FAA and the manufacturer to ensure safety in the aging fleet, the regulation will continue to get tougher. However, the MU-2 does have several advantages over other aircraft makes: I feel that the MU-2 has a superior airframe and wing, the engines are fuel efficient and reliable, and the sub systems of the aircraft have stood the test of time. With advancement of avionics systems, the durability of the airframe, and Mitsubishi commitment to the aircraft, I feel that the aircraft will be here for decades to come. ✈