

Aviation Industry Forecast...

Crystal Ball Gazing

After a tumultuous 2008 what lies ahead for the industry in 2009? We take a look at the issues and challenges in the marketplace

"The outlook is bleak," says IATA chief executive Giovanni Bisignani "We face the worst revenue environment in 50 years."

HIGHLIGHTS

- **Aviation Industry Forecast... Crystal Ball Gazing**
(Page 1)
- **NFR: Oil Fundamentals... Fuel for Thought**
(Page 1)
- **Technology... Logisti-Seal Makes the Bottom Line Shine**
(Page 7)
- **News Briefs... Nigerian Operators Call for Fuel Price Drop**
- US Government Praises FAA's ATC Management**
- Southwest Posts Collateral on Fuel Hedges**
(Page 10)

Although the traditional celebratory fireworks ushered in 2009, there were few explosions of joy at distinctly un-festive airline headquarters all over the world. Last year's unprecedented oil prices coupled with the onset of a bitter recession has left many carriers fighting for their lives. Fuel continues to be a constant factor in the crisis.

The International Air Transport Association (IATA) has said that declining passenger traffic, revenue and yield would cause the industry to post a USD2.5 billion loss next year. "The outlook is bleak," says IATA chief executive **Giovanni Bisignani** "We face the worst revenue environment in 50 years." Major US carrier stocks all finished in the red at

the end of 2008. The prognosis is no better on the other side of the planet. The Center for Asia Pacific Aviation (CAPA) backs up Bisignani's assertion, suggesting that pressures on fuel prices, plus ongoing recession will reshape the global aviation industry.

The volatility of fuel prices has sharply affected airlines' bottom lines. Fuel has tumbled from around 40% of airline costs to below 20%, though a strengthened USD has softened this improvement for some. The price of oil has recently dropped to the almost the lowest in a decade, thanks to gloomy markets and softening demand. The speed of the decline and recent stabilization indicate a strong chance

(Continued on page 2)

NFR: Oil Fundamentals... Fuel for Thought

For centuries we have burned our fossil fuels like there's no tomorrow. Is the day of reckoning finally upon us?

At London Heathrow, one of the world's busiest airports by movements, an airliner takes to the skies or lands every two minutes. This pattern happens constantly at many airports the world over. All are a hive of activity, a daily logistical ballet of planes taxing out from parking slots, the space never remaining empty for long as a new arrival noses in with idling turbines.

A quick once over by ground crews, and fuel hoses pump the lifeblood of the world into the tanks of the still warm jet primed for rapid turnaround. The fresh flight crew and

passengers board and the cycle repeats. The airplanes sit waiting on the ramps and taxi ways, burning a steady stream of high-grade kerosene.

The skies are crowded with thousands of aircraft all guzzling the same finite resource. Air travel is taken for granted - vital for all economies, creating prosperity and GDP growth. Despite the recent trends in rising fares, the consuming masses still seek out the best deals safe in the knowledge there will be always be a seat available on a plane.

However, there has been a

(Continued on page 4)

Industry revenues are expected to decline by 6.5% to USD501 billion in 2009 - the first drop in annual revenue since the two consecutive years of decline in 2001 and 2002.

that we will see price increases, as oppose to substantial reductions.

Experts agree that stabilization is necessary. Macquarie Bank's **Erik Petersson** believes that we need to see more economic stability, which he says will lead to "more visuals on future fuel price and future seat demand."

The Oil Producing Economic Countries (OPEC) recently announced a cut of 2.2 million barrels per day (mbpd) from January 1st, taking cuts since September 2008 to 4.4 mbpd. Oil prices are now down some 70% from last July's highs and are unlikely to stop falling until the global economy shows some signs of stabilizing.

According to CAPA, as OPEC reduces production and **President Barack Obama** lifts morale with new spending, the short-term trend for fuel is likely to be upwards, probably exceeding USD60 a barrel. After that, prices will fall, unless there is worldwide economic improvement. Demand will fall and oil prices should slip again by mid-year, possibly even to below USD40. Because of weakened requirements, the major oil companies are projecting that supply will remain adequate despite the output cut.

Grim Outlook

Even though last year's drastic oil prices almost flooded the industry, CAPA believes that today few operators have adequate risk management strategies in place. The aviation industry trades in US dollars and up to half of non-US airlines' costs could be in that currency. Fluctuations in USD can make or break players in the sector. The industry is ultra-sensitive to economic fluctuations, which can be calamitous for businesses with high capital costs. The recent spending spree on new aircraft worldwide has been realized just as demand slumps, playing havoc with cash flow and profitability and threatening long-term credit-worthiness. Given the current state of lending, this could become a huge problem. While the USD is strong today, should it soften, it will impact airline costs.

Although most airlines and airports now have some form of currency hedging, few have serious fuel price management strategies in place. This could be fatal, as 2009 looks set to be a challenging year.

Other factors that will squeeze the industry could be political uncertainty in the Middle East; OPEC volume reductions, as producers look to stabilize at around USD70-80 per barrel; US dollar fluctuations; and market speculation. Downward pressures will come from slackening consumer demand as people cease flying as frequently. Industry revenues are expected to decline by 6.5% to USD501 billion in 2009 - the first drop in annual revenue since the two consecutive years of decline in 2001 and 2002.

Every region apart from the US is slated to report larger losses in 2009 than in 2008, as international yields fall 3.0% (5.3% when adjusted for exchange rates and inflation) and passenger traffic declines by 3% following growth of 2% in 2008. However, most airlines are benefiting in some form from lower fuel prices. IATA slashed its members' predicted total oil bill by 18% in 2009 to USD142 billion, based on an average price of USD60 per barrel.

Debt rating agency Fitch said in a statement: "Following a year of operating weakness characterized by extreme volatility in jet-fuel costs and a steady erosion of air-travel demand in a deepening recession, US airlines face another year of intense cash flow uncertainty in 2009."

Cargo traffic is expected to be hardest hit and decline by 5%, following a drop of 1.5% in 2008. Heavily dependent on the cargo segment, Asia Pacific carriers are likely to sustain losses of more than USD 1.1 billion in 2009, more than twice those of 2008's USD500 million. Another problem for the region is the continuing crack-spread difference for Asia, which appears to be slightly more under pressure as refiners switch to alternative products and target their products towards Europe. However, European carriers are also suffering

(Continued on page 3)

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Fredrich says: "Lufthansa's strategy to hedge high percentages using mainly option structures has proven to be the right strategy."

and slated to see losses increase ten-fold to USD1 billion in 2009, as Europe spirals deeper into recession. Many carriers are slammed by high fuel hedging prices in US dollars, compounded by a weakened Euro.

Hedging Forecast

So how does this impact the hedging market? Although some airlines may be reluctant to hedge, Petersson believes that it is an essential strategy. He says: "Those who are nursing large negative mark to markets may be reluctant to hedge until some of their contracts have rolled off. The volatility in the market, however, has demonstrated the need to hedge. There may be a move to strategies with more optionality, which would protect against aggressive moves to the upside and may even give rise to large downward moves."

He adds: "Existing hedges maturing over the year will remove some of the pressure on those who have traditionally hedged aggressively."

Other experts are predicting a period of continued weakness in oil prices for the next few months (though volatility will still be a problem). This will be followed by further upward pressure should the world come out of recession. This means that although airlines may want to hedge, weaker balance sheets may force some players out of the hedging market.

Helmut Fredrich, Lufthansa's vice president of corporate fuel management says that the determining factors on oil prices will be the high volatility and the strong contango. He says: "Airlines who started hedging late at high prices and which are burned heavily now will be reluctant to add further hedges giving the current contango." (Contango is a term used in the futures market to describe an upward yield curve). The last time the crude oil market was in contango was in 2005 and 2006, because of projected future supply shortages. Some experts say that up to an USD10-20 per barrel premium was added to the spot price of oil as a result.

However, Lufthansa has hedged cautiously and will not be

impacted by price fluctuations. Fredrich says: "Lufthansa's strategy to hedge high percentages using mainly option structures has proven to be the right strategy."

United Airlines, however, told a different story. With difficulties in hedging and wildly fluctuating fuel costs last year, the airline posted losses for both the fourth quarter and the full year. UAL's fuel costs increased by USD2.9 billion in 2008, driving a USD1.3 billion loss for the fourth quarter and USD5.3 billion in losses for the full year. The company also recorded USD566 million in non-cash, mark-to-market losses from its fuel hedging portfolio. COO **John Tague** remains bullish about UAL's prospects, arguing: "Our industry continues to be challenged by a volatile fuel and revenue environment, and against that backdrop, we are delivering strong cost results even as we reduce capacity and improve quality."

For 2009 UAL expects its capacity to fall year-over-year by 7%-8% as its first quarter capacity is projected to drop 11.5%-12.5%. The company also plans to cut 1,000 management and salaried employees, bringing the total number of job cuts initiated since the start of 2008 to 2,500.

In Asia, China Eastern reported that it suffered a fair value loss of 6.2 billion Yuan (USD906 million) on fuel hedges last year and that operations had been affected by deteriorating business conditions since the second half. It warned it would report a "significant loss" for 2008. The Shanghai-based airline said losses were accumulated under an "industry wide crisis." It said its aviation fuel hedges ballooned into losses after crude oil prices fell sharply. China Eastern booked actual cash loss of USD14.5 million on fuel hedges in December and all of its fuel-hedging related losses were unaudited

There is a spark of hope for at least one airline though. UK budget carrier EasyJet has upwardly revised its interim revenue expectations after its first-quarter total rose 32% to £550 million (USD764 million). The airline

(Continued on page 4)

"Our industry continues to be challenged by a volatile fuel and revenue environment, and against that backdrop, we are delivering strong cost results even as we reduce capacity and improve quality."



sold 10.1 million seats during the three months ending 31 December. Its revenue per seat grew by 23% to £45.57, or 14% on a constant-currency basis. Chief executive **Andy Harrison** says: "EasyJet revenues for the first half will be ahead of previous guidance, although the unit revenue outlook for the summer remains uncertain due to the difficult macro-economic environment and any potential impact from the strengthening

of the euro against sterling."

Although far from demonstrating a spectacular year-end fireworks display in terms of its fortunes, EasyJet says that for the full year, at current fuel and exchange rates, it expects to be profitable. **JFR**



**NFR: Oil Fundamentals...
Fuel for Thought**
(Continued from page one)

steady realization that oil once referred to as black gold could soon be as rare as black diamonds. There will come a time when oil in its natural crude state will become too expensive to extract given the inevitable depleting reserves. In this context that guaranteed plane ride can no longer be an assured prospect.

once the mature, industrialized economies return to their spending habits, albeit cautiously. Demand for oil will make a swift comeback as production struggles to keep pace with new business optimism. Once again the prospect of higher prices will loom.

Just prior to the financial meltdown many industry experts began to debate the controversial subject of the possible rapid depletion of oil reserves. The vision of a 'world without oil' may appear fanciful and could reside in realms of improbability. However it is inevitable that one day the commodity will become scarce enough to render it economically unfeasible for further investment in extraction technologies.

Is Oil Running Out?

The world has been consuming oil at an alarming rate with the only lull in demand due to economic slowdowns. Experts estimate that 75 million barrels a day are consumed with that figure set to rise to 130 barrels by 2030. Oil prices in 2008 peaked to USD147 a barrel. The pain of steep oil prices had a marked affect upon faltering developed economies, filtering through to fuel inflation as transportation and manufacturing costs rose exponentially.

The cold hard truth is that the amount of oil in the ground is difficult to gauge and nobody really knows how much actually exists given the estimated volumes mined already. Figures range widely about how oil there is. Some estimates peg it at 1,000 billion barrels of current proven, which gives 40 years of supply left. Add to this the undiscovered fields yet to be made and the spare volumes boost reserves as well as the supply timeframe.

Today the price of a barrel of oil has fallen to near 2004 levels with the expectation that it will fall further in 2009 as the credit freeze turns into a prolonged ice age. The downturn offers bitter respite with all industries including airlines, consolidating their operations, and establishing strategic partnerships and ventures with former competitors to weather the gloom.

What can be stated with certainty is that the large discoveries of oil have all been made; there exist no more easily accessible sources of fossil fuels. The existing oil fields have been in operation for decades, but producer nations are tightlipped over how much oil has been extracted.

The scarcity of oil once dominating the headlines has been temporarily nudged aside in favor of the daily reports on bad economic data. But as governments inject billions to prop up ailing financial institutions it is inevitable that the emergent economies will once reign again as the rulers of double-digit growth. This will happen

In the absence of specific geological data the best way to ascertain if oil abundance is in decline

(Continued on page 5)



In our ongoing effort to cover important aspects of the aviation industry, AAG has launched a new publication, New Fuels Report (NFR) that will cover the growth in alternative jet fuels. When warranted, the AAG Daily Briefing will highlight significant developments in this section and the Jet Fuel Report (JFR) will include a supplemental that will cover important developments in detail. Please contact AAG for additional information on NFR or if you would like to highlight your company's developments in the NFR daily segment or the monthly supplemental.



Many analysts speculated that OPEC, which controls 55% of the world's oil, had only about an unconfirmed two million barrels of capacity left to play with.

is to measure the output from individual oil fields over time and aggregate them on a global scale. If world output has culminated in a maximum rate with no evidence of further increases then a milestone has been reached called 'Peak Oil'. Following this event the rate of production enters the decline phase as existing reserves head towards exhaustion.

In practical terms trying to pinpoint the probability of Peak Oil is no easy task given the protective nature of the oil industry. Many analysts have resorted to conjecture in the absence of hard quantitative evidence where the issue of remaining output is calculated.

Some experts suggest that the Peak Oil situation is already underway and that production rates are falling annually. Others disagree, predicting that proven reserves have several decades of capacity left before stagnating. The latter is termed as "plateau oil," which in itself could cause problems when demand once again outstrips supply. At the height of the oil price boom of 2008 there was much pressure upon the OPEC (Oil Producing Economic Countries) cartel to increase production to help cool overheating economies.

Many analysts speculated that OPEC, which controls 55% of the world's oil, had only about an unconfirmed two million barrels of capacity left to play with. This could be attributable to the limitation of current refining resources caught out by unanticipated rising demand and not point towards actual declining oil reserves.

The recognition that many of the world's oil supplies are confined within politically unstable regions has led to the overt desire for less dependence on such troubled and potentially unpredictable sources of oil. The search is on for new, virgin 'elephant fields' taking exploratory expeditions to the ends of the earth.

Drill Smart. Drill Deep

Oil companies have benefited from the rising price of oil. The big names such as Shell, ExxonMobil and BP have been ploughing some of their

bumper profits into the exploration of yet untapped reserves. Many modest oil fields have been discovered to date but the larger finds are proving elusive.

At the forefront is the use of technology to facilitate the search effort. For instance Shell has been pioneering the use of electromagnetic waves to penetrate through rock and silt in identifying possible sources many thousands of feet below the ocean floor. The quest has taken companies into deep waters, a proposition thought impossible a few years ago. In addition explorers are now targeting many inhospitable environments and countries to scour for possible pockets of oil.

There is also reliance upon technology with new drilling techniques for getting the most out of maturing oil fields. This enables the extraction of oil at depths of 8-10,000 feet below the seabed. Deep water unmanned submersibles equipped with drilling and seismic equipment make the task of hitting a potential field all the easier.

All of these methods require significant investment and prospectors will continue to sift for new reserves on the premise of sufficient returns. It is expected that demand for oil will always remain since 'drop-in' substitutes for petroleum have yet to be discovered. Dwindling resources will boost the price to the extent that it may become unaffordable. Before that situation arises, which maybe a good century away, scientists will aim to discover suitable alternatives.

Higher oil prices motivate companies to seek out new reserves. With the price of oil falling along with demand in the current climate the incentive for making expensive commitments could be curtailed to hedge against greater losses and dampened shareholder return.

Additionally, the momentum for obtaining cleaner, greener forms of renewable energy means that demand for fossil based fuel could be further undermined.

The Next Generation of Oil Supply

(Continued on page 6)

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Because of the decline in Britain's North Sea gas and oil, the country is expected to be a net importer of energy by 2010.

New oil sources are being discovered at a reassuring frequency thanks to both innovation and investment. Because of the decline in Britain's North Sea gas and oil, the country is expected to be a net importer of energy by 2010. However with the global grab for oil taking place, UK onshore prospecting is now an attractive venture. It is estimated that onshore UK fields will amount to about 100 million barrels of proven reserves.

Significant finds have also taken place in oil rich Nigeria and in the Gulf of Mexico. Africa, too, represents uncharted territory with many companies optimistic in their quest to locate pockets of oil. However, the instability of some of the countries involved has depressed the level of mining investment.

In 2008 Brazil discovered significant offshore reserves estimated to be in order of several billion barrels. Paradoxically, Brazil is one of the strongest promoters of biofuels with many sugar cane fields dedicated for feedstock production. However this sizeable oil finds will position Brazil in the same league as Arab producers and its Latin neighbor, Venezuela.

Canada has also been experiencing a slight oil rush since prices topped USD147. The oil sands in northern Alberta consist of bitumen (a fraction of crude oil) mixed with sand and water. The estimated area of 162 square miles equates to a proven reserve of 173 billion barrels of oil, with an estimated four centuries of production.

However, the process of filtering out bitumen sediment is an expensive and labor-intensive one. The energy requirement to create a barrel of oil from two tonnes of tar sand is proving excessive. A consortium led by Shell has invested billions in the region and is taking a longer-term view rather than becoming discouraged by the current price of oil.

The oil sand boom has attracted controversy because the extraction methods draw upon vast quantities of water and gas to generate four times the greenhouse gas emissions than conventional refinement. Environmentalists also

express concern over the toxic contaminants being released, heightening worries over both health and fragile ecosystems.

General Aviation: Meeting Challenges

The commercial aviation sector like many industries is learning to adapt in the wake of volatile oil prices. Bruised by the economic downturn and singled out on its contributions to climate change, the sector is undergoing a shift in focus.

Even though oil prices have fallen, aero engine makers, airframe manufacturers and airline customers are striving for greater fuel efficiencies in the next generation of commercial aircraft. As governments call for alternatives to fossil based fuels, airlines are working with industry partners for alternative, clean burning sources of energy.

In February 2008, a Virgin 747 flew to London from Amsterdam with one of its engines powered by a fuel blend of normal jet fuel and a derivative of the Brazilian babassu nut. In December 2008 Air New Zealand followed suit piping a mix consisting of A1 jet fuel and a jatropa plant oil extract through one of its engines. Continental Airlines was the first US national carrier in 2009 to test a biofuel 50/50 mix of jet fuel and an algae extract.

The commitment of airlines to address tightening oil supplies and volatile pricing and at the same time tackling climate change indicates the desire for less reliance on traditional fossil fuels. The industry is also ensuring its survival through difficult economic spikes by looking to innovation.

Aero engine manufacturers such as CFM, Pratt and Whitney and Rolls Royce are investing in fuel-efficient engine technologies and designs. Airframers are also making use of more composites and plastics in the design of lighter aircraft with less fuel burn demands. There is even serious consideration of the use of hydrogen as a complete fuel source; but the technology harnessing its

(Continued on page 7)

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combustible raw power is decades away.

There is no easy alternative to the distilled fraction of jet kerosene. But supplementing the fuel mix with renewable and commercially viable sources will help prolong existing oil reserves as well as lessen emissions.

Oil will not run out for generations to come. It may decline, however adopting measures for its

conservation will help ensure that fossil fuels are available for some time yet. New extraction methods and technological advances will always unearth new reserves, but it can be safely assumed that the sun is setting upon the days of cheap abundant oil.
JFR

Technology...

Logisti-Seal Makes the Bottom Line Shine

Several initiatives promise increased fuel savings. We discover a shining example in Texas

Who would have thought a paint job could save thousands of dollars a year? One of the hallmarks of enterprise is the ability to identify a niche in a market and then offer a product that scratches that demand itch. To be truly head and shoulders above the competition it is vital to add a premium, which cannot easily be replicated by those vying for the same business. This is what Texas-based aviation cleaning outfit Logisticlean achieved through their aircraft skin sealant christened Logisti-Seal.

The company's original intention with Logisti-Seal was to shield the aircraft skin from corrosion and to prolong paint life. However, the product conferred an even more remarkable benefit once applied to an airframe. Following initial application and subsequent use of Logisti-Seal on a variety of aircraft, it became apparent that the sealant played a part in reducing fuel burn.

A Family Affair

The story of Logisticlean and its fuel saving product began when the company was established in 2003. Father and son team, **Jim** and **Andrew Armstrong** had been involved in a number of successful ventures within the general aviation industry. Thanks to a stake in air medical services company, Omniflight Helicopters, they understood early on the impact of corrosion on an active fleet.

Involved with the maintenance of such heavily used medical

evacuation helicopters they discovered that the rigorous demands of each flight, had a detrimental affect upon the aircraft. The back of such helicopters often serve as in-flight emergency rooms giving rise to a multitude of spills from acidic bodily fluids to chemicals used during treatments. The combination of such spills forms a corrosive cocktail, slipping through floor panels that pooled against the aircraft skin, weakening it. The pair's valuable experience maintaining the fleet served as the foundation for their next foray into cleaning and protecting aircraft exteriors.

The Armstrongs moved to Houston and established Logisticlean. Because of its proven track record in supporting demanding FBOs (Fixed Based Operators), Logisticlean was able to offer aircraft cleaning services. With rising costs for maintenance, fuel and the prospect of stagnating fares in the wake of mounting economic gloom, Andrew and Jim set about offering a premium cleaning operation inclusive of asset protection. Their underlying mission was to reduce airline operating costs by enhancing the life of existing metal surfaces, thereby keeping airplanes flying longer between maintenance cycles.

From Aluminum Siding to Fuselages...

The idea for the sealant came from similar compounds used to

(Continued on page 8)

Following initial application and subsequent use of Logisti-Seal on a variety of aircraft, it became apparent that the sealant played a part in reducing fuel burn.



A smoother surface will offer less resistance and friction, theoretically reducing fuel consumption.

protect houses clad in aluminum siding. Logisticlean wanted to investigate if the basic chemical ingredients of such sealants could be altered for use on commercial aircraft. They wanted to create a product that would offer an invisible shield against weather and assorted harsh chemicals such as hydraulic fluid to maintain the luster of the underlying paint for longer periods. Fuel saving properties were far from their development agenda.

It is easy to surmise how Logisti-Seal could reduce fuel burn when applied uniformly to a given aircraft. The sealant bonds to the skin, smoothing out the minute and natural irregularities on the surface at a micron level. A smoother surface will offer less resistance and friction, theoretically reducing fuel consumption.

Anecdotal evidence appeared to support this theory. Intriguing reports from general aviation pilots using Logisti-Seal trickled in, suggesting that the sealant was helping to reduce fuel consumption. Andrew says: "We were a little skeptical about the experiences of individual pilots flying their Cessnas or Gulfstreams telling us that they landed at destination airports with a little more gas than usual. If it was the case that the sealant had reduced the fuel consumption then this needed to be validated with the help of a third-party entity."

After ten individual reports from corporate and private users, Logisticlean set about to investigate the purported fuel saving performance of its new product.

Twelve Months and Twelve Airliners Later...

In September 2005 the company enlisted the help of a major US carrier to prove the fuel saving properties of its compound. Having signed a confidentiality agreement with this partner, they set about to test the claims over a twelve month period.

Two of the carrier's Boeing 737-800's were coated with Logisti-Seal, and a further ten 737's of the same type serving as a control sample for evaluating fuel burn comparisons.

The benchmark fuel burn for the aircraft type was obtained using Boeing's official figures published in its Aircraft Performance Monitoring Report. Although Boeing's data was useful, actual fuel burn for in service aircraft deviated from manufacturer's book values.

It was therefore necessary to conduct the experiment over twelve months using a large control sample of aircraft versus the two test 737's to ensure a definitive outcome. The longer period would account for seasonal variations in temperature due to inclement weather, passenger loading factors and specific performance anomalies that could influence the final results.

The exercise yielded 21,000 lines of data for fuel burn analysis and evaluation. The results indicated that the two treated 737-800's achieved a fuel saving of between 0.63%-1% when compared to the untreated ten aircraft in the control sample. Such favorable conclusions suggest that an airline customer could reduce its yearly fuel bill by applying Logisti-Seal to its fleet.

The American Airlines Effect

Logisticlean signed up American Airlines (AA) as its first commercial customer. The carrier's intention with Logisti-Seal was to enhance and maintain the luster of its natural metal livery finish for longer periods. The sealant also guards against corrosive hydraulic fluids, which can be easily wiped off with a cotton cloth without the need for harsher and time consuming chemical treatments.

In October 2007 AA successfully trialed Logisti-Seal using two of its MD-80's. Fuel savings were determined as 0.5%. Independent laboratory Q-Lab performed accelerated weather tests, simulating seven to eight years of continuous exposure to the elements. These concluded that the sealant maintained 51% more distinct image (reflection) on aluminum surfaces than untreated panels. This aesthetic and longevity aspect was important to AA in addition

(Continued on page 9)

The results indicated that the two treated 737-800's achieved a fuel saving of between 0.63%-1% when compared to the untreated ten aircraft in the control sample.



Following completion of the tests, NASA confirmed that the 0.63% reduction in fuel burn was likely attributable to the application of the sealant.

to the 36 month buff cycle (re-application of Logisti-Seal). AA has since applied Logisti-Seal to one of its in service aircraft christened Susan G Komen and will be treating more of its fleet with the protective sealant.

NASA’s Seal of Approval

NASA’s research laboratories at Langley finally achieved a scientific verification of Logisti-Seal’s fuel saving credentials. “I’m really proud of their involvement,” says Andrew. “When we had our first meetings with them we were a little baffled by the science. What they did was to photograph panels with Logisticlean applied at a microscopic, nano level and carry out wind tunnel tests on test samples.”

NASA’s empirical investigation was underpinned by the extensive data collected from the 12-month fuel burn flight tests with the partner airline. High-resolution photography also confirmed that the natural roughness at a micron level was significantly reduced following Logisti-Seal application. Following completion of the tests, NASA confirmed that the 0.63% reduction in fuel burn was likely attributable to the application of the sealant.

The Secret Ingredients

Unsurprisingly Logisti-Seal’s chemical makeup is a closely guarded secret. Andrew reveals it is an acrylic based polymer with a PTFE component for strength, durability, and smoothness. Manufacturing is outsourced to a third party facility based in the Southeastern US. The same company also assisted Logisticlean with adapting the base aluminum siding sealant ingredients for aviation industry use.

Improvements to the compound included faster setting times and the means to administering it in bright sunlight. Additionally, the company played an intrinsic part in mixing the final formula. Logisti-Seal can be applied to any non-porous surface inclusive of painted metal as well as carbon-fiber composite skins. With the increasing use of composites in airframe construction, this means

that the sealant can be applied to successive generations of aircraft.

There is another benefit for users. Increasing focus upon climate change and the need to reduce emissions has placed the industry’s contribution under the spotlight. Small measures and changes as well as embracing new technologies will no doubt enable airlines to rack up carbon credits in their favor.

Logisticlean has taken independent steps to verify the reduction in fuel burn as a consequence of using its product. Increasing efficiency means fewer pollutants, therefore the possibility of earning carbon credits. Furthermore as it overcomes the need for harsh cleaning agents in removing hydraulic fluid spills, a simple wipe of a wet cotton cloth means it’s better for the environment. In addition the time between wash cycles is increased; repelling dirt and grime for longer means less water is wasted as the airframe remains pristine. This aspect was particularly important for AA given its desire to enhance the longevity of its natural metal livery.

Tailored Solution

The Logisticlean team worked closely with American to work out how best to use the sealant. Its application can be described as a “wax on and wax off” process. The company’s experience with the launch customer enabled an exchange of ideas of how best to administer the product. AA cleaning staff ingeniously came up with the use of drum rollers allowing for rapid more efficient coverage. Andrew says: “We like to work with the customer to incorporate the application of Logisti-Seal into their regular maintenance cycles without having to pull the plane out of service just to apply it.” He adds: “This means that the airlines don’t lose revenue as a consequence of the plane sitting on the ground. The application process does not require any capital expenditure and saves repainting costs. You don’t need a paint booth; it’s just the cost of Logisti-Seal and applying it.”

The next confirmed customer

(Continued on page 10)

Increasing efficiency means fewer pollutants, therefore the possibility of earning carbon credits.



