

The State of U.S. Airline Maintenance Outsourcing: A White Paper

Transport Workers Union of America AFL-CIO
June 2019

TABLE OF CONTENTS

- INTRODUCTION
- BRIEF HISTORY OF U.S. AIRLINE MAINTENANCE
- CONFUSING AND CONFLICTING STATISTICS
- SHIFTING TRENDS IN LABOR
- CURRENT STATE OF OUTSOURCING: “TWO SETS OF RULES”
- OUTSOURCING AND OFFSHORING HEAVY MAINTENANCE
- NEW THREATS TO LINE MAINTENANCE
- HOW FAA OVERSIGHT HAS SHIFTED
- CURRENT STATE OF FAA OVERSIGHT
- OFFICIAL AND UNOFFICIAL WARNINGS
- ACCIDENTS AND OTHER EVENTS
- SEEKING SOLUTIONS
- PROPOSAL: AN AIRLINE PASSENGER SAFETY BILL OF RIGHTS
- BIBLIOGRAPHY
- ABOUT THE AUTHOR

INTRODUCTION

“I do not think the government should permit airlines to offshore heavy maintenance. While doing so undoubtedly saves money, it does so at the expense of good jobs we need here in the States. Moreover, since the FAA does not have the ability to supervise the work as intensively as it would if the work were done in the U.S., offshoring represents an unnecessary compromise of safety.”

—Robert L. Crandall

Former Chairman & CEO, American Airlines

May 27th, 2019

“That \$99 ticket came with a price. And the savings came from maintenance.”

*—A mechanic for a major U.S. airline
ATTENTION ALL PASSENGERS, Page 172*

The United States has had a stellar commercial aviation safety record in recent years, with the exception of one fatal domestic accident in 2018. However, that record was built by tens of thousands of dedicated American men and women over many decades that displayed professionalism, dedication, and ingenuity. In recent years those safety standards have been threatened by quiet but persistent wholesale changes in 1) how the nation’s airlines maintain and fix their airplanes and 2) how the Federal Aviation Administration (FAA) oversees such work.

Industry professionals maintain this crisis is reaching a tipping point. The recent events concerning the Boeing 737 MAX aircraft—culminating in two accidents totaling 346 fatalities within a five-month span between October 2018 and March 2019—have graphically demonstrated to the nation and the international community that the FAA’s “cozy” and lax oversight practices of the world’s largest aircraft manufacturer are a cause for much concern. On the other hand, quite a few aviation professionals have been sounding similar alarms for many years now, asserting that such laxity could have even more dire consequences due to how the FAA oversees the ways in which U.S. airlines outsource critical maintenance work. And it should be noted that such outsourcing comes at a time when the domestic airline industry is posting record profits.

Such outsourcing of critical work is a threat to safety, because there are two sets of standards in play, particularly when waivers are extended outside the United States for regulations that apply domestically. What’s more, this lack of control also triggers concerns about security, since the safeguards that are

in place within our borders can be virtually non-existent in other countries. Finally, the wholesale offshoring of skilled American jobs to El Salvador, Brazil, Mexico, China, Singapore, and other countries has dire effects on the nation's economy and is irreversibly eroding an entire profession.

This White Paper chronicles these crises, provides statistical data to illuminate current trends, and details how corporate hubris and a complacent FAA have allowed greed to undermine that stellar aviation safety record. Dedicated and concerned professionals inside the industry are gravely concerned, and this document reflects those concerns. It also offers a set of proposals for addressing these issues.

BRIEF HISTORY OF U.S. AIRLINE MAINTENANCE

It's impossible to understate the importance of proper aircraft maintenance as a component of airline safety, even with the advent of tremendous technological advances and even as the overall aviation safety record has improved. PlaneCrashInfo.com has crunched the numbers for five decades from the 1960s through the 2000s and found that mechanical problems remained constant as the second leading cause of airline accidents, behind pilot error. In the 2000s mechanical problems resulted in 18% of accidents, which in fact was even higher than the five-decade average of 17%.

For decades it was understood at many airlines that when it came to corporate cost cutting, aircraft maintenance was verboten and off the table. Today the pendulum has swung in the other direction, and cost cutting deserves closer scrutiny. While maintenance outsourcing raises questions about safety, security, jobs, and national infrastructure, it's important to understand outsourcing in its context as an economic issue.

What the airline industry terms “contracted maintenance” has always existed among domestic airlines, but was not as prevalent in its present forms. Major U.S. carriers have long relied upon maintenance assistance from Original Equipment Manufacturers, such as Boeing for aircraft, General Electric or Pratt & Whitney for engines, etc. Also, the majors have always serviced rival carriers’ aircraft at “downline” or “spoke” airports, usually through reciprocal agreements. And smaller and charter operators traditionally outsourced maintenance to major airlines.

Among the nation’s largest airlines, however, robust in-house maintenance programs were the rule and not the exception for decades, even after the industry was deregulated in 1978. That started changing in the 1990s, and accelerated after 9/11, when cost cutting increased and industry consolidation began in earnest. Venerable names such as Trans World Airlines, America West Airlines, Northwest Airlines, Continental Airlines, and US Airways melded with the “Big Three” network legacy carriers—American Airlines, Delta Air Lines, and United Airlines. Major domestic airlines began outsourcing and offshoring critical “heavy” work to Maintenance, Repair, and Overhaul (MRO) companies, both in the United States and abroad.

MROs are scattered throughout the country, and more than 900 foreign shops are in locations such as Latin America, the Caribbean, Europe, and Asia; there is more information below. In 2018 *Aviation Week* reported: “But both MROs and OEMs [Original Equipment Manufacturers] are going after a bigger slice of a pie that is growing larger, the increasingly important U.S. outsourced MRO market.”

To put things in perspective, the International Air Transport Association (IATA), the world’s leading airline industry trade group, estimated that global MRO expenditures totaled \$76

billion last year. The breakdown—based on costs, not actual labor hours—was as follows:

- * Engines: 42%
- * Components: 21%
- * Base maintenance: 20%
- * Line maintenance: 17%

What's more, IATA reported the global market that spent the most on MRO outsourcing was North America, 32% of the world total.

CONFUSING AND CONFLICTING STATISTICS

The U.S. Department of Transportation (DOT) provides financial data for domestic airlines dating back to 1990, and ideally these statistics provide a graphic illustration of how the nation's carriers have altered their maintenance programs, and the effects they have had on in-house employment of maintenance personnel. What's particularly disturbing, however, is that it's quite difficult to determine the full size and scope of domestic airline maintenance outsourcing via the public documents provided by the airlines through the DOT.

Such confusion underscores the larger problems for regulators—let alone consumers—in understanding how the airplanes American travelers fly on are being serviced. If the DOT cannot present consistent and transparent statistics on where, how, and how much aircraft maintenance work is being done, it's not surprising there are concerns about how well the FAA is overseeing such work.

This confusion seems to be due to separate but critical factors:

- Fundamental differences in how different airlines report data
- Potential discrepancies in reporting data, including separate reporting for international maintenance vendors

Consider CHART #1, which details the Total Maintenance Expenses reported to the DOT by U.S. scheduled airlines via Form 41 data. These amounts are contrasted with the Direct Maintenance Expenses the airlines also reported, to determine each carrier's total dollar amounts for outside maintenance work. The chart provides such data for 2018, 2008, 1998, and 1990, the earliest year available, for the ten largest domestic scheduled jet passenger airlines. Included are the airlines they merged with, but not included are their regional airline partners, which operate separately under DOT and FAA guidance.

According to the DOT data we interpreted, the largest percentage of outsourced maintenance work last year was by Frontier Airlines, at 50% of total expenses, while the smallest percentage was Spirit Air at 0%. These are the numbers reported for all ten carriers and their percentages of outsourced maintenance work in 2018, from most to least outsourced:

- * Frontier Airlines, 50%
- * American Airlines, 31%
- * Delta Air Lines, 30%
- * United Airlines, 28%
- * Allegiant Airlines, 28%
- * Southwest Airlines, 21%
- * Alaska Airlines, 18%
- * JetBlue Airways, 16%
- * Hawaiian Airlines, 15%
- * Spirit Air, 0%

Thus, based on the Form 41 data reported by the airlines to the DOT, the total outsourcing percentages for these ten carriers combined was 36% in 1990; 37% in 1998; 29% in 2008; and 27% in 2018. Yet industry experts, including the unions that represent airline mechanics both in-house and in some cases at outside facilities, claim these numbers simply are not accurate.

That is why the fundamental differences in reporting data are so important. It means that some carriers define outsourcing in terms of total dollars spent, while others define it in total work hours spent on aircraft maintenance. So for example, if a given airline spends \$50 on outside maintenance and \$50 on in-house maintenance, but outsourced employees are earning half the salaries of in-house employees, then two-thirds of that work is being outsourced, not 50% of that work.

Gary Schaible, President of the Transport Workers Union (TWU) Local 591, representing TWU American Airlines line maintenance aircraft mechanics nationwide, questions American Airlines' 31% aircraft maintenance outsourcing data provided to the DOT by the airline.

He stated: "American Airlines reported to TWU that 39.8% of 'maintenance spend' on legacy American Airlines work went outside the company in 2018. This logically equates to well over 39.8% of the legacy American Airlines work being outsourced due to the low wages paid in countries including Argentina, Brazil, and Mexico, where many of American's planes are now being inspected and repaired. Add to that the merged legacy US Airways outsourcing of ~50% base maintenance work and nearly all of the legacy US Airways component and engine work and the 31% number reported by American sounds very low."

Further clarification is offered by Bret Oestreich, National Director of the Aircraft Mechanics Fraternal Association (AMFA), who stated: "Carriers can hide the true outsourcing numbers with these varying statistics. For instance, at Southwest Airlines, where we represent the mechanics and related, it is well known that over 50% of the maintenance is

outsourced, not including Engine and Engine Component overhaul. However, Form 41 data indicates it is around 20%.”

In other cases, the DOT statistics simply don't reflect reality. Consider Spirit Air. As shown above, the DOT reports Spirit's Direct Maintenance Expenses were identical to its Total Maintenance Expenses in 2018. And yet in May 2018 MRO-Network.com published an interview with Kirk Thornburg, Spirit's Vice President for Technical Operations, who stated the following: “The work we do in-house is typically line-level work, so we go up through A checks. Our heavy checks (C checks and higher) are outsourced to Lufthansa Technik in Puerto Rico. We're in the third year of a five-year deal with LHT to do all of our heavy maintenance. Pratt & Whitney maintains the engines.”

In fact, in July 2018 *Aviation Week* reported much higher outsourcing percentages for the domestic industry. That report indicated the top ten airlines in the United States averaged 48% outsourcing in 2017, based on spending. *Aviation Week* also stated that for the nation's ten largest airlines and their predecessor carriers, outsourced spending more than doubled between 1995 and 2017, from 23% to 48%.

The 2018 *Aviation Week* report also indicated other discrepancies in outsourcing spending percentages, including the following:

- * JetBlue Airways, 75%
- * Southwest Airlines, 53%
- * United Airlines, 52%
- * Delta Air Lines, 46%
- * Frontier Airlines, 45%
- * American Airlines, 39%

Experts have even raised concerns about more basic statistics reported by the airlines. CHART #2, also taken from Form 41

data reported by these ten carriers to the DOT, theoretically provides additional context for in-house maintenance expenses by detailing annual total salaries for maintenance employees during 1990, 1998, 2008, and 2018. Between 1990 and 2018, the overall total salaries for these ten airlines increased 25%. For context, it should be noted that the cost of living in the United States increased 48% during these years, according to the American Institute for Economic Research, highlighting that airline maintenance employee payrolls have been dramatically reduced over 28 years.

Other Form 41 data that is also questionable is how each airline accounts in the number of “in-house maintenance employees.” American Airlines reports nearly 15,000 in-house maintenance employees on its Form 41 Data, yet the airline has less than 10,000 FAA Certificated Airframe and Powerplant Technicians working on their aircraft. Shouldn’t the Form 41 data more accurately account for FAA Certificated employees working on the aircraft in one category and categorize all others as “in-house maintenance employees?”

Finally, CHART #3 further attempts to define maintenance outsourcing by detailing the ratio of in-house maintenance employees at the ten airlines to the total number of aircraft in each carrier’s fleet. The bottom line is that overall there are fewer in-house mechanics for each airplane. Between 2008 and 2018, the overall ratio for these ten airlines fell from 10.1-to-1 to 9.0-to-1, a reduction of 1.1 per aircraft. During these ten years, the most dramatic decreases took place at Alaska (down 2.2-to-1); Frontier (down 2.2-to-1); American (down 2.3-to-1); and United (down 2.6-to-1).

Once again, statistics do not tell the whole story. Further clarification is offered by AMFA’s Oestreich, who stated: “We must also recognize in comparison that when it comes to such ratios, some of these carriers only perform line maintenance in-

house and outsource intermediate and heavy maintenance to outside vendors.” AMFA’s mechanics at Alaska Airlines, for example, only perform line maintenance. Also, AMFA does not perform all of the heavy maintenance at Southwest Airlines.

SHIFTING TRENDS IN LABOR

Passenger advocates clearly have a vested interest in ensuring that all U.S. airlines operate as safely as possible. Nevertheless it’s naïve to assume the interests of labor organizations should always be separate and apart from passenger concerns about safety. As noted in *Attention All Passengers*: “There is no question that employee ‘downsizing’ and outsourcing have had adverse effects not only on safety but also on service and quality.”

- Employment and Salaries

There is no doubt there will continue to be a growing need for skilled aircraft mechanics, since all estimates are that the commercial aviation industry will grow globally in the years and decades to come. For example, Boeing estimates there will be a need for 754,000 new technicians worldwide by 2037, with 25% of that total—189,000—required in North America.

While theories diverge (amid heated arguments between industry and labor representatives) about the causes, most aviation professionals concur there is a shortage of aircraft mechanics in the United States. “We lost a generation of mechanics,” asserted Chris Moore, International Representative for the Teamsters Airline Division, which represents mechanics at carriers such as Allegiant Airlines, Frontier Airlines, and United Airlines.

The Aeronautical Repair Station Association estimates there currently are more than 2,500 unfilled technical positions in the

U.S., which ARSA says costs the repair station industry up to \$642.5 million annually. What's more, the Aviation Technician Education Council reported last year that "mechanics are retiring faster than they are being replaced," with 30% of the workforce at or near retirement age.

Such findings correlate with research conducted by Oliver Wyman, which estimates the Maintenance, Repair, and Overhaul sector will grow by 3.8% between 2017 and 2027. As an industry, MRO revenues will increase from \$75.6 billion in 2017 to \$109.2 billion by 2027.

Unfortunately, the margins of safety surrounding aircraft maintenance have eroded as more and more skilled airline employees are replaced with outside technicians who often lack the same skills, experience, certification, and screening. Statistics from the U.S. Department of Transportation and U.S. Department of Labor exemplify just how dramatically the state of airline maintenance has changed in recent years.

As shown in CHART #4, the total number of in-house maintenance employees at the nation's ten largest scheduled passenger airlines (including the carriers they have merged with in the last 28 years), has dropped significantly. According to the DOT, the total number of in-house maintenance employees among these ten airlines fell from 48,177 in 1990 to 38,030 in 2018; this represents a 21% reduction.

Most of this downsizing took place in the decade between 1998 and 2008. It's important to note these staff reductions occurred even as the number of daily flights and total aircraft in the nation's fleet increased dramatically. For example, Oliver Wyman estimates the in-service commercial airline fleet will grow globally from 25,368 aircraft in 2017 to 35,508 in 2027; in North America this breaks down to 7,674 aircraft in 2017 expanding to 8,295 aircraft in 2027.

The largest in-house maintenance decrease took place at the entity formed by the merger of United Airlines and Continental Airlines; together these two carriers employed 14,643 maintenance personnel in 1990, and that total was nearly halved to 7,912 in 2018. American Airlines also saw significant reductions during these three decades. American combined with four other carriers during this period—Reno Air, TWA, and America West/US Airways—and together the total number of in-house maintenance personnel fell from 22,881 in 1990 to 14,603 in 2018, a decrease of 36%.

More recently, Labor Department statistics show an increase in aircraft maintenance employment between 2017 and 2018 for both Mechanics/Service Technicians and Avionics Technicians, as shown in CHART #5. But the number of jobs in “scheduled air transportation” paled compared to the number of jobs in “support for air transportation” over the last two years. For Mechanics/Service Technicians, there was 19% higher employment outside scheduled aviation, and employment outside scheduled aviation for Avionics Technicians was a whopping 204% higher.

As for wages, the Labor Department reported modest increases nationwide for aircraft maintenance personnel between 2017 and 2018, as shown in CHART #6. Mechanics/Service Technicians earned 3% more and Avionics Technicians earned 2% more. As shown in CHART #7, while there are more maintenance workers in “support” rather than “scheduled” positions, those in scheduled aviation made considerably more than those in support in 2018. The pay differential was 35% higher for Mechanics/Service Technicians in scheduled careers and 30% higher for Avionics Technicians. Simply put, those working outside scheduled aviation do not earn nearly as much because wages are suppressed.

In certain cases, carriers that outsource maintenance are moving some of the work back in-house, particularly at Allegiant Airlines, Delta Air Lines, and United Airlines. (Allegiant's maintenance program was particularly problematic several years ago, according to FAA data obtained by a Freedom of Information Act request by Jessica Monsell of the Motely Rice law firm in 2016 detailing multiple inflight maintenance failures that attracted national attention. However, the Teamsters Airline Division, which now represents Allegiant, maintains "the media spotlight put pressure on everyone to make it right.")

The bottom line is these statistics indicate more aviation maintenance personnel are being hired outside the scheduled transportation sector, but the pay levels are considerably lower.

- Labor Action and Effect

One of the most dramatic turning points for the safety of the American flying public occurred in 2005, when mechanics at the nation's fourth-largest carrier went on strike. The Northwest Airlines maintenance strike was a watershed event in many ways. That action by the Aircraft Mechanics Fraternal Association (AMFA) lasted for 444 days and caused Northwest's maintenance presence to drop from 3,600 to about 900 overnight. What was most alarming was that Northwest continued flying a robust schedule even while losing most of its maintenance workforce.

Despite public assurances, the FAA gave its tacit blessing to Northwest. *Attention All Passengers* describes these events in details and states: "So here is the total amount of maintenance fines levied by the FAA against Northwest during the strike: \$0.00. Zero dollars, zero cents. A major U.S. carrier operating worldwide reportedly lost 75% of its maintenance force and yet the FAA asserted that no corners were cut."

In fact, it was later documented that there were numerous violations, and the number of air turn backs and emergency diversions during this period set off alarm bells throughout the industry—first two such events within two days, and then two events back-to-back on the same aircraft. After Northwest publicly referred to such an occurrence as “normal,” a satiric blog entitled *Weekly Normal Emergency Landing* was launched. Such events caused an FAA inspector to become a whistleblower as he asserted the FAA was ignoring serious maintenance flaws at Northwest during the strike. In 2010 the U.S. Office of Special Counsel confirmed such claims and stated the FAA “failed to provide effective oversight of [Northwest].”

And so Northwest successfully locked out AMFA mechanics while continuing to operate its robust flight schedule, and with virtually no repercussions from the federal agency sworn to oversee its safety. Shortly after, Northwest was acquired by Delta Air Lines. The lessons of the Northwest strike were not lost on U.S. airline executives, particularly the FAA’s lack of enforcement. It’s worth noting there hasn’t been a major labor action of that scope in the U.S. airline industry in the 14 years that have passed since then.

CURRENT STATE OF OUTSOURCING: “TWO SETS OF RULES”

Title 14 Part 121 of the Federal Aviation Regulations (FARs) dictates the parameters U.S. carriers must adhere to when operating scheduled passenger flights. Similarly, Title 14 Part 145 provides the specific regulations outside repair stations must comply with under FAA supervision.

These regulations are specific about issues such as licensing certification for mechanics; security background checks; and drug and alcohol testing programs. In theory, the FAA maintains there is one set of rules for all maintenance work performed on

U.S.-registered commercial aircraft, whether such work is done in-house or outsourced, and whether the facility is located in the United States or in a foreign country.

In reality, however, there are two sets of rules. A White Paper published last year by Ridge Global (detailed below) put it this way: “In some cases, the rules for non-U.S. facilities are more stringent. In others, U.S. shops have a higher regulatory burden.” This is because foreign facilities are often given waivers exempting them from certain policies, such as drug and alcohol screening, which is banned in many countries due to privacy laws.

And the FAA’s oversight has been proven to be more limited at outside repair stations than at airline facilities, even inside the United States. Therefore, many outsourced maintenance shops effectively police themselves to a significant extent. What follows are some key issues.

- Security

John Samuelson, the International President of the Transport Workers Union, bluntly asserted U.S. government agencies have little control over security outside our borders: “They have no ability to say the physical plants are safe. They’re just lying through their teeth to say otherwise.” He cited examples of airline mechanics that have found drugs smuggled in the noses and cabins of aircraft returned from maintenance in Latin America. “It’s a clear and present danger, and it’s going to lead to a catastrophic event.”

- Drug and Alcohol Screening

The FARs—in 14 CFR § 120—have mandated testing for air carrier “safety-sensitive employees” since 1991, and the FAA extended such rules to subcontractors in 2006. Ridge Global

details how numerous international government bodies have balked at pre-employment and/or random testing. This list includes many of the locations where maintenance work is performed for U.S. airlines, including the European Union, Germany, Canada, Japan, and Singapore.

- Language Issues

Boeing's manuals for U.S. carriers are printed in English, yet some foreign employees can't read the language. The Ridge Global report states—amazingly—that FAA regulations “explicitly allow individuals who cannot meet the language requirement” to become certified *provided* they are employed *outside* the United States.

- Certification

One of the biggest differences between airline-employed mechanics and outsourced workers can be certification, the process by which maintenance professionals are licensed by the FAA (or equivalent agencies in foreign countries). Much of the critical work being performed on commercial U.S. aircraft is done by workers who do not possess the same skills, experience, and certification, as detailed in the reports cited below.

- Differences in FAA Oversight

These issues are discussed at length below.

OUTSOURCING AND OFFSHORING HEAVY MAINTENANCE

Unlike automobiles that require periodic maintenance based on mileage driven, commercial aircraft are in constant need of preventive maintenance based on hours inflight and other factors, rather than miles flown. But once again, there is

conflicting information on defining such terms, and these definitions have serious effects on determining exactly who is performing safety-critical maintenance work.

The FAA has publicly posited more than one set of parameters for the maintenance work it mandates for all commercial aircraft. A research paper posted on the FAA's website breaks down "heavy maintenance" in approximate terms as follows:

** Type A Check: every 65 flight-hours, about once a week; inspection of all major systems, including landing gear, engines, and control surfaces*

** Type B Check: every 300-600 flight-hours; thorough visual inspection plus lubrication of all moving parts, such as horizontal stabilizers and ailerons*

** Type C Check: about once a year; four-day inspection that takes the aircraft out of service for about a month*

** Type D check: about once every four years; four-day inspection that takes the aircraft out of service for about a month*

However, in 2009 the FAA revised its Operating Specifications for airlines by providing guidance that stated: "Heavy maintenance includes any scheduled or unscheduled maintenance that requires the airplane to be out of service for more than 72 hours." Furthermore, Congress provided additional clarification in H.R.636, the FAA Extension, Safety, and Security Act of 2016 when it stated: "The term 'heavy maintenance work' means a C check, D check, or equivalent maintenance operation with respect to the airframe of a transport category aircraft."

In essence, industry experts maintain the term "heavy maintenance" is a variable that is left to airlines to quantify, since there is no "actual definition or standard."

In addition, there is “line maintenance,” or daily and intermediate maintenance needs that are constantly occurring in-between an airline’s heavy maintenance visits at airports throughout the world. These checks would typically be accomplished in less than 24 hours of ground time. Similar to heavy maintenance, each airline and the regulatory agency set line maintenance inspection standards for the carrier, that can vary carrier to carrier on the same aircraft equipment type.

Of course, all airlines have to manage the unscheduled repairs that are inevitable between flights as a result of passengers’ use of the cabin or the demands of the simple mechanics of flying. This is particularly challenging for the largest domestic carriers, such as American Airlines (969 airplanes); Delta Air Lines (893 airplanes); United Airlines (773 airplanes); and Southwest Airlines (751 airplanes).

All of this work is critical, and needless to say it is imperative that it is done properly since lives are dependent upon it. As noted above, traditionally the largest airlines performed most heavy maintenance in-house, but by 2012 American Airlines became the last major domestic carrier to begin outsourcing heavy work. Following American’s merger with US Airways, American built a state-of-the-art facility in Brazil. American told its U.S.-based aircraft mechanics that hangar was built to simply put a roof over their workers’ heads in Brazil; however, the facility appears poised to take over performing a lot more of the carrier’s U.S.-based line, intermediate, and heavy aircraft maintenance work—striking a chord with the airline’s U.S.-based aircraft mechanics.

American Airlines built the 175,000-square-foot widebody heavy maintenance hangar in São Paulo, in partnership with an outside company, FSB. The FSB website states: “American Airlines officials originally approached FSB to design this wide-body heavy maintenance hangar in order to offset an efficiency

problem with maintaining their international aircraft. Specifically, aircraft would arrive in São Paulo in the morning and then sit on the tarmac all day, returning to the United States in the evening. Construction of this new hangar will provide significant time and cost savings for American by streamlining routine maintenance and taking advantage of aircraft down time.”

It was made clear above that when U.S. airlines choose to outsource aircraft maintenance—particularly outside the United States—they face numerous challenges due to the many trade-offs cited. But it’s no mystery why domestic carriers ferry empty airplanes to locations such as El Salvador, destinations they don’t even serve. As the Congressional Research Service noted: “Airlines outsource maintenance to countries like China and El Salvador to achieve cost savings from the comparatively lower wages and from lower costs to build and maintain repair facilities.” There also can be marked differences in environmental protections at repair shops outside the United States.

The job of tracking and monitoring such work is a huge task in and of itself, not only for the airlines with hundreds of aircraft in their fleets, but also for the FAA charged with overseeing such maintenance. There are thousands of approved facilities throughout the United States, as well as every corner of the world.

CHART #8 details that the FAA must provide oversight for 4,027 domestic aircraft repair stations in all 50 states and numerous U.S. territories. Not all of these facilities service commercial aircraft, but the FAA is still responsible for overseeing them. Many are clustered in certain states; for example, there are 587 shops in California, 571 in Florida, and 378 in Texas.

The greater challenge for the FAA, naturally, is the maintenance work offshored to foreign countries around the globe. CHART #9 provides a complete list of all 915 FAA-approved foreign repair stations, and though not all the shops the FAA oversees are approved for commercial airlines the agency is still required to provide oversight. These facilities are spread out among 65 countries in every region of the world, with a high density in the United Kingdom (175); France (115); China (78); Germany (63); and Singapore (54). This leaves an additional 430 facilities in 60 countries requiring FAA oversight, despite budgetary restrictions.

As noted above, one key issue for outside repair stations is that maintenance personnel often are not certificated by the FAA. Using the FAA's own online database, here is a summary of some of the key domestic and foreign repair stations that have performed critical work for U.S. airlines in recent years. Included is a breakdown of the ratio of "non-certificated mechanics" to "certificated mechanics" at each facility.

- AAR Aircraft Services; Indianapolis, Indiana
TOTAL: 774
CERTIFICATED: 325
RATIO, NON-CERTIFICATED TO CERTIFICATED: 2.4-to-1
- Aviation Technical Services; Kansas City, Missouri
TOTAL: 356
CERTIFICATED: 156
RATIO, NON-CERTIFICATED TO CERTIFICATED: 2.3-to-1
- Aviation Technical Services; Everett, Washington
TOTAL: 1,164
CERTIFICATED: 340
RATIO, NON-CERTIFICATED TO CERTIFICATED: 3.4-to-1
- Aeroman; San Salvador, El Salvador

TOTAL: 2,400

CERTIFICATED: 163

RATIO, NON-CERTIFICATED TO CERTIFICATED: 14.7-to-1

- Hong Kong Aero Engine Services Ltd. (HAESL); Tseung Kwan O, Hong Kong

TOTAL: 1,100

CERTIFICATED: 48

RATIO, NON-CERTIFICATED TO CERTIFICATED: 22.9-to-1

- Goodrich TAECO Aeronautical Systems (TAECO), Xiamen, China

TOTAL: 63

CERTIFICATED: 0

RATIO, NON-CERTIFICATED TO CERTIFICATED: 63-to-0

Mary Schiavo is an aviation attorney who served as the U.S. Department of Transportation Inspector General in the 1990s, when she criticized the FAA after the fatal crash of ValuJet Flight 592 in the Everglades. She stated it's "ludicrous" the FAA doesn't provide the same type of hands-on oversight when maintenance is offshored: "They could. They simply don't." In theory, the FAA works through the International Civil Aviation Organization, chartered by the United Nations, to establish comparable oversight standards in other countries. "The FAA finds that just about everyone passes," Schiavo noted. "Of course, it's absurd to assume that work in El Salvador is comparable."

Ironically, there is no more stability for the workforces in these foreign countries than there has been for those employed by major domestic airlines in the United States. Documentary filmmaker Dawn Mikkelson noted this when she visited outsourced maintenance shops in Asia: "The guy in Hong Kong is going to lose his job to someone in China, and now the guy in China is going to lose his job to somewhere else."

NEW THREATS TO LINE MAINTENANCE

While some have been ringing warning bells for more than a decade now about U.S. airlines outsourcing heavy maintenance, over the last few years a new development is raising concerns about safety—let alone American jobs. Some carriers are increasingly outsourcing everyday “line maintenance” outside the country to achieve even more cost savings.

Airline mechanics have been voicing concerns that their role as the “last line of defense” is eroding because the in-house line mechanics are not always working on airplanes when they return from overseas heavy maintenance. In *Attention All Passengers*, it was well documented that aircraft returning from overseas maintenance service often had problems that required immediate correction. This included an event in 2009, when an airplane operated by US Airways (since merged with American Airlines) diverted to Denver after losing pressurization inflight. It was discovered that personnel at the Aeroman facility in El Salvador had installed a key component on the main cabin door *backward*.

Another factor affecting line maintenance is the intense pressure by many airlines to “turn” aircraft quickly at the gates, in order to ensure better on-time flight performance and achieve greater utilization of airplanes, crews, gates, and facilities. Airlines are fiercely protective of ensuring that delays are blamed on weather, air traffic control, security, or just about anything other than themselves, including aircraft maintenance. In 2018, fewer than four out of five domestic flights (79.2%) arrived within 15 minutes of scheduled arrival time. Yet according to the DOT’s latest monthly Air Travel Consumer Report (reflecting February 2019), delays “charged to air carriers”—a category that includes but is not limited to

aircraft maintenance—average only about 5.9% of all flight delays.

AMFA's Oestreich stated there is much friction between Southwest Airlines supervisors and AMFA's technicians: "Our supervisors are getting mad that we're finding problems." He acknowledged mechanics are feeling "pressured." Southwest outsources to "on-call providers" at airports around the United States, and AMFA suggests many of these outside employees are not qualified to confront unexpected real-time problems, such as hail damage or "out-of-service" broken equipment.

Another variable that can affect line maintenance is the age of an aircraft. While experts assert that older airplanes can operate safely, the caveat is that older equipment can require added diligence and more maintenance. In addition, some airline schedules include more short-haul takeoff and landing "cycles" rather than long-haul flights; this is particularly true for Southwest Airlines and other low cost carriers.

CHART #10 reflects the latest data on U.S. airline fleets from Airfleets.net and illustrates there is a very wide range on the average age of airplanes operated by the nation's ten largest scheduled carriers. The youngest average age is Frontier at 4.2 years, followed by Spirit Air at 5.6 years and Alaska Airlines at 8.4 years. On the other end of the spectrum, the oldest average age is Delta Air Lines at 15.8 years, higher than the United Airlines average of 15.1 years.

Lee Seham, a Westchester, N.Y.-based attorney representing airline maintenance whistleblowers at Southwest Airlines and American Airlines, stated that more cycles take a toll on older airplanes: "There's more stress to the aircraft, with all that pressurization and depressurization. You can't have more takeoffs and landings *and* fewer mechanics. That's a bad combination." Schiavo noted: "The whole model of the quick

turn was based on using new planes, but now they're flying tired iron.”

Southwest Airlines mechanics are not alone in voicing complaints about outsourced line maintenance. Stories from American Airlines mechanics echo the Southwest saga; they assert that maintenance at American's domestic airports is being taken away from those best suited to perform such tasks.

“American is demanding, through contract negotiations, a significant increase in line maintenance outsourcing internationally, for work that has historically been accomplished in the United States by our mechanics,” stated TWU's Schaible. He went on to say, “I have expressed concerns to David Seymour, American Airlines Senior Vice President of Integrated Operations, about planes sitting sometimes for ten or more hours in the United States not being worked by U.S.-based aircraft technicians, then being flown to Brazil or elsewhere overseas for line maintenance inspections and/or repairs.”

HOW FAA SAFETY OVERSIGHT HAS SHIFTED

The Federal Aviation Administration is an agency within the U.S. Department of Transportation (DOT) and is responsible for regulation and oversight of civil aviation in the United States. These vast responsibilities include operating the nation's civilian air traffic control network (the busiest in the world), as well as overseeing the certification of aircraft manufacturers, airlines, airports, and numerous types of aviation personnel, including pilots, instructors, dispatchers, and mechanics. The FAA and its predecessor agencies trace back nearly a century, before responsibilities were more clearly defined in the 1938 Civil Aeronautics Act. Then the 1958 Federal Aviation Act called for the independence of the Federal Aviation Agency, before the

current organization was renamed and reformed when the DOT was created in 1967.

In short, the FAA is Congressionally mandated to serve and protect all American citizens by ensuring the nation's aviation industry operates as safely as possible. The agency's "Our Mission" statement reads: "Our continuing mission is to provide the safest, most efficient aerospace system in the world." Worth noting is that until quite recently the FAA had a "dual mandate" to not only regulate but also *promote* the aviation industry, and this was reflected in public statements that referred to airlines—*not* the American public—as the FAA's "customers."

Critics remain concerned that this mentality still exists at the FAA, and in the wake of the Boeing 737 MAX certification crisis, global attention has become focused on the FAA's "coziness" with the corporations it is responsible for overseeing. In addition, there have been systemic changes in how the FAA oversees commercial aviation. What follows are more details on some of these challenges.

- Broadening Areas of Responsibility

Back when major domestic airlines performed the bulk of their aircraft heavy maintenance in-house, the FAA built Flight Standards District Offices (FSDOs) near those facilities to provide close and constant oversight. That's why there were FSDOs in locations such as Oklahoma (American); California (United); and Texas (Continental). So these days Aviation Safety Inspectors are often "stranded" in those FSDOs as the actual maintenance work has been moved far away—*very* far away in some cases.

CHART #11 reflects current FAA data and shows the FAA currently maintains 78 FSDOs in 46 states and Puerto Rico.

That said, even many domestic outside repair stations are not geographically close to these offices. Internationally, of course, this coverage issue is much more acute.

CHART #12 illustrates that the FAA maintains just four International Field Offices that oversee every region of the world. For example, the New York office oversees parts of Asia and Europe, while the Dallas office is responsible for such regions as Africa, Russia, and parts of the Middle East. The scope is just as broad for the Miami and Los Angeles offices.

The FAA also maintains Designated Maintenance Air Worthiness Representatives (DAR-Ts), which the FAA states “may perform examination, inspection, and testing services necessary to the issuance of certificates.” (Designees are discussed in more detail below.) As shown in CHART #13, there are DAR-T representatives in 15 locations worldwide, and all are overseen by FAA offices in New York, Dallas, and Los Angeles.

Closer to where the actual airline maintenance work is being performed overseas, the FAA does maintain some offices outside the United States. Unfortunately, the agency’s foreign presence has been dwindling for years now, particularly when it comes to directly overseeing outsourced aircraft maintenance. Currently there are 13 FAA International Offices overseeing issues related to Policy, International Affairs, and Environment. As shown in CHART #14, there are four of these offices in Europe; one each in the Middle East, North Africa, and Sub-Saharan Africa; two in the southern region of the Western Hemisphere; and four in the Asia Pacific region. In all cases these offices are located inside U.S. Embassies.

What many air travelers may find shocking is that the FAA has virtually abandoned its direct oversight on the continent where millions of American passengers fly every year—Europe. According to the DOT Office of Inspector General and shown in

CHART #15, over the course of a decade the FAA all but erased its footprint in Europe:

* the number of FAA inspectors fell from 23 in 2005 to 0 by 2015

* the number of FAA Field Offices fell from 2 in 2005 (Frankfurt and London) to 0 by 2015

Meanwhile, however, during these years the number of FAA-certificated repair stations in Europe actually increased, from 458 in 2005 to 474 by 2015. This was achieved by dramatically increasing bilateral agreements that shifted FAA responsibilities to foreign regulatory agencies. So while 163 repair stations were certificated under three such agreements in 2005, by 2015 there were 407 repair stations certificated under a single agreement that encompassed a total of 18 countries.

- Budgetary Cuts and Staffing

For years now, the FAA's annual budgets have not provided for meaningful increases in its Aviation Safety Organization, which among other functions provides oversight for airline maintenance. At best, the budgets have kept pace with inflation and offered very modest increases in FAA personnel; at worst the number of Aviation Safety Inspectors has actually been reduced in some years.

CHART #16 illustrates this phenomenon. The total Full Time Permanent Employment within the Aviation Safety Organization for the last five years is actually projected to go down, from 7,300 employees in 2016 to 7,284 in 2020. The Aviation Safety Inspector workforce, which among many other responsibilities provides critical oversight for not hundreds but thousands of in-house and outside aircraft repair stations in the United States and abroad, is slated to basically remain flat—from 4,036 inspectors in 2016 to 4,079 in 2020.

- Electronic Surveillance

In recent years the FAA has increasingly moved away from the traditional hands-on inspection of aircraft maintenance work—long known as “kicking the tires”—to a more distant and electronic form of surveillance of paperwork in many cases. While electronic surveillance certainly is a necessity, critics have charged that Aviation Safety Inspectors are hampered in their inability to reinforce their findings via in-person visits. Some inspectors say that electronic surveillance doesn’t adequately substitute for such visits.

The introduction of the Air Transportation Oversight System (ATOS) and similar surveillance efforts has revealed shortcomings. In 2010 the DOT Office of Inspector General conducted its third audit of ATOS, noting that the system was conducting surveillance on nearly 100 airlines, transporting 90% of U.S. airline passengers and cargo. The DOT-IG stated: “We have consistently reported that ATOS is conceptually sound because it is data-driven and intended to target inspector resources to the highest risk areas. However, in 2002 and 2005, we reported that FAA needed to strengthen national oversight of ATOS to hold field managers more accountable for consistently implementing effective oversight practices. In 2008, safety lapses at Southwest Airlines exposed serious weaknesses in FAA’s risk-based oversight process at that airline.” This 2010 report found several areas where improvement was needed, most critically that “FAA did not perform timely ATOS inspections of policies and procedures for air carriers’ most critical maintenance systems.”

- Designees

The Boeing 737 MAX crisis has shone a global spotlight on the FAA’s designee program, whereby surrogates perform key

oversight functions for the agency. In the FAA's own words: "Designees are individuals and organizations in the aviation industry authorized to conduct examinations, perform tests, and issue approvals and certificates on behalf of the FAA." Although designee programs have a long history at the FAA—and were expanded in 1958—they have raised unanswered questions, particularly when designees are paid by the aircraft manufacturers, airlines, or repair stations they simultaneously are overseeing for the FAA.

At a House Transportation Committee hearing in May 2019, the FAA Acting Administrator Daniel Elwell was asked about how designees may have exacerbated Boeing's certification of the MAX aircraft and *The New York Times* reported "he said he supported the idea of delegating 'certain tasks and certain decisions' in the certification process to private employees, despite criticism that the practice has led to lax oversight." The Chair of the House Aviation Subcommittee stated: "The FAA has a credibility problem." One of the key questions posed at the hearing was, "What firewalls exist between manufacturers and its FAA-designated representatives to ensure proper oversight and that there is no undue influence placed on them?"

Although the focus of that hearing was Boeing, the same question applies to airlines and outside repair stations. The FAA's Organization Designation Authorization (ODA) program is the means by which the FAA designates not individuals but "organizations or companies." The FAA's ODA webpage includes a directory that contains a total of 148 such companies, across six different categories, as of May 2019.

Major Repair, Alteration, and Airworthiness ODAs (MRAs) are described by the FAA thusly: "Holders of an MRA ODA may approve data for major repairs and alterations, issue airworthiness certificates and approvals, and perform aging

aircraft inspections and records reviews. Repair stations and operators qualify for all functions available under MRA ODA. Consultant groups are only eligible for engineering approval functions.” Of the 148 ODAs, 27 nationwide are MRAs.

- Government Shutdowns

In addition to the ongoing budgetary and staffing constraints, another shocking aspect of FAA oversight of airline safety is that such oversight can grind to a virtual halt when a budget impasse shuts down the federal government. In the most recent shutdown between December 2018 and January 2019—the longest in history at 35 days—much media attention was focused on the FAA’s air traffic controllers and the Transportation Security Administration’s airport screeners, because both workgroups were on the job without pay. Meanwhile, nearly all of the nation’s Aviation Safety Inspectors were furloughed for more than a month, quite literally leaving the airlines and aircraft repair stations to police themselves.

Consumer Reports detailed these issues, noting among other problems that in January 2019 the FAA issued only two Airworthiness Directives, compared to 19 during the same period one year earlier. Michael Gonzales, Regional Vice President at Professional Aviation Safety Specialists, a union representing FAA inspectors, stated: “The further we get away from our standards the more we’re holding the system at risk.” Another source stated: “A month of work is not something [inspectors] will be able to catch up with easily or ever.”

CURRENT STATE OF FAA OVERSIGHT

In May 2019, CBS News aired a report that FAA inspectors worry “people’s lives” could be at stake because agency managers pressure inspectors to ignore critical safety issues such as aircraft corrosion. Inspectors claimed reports they

entered into the FAA database that were critical of airlines were subsequently deleted. CBS quoted one inspector who stated: “I’ve been flat out told to back off. I’ve had airlines contact my management and ask them not to assign me any inspections to that airline.”

Such assertions are not new, and similar disclosures have come to light by government audits, media outlets, and whistleblowers for several years now. They speak to a Federal Aviation Administration that is reactive rather than proactive, and is a regulatory agency that is “captured” by the multi-billion dollar aviation industry.

Consider how the FAA responds to tragedies; a case in point is Southwest Airlines. Flight 3472 in August 2016 and Flight 1380 in April 2018 both suffered nearly identical uncontained engine failures inflight, both with portside CFM56-7 engines manufactured by CFM International on Boeing 737s. However, there was a critical difference between these two events. In 2016 Flight 3472 landed safely, but unfortunately in 2018 there was a fatality onboard Flight 1380 when a passenger named Jennifer Riordan was nearly sucked out of a gaping hole in the fuselage caused by engine shrapnel.

The FAA’s response last year may have seemed swift to those uninitiated in the agency’s ways. Just three days after Riordan’s death, the FAA issued Emergency Airworthiness Directive (AD) 2018-09-51 to all operators of CFM Model CFM56-7B engines, requiring them to perform a one-time ultrasonic inspection of all 24 fan blades to detect cracking, and to do so within 20 days. The advisory did *not* mention Flight 3472 in 2016.

In other words, for nearly two years the FAA failed to display urgency in correcting the established problems with that engine. But within 72 hours of a fatality, it took quick action.

Aviation experts declared this was a textbook case of why the FAA is often called the “Tombstone Agency,” a nickname that has been used for years to illustrate that directives are all too often written in blood.

“It was classic tombstone mentality,” stated Schiavo, the former DOT Inspector General. In 2018, she noted that engine manufacturer CFM issued a *non-binding* “service bulletin” in June 2017 recommending ultrasonic inspections of its fan blades; however, the FAA’s proposed Airworthiness Directive of August 2017 would have *mandated* inspections *but* it was not enacted then because airlines lobbied for more time to implement the inspections. Schiavo stated: “It’s a sad state of affairs when it takes the loss of life for meaningful action to take place, whether by market pressures or government mandates.”

A DOT Inspector General’s investigation in 2009 found “an overly collaborative relationship” between Southwest and the FAA. The report’s disturbing evidence included finding that the FAA’s Principal Maintenance Inspector assigned to the airline “knowingly allowed SWA to continue to operate, in passenger revenue service, 46 aircraft, carrying an estimated 145,000 passengers, in an unsafe or unairworthy condition.” Furthermore, the inspector “permitted and encouraged” Southwest to self-disclose through the FAA’s Voluntary Disclosure Reporting Program to avoid any penalties. Even after this admission, Southwest continued flying these aircraft for another eight days.

“This is an industry-wide problem,” stated the attorney Seham. “Proper aircraft maintenance is treated as a cost to be avoided, rather than a legal and moral obligation.”

Over the years, the FAA has levied hefty fines against many airlines for aviation safety violations, to the tune of tens of

millions of dollars. However, it's common for such fines to be negotiated down to fractions of the original penalties by armies of airline attorneys; as one veteran FAA employee explained, "Airlines never pay what they announce in the press release."

OFFICIAL AND UNOFFICIAL WARNINGS

While concerns about outsourced maintenance and FAA oversight have not reached a critical mass, there has been a consistent drumbeat of warnings from various quarters for more than a decade.

- Government Agencies

In recent years, several government agencies have raised red flags about U.S. maintenance outsourcing and the FAA's oversight. Consider the following:

* The DOT's Office of Inspector General (DOT-IG) has investigated airline maintenance outsourcing numerous times, in 2002, 2003, 2005, 2006, 2007, and 2008. More recently, an audit in 2013 found: "FAA's oversight of foreign and domestic repair stations lacks the rigor needed to identify deficiencies and verify that they have been addressed. This is because FAA inspectors typically do not use comprehensive and standardized procedures for conducting inspections and reporting inspection findings, resulting in inadequate and inconsistent inspection practices."

In June 2017, the DOT-IG announced a new review of the FAA's oversight of airline maintenance, and then in May 2018 the audit's focus was readjusted to further examine FAA's processes for investigating "allegations of improper maintenance practices" at two domestic carriers, Allegiant Airlines and American Airlines. The announcement stated: "A key issue raised by a number of requestors is how FAA

implements its compliance philosophy, which focuses on working with air carriers to address the root causes of noncompliance of safety regulations rather than emphasizing enforcement actions.” One month later, the DOT-IG announced a separate investigation into Southwest Airlines; these reports are pending.

* The U.S. Government Accountability Office (GAO) also has a long history of investigating airline maintenance, and in 2016 released a report with a title that aptly summed it up: “FAA’s Risk-Based Oversight for Repair Stations Could Benefit from Additional Airline Data and Performance Metrics.” [Disclosure: The author offered testimony in this investigation on behalf of Consumers Union/Consumer Reports.] Specifically, the GAO found the FAA’s “Safety Assurance System” was not meeting its stated goals and faulted its “ability to measure progress.” In other words, the FAA does not have a firm command of the critical safety work being sent overseas.

* In 2012, an investigation by the Congressional Research Service recommended improving “the allocation of FAA inspectors and resources focused on the oversight of foreign repair stations,” and also referenced qualification standards for foreign facility supervisors and language proficiency.

- Labor and Media Organizations

In addition, Ridge Global—a firm founded by former Secretary of Homeland Security Tom Ridge—presented a lengthy White Paper on “Risks Associated with Foreign Repair Stations” to the Transport Workers Union in May 2018. The scathing document stated that U.S. standards “are superior to those overseas,” and criticized the absence of direct oversight by the FAA when work is offshored. The paper asserted, “Legal, regulatory, and cultural differences clearly affect the quality, frequency, and thoroughness of inspections.” Key threats include:

- * security screening
- * language proficiency
- * certification of personnel
- * drug and alcohol testing

There have been several in-depth investigations into airline maintenance outsourcing by both print and broadcast media outlets, and several of these are included in the bibliography below; this list includes PBS Frontline, National Public Radio, CBS News, and many newspapers and magazines. The author has written about these topics for several publications, starting with *Consumer Reports* in 2007, and culminating in the book *Attention All Passengers* in 2012.

- Whistleblowers

In recent years the final line of defense in exposing critical life-and-death safety issues concerning commercial aircraft has been whistleblowers, the brave men and women working for airlines, repair stations, and the FAA itself. Whistleblowers also have been an intrinsic component in exposing systemic concerns about the Boeing 737 MAX and the FAA's oversight.

In 2000, Congress enacted the AIR21 Whistleblower Protection Program for airline employees reporting on safety issues. Attorney Lee Seham has represented more than 30 mechanic whistleblowers, and he and others cite incidents in Dallas, Denver, Las Vegas, Los Angeles, and Phoenix. Here are just two of the issues Seham has exposed:

- * Whistleblower Complaint EWB17634 spurred an FAA investigation that detailed testimony from numerous Southwest Airlines mechanics at Los Angeles International Airport (LAX) in November 2017. The report stated: "All of the mechanics interviewed except two felt pressured and under scrutiny as to whether they were doing their job correctly or if

they were finding too many things wrong with the aircraft.” Seham represented four of these whistleblowers, and he said his clients were told by their LAX supervisors, “‘Dallas [Southwest headquarters] is watching us.’ Don’t make us look bad with delays.” While the report ruled no corrective action was required, the FAA did state “there is an absence of a ‘Just Safety Culture’” at Southwest in LAX.

* Whistleblower Complaint EWB17582, investigated concurrently by the FAA in Dallas. A report in October 2017 detailed 12 separate complaints from five Southwest employees, all represented by Seham, and in this case the agency found violations were substantiated, including hazing and intimidation by supervisors.

ACCIDENTS AND OTHER EVENTS

Many experts keep citing the dangers posed by outsourced maintenance and lax FAA oversight, and warn of potential tragedies. In fact, we’ve already seen tragedies occur. Consider the following:

* ValuJet Flight 592. On May 11th 1996, a McDonnell Douglas DC-9 crashed in the Florida Everglades, killing all 110 people onboard. The subsequent investigation by the National Transportation Safety Board (NTSB) assigned blame not only to ValuJet and the FAA, but also SabreTech, the outsourced company the airline contracted for heavy maintenance. SabreTech had improperly transported chemical oxygen generators that caused an inflight fire that quickly brought down the aircraft less than ten minutes after takeoff. One year later, a grand jury indicted SabreTech on manslaughter and third-degree murder charges.

* Alaska Airlines Flight 261. This fatal accident, which occurred off the California Coast on January 21st, 2000 and killed all 88

people onboard, was due to an improperly maintained jackscrew assembly that caused the MD-83's horizontal stabilizer to fail inflight and sent the aircraft hurtling into the Pacific Ocean. This was a tragedy caused not by outsourcing, but by a dangerously lax in-house maintenance program at Alaska; two months after the crash, these internal problems prompted 64 of the airline's mechanics to publish a letter in the *Seattle Times* that their "pleadings have gone unheeded." The NTSB subsequently found that "FAA surveillance of Alaska Airlines had been deficient for at least several years." This debacle prompted the FAA's Principal Operations Inspector assigned to Alaska to file suit against the agency, a suit the FAA later settled.

* Air France Flight 4590. On July 25th, 2000, a BAC Concorde crashed upon takeoff outside Paris, killing 113 people. The fiery accident made headlines worldwide and directly led to the grounding of the Concorde fleets at Air France and British Airways, until all of these aircraft were retired in 2003. French investigators found the accident was caused by a blown tire, which in turn was caused by a piece of metal scrap on the runway which had fallen from the engine of a Continental Airlines DC-10 that took off a few minutes earlier. Continental had outsourced that repair to an Israeli company as part of a C check the month before; a criminal investigation followed.

* US Airways/Air Midwest Flight 5481. This fatal accident on January 8th, 2003 claimed 21 lives and highlighted two different forms of airline outsourcing: the flight itself was subcontracted by US Airways to the regional carrier Air Midwest, and Air Midwest outsourced the aircraft maintenance to Raytheon Aerospace. This repair facility in West Virginia improperly serviced the Beechcraft 1900D's elevator control cable, causing the aircraft to stall upon takeoff. The NTSB investigation subsequently reported the FAA had found

“serious deficiencies” at the Raytheon facility but had failed to correct them.

This White Paper cites numerous examples of other troubling events that underscore failures by outsourced repair shops. It also details multiple instances of insufficient oversight by the FAA. Most recently, in April 2019, Bloomberg reported that the faulty sensor in the Boeing 737 MAX involved in the fatal Lion Air crash was allegedly repaired by an outside repair shop, XTRA Aerospace in Miramar, Florida; that accident in Indonesia in October 2018 killed 189 people.

SEEKING SOLUTIONS

Over the course of more than a decade, members of both major political parties have spoken out on these issues. President Donald Trump, who campaigned on protecting the offshoring of American jobs, has remained largely silent on the specific issue of aircraft maintenance outsourcing, such as the recently completed American Airlines \$100 million facility in Brazil. In 2008, when campaigning for the White House, President Barack Obama told the Teamsters that he would focus on limiting aviation maintenance outsourcing, but he too did not act to prevent such outsourcing during eight years in office.

When the author served as the only consumer advocate on the DOT’s 19-member Future of Aviation Advisory Committee in 2010, he recommended—with support from labor representatives—that the FAA strengthen its oversight of outsourcing. Ultimately, the airlines voted against this measure and it was not included in the committee’s official recommendations. However, the FAAC’s final report included a dissenting opinion that stated: “Despite the FAA’s commitment to one level of safety, there are currently two sets of standards for maintenance of U.S. aircraft.”

The FAA has weathered severe criticism before, but pressure intensified last year, in the wake of Jennifer Riordan's death on Southwest Flight 1380. In June 2018, House Democrats wrote DOT Secretary Elaine Chao that they were "utterly confused" by the FAA's failure to require workers at foreign repair stations to be screened for drugs and alcohol, saying "it is unacceptable that the FAA has abdicated its responsibility" to 800 million passengers annually.

Weeks earlier, Claire McCaskill, then the Democrat Senator from Missouri, introduced the Aircraft Maintenance Outsourcing Disclosure Act, which would require carriers to indicate on their websites and boarding passes the cities and countries where heavy maintenance is performed. The co-sponsor of the House version of this bill, Rep. John Garamendi (D-Calif.), stated that the last heavy maintenance on the engine that killed the passenger onboard the Southwest flight in 2018 was performed in 2012—in Brazil.

As of May 2019, there were no further developments on Congressional or regulatory efforts to reform outsourced airline maintenance and/or FAA oversight of airline maintenance.

PROPOSAL: AN AIRLINE PASSENGER SAFETY BILL OF RIGHTS

The Transport Workers Union, the Aircraft Mechanics Fraternal Association, the Business Travel Coalition, and the author, in consultation with other consumer advocates and labor organizations, have developed the following proposal to address growing concerns about eroding airline safety standards caused by outsourced aircraft maintenance and lax FAA oversight.

An "Airline Passenger Safety Bill of Rights"

The most fundamental of all U.S. passenger rights is flying safely, with complete confidence that all aircraft are properly maintained by skilled professionals, under sufficient government oversight. To ensure this, maintenance personnel must be appropriately trained and certificated. Outsourcing such critical work—particularly outside the United States—threatens airline safety, poses grave risks to aviation security, and has dire consequences on the American economy. The following provisions should apply to all U.S. scheduled passenger airlines:

- 1) The right for all travelers to fly on aircraft that undergo both scheduled “intermediate maintenance” and “line maintenance” work performed only by maintenance personnel certificated as Airframe and Powerplant mechanics by the Federal Aviation Administration and based in the United States.
- 2) The right for all travelers to fly on aircraft that undergo scheduled “heavy maintenance” work performed in the United States at FAA-certificated maintenance facilities, with at least a 2-to-1 ratio of FAA-certificated Airframe and Powerplant mechanics to non-certificated personnel.
- 3) The right for all travelers to fly on aircraft maintained by personnel who have undergone proper security background check investigations.
- 4) The right for all travelers to fly on aircraft maintained by personnel who are part of continuous drug and alcohol testing programs.
- 5) The right for all travelers to fly on aircraft that are properly and frequently overseen by FAA Aviation Safety Inspectors, without compromises or limitations due to staffing, budgetary constraints, or government shutdowns.

6) The right for all U.S. citizens to access standardized and consistent airline records in a U.S. Department of Transportation database containing a minimum of one year's maintenance history on each aircraft, made public by the airlines. Such data should be available whenever an aircraft is assigned to a scheduled flight. These statistics will include total percentages of airline maintenance employees and outsourced personnel; ratios of FAA-certificated Airframe and Powerplant mechanics to non-certificated technicians; and other critical data to be determined.

7) The right for all travelers, in the event of lengthy aircraft maintenance delays, to receive regular briefings by the airline prior to departure.

BIBLIOGRAPHY

In addition to author interviews, the following resources were referenced in the preparation of this White Paper.

- Aeronautical Repair Station Association, ARSA Survey Shows Industry Poised for Growth, Facing Technician Shortage Headwind; April 24, 2018; (arsa.org/survey2018/).
- Airfleets.net, Airline Fleets Database; (www.airfleets.net/recherche/search_airline.htm).
- American Airlines, Celebrating Our Aviation Maintenance Technicians; May 24, 2019; (news.aa.com/news/news-details/2019/Celebrating-our-Aviation-Maintenance-Technicians/default.aspx)
- Attention All Passengers: The Airlines' Dangerous Descent—And How to Reclaim Our Skies, William J. McGee; HarperCollins Publishers, 2012;

(www.harpercollins.com/9780062088383/attention-all-passengers/).

- Aviation Technician Education Council, National Training Aircraft Symposium; August 14, 2018; (commons.erau.edu/ntas/2018/monday-august-13/).
- Aviation Week, “U.S. MRO Trends Still Favor Outsourcing,” Henry Canaday; July 2, 2018; (aviationweek.com/%5Bprimary-term%5D/us-mro-trends-still-favor-outsourcing).
- Bloomberg, “Faulty 737 Sensor in Lion Air Crash Linked to U.S. Repairer,” Alan Levin and Harry Suhartono; April 2, 2019; (www.bloomberg.com/news/articles/2019-04-02/faulty-737-sensor-from-lion-air-crash-linked-to-u-s-repair-shop).
- Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile; Final Report on the Accident of Air France F-BTSC on 25 July 2000; 2015; (web.archive.org/web/20151026081536/http://www.bea-fr.org/docspa/2000/f-sc000725a/htm/f-sc000725a.html).
- CBS News, “Airline Mechanics Feel Pressured to Overlook Potential Safety Problems: ‘Accident Waiting to Happen,’” produced by Megan Towey; February 4, 2019; (www.cbsnews.com/news/airline-mechanics-feel-pressured-by-managers-to-overlook-potential-safety-problems-cbs-news-investigation/?fbclid=IwAR1aiovftuRn5DRE5-V1iJRG6mgFNE7GS2tdMLb-qmK0hNL_tub8n6tR86Y).
- CBS News, “Inspectors Say FAA Pressures Them to Ignore Critical Plane Problems: ‘The Flying Public Needs to Wake Up,’” Megan Towey and Tony Dokoupil; May 23, 2019; (www.cbsnews.com/news/federal-aviation-administration-inspectors-say-they-are-pressured-to-overlook-problems-flying-public-needs-to-know/).

- Consumer Reports, “An Accident Waiting to Happen?,” William J. McGee; March 2007; (www.consumerreports.org/cro/news/2008/05/outsourcing-of-airline-maintenance-soars/index.htm).
- Consumer Reports, “In Shutdown’s Wake, FAA Inspectors Face Backlog of Safety and Maintenance Issues,” William J. McGee; January 25, 2019; (www.consumerreports.org/airline-safety/faa-inspectors-safety-maintenance-backlog-government-shutdown/).
- Dallas News, “FAA Faces Scrutiny Over How it Handled Concerns About Southwest Operations Before Flight 1380 Tragedy,” Aidan Quigley; June 20, 2018; (www.dallasnews.com/business/southwest-airlines/2018/06/20/faa-faces-scrutiny-handled-concerns-southwest-operations-before-flight-1380-tragedy).
- Federal Aviation Administration, AIR21 Whistleblower Protection Program; (www.faa.gov/about/initiatives/whistleblower/).
- Federal Aviation Administration, Budget; (www.faa.gov/about/budget/).
- Federal Aviation Administration, Delegated Organizations; (www.faa.gov/other_visit/aviation_industry/designees_delegations/delegated_organizations/).
- Federal Aviation Administration, Designees; (www.faa.gov/other_visit/aviation_industry/designees_delegations/).

- Federal Aviation Administration, Code of Federal Regulations, Title 14 Part 121 Air Carrier Certification: Domestic, Flag, and Supplemental Air Carriers; (ecfr.io/Title-14/cfr145_main).
- Federal Aviation Administration, Code of Federal Aviation Regulations, Title 14 Part 145: Repair Stations; (ecfr.io/Title-14/cfr145_main).
- Federal Aviation Administration, Enforcement Reports; (www.faa.gov/about/office_org/headquarters_offices/agc/practice_areas/enforcement/reports/).
- Federal Aviation Administration, Maintenance Airworthiness Designees; (www.faa.gov/other_visit/aviation_industry/designees_delegations/individual_designees/dart/).
- Federal Aviation Administration, Notice N8900.103/National Policy: Revised OpSpec Paragraph D091; November 25, 2009; (www.faa.gov/documentLibrary/media/Notice/N%208900.103.pdf).
- Federal Aviation Administration, Repair Station Database; (av-info.faa.gov/repairstation.asp).
- International Air Transport Association, Airline Maintenance Cost Executive Commentary/FY2017; November 2018; (www.iata.org/whatwedo/workgroups/Documents/MCTF/MCTF-FY2017-Report-Public.pdf).
- International Civil Aviation Organization, How ICAO Develops Standards; (www.icao.int/about-icao/AirNavigationCommission/Pages/how-icao-develops-standards.aspx).

- Motley Rice, Aviation Attorneys Offer Insight on Deadly Boeing 737 MAX 8 Plane Crash in Ethiopia; April 1, 2019; (www.motleyrice.com/article/boeing-737-max-8-plane-crash-ethiopia-aviation-attorneys).
- MRO-Network.com, “Spirit Airlines Considers Another Hangar, MRO Support For New Destinations,” Lee Ann Shay; May 15, 2018; (www.mro-network.com/airlines/spirit-airlines-considers-another-hangar-mro-support-new-destinations).
- National Journal, “Unions, Airlines at Odds Over Foreign Maintenance of Planes”; June 13, 2018; (www.nationaljournal.com/s/669142/unions-airlines-at-odds-over-foreign-maintenance-of-planes).
- National Public Radio, “To Cut Costs, Airlines Send Repairs Abroad,” Daniel Zwerdling; October 19, 2009; (www.npr.org/templates/story/story.php?storyId=113877784).
- National Transportation Safety Board; Aircraft Accident Report AAR-97/06: ValuJet Airlines Flight 592; 1997; (www.nts.gov/investigations/AccidentReports/Reports/AAR9706.pdf).
- National Transportation Safety Board; Aircraft Accident Report AAR-02/01: Alaska Airlines Flight 261; 2002; (www.nts.gov/investigations/AccidentReports/Reports/AAR0201.pdf).
- National Transportation Safety Board; Aircraft Accident Report AAR-04/01: Air Midwest Flight 5481; 2004; (www.webcitation.org/6Qg9npLmo?url=http://libraryonline.erau.edu/online-full-text/ntsb/aircraft-accident-reports/AAR04-01.pdf).

- National Transportation Safety Board; News Release: Investigative Update Provides Initial Findings in Investigation of Uncontained Engine Failure; September 12, 2016; (www.nts.gov/news/press-releases/Pages/PR20160912.aspx).
- The New York Times, “FAA Chief Defends Boeing Certification Process at House Hearing,” Glenn Thrush; May 15, 2019; (www.nytimes.com/2019/05/15/us/politics/boeing-faa-congress.html).
- Oliver Wyman, Global Fleet & MRO Market Forecast Summary/2017-2027, Tom Cooper, Et al.; 2017; (www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2017/feb/2017%20Global%20Fleet%20MRO%20Market%20Forecast%20Summary%20Final_Short%20Version_1.pdf).
- PlaneCrashInfo.com, Accidents By Cause, 1960s-2000s; (www.planecrashinfo.com/cause.htm).
- PBS Frontline, “Flying Cheaper,” produced by Catherine Rentz; 2011; (www.pbs.org/wgbh/pages/frontline/flying-cheaper/).
- Ridge Global, Risks Associated with Foreign Repair Stations; May 21, 2018; (www.twu.org/wp-content/uploads/2018/05/Risks-Associated-with-Foreign-Repair-Stations.pdf).
- Seham, Seham, Meltz & Petersen, LLP; Airline Issues; March 2019; (www.ssmplaw.com/airline-safety-issues/).
- Unions-America.com; AAOutsourcing.com; (aaoutsourcing.com).

- University of Maryland, Transportation Research, “An Optimization Model for Aircraft Maintenance Scheduling and Re-Assignment,” Chellappan Sriram and Ali Haghani; 10 March 2000; (www.faa.gov/about/initiatives/maintenance_hf/library/documents/media/aviation_maintenance/science1.pdf).
- U.S. Congress, H.R.636, FAA Extension, Safety, and Security Act of 2016; July 15, 2016; (www.congress.gov/bill/114th-congress/house-bill/636).
- U.S. Congress, H.R.6028, Aircraft Maintenance Outsourcing Disclosure Act of 2018; June 7, 2018; (www.congress.gov/bill/115th-congress/house-bill/6028/text).
- U.S. Congress, Rep. John Garamendi, Congressman John Garamendi Introduces the Aircraft Maintenance Outsourcing Disclosure Act; June 7, 2018; (garamendi.house.gov/media/press-releases/congressman-john-garamendi-introduces-aircraft-maintenance-outsourcing).
- U.S. Congress, House Transportation Committee, DeFazio and Larsen Slam FAA for Deficient Oversight of Foreign Aircraft Repair Stations; June 28, 2018; (transportation.house.gov/news/press-releases/defazio-and-larsen-slam-faa-for-deficient-oversight-of-foreign-aircraft-repair-stations).
- U.S. Congress, Sen. Claire McCaskill, McCaskill Introduces Proposal to Bring Transparency to Airline Maintenance for Consumers; June 7, 2018; (www.mccaskill.senate.gov/media-center/news-releases/mccaskill-introduces-proposal-to-bring-transparency-to-airline-maintenance-for-consumers).

- U.S. Congressional Research Service, Offshoring of Airline Maintenance: Implications for Domestic Jobs and Aviation Safety, Rachel Tang and Bart Elias; December 21, 2012; (www.hsdl.org/?view&did=729477).
- U.S. Government Accountability Office, FAA's Risk-Based Oversight for Repair Stations Could Benefit from Additional Airline Data and Performance Metrics; July 2016; (www.gao.gov/assets/680/678735.pdf).
- U.S. Department of Labor, Bureau of Labor Statistics; Overview of BLS Wage Data by Area and Occupation; (www.bls.gov/bls/blswage.htm).
- U.S. Department of Transportation, Statement of FAA Administrator Randolph Babbitt, Aviation Safety: FAA's Role in the Oversight of Air Carriers; June 10, 2009; (www.transportation.gov/content/aviation-safety-faas-role-oversight-air-carriers).
- U.S. Department of Transportation, The Future of Aviation Advisory Committee: Final Report; April 11, 2011; (www.transportation.gov/sites/dot.gov/files/docs/faac-final-report-for-web.pdf).
- U.S. Department of Transportation, Office of Inspector General, FAA Needs to Improve Risk Assessment Processes for its Air Transportation Oversight System; December 16, 2010; (www.oig.dot.gov/sites/default/files/ATOS_Report.pdf)
- U.S. Department of Transportation, Office of Inspector General, Review of FAA's Safety Oversight of Airlines and Use of Regulatory Partnership Programs; June 30, 2008; (www.oig.dot.gov/sites/default/files/SWA_Report_Issued.pdf).

- U.S. Department of Transportation, Office of Inspector General, FAA Continues to Face Challenges in Implementing Risk-Based Approaches for Repair Station Oversight; May 1, 2013; (www.oig.dot.gov/sites/default/files/FAA%20Repair%20Station%20Oversight%5E5-1-13.pdf).
- U.S. Department of Transportation, Office of Inspector General, Audit Initiated of FAA's Safety Oversight of Allegiant Airlines and American Airlines; May 9, 2018; (www.oig.dot.gov/sites/default/files/Audit%20Re-Announcement%20-%20Air%20Carrier%20Maintenance%20%28Allegiant-American%29.pdf).
- U.S. Department of Transportation, Office of Inspector General, Audit Initiated of FAA's Safety Oversight of Southwest Airlines; June 20, 2018; (www.oig.dot.gov/library-item/36579).
- U.S. Office of Special Counsel; Response from the Secretary of Transportation, on Northwest Airlines; December 14, 2009; (osc.gov/PublicFiles/FY2010/10-38%20DI-08-2971%20Agency%20Report.pdf).
- USA Today, "Southwest Settles FAA Complaint for \$2.8M," Bart Jansen; December 21, 2015; (www.usatoday.com/story/travel/flights/todayinthesky/2015/12/21/southwest-settles-faa-maintenance-complaint/77717566/).
- Vanity Fair, "The Disturbing Truth About How Airplanes Are Maintained Today," James B. Steele; November 9, 2015; (www.vanityfair.com/news/2015/11/airplane-maintenance-disturbing-truth).

ABOUT THE AUTHOR

William J. McGee is a passenger rights advocate, an award-winning aviation journalist, and the author of the airline industry exposé *Attention All Passengers*. The former Editor of *Consumer Reports Travel Letter*, he has testified before both Houses of Congress and the DOT on aviation safety, airline competition, and passenger rights. In 2010, he served as the lone consumer advocate on DOT Secretary Raymond LaHood's Future of Aviation Advisory Committee, and wrote two dissenting opinions on aircraft maintenance outsourcing and child restraint systems. McGee spent seven years in airline flight operations management and is an FAA-licensed Aircraft Dispatcher who served in the USAF Auxiliary. He previously taught at Vaughn College of Aeronautics.