

CHAPTER 3

IMPROVING OPERATIONS AND OVERSIGHT OF CONTRACT MAINTENANCE

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3.1 EXECUTIVE SUMMARY

This study reports on the operational and regulatory challenges faced by “third party” (3rd Party), or contract repair stations, that provide intermediate and heavy level airframe maintenance for Federal Aviation Regulations (FAR) Part 121 certificated air carriers. Current operations, personnel, human factors, training, qualifications, documentation processes, job/task sign off issues and problems were examined. Federal Aviation Administration (FAA) oversight, surveillance and inspection of these operations were also reviewed. In addition, the relationships between aircraft operators (air carriers) and their contract maintainers were evaluated for potential issues and problems.

This research was accomplished by visiting major repair station sites and Flight Standards District Offices (FSDOs) over a cross section of the country. Altogether seven repair stations and FSDOs were visited, and over sixty people were interviewed. The researchers met and spoke with groups and individuals at the operations level of both major repair stations and the [FAA](#). The findings and this report are based on those discussions and observations. By design, the research method and reports is not meant to be a statistical analysis. Instead, it is a “grass roots” investigation of what is actually going on in the day-to-day operation of the domestic 3rd Party contract maintenance business.

Oversight of 3rd Party contract maintenance has improved dramatically since the ValuJet accident in May of 1996. A United States General Accounting Office (GAO) report to Congressional Requesters, entitled *Aviation Safety – [FAA Oversight of Repair Stations Needs Improvement](#)*, was released in October of 1997 and was critical of the FAA’s inspection and oversight of 3rd Party repair stations. Several recommendations were made based upon the GAO’s findings and evaluation. The majority of these recommendations relating to inspection and oversight of repair stations have been implemented by the FAA; some were in progress prior to the report being distributed, others have been accomplished, some are still in various stages of implementation.

The inspection and oversight process is working well. [FAA](#) field operations are accomplishing the objective of ensuring that aviation maintenance is being carried out safely within the established rules and regulations. Air carriers and repair stations are ensuring that the air carrier’s manuals, task documentation, procedures and processes are being followed. The relationships between the FAA field operations staff, the Principal Maintenance Inspectors (PMIs), the Aviation Safety Inspectors (ASIs), with some rare exceptions, are generally good to excellent. Are there issues and challenges within this process? Can improvements be made? Are there some problems and challenges that need to be addressed? The answer to these questions is, yes. However, the system is functioning well, continuously improving, and working to ensure regulatory compliance and aviation safety in the various maintenance facets of the industry.

The issues and problems that do exist are primarily systemic, having to do with the clarity and uniformity of [FAA](#)'s management processes and oversight. These opportunities for regulatory improvement range from internal communications, varied interpretation of rules and regulations, autonomy of Regions and [FSDOs](#), and the evolving regulatory review and change process. It creates a climate where many in industry feel they must constantly struggle to conduct business in this sometimes strained and ill-defined environment. These factors and non-uniform oversight situations have the potential to drive up the cost of doing business at an aircraft maintenance facility. Further they can lead to inefficient and costly regulatory oversight.

It is apparent that significant changes have been made based upon the lessons learned from the ValuJet accident. The errors made that caused the system to breakdown and created the chain of events that contributed to this accident have been addressed, eliminated, and/or corrected. However, there are no guarantees that the changes made, along with the increased level, frequency, and improved quality of [FAA](#) oversight and inspections will prevent such an accident from occurring again.

Despite these changes, there is much that remains to be done to update the [FAA](#)'s operations systems, processes, and internal communications. There has been little progress to streamline the regulatory change and review process. Other nations are able to make significant progress in the area of regulatory change while the US has moves very slowly with maintenance regulatory action. Determining how to address and solve the existing issues and problems is not a simple task. Political oversight and special action committees have not been effective at changing rules. FAA continues to apply its limited appointed and career staff to identify and solve challenges that are presented in this report.

3.2 INTRODUCTION

A dramatic increase in outsourcing of air transport category maintenance has occurred over the past ten years. Outsourcing to 3rd Party maintenance providers (large [FAR](#) Part 145 Certificated Repair Stations) allowed aircraft operators world wide to reduce costs and focus on their core business. Operating under [FAR](#) Part 145, major repair stations do not have the same level of specific and detailed requirements for certification, training, maintenance programs, documentation, work cards, and organization structure as the air carriers who operate under [FAR](#) Part 121. Repair station maintenance staff differ significantly from those in air transport, in that the majority of those working in repair stations are specialists, of whom slightly over half are Airframe and Powerplant (A&P) certificated. Another element of repair station staffing, due to the fluctuating nature of workloads, is the emergence of a large pool (estimated to be in the range of 3,500 to 4,500) of maintenance personnel who work for temporary placement organizations ("4th party"). These organizations supply technician staffing to repair stations, allowing them to meet peak workload demands. These "contractors" move from one organization to another as needed, and have become a significant work force within the 3rd Party maintenance environment.

Maintenance visits to major 3rd Party repair stations include major overhaul (D checks), major periodic maintenance (C checks), major modifications and/or retrofits (passenger to cargo conversions and installation of noise reduction "hush" kits). Other work involves sale/lease preparation and lease return (operator to operator, leased aircraft owner to owner, often involving multiple countries with differing regulations and operating rules) and configuration changes. In addition, interior refurbishment, damage repairs (ground damage), out of phase major component changes (landing gear, etc.), and exterior painting may also be accomplished.

The basic elements of aircraft maintenance have changed little over the years. However, where maintenance is accomplished and by whom has and will continue to change. 3rd Party maintenance is one of, if not the fastest growing sector in aviation maintenance. Industry growth, coupled with increased maintenance workloads, has created challenges for the regulator. Add to this dramatic change in where maintenance is accomplished and by whom, plus rapid advances in technology, then all of the elements for problems that can challenge the [FAA](#) Aviation Safety Inspection program are in play.

A United States General Accounting Office (GAO) report to Congressional Requesters, entitled *Aviation Safety – FAA Oversight of Repair Stations Needs Improvement*, was released in October of 1997. This report was prepared as a result of heightened public and congressional interest in 3rd Party Aircraft Maintenance, generated by the preliminary [NTSB](#) findings from the May 1996 Value Jet Flight 592 “Everglades accident.” The GAO report was critical of the FAA’s performance in the area of 3rd Party Part 145 Certificated Repair Station oversight and inspections. It was specifically critical of the FAA’s ability to ensure compliance at large repair stations.

The purpose of this project is to continue research and evaluation of the “3rd Party,” or contract repair station operations, that provide intermediate and heavy level airframe maintenance. Current operational, personnel, human factors, training, qualifications, documentation processes, job/task sign off issues and problems were examined. [FAA](#) oversight, surveillance, and inspection of these operations were reviewed to determine to what extent issues and problems exist. The relationships between aircraft operators (air carriers) and contract maintainers were also evaluated.

Dr. Colin G. Drury examined job documentation processes and job/task sign off issues. His report, *Development of Process to Improve Work Documentation of Repair Stations*, is closely related to this project. Research for both projects was conducted, in part, during simultaneous team visits to major 3rd Party repair stations and [FAA](#) offices. The combined discussions and observations provided for full spectrum analyses of “shop floor” operations while they were in progress.

Training and qualifications issues were researched and summarized in the report released in April of 1998 by the [FAA](#) Office of Aviation Medicine (AAM-240) Aviation Maintenance & Inspection Human Factors Research Program entitled *Comparative Study of Personnel Qualifications and Training at Aviation Maintenance Facilities*.

The primary focus of this specific research is [FAA](#) oversight, surveillance, and inspection of major 3rd Party repair stations operations to determine the extent of any issues and problems that may exist. In addition, the relationships between aircraft operators (air carriers), 3rd Party repair stations with whom they are contracting, and the FAA were also evaluated for potential issues and problems. This research is not an evaluation of the overall FAA Aviation Safety Inspection Program. It is an overview of the current state of the inspection program in major 3rd Party Certificated Repair Stations and the relationships that exist between those parties.

Site visits were conducted at seven major 3rd Party Certificated Repair Stations located across the United States. In addition, four [FSDOs](#) were visited at locations close to the appropriate repair stations. In order to obtain objective, candid comments from the individuals contacted, their names and specific sites visited are held in confidence. Over sixty individuals were interviewed, both formally and informally, specifically for this research. Some of the repair station and site [FAA](#) visits were co-conducted with Dr. Drury. His report, mentioned above, focuses on job task documentation and related errors, along with recommendations for improvements. It should be considered, in addition to this report, to gain a wider perspective of repair station/FAA issues.

3.3 AVIATION MAINTAINERS

Before proceeding further with the details of this report, a discussion of the paramount and basic findings evident in this and previous research is appropriate. Anyone who has been in the aviation maintenance industry for any length of time, or has spent time learning about the business, can come to only one conclusion: Aviation maintenance people are solidly dedicated to the safe operation of the equipment they maintain, to the crews that fly it and the travelers who put their trust in both. This holds true for all participants including owner/proprietors, corporate executives, regulatory personnel, managers, workers, and those who manufacture and build airframes, engines, components, appliances, and related materials. It is not a business in which it is easy to make large profits, high-end wages, or quick and extensive capital gains. There is an old adage in aviation maintenance, “Do you know how to make a small fortune in aviation maintenance? Start with a large fortune!” It is an industry in which the vast majority of its members are hard working, dedicated, safety-minded people. Unfortunately, as in all businesses, there is an occasional rogue or “bad apple” who degrades the reputation of this majority, fortunately they are rare.

The people in the “trenches” at the major repair stations, [A&P](#) mechanics, Repairmen, and the non-certificated specialists, are solidly committed to aviation safety. These people abhor aviation accidents and do their absolute best to avoid making errors. They are the base line, the personnel who interpret the documentation, complete the tasks and sign off their work. Under [FAA](#) certification they exercise the privilege to perform maintenance, as well as the management of the organizations where they are employed. They rely on the FAA for effective regulations. They also rely on the FAA to provide reasonable oversight to ensure compliance with those regulations. They depend on their management to provide them with the documentation, special equipment, training, qualifications, and leadership aligned with the regulatory requirements.

3.3.1 Industry and FAA Comments (Direct Quotes)

At the end of each section of this report there are a few selected direct quotes from industry and [FAA](#) personnel who participated in the interviews. These quotes are offered to show the opinions of interviewees. The quotes do not necessarily represent the opinion or recommendations of the report author, Galaxy Scientific Corporation, or the Office of Aviation Medicine.

The [FAA](#) is an extra set of eyeballs; we have the same goals, viewed from different perspectives. They don't conduct surveillance and inspections to make repair stations honest, they do it to help them stay honest.

The [FAA](#) has the same objectives as ours, aviation safety. They are simply a different set of eyeballs with a different point of view.

Performance is the thing, no cutting corners here. The old adage, “pay me now or pay me later” is especially true in our industry.

The Aloha accident was the wake up call; ValuJet was an even louder alarm! There have been many changes resulting from these accidents, the large majority of them are positive.

Outsourcing will continue to grow. It will grow at a faster rate than the rest of the industry. It is up to everyone involved to make sure it grows safely.

3.4 THE ISSUES

One of the cost effective business trends in today's airline environment is outsourcing. At the center of this trend is the core business issue. Many carriers have elected to place primary focus on their core business of marketing, filling and moving airline seats from point A to B. The carriers that conduct this core business most successfully are those that carry the highest number of passengers at the lowest overall cost.

It is possible in today's environment for air carriers to own nothing, outsource everything, except passenger related operations, and in fact become "virtual airlines." One major area of outsourcing activity is aircraft maintenance. Outsourcing of maintenance has several advantages, especially for start-up carriers with limited infrastructure. It is a purchased service that provides lower overall cost than accomplishing the same work in house. At the end of the day, after the primary responsibility of ensuring that all safety standards and requirements have been met, the air carrier's second responsibility is the cost effectiveness required to maintain competitive operations.

The operational environment at a large [FAR](#) Part 145 Repair Station is significantly different from a FAR Part 121-Certificated Air Carrier. These differences create both advantages and disadvantages for the industry. Some of the major differences are:

- Maintenance workload is more predictable in the air carrier environment than at a 3rd Party repair station. An airline has control of fleet size, fleet mix, aircraft hours, cycles, maintenance plans, and aircraft routing. With these known factors, planning for workforce staffing, facilities allocation, and all contingent operations can be controlled reasonably well. If there is a workload overflow, it can be outsourced. A 3rd Party repair station, on the other hand, has limited control over these elements. Workload varies with customer demands; contracts come and go, there is limited control over fleet mix, work content and amount. Staffing, therefore, is variable, as is facility use and space management. Maintaining costs at competitive levels while keeping a stable, trained and qualified workforce is a challenge. This variability is met by maintaining a core workforce and bringing in temporary contract workers to meet any shortfall.
- While some air carriers accomplish limited amounts of aircraft maintenance for other carriers, their primary effort and main focus is placed on their own fleet. They operate under one [FAA](#) approved (their own) General Maintenance Manual (GMM), produce and maintain their own work documents and deal directly with the aircraft manufacturer for technical information and support. A repair station operates under its own FAA approved GMM and must also comply with each customer's FAA approved GMM. They have their own job documentation and most often mix it with different job documents from each customer.
- Technical data exchange is often a challenge for 3rd Party repair stations. The air carriers are linked directly with the original equipment manufacturer (OEM) or manufacturer for technical data as part of aircraft purchase agreements. The repair stations most often do not have such access and must rely on their customers for necessary technical information. Parts and components support is frequently a similar issue, the repair station is dependent upon their customer carriers to provide parts and components.
- Personnel training and qualification, along with the required record keeping, is a significant task for air carriers. Since most carriers have large computer systems, training and qualification (T&Q) records are maintained as complex electronic databases. These electronic T&Q systems allow carriers to maintain, access, sort and analyze data quickly and effectively. The repair stations have significantly less computerization and automation on hand. In most cases training and qualification records are manual entry and paper based, or simple computer software spread sheets. Since workload and fleet type are subject to frequent changes, training record maintenance is a challenge, especially on the job training records, which serve to verify a worker's task(s) currency and/or competency.
- Air carriers operate under the surveillance of [FAA](#) Certificate Management Offices (CMO). Aviation Safety Inspectors (Airworthiness) (ASI) who are often experienced in [FAR](#) Part 121 operations, and are usually responsible for a single carrier, staff CMO offices. Certificated Repair Stations operate under the surveillance of Flight Standards District Offices (FSDO). According to those interviewed, these offices are often staffed by personnel who are most familiar with general aviation; fewer office personnel have large air transport operations experience. Staffing increases in the ASI workforce place new inspectors in offices by seniority, this often places the new inspectors in FSDOs at "less desirable" locations. Frequently, the so-called "less desirable" locations are where the largest concentration of major 3rd Party repair stations are located.

Major repair station operators have many challenges and must serve more than one airline. They are responsible for their own operational requirements, the requirements of individual customers, and for working several models of aircraft from different manufacturers. In addition, they are legally bound to oversight from a regulator whose inspectors are from both customer [CMOs](#) and local [FSDOs](#) and who, at times, provide variable interpretations of the same rules.

These issues, plus a few of lesser impact, are addressed in this report. Knowing that these issues are part of the repair station environment should not lead one to believe that the environment has negative impact on aviation safety. It serves to point out, however, that there are problems that create more complexity in maintenance operations at major certificated repair stations than may be obvious to the casual observer.

3.5 THE GENERAL ACCOUNTING OFFICE 1997 REPORT

The 1997 [GAO](#) Report *Aviation Safety – FAA Oversight of Repair Stations Needs Improvement* provides issues that were reviewed in part for this research. The following issues were defined in the document as part of the Executive Summary - Principle Findings:

Current Inspection Approach Limits [FAA](#)'s Ability to Ensure Compliance at Large Repair Stations

Most of [FAA](#)'s offices use the approach of assigning an individual inspector to a repair station, even one that is large and complex, rather than assigning a team of inspectors. Although this one-inspector approach constitutes [FAA](#)'s primary frontline surveillance of repair stations, each year regional and national decisions are made to use teams for more comprehensive reviews of a few repair stations. When direct comparisons could be made, teams were shown to be more effective than individual inspectors in identifying those areas in which repair stations were not in compliance with [FAA](#)'s rules and regulations, even if one inspector visited the facility several times and the team visited it just once. [GAO](#) reviewed 19 instances in which large repair stations inspected by one person had also been inspected by a special team during the same year. These special inspections are conducted at selected facilities that [FAA](#) regards as needing additional attention. The teams found a total of 347 deficiencies, only 15 of which had been identified in all of the visits made by individual inspectors in the year or more leading up to the special inspections. Deficiencies the teams identified included many that were systemic and apparently long-standing, such as inadequate training programs or poor manuals for quality control. Such deficiencies were likely to have been present when the repair stations were inspected earlier by individual inspectors.

There are several reasons why team inspections identify a higher proportion of the deficiencies that may exist in the operation of large repair stations. Teams are better than individuals at ensuring that the inspection covers all areas of operations and that inspectors stay focused on the task at hand. Many [FAA](#) inspectors responsible for conducting inspections on their own said that because they have many competing demands on their time, their inspections of repair stations may not be as thorough as they would like. Another reason is that team inspections make greater use of checklists or other job aids for ensuring that all points are covered. [FAA](#)'s guidance requires inspectors to address all aspects of repair stations' operations but does not prescribe any checklist or other means for specifying the items to be covered. The lack of a standardized approach increases the possibility that items will not be covered. Finally, inspectors believe team inspections help ensure that their judgements are independent because most team members have no ongoing relationship with the repair station. By contrast, individual-inspector reviews are conducted by personnel who have continuing regulatory responsibility for the facilities.

A few of [FAA](#)'s offices have recognized that the traditional approach of relying on one inspector may be inadequate for overseeing the operations of large repair stations and have reconfigured their inspection resources to do more team inspections without adversely affecting other duties. They have done so mainly by redirecting the time formerly spent on reviews by individual inspectors into more systematic inspections done by a team of local, in-house staff. [GAO](#) identified FAA offices in Scottsdale, Arizona; Miami, Florida; and Seattle, Washington, as having initiated such changes on their own. FAA headquarters officials acknowledge and support these offices' initiatives. They said they believe these initiatives need to be evaluated and, if appropriate, used at other offices.

Follow –Up and Documentation Need Attention

[FAA](#)'s guidance is limited in specifying for inspectors what documents pertaining to inspections and follow-up need to be maintained in repair station files. The closest thing to a requirement is a statement in the Airworthiness Inspector's Handbook that the deficiency letter FAA sends to the repair station describing all deficiencies should be included in the repair station case file. [GAO](#) examined records of 172 instances in which FAA sent deficiency letters to domestic repair stations. The responses from the repair stations were not on file in about one-fourth of these instances, and FAA's assessments of the adequacy of the corrective actions taken by the repair stations were not on file in about three-fourths of the instances. [GAO](#) also examined computer-based reports summarizing inspection information for FAA managers and found these reports were even less complete. Without complete documentation, it was impossible to assess how completely or quickly repair stations were bringing themselves into compliance.

Better documentation is needed not only to allow [FAA](#) to demonstrate how quickly and thoroughly repair stations are complying with regulations, but also because it can affect FAA's ability to identify performance trends involving the inspection of repair stations and to make informed decisions about them. FAA is developing a reporting system that, among other things, is designed to use this documentation to make decisions on applying inspection resources to those areas posing the greatest risk to aviation safety. Such a system will be of limited use if the documentation on which it is based is inaccurate, incomplete, or outdated. FAA must have data to show where safety problems and deficiencies exist and, thus, where to better target its limited inspection resources. In 1995, as part of a prior study examining FAA's information management systems, [GAO](#) recommended that FAA develop a comprehensive strategy for making data-related improvements. FAA agreed with GAO and has been implementing a number of improved data collection systems. FAA's On-line Aviation Safety Inspection System (OASIS) is a leading example of this progress.

Documentation of inspections and follow-up was better in [FAA](#)'s files for foreign repair stations, perhaps in part because under FAA regulations, foreign repair stations must renew their certification every 2 years. By comparison, domestic repair stations retain their certification indefinitely unless they surrender it or FAA suspends or revokes it. Foreign repair stations appear to be correcting their deficiencies quickly so that they qualify for certificate renewal. The 34 FAA inspectors [GAO](#) interviewed who had conducted inspections of both foreign and domestic repair stations were unanimous in concluding that compliance occurred more quickly at foreign facilities. They attributed the quicker compliance to the renewal requirement and said that it allowed them to spend less time on follow-up, freeing them for other surveillance work. However, because of the poor documentation in domestic repair station files, GAO was unable to confirm whether foreign repair stations achieve compliance more quickly than domestic repair stations do.

Actions Under Way Directed Primarily at Air Carriers' Oversight of Repair Stations

A number of repair station initiatives, announced in June 1996 by the previous [FAA](#) Administrator, following the ValuJet crash are directed at clarifying and augmenting air carriers' responsibilities for overseeing repair stations. For example, one initiative requires that before an air carrier can add a repair station to the list of repair stations doing substantial maintenance on its aircraft, the carrier must conduct an audit to verify that the repair station is capable of doing the work in accordance with the carrier's approved programs. [GAO](#) did not directly assess the initiatives in this review because the initiatives are not focused on strengthening FAA's own inspection and follow-up efforts. FAA inspectors assigned to oversee repair stations told GAO that the initiatives would have no effect on their direct inspections of repair stations.

Several other efforts unrelated to the June 1996 initiatives may hold potential for improving [FAA](#)'s own inspections of repair stations. Two involve initiatives to change the regulations covering repair station operations and the certification requirements for mechanics and repairmen. FAA acknowledges that the existing regulations do not reflect many of the technological changes that have occurred in the aviation industry in recent years. The FAA inspectors surveyed by [GAO](#) strongly supported a comprehensive update of repair station regulations as a way to improve repair stations' compliance. This update began in 1989, has been repeatedly delayed, and still remains in process. The most recent target – to have draft regulations for comment published in the Federal Register during summer 1997 – was not met. Similarly, the update of the certification requirements for maintenance personnel has been suspended since 1994. Because of these long-standing delays, completion of both updates may require additional attention on management's part to help keep both efforts on track. The third effort involves increasing FAA's inspection resources. Since fiscal year 1995, FAA has been in the process of adding more than 700 inspectors to its workforce who will, in part, oversee repair stations. Survey responses from current inspectors indicated that the success of this effort will depend partly on the qualifications of the new inspectors and on the training available to all those in the inspector ranks.

3.6 REPAIR STATION VISITS

Is the Aviation Inspection System improving? Has the [FAA](#) inspection program changed significantly since the 1996 ValuJet accident? Are major 3rd Party repair stations and FAA inspectors working as safety improvement teams? Have the issues stated in the 1997 [GAO](#) report been addressed? The answer to these questions is generally, yes. There was consensus that significant improvements in FAA oversight have been made over the past two years. Repair station personnel at all levels were cordial, cooperative and very candid with what they had to say interviews and discussions.

There was concern expressed by both repair station and [FAA](#) personnel over the so-called “ Bean Counter” mentality. Some felt strongly that the tough competition between airlines to lower their costs per seat mile, if not carefully and objectively evaluated by maintenance professionals and monitored by the FAA, could have a negative effect on safety. There is always heavy pressure from airline corporate officials to “do more with less” along with the “better, faster, cheaper” motive for profit. “There is nothing wrong with profit, that's what the world economy is all about,” said one repair station [QA](#) manager. “It's up to us guys in the trenches, working with the FAA, to keep them honest.”

Though some aspects of the relationship with the [FAA](#) may be less than nominal, with only one exception, it was agreed that the inspection and regulatory oversight elements of the relationship are good to excellent. While progress is being made and positive steps continue to occur, areas remain where further improvements can be made.

3.6.1 Inspection Frequency and Effectiveness

The seven repair stations visited were unanimous in stating the number of [FAA](#) inspections have increased significantly. In some operations, prior to 1997 and early 1998, [ASIs](#) seldom visited the premises more than once or twice per year. Currently, at a minimum of once per year, repair stations are subject to National Aviation Safety Program Inspections (NASIP), consisting of teams with members from other [FSDOs](#), Regions or [CMOs](#). The NASIP inspections are conducted under a procedural format with written guidance and specific inspection tasks. The team spends several days in the operation being inspected; they are certainly not casual “drop in visits.”

There were no serious issues nor problems found in six of the seven repair stations visited. Certainly, along with positive findings, some were less than positive. Several areas where improvements can be made were presented and discussed. In only one repair station, a separate topic in this report, were significant issues and problems with the [FAA](#) evident.

Note: It was observed that in some 3rd Party repair stations, personnel safety practices and the hangar equipment used is well below the standards of air carrier maintenance. During these visits several potential [OSHA](#) violations and obvious safety infractions were observed. In pointing these out to repair station personnel they were asked if the [FAA](#) ever mentions on-the-job safety issues as part of their inspections and surveillance. The answer was: “almost never.” The FAA was queried about this finding; the general response was that they did not have time to observe personnel/hangar safety and it is also the responsibility of another agency.

3.6.1.1 Comments from Repair Station Personnel (Direct Quotes)

Most issues are resolved in meetings with our PMI (Principle Maintenance Inspector) and [ASIs](#). Sure, we still get a letter of investigation once in a while; as a result you get a better repair station.

We have an excellent relationship with our local [PMI](#).

Working together and professionalism really showed with the 737 fuel pump wiring grounding AD (Airworthiness Directive).

If you are honest and straightforward with the [FAA](#), they are usually the same with you; taking an adversarial position does not work well for either side.

The best inspectors are from the air transport industry. Some of those who are not tend to be out to make a name for themselves, and are often uninformed and ignorant of “big iron” operations.

We see our [PMI](#) or [ASIs](#) at least once each week and we have formal [NASIP](#) inspections at least once a year, usually more often. This facility has had no enforcement action for over 4 years... that’s positive for the [FAA](#) and us.

We seldom see our customer’s [PMIs](#) after their first visit. A major customer’s PMI (with whom we have a large multi year contract) visits about once a year.

We operate multiple facilities and have good relationships with the Region and all our [FSDOs](#).

Since we operate primarily as a Military contractor, we don’t see the [FAA](#) very often. As we change to more civil air transport customers, the FAA will be here frequently. The FAA works with us like a “neighborhood policeman who walks a beat.” They are here to keep order; we know them, they know us and we respect each other.

We have no scheduled meetings with the [FAA](#), but meet or talk with them 3 of the 5 work days each week.

The [PMI](#) should be on site once a week. Meetings would be a good idea and/or have them sit in on our Quality Assurance status meeting.

We had a recent paper work audit that was very productive. The [FAA](#) found errors, sat with our auditors and chief inspector to help us improve our processes. They stated clearly what the problems were and suggested how to fix them. There were no Letters of Investigation, just a good meeting of the minds and the clearing up of some paper work problems.

The [PMI](#) and his [ASIs](#) meet with us once a week in a formal process improvement meeting. We have an agenda, action items, goals, objectives and time lines. There have been several problems solved and errors corrected as a result of these meetings. Our organization feels that this team approach to oversight yields both good relationships and excellent results.

The frequency of [FAA](#) visits has increased and there is a good deal more surveillance.

We have excellent relationships with the [FAA](#). We passed 3 [NASIP](#) inspections with only minor paperwork errors.

There are a few [PMIs](#) that need to micro manage, others who work as a team with their repair stations, and one or two who think they need to act like mean “motor” cops.

Our organization is primarily airline folks. We have a different book [view] on how to do things. Our primary customer is an airline that we have worked with for over 9 years, we all work well together. The customer, their [PMI](#), our organization and [PMI](#) work very well together. We started 11 years ago with a “white glove” inspection and have passed our last 3 [NASIPs](#) with no findings other than minor paper work and manual problems.

Our repair station has more scrutiny than the airlines. We have our own strong [QA](#) organization, plus our [PMI](#), the airlines [PMIs](#) and the [QA](#) groups from all the customers.

We considered ValuJet a wake up call. All of our parts now go through our stock room that is staffed by well-trained people with a double signature requirement on all documents.

Bean counters have had too much influence on the maintenance industry. The fact is that our organization is not run by bean counters. We are concerned about business, profit etc., and we also understand that true cost effectiveness is based in high safety and quality. We are only as good as the last airplane that left here.

The bottom line can be dangerous. “Bean Counters” are not only running airlines; they are running safety. An example is a 145-repair station accomplishing a letter check (A thru D) at a flat rate for routine work, with a x dollar cap for non-routine. This could be a very dangerous practice.

The [PMI](#) has the last word on the operation here.

Though a lot depends on individual [ASIs](#) and [PMIs](#), if the repair station staff is honest and straightforward, the [FAA](#) will respond in kind. An adversarial position does not work well for either side.

3.6.1.2 Comments from FAA Personnel

We see no problems here; there are normal regulator/operator relations.

We know that the so-called bottom line will kill. Sometimes we have to fight with each other to make it right.

There is too much aviation for the numbers of skilled and qualified people who are properly certificated. There are too many who don't know what they don't know.

Sub, sub, sub, is a problem. The repair stations sub-contract work to others who often sub-contract part of the work sub contracted to them and so on. It becomes a real challenge to keep up with it all.

3.6.2 Air Carrier Oversight of Repair Stations

One [FAA ASI](#) said it very well; “outsourcing simply provides another hangar for an airline.” While several airlines have always maintained a keen interest in how their 3rd Party contract maintainers conducted their business, others have not. The actions taken by the FAA with revisions to the Inspectors Handbook 8300-10 and additional guidance and advisory materials have caused all air carriers to pay close attention to work being conducted for them by repair stations. It is now required that air carriers report substantial work done at major 3rd Party maintenance facilities to their Principle Maintenance Inspector (PMI) or Certificate Management Office (CMO). Each CMO now has an “R” item (formal recurring item) requirement to visit these repair stations to ensure regulatory compliance and to ensure the coordination of oversight from the customer carriers.

Some air carriers (Northwest was cited as an example) now have a section in their General Maintenance Manual (GMM) that speaks to the who, what, when, and how work is to be conducted by contract maintenance providers. The [FAA FSDO](#) people who provided this information suggest that this should be an industry wide requirement. In general the air carriers appear to have taken seriously the requirement to supervise maintenance operations conducted on their aircraft while being worked in 3rd Party repair stations. There were no problems indicated, airlines are taking responsibility for compliance with this requirement.

3.6.2.1 Comments from Repair Station Personnel (Direct Quotes)

We are not only under the surveillance of the [FAA](#) but also our airline customers. The airlines, with the increased emphasis by the FAA on their responsibility for work done by contractors, are more focused on our operations and how we perform work on their equipment.

Our Part 121 air carrier customers are very particular about their inspection and oversight of our operations. They are very thorough and we are very diligent in correcting any problems in order to make it right and keep the business.

3.6.2.2 Comments from FAA Personnel

The airlines who were not paying attention to their work being done in repair stations are doing so now. All air carriers are now clear on their responsibility to ensure their documentation is being followed and that quality work is being accomplished at repair stations where their aircraft are being maintained or modified.

With one of the airlines assigned to us, their contracting out has not been a pleasant experience. They were doing a poor job of overseeing and monitoring their 3rd Party maintenance providers.

At times we have had problems getting operators to really accept the oversight responsibility. Clarification of the regulations has improved this area immensely.

“Rent-a-Reps” [Maintenance Representatives] contracted by an air carrier to oversee their airplane(s) during maintenance at a repair station] are not tied into carrier’s quality control. Air carriers should provide representatives based upon the type of work being done.

Reps. tend to spent too much time in the office doing things other than ensuring the repair station is doing the work correctly, based upon their specifications, manuals and job cards.

3.6.3 Manuals, Documentation and Job Task Cards

Detailed information on this aspect of our research will be found in Dr. Colin Drury’s report, [*Development of Process to Improve Work Documentation of Repair Stations*](#). Certain elements Dr. Drury’s report are germane to this project, because the maintenance documentation process creates challenges for repair stations, and their [FAA](#) inspectors.

The aircraft worked at repair stations are basically the same on a type by type basis. There are differences in various models and configurations within a type, but the basic airplane is the same or highly similar. This being true, no standards for common documents exist, nor are any required between airlines, repair stations and for that matter aircraft and component manufacturers. This means that repair stations are required to understand and conduct work based upon their own General Maintenance Manual, Operating Procedures and job task cards while at the same time working from the same document set provided by each customer. The repair station must follow each customer's maintenance plan, maintenance manuals, job task cards, and procedures.

There was consensus from all repair station personnel who participated in the station visits, the variance in documentation, manuals, and job task cards between customers is a major challenge. "Paper work" differences provide a significant area where errors can easily be made. There was not one repair station official who was not willing to participate in any sort of maintenance documentation standardization effort that the industry may mount.

3.6.3.1 Comments from Repair Station Personnel (Direct Quotes)

Each customer has their own maintenance manuals, illustrated parts catalogs, structures repair manual, general maintenance manual, quality control procedures manual, maintenance procedures, routine job cards and non-routine job cards. These documents are mixed with our general maintenance manual and our own job cards. Imagine, at one time we can have three or four customer aircraft in work, all of the same type and model, with a different set of paper work for each. Keeping all the documentation straight and correct is a real challenge. It is an area where it is easy to make errors if not very alert and careful.

Mechanics with experience should be used to write job cards; there would be fewer errors, more productivity.

Perhaps the 145s will help straighten out the 121's paper work. The 145s are forced to read it word for word.

There is a strong need for standardization of maintenance documentation and job/task cards. The basic work package is so bastardized, yet the job/task content is 90% the same. Job cards should all be the same; differences could be handled in other documentation related to, but outside of, the actual work packages.

It is a known fact that Simplified English reduces comprehension errors by at least half. The technology to convert all maintenance documents exists, why isn't its use a requirement. This is one area where the [FAA](#) could exert some influence.

3.6.3.2 Comments from FAA Personnel

Maintenance documentation is an area we watch carefully. Since it is different for each manufacturer, air carrier, and repair station, we have to know and understand the differences. It is an area that needs attention and probably could use standardization.

There should be a team effort to decide what needs to be in the General Maintenance Manual and also the Inspector's Handbook, 8300-10. Maintenance has gone global and clarification is needed.

3.6.4 Human Factors and Error Management Programs

Maintenance Human Factors, Maintenance Resource Management (MRM), and Error Identification and Management programs are recognized to have value in improving safety and overall performance. Most major airlines throughout the world have these programs in place. The 3rd Party repair stations, as a rule, are not nearly as far along as the airlines in developing Maintenance Human Factors and Maintenance Resource Management (MRM) programs.

The [FAA](#), Office of Aviation Medicine has been conducting research in Maintenance Human Factors over the past 12 years and has produced a large quantity of valuable data, training programs, research papers, performance statistics and related materials. This information, including their [Human Factors Guide in Aviation Maintenance and Inspection](#) is available on both [CD-ROM](#) and the Internet. The Air Transport Association (ATA) has also recognized the need for these programs and has formed a Maintenance Human Factors Subcommittee, which is open to any interested party including non-ATA members. This ATA subcommittee has recently developed and released [ATA Specification 113 – Maintenance Human Factors Program Guidelines](#).

There is only one major repair station that has made a significant effort, and have developed an exemplary program. This program could well be used as a model for all major repair stations, all the groundwork has been done and this organization is willing to share. They developed their program using the material available through the [FAA](#) Office of Aviation Medicine's Aviation Maintenance and Inspection Human Factors Research Program materials on the subject, and also worked with the Boeing Company and the Air Transport Association. There may be a few other repair stations that are in the process of starting programs without having made it known to the industry. However most repair stations visited had limited knowledge if any of Maintenance Human Factors and related programs. The 3rd Party repair station community is well behind the rest of the industry in this obviously important area.

The new aviation maintenance personnel certification rules from Transport Canada and the Joint Aviation Regulations in Europe and the United Kingdom include requirements for mandatory Maintenance Human Factors training programs. None of the US [FAA](#)'s current rules or those under review or in process of revision, has any provision for Maintenance Human Factors programs and/or training as a requirement. This holds true even though at least one National Transportation Safety Board (NTSB) member strongly supports a Maintenance Human Factors regulatory requirement, and both the [EEC](#) and Transport Canada have made it mandatory.

[NTSB](#) Member John Goglia is a strong and avid supporter of Maintenance Human Factors and [MRM](#) programs. He has supported all activities, meetings, seminars, and symposiums possible, as both an attendee and speaker. Member Goglia, who is the only NTSB member to come through the ranks as an [A&P](#) Certificated Mechanic, strongly supports including Maintenance Human Factors as part of all [FAA](#) maintenance certification rules. His viewpoint simply stated; it costs a lot less for the industry to have a Maintenance Human Factors requirement than it does for one air carrier accident. Member Goglia questions why the FAA has not considered such an important element, in the improvement of aviation safety, as part of their rulemaking action.

These programs are being put in place voluntarily by the aviation industry because they improve safety through the identification and reduction of errors, finding root causes to prevent accident reoccurrence, and thus improve overall performance. They are not being funded and developed because they are "programs de jour" or the current business trend. Human Factors and error reduction programs are simply good business from any standpoint. It was interesting to learn that the [FAA](#) has no intention of including these sorts of programs as a requirement in any rule making. It was also obvious that the FAA personnel in the field are, for the most part, uninformed about the entire Maintenance Human Factors effort.

[3.6.4.1 Comments from Repair Station Personnel \(Direct Quotes\)](#)

Safety can be improved with formalized, expanded, self-disclosure. [MEDA](#), or similar programs, gather error data that can be objectively analyzed. Problems and issues identified can be prioritized, evaluated and corrected.

Though we don't have a formal Human Factors program, we do some of those sorts of things. At the end of each aircraft visit we hold a team de-briefing to learn what we could have done better. We also follow the aircraft operational performance for the 30 post visit days, taking action to correct discrepancies that may have caused problems. These reports go to the President and Vice President for review, then into the aircraft's file.

Repair stations must be pro-active with error reporting and analysis. The [FAA](#) must be receptive and work together with us to solve problems and correct deficiencies.

Do we want [MRM](#) & [MEDA](#), self-reporting and error disclosure to work or not? If we don't know what the problems are, we can't work toward solutions.

We here at the 145s don't respond well to LOIs (letters of investigation), official or unofficial.

3.6.4.2 Comments from FAA Personnel

Is there a human factors program? We don't know much about what Headquarters is doing, in the area of Maintenance Human Factors, out here in the field. We did not know that the Office of Aviation Medicine even had a program, we will take a look at their Web-site.

A lot of this error reporting business is just a way for the repair stations to avoid [LOIs](#) and violations. This human factors stuff is just a bunch of hooie thought up by some Ph.D. guys. When mechanics make errors they should not be able to report them to an error program, and by doing so avoid any action from the [FAA](#).

3.6.5 Maintenance Personnel Training

Training at the 3rd Party repair stations has not changed for a number of years. It is still a function that meets, but at most repair station never exceeds the minimum standard. Training and qualifications issues were researched and summarized in the report released in April of 1998 by the Office of Aviation Medicine Aviation Maintenance and Inspection Human Factors Research Program (AAM-240) entitled [*COMPARATIVE STUDY OF PERSONNEL QUALIFICATIONS AND TRAINING AT AVIATION MAINTENANACE FACILITIES*](#). Little would be served by restating the findings of that report here. In conducting this research, though maintenance training was not a focus, comments were made that reinforce the 1998 research findings.

3.6.5.1 Comments from Repair Station Personnel (Direct Quotes)

A training audit is on records and rosters only, never on training content, quantity or quality.

The [FAA](#) accepts 40-hour General Familiarization courses, provided by outside vendors, as satisfactory for work on a specific aircraft type. They don't look into the instructor's background nor review the training programs. We insist on instructors that are factory trained or those qualified as airline instructors. The FAA is too easy to satisfy in this important area.

Airlines will run required paper work and processes training for repair stations, usually free of charge.

The regulator will accept a "read and sign off" as an acceptable orientation program for a new hire repair station mechanic. This may be OK for an older, experienced hand, but most of our new folks are new folks. We don't feel that reading the manuals is enough here; we have a good program taught by our own instructors.

3.6.5.2 Comments from FAA Personnel

No, we don't sit in to monitor classes at repair stations; there is not enough time.

We accept 40-hour general aircraft system familiarization courses as acceptable for repair station mechanics.

Most repair stations are doing a much better job in recording, training, and keeping acceptable records.

We accept a minimum standard without having a clear definition of what it is. As long as the maintainers have had some training and it's on record, we accept it.

3.6.6 FAA Inspector Training and Qualification

The training of Aviation Safety Inspectors (Airworthiness) is an area where both the [FAA](#) and Repair Station people agreed that improvement is needed. Unfortunately there were no raves for the [ASI](#) programs given at the FAA Academy in Oklahoma City. Most suggested that the best training is what's learned on the job and from what experienced FAA people can tell them.

Several comments pointed toward the need for more, higher quality, in depth, "real world and task focused" curriculum. This area was not explored in depth and the comments speak for themselves.

3.6.6.1 Comments from Repair Station Personnel (Direct Quotes)

Though the quantity has improved, there has been little improvement in the quality. This may be due to so many new inspectors on the job and what seems to be lower [FAA](#) hiring standards than in the past.

It would be good if the [FAA](#) could do a better job of matching an [ASI](#)'s assignment to his or her background and experience. We have to train new ASIs if they are not 121 aircraft maintenance qualified. We have a program (mechanic entry internship) that lasts from 2 weeks up to 30 days. We only hire people who are successful in this program. We would be happy to include anyone from the FAA who may wish to attend.

We have to train the [PMIs](#), there are just too many with very little or no experience at all.

[ASIs](#) tend to look for what they know, paper work or process.

We have frequent turn over in our [PMIs](#); they only last about one year.

[FAA](#)'s numerous manuals, rules, regulations, advisory circulars, and handbooks force [ASIs](#) and [PMIs](#) to make interpretations beyond their skill sets, educational levels and training base. Let's face it, the training given to FAA staff (travel on Monday, training on Wednesday through Thursday, and travel on Friday, causes the FAA training week to be only 24 hours) is simply not very good.

There should and could be joint training at the [FAA](#) Academy which includes the FAA, repair stations and their customers, the manufacturers and our vendors. This could be done so that we can work together to improve, establish and maintain continuous improvement in the aviation safety system. Take a look at the dramatic success of Boeing's 777 Working Together Program.

Sure some things have improved since ValuJet but others have not. Training for new [ASIs](#) must not be very comprehensive. We, the 145s, have to do a lot of training before these new folks have a clue as to what is going on. I know the [FAA](#) has lowered their hiring standards. Given the lower entry-level inspector qualifications, their training should be evaluated and re-developed accordingly. Why should the repair stations be training new ASIs? There is only one reason, if we don't, no one else will.

3.6.6.2 Comments from FAA Personnel

More [ASIs](#) have been provided, most are new to the [FAA](#) but not to aviation. They are running them through Oklahoma City very quickly.

Our training has no standards. The rules are very vague giving us no solid foundation on which to conduct surveillance over the repair station and/or the airlines. There is a very high turn over rate, which adds to the problems.

3.7 FSDO VISITS

A number of visits to [FSDOs](#) were conducted and their leadership and management varied. Most of what was observed could be classified in a range from excellent to very good.

The Managers, [PMIs](#), and [ASIs](#) take their jobs very seriously. Some of the offices are operated by leaders who appeared to be excellent managers, versed in modern team building and “working together” principles. Those who fostered the team and working together concepts were respected, if not admired, by both their staff and the repair station personnel they oversee. One [FSDO](#) in particular could be used as a model for establishing an [FAA](#) operational standard on how maintenance operations oversight could and should be managed.

While all the [FSDO](#) personnel were quick to state that there have been several improvements since the summer of 1996, they will also state that there are still some problems and issues that must be addressed. There was, however, unanimity that the problems with the aviation oversight system have been addressed and, if not completely fixed, are well on the way toward being solved. All were in agreement that aviation safety is in good hands, and that the regulator is successfully accomplishing maintenance and major repair station oversight

There was consensus in all offices visited that there is a big “disconnect” between the field and Washington Headquarters. There is also a level of disdain for the way the [FAA](#) is managed at the highest levels. Not only is it common to hear “we have no idea what is going on back there” but also, “we don’t care what is going on back there.” It’s small wonder that both the repair stations and the FAA people in the field will state openly that the system is dysfunctional. This begs the question; is it any wonder why there are so many different interpretations of rules and regulations depending upon the Region, [FSDO](#), and individual FAA person?

3.7.1 FAA Comments (Direct Quotes)

There has been a great deal of improvement since 1996. Too bad it had to happen by accident.

There are now 120 employees handling what 80 were responsible for prior to ValuJet. When at full staffing, there will be 130. It’s great to have what it takes to get the job done.

Now that we have what we need, we will be doing the job we should. It has been a struggle, we are getting some new guys and gals that are really knowledgeable and professional.

We will have a new facility soon. All employees will have both the space and the tools they need to do an effective job.

[ASIs](#) in the field know what their job is. Most are focused on what they do. We have rules, advisory material, handbooks and procedures, if one follows them the job is straightforward. ASIs do what they are trained to do.

Things are really looking up in the [FAA](#). It is a good job, good security and well paid. Most of the folks we work with are appreciative.

There seems to be good communication between regional offices. There is no turf issue with airline [CMOs](#) or [ASIs](#). We all review the PTRS (Program Tracking and Reporting Subsystem). It is an excellent way to keep abreast of what others are doing, issues and problems in the field. The ASI from an airline reviews the reporting region’s inspection data (3650s and 5650s), agrees or reviews with the reporting inspector.

Our office holds industry meetings and listening sessions. We try to level the playing field.

The [FAA](#) should look at the amount of a repair station's re-work (non-billable) as a measure of quality. We should also look at the percent of core group (permanent full time staff) to contract labor as well as the ratio of infrastructure staff to mechanics.

There are great variances in [PMI](#)'s abilities, skills, qualifications, quantity and location.

One of the big challenges is keeping [ASIs](#) in so-called undesirable locations. Take xxx as an example; we get mostly new inspectors here. The ones from the local area plus a few who grow to like it and stay on. Most however want to go closer to home, or where the higher level jobs are to be found. After one year, a new person can transfer elsewhere. This means we are constantly training new people and our repair stations are forever seeing new inspectors. It's tough to maintain a consistent operation with such high turnover.

There is one case where the [PMI](#) is 300 miles away from one of his major repair stations; they only see him every one to six months. To top it off, this repair station specializes in major structural repairs on transport aircraft; the PMI is a GA (General Aviation) inspector.

Small vendors, who are also Part 145 certificated, experience lots of variances in PMIs and their territorial behavior.

One of the [FSDOs](#) visited, and in particular the [PMI](#) assigned to a major airframe repair station, does not accept partnership with his assigned repair station in any way, shape, nor form. Not only is partnership taboo in the eyes of this PMI, but he also asserts that this repair station (that he stated "is one of, if not the best") is generally not in compliance with the regulations. Further, this PMI has not and will not accept nor approve their maintenance error reporting and corrections program, part of their overall Maintenance Human Factors or [MRM](#) program. The repair station has an outstanding program. It is the only major 3rd Party repair station with a comprehensive program in operation based upon the industry standard Boeing Maintenance Error Decision Analysis (MEDA) program. The senior personnel from this repair station have received major industry awards for the excellent incorporation of the MRM program. The PMI has yet to accept and approve the program at this repair station.

This repair station also finds itself inundated with violation notices, letters of investigation, letters of finding, assessment of penalties, and a barrage of negative comments from their [PMI](#). In addition, for whatever reason and from unknown sources, the Press has been provided with negative information concerning the repair station that should only be known, in any detail, by repair station senior management or the [FAA](#).

The research team visiting this repair station was impressed with the site, the working conditions, processes, procedures, practices in place, and especially their [MRM](#) program. Their open door policy, which included, frank, honest, cooperative behavior on the part of the entire management team and workforce left a very positive impression. The same team visited the local [FSDO](#) and met with the station's PMI. We were equally impressed, though negatively, by this [PMI](#)'s policeman based, enforcement only mentality, the negative comments about the organization and his strong opinions that their MRM program was only in place to evade serious rule and regulatory violations. This was the only site visit where the research team found such a negative environment or any serious deficiencies in the FAA Safety Inspection program.

This visit points out that even a system that is improving and running well overall can be negatively impacted by one individual. It was clear to the team that in this situation the [FAA](#) has a significant problem, that is well documented by a major repair station and all of their customers. This situation confirms comments that Regions, [FSDOs](#), individual [PMIs](#) and [ASIs](#) can ignore programs developed in FAA headquarters, such as acceptance of Human Factors Error Reporting Systems

The situation also points out that while the autonomy of the Regions, Districts and individual [FSDOs](#) may be an effective structure through which to manage a large, complex organization, it can also have negatives. The [FAA](#) leadership should keep watch to ensure that this de-centralized system does not allow for the building of information exchange walls, and that individuals in the Regions, FSDOs, and individual [PMIs/ASIs](#), do not operate contrary to overall agency policy.

3.8 THE FAA “SYSTEM” AND COMMUNICATIONS

- Many of the people, repair station and [FAA](#) alike, who talked with the research team seemed to feel that the problems and issues with the FAA are a result of the “system” itself. The primary source of problems point toward FAA Headquarters, not the operations in the field. The word dysfunctional was frequently used to describe operations at FAA Headquarters in Washington.
- There was a general consensus that too many upper level jobs within the [FAA](#) are filled by political appointees. These appointees often have little or no relative experience with the challenges and issues facing the Administration and/or the aviation industry. The middle managers and their professional staff appear stymied and restrained by those above them who have limited comprehension of what is needed and/or necessary to keep the system running effectively. There are persons of significant responsibility in both industry and the FAA who candidly state that they do their best to get the job done in spite of the FAA’s leadership team. There is a good deal of concern that what is politically correct may not be the right thing to do. Those who were most candid felt that the senior staffers at DC headquarters spend so much time answering questions and responding to issues created by the inexperienced and politically motivated leadership, that they don’t have time to do their own jobs.

Elements of these concerns were expressed in the April 1998 Guest Editorial for Aviation Maintenance Magazine entitled *Coercion, Intimidation and Delays*. The author opens with this qualification:

“This is not about people, inspectors, nor administrators; the [FAA](#) has some of the finest individuals working in aviation today. They are highly dedicated professionals. This is not about them; this is about their system – a system that doesn’t provide adequate tools, refuses responsibility and allows them to be crucified in the public media. In short, this is a broken system.”

There is significant frustration within the industry over apparent inconsistencies in their system and overall communications. While usually not stated as succinctly as in this editorial, the concern and frustration coexist. The article continues:

“But like other businesses today, the [FAA](#) is having trouble keeping the experienced folks out in the field. The experienced inspectors have advanced into management, which leaves a new breed of inspectors to represent the FAA. And like the emerging employees of today’s businesses, this new generation needs guidance to compensate for experience.” ... “The guidance provided to inspectors, and often interpreted literally, is used to justify increased regulation of differing aspects of aviation. Interpretations vary between headquarters, regions, and often between inspectors, which results in extreme inconsistencies and significant disruption to the aviation industry.”

The article goes on to discuss that the guidance provided by the Inspector’s Handbook (8300-10) should not be used to go beyond ensuring that minimum standards are met. The Handbook does not permit the inspectors to disregard nor expand upon these minimums. The author goes on to state:

“The [FAA](#)’s responsibility is the enforcement of the minimum safety standard – not an arbitrary standard set by a guidance document.”

A majority of those who participated in this research seldom blamed individuals within the [FAA](#) for their frustrations, however they did fault their “system.” There is simply a great deal of frustration within the industry and FAA personnel in the field over the current state of the system resulting from what they view as a lack of quality leadership and the dysfunction it has created within headquarters operations.

The task of keeping an organization with over 45,000 employees well informed about current operations, issues and policies is difficult. The single area on which all individuals from all industry elements agreed was that [FAA](#) internal communications must improve. It is a topic of discussion at every forum in which the FAA participates, or at listening sessions their staff members attend. The need for more and open communication exists between headquarters and the field, region to region, [FSDO](#) to FSDO, and several points in between.

The [FAA](#) holds listening sessions at various industry meeting and seminars. A major topic of discussion at these sessions has to do with the variances in the interpretation of rules, regulations, and guidance materials. Interpretations vary from inspector to inspector, region to region, [FSDO](#) to FSDO, [CMO](#) to CMO and Region to Region. These differences can be significant. When known differences or conflicts of interpretation are brought up to the FAA at such sessions, they listen intently and usually agree to have the “appropriate people look into the situation.” A major concern expressed by both FAA and 3rd Party repair station personnel, is that though those who can effect change listen and do nothing about what they hear, or simply hear but don’t listen and then do nothing. Either change is so slow that it is not perceptible or changes are simply too difficult to make so none are made.

The following are several comments were made regarding the lack of any objective or formal means to rectify, remediate, resolve, or arbitrate disputes in interpretation. Many industry officials’ feel there is no practical place to turn, and they simply do the best they can with the cards they are dealt. There seems to be a great deal of time spent within the aviation maintenance process dealing with differing views, opinions and interpretation of [FAA](#) rules, regulations and guidance materials. Perhaps if there were a revised, clearly defined communication and conflict resolution process, the system would operate with less confusion, conflict, and frustration.

3.8.1 Comments from Repair Station Personnel (Direct Quotes)

Apply new technology to improve maintenance performance. Go to those in the [FAA](#) who are most receptive and get it done.

The [FAA](#) should look at [ISO](#) 9000 (the Europeans use it big time) as a possible quality conformity standard. At least there could be one single system based upon one manual... the FAA should get behind ISO 9000 along with BF Goodrich, Boeing, General Electric, Pratt & Whitney, Rolls Royce, AirBus, Grumman, United Airlines and several others.

There is a revolving interpretation of policy and regulations. We have had three of four [PMIs](#) in the past four years or so. Each had a different modus operandi and interpretations of compliance. If you don’t adjust, it can be very difficult. This is very confusing to the workforce and gives them a negative impression of the [FAA](#).

Now that there is increased involvement between [PMIs](#) at repair station and customer airline’s [PMIs](#), at times there are two differing messages and interpretations.

The system seems to be polarized at two extreme ends... good and bad. It is almost like a marriage between the major 145s and the [FAA](#), some good, some bad.

There are now three our four different interpretations of [FAA](#) regulations because they are, in fact, written by lawyers. In most other countries the regulators, those who possess industry knowledge, write the rules.

The [FAA](#) should do it better (right) and stop giving cart blanche Class 4 Certified Repair Station authorizations.

There needs to be a better tie-in between the [NTSB](#) and the [FAA](#).

There should be monthly meetings required between the [PMI](#) and the repair station to discuss how goes it, problems, and plans for the operation.

We would like to be more involved and communicate with the FAA inspectors, but it seems to be becoming more one-way. Everyone is out of some sort of compliance with some aspect(s) of the regulation at some point in time.

There needs to be some sort of referee system that leads to mediation, and finally arbitration to resolve disputes between the repair stations and the [FAA](#). Emotions and feelings must be considered, a strict and objective process would need to be developed. Headquarters ([AVR-1](#)) is the only objective alternative, but they remain in a “defend the FAA” posture.

There is no way to arbitrate. It takes an inordinate amount of time to override a [PMI](#) decision, if any one will do so. Regions do not want to arbitrate or override PMIs.

There should be some sort of rule/regulation interpretation database that can be accessed by both [FAA](#) inspectors and the repair stations. This could sure help with the differing interpretations of the same rules by different [ASIs](#).

There are too many differences in interpretation. This can often boil down to plain stubbornness and can become confrontational.

There is too much regulation by Advisory Circular, Memos and Inspector’s Handbook “8000” orders.

[FAA](#) bases interpretation at the region and with local 145/121 [ASIs](#). This is the reason they are often so different. Add the third component, the manufacturers and their FAA certification inspectors and it really becomes confusing. There needs to be standardization on all sides and plenty of training to go along with it.

The [FAA](#) must implement a mediation and arbitration system. We could work with them to develop the process. There could be a database developed that would capture precedent and interpretation of standards. This would provide a means to use history, rather than going on a case by case or individual basis. With the [OASIS](#) system it should be a relatively simple task to do this and make it a process that all [ASIs](#) can easily use. There could be a simple Source Book or Handbook that is online with word and subject search.

Flight Standards appears to be fragmented and disjointed. Organizations are not coordinated; Regions and [FSDOs](#) do not use headquarters for interpretations.

Our local [FAA](#) is being very rigid due in part to the ValuJet environment, this stands in the way of progress. If interpretation is needed they should go to legal.

More and better surveillance causes some customers to go elsewhere. Are we causing companies to fail? Now, they are coming back to the stations they left to get better quality, sometimes it’s a strange business.

The [FAA](#) is a reactionary organization, they are not proactive. It is an after the act, rather than before the fact group. The Fine Air DC-8 Miami accident is a classic; now there is a big push on pallet locks and Load Master qualifications. Next it will be fuel trucks, fueling and aircraft grounding.

There are too many industry culls that end up as [ASIs](#). Doesn’t the [FAA](#) check with former employers on their candidates before hiring them?

3.8.2 Comments from FAA Personnel

ATOS (Air Transportation Oversight System) is great for air carriers, not often used in 145s.

ATOS is a systematic inspection of air carriers. The ASIs, who become specialists, are trained. Lots of focus, detailed training, and open communications between FSDO specialists and CMOs. We are in constant communication.

OASIS (Operational and Supportability Implementation System) is a good system. There are some ASIs who still need training. Many of the “old hands,” familiar with the old system, don’t or won’t use it. The newer personnel, who are for the most part at least somewhat computer literate, like and use the system. We have new desk top, networked computers in most FSDOs. Some of us don’t use the OASIS laptops, but return to the office to complete their reports on the desktops.

The CSET (Certification Standardization Evaluation Team) system is very effective. This new program for air carrier certification is much better than how it was accomplished in the past.

Handbook bulletins without regulations to back them up don’t help us. Don’t tell us what we are responsible for in the field with no regulations to back us up. Who have they been talking to back there? - Not us!

Now we are regulated by handbook bulletins, where are the regulations we need?

Sexual harassment has top priority at legal. Violations are just not worth it. There is so much legality involved and they expect us to be legal folks. It took four years for one of our violations to go to actual collection of a fine, by then all of the folks involved were long gone. When you violate someone it simply takes too long to get action. Our objective is safety, if there is a problem – get it fixed!

Part of the problem is the supplemental airlines and the way they are certificated. It is a system that makes certification too easy, in fact it’s a joke.

The legal people have a lot to say about what goes on in regulatory development. Legal people do not know a great deal about maintenance. Do the legal folks have too much control over regulations and regulatory policy?

The Regions, FSDOs and individual ASIs seldom, if ever, call headquarters (Flight Standards) any more for policy interpretation and direction.

Trickle down from HQ is severely watered down by the time it gets to the front line.

There are seven Regions out there, all producing policy. No wonder the troops in the field and the repair stations and air carriers are confused by the differing answers they receive for the same question or issue.

Upper management, no foolin’, what do you want us [ASIs] to do? We need real guidance on what they want things to be, very unclear directions from AFS/AVR headquarters on what they want the PMIs and ASIs to do. Is there too much political pressure in headquarters? Headquarters has a lot of problems and the bureaucracy kills too much, there are simply too many hoops to go through to get anything done.

3.9 REGULATORY REVIEW, REVISION AND CHANGE

The entire aviation maintenance community, including FAA in the field and at Headquarters, are very frustrated with the process. All the information gathered on this issue can be summed up very simply, the system is broken, regulatory review, revision, change and implementation simply takes too long. Nothing ever happens. This has been expressed hundreds of ways, hundreds of times, by people from all facets of the aviation maintenance community, including those in the FAA who trust their anonymity will be protected. Those who will talk candidly on the subject don’t know how to fix it, wish someone would take on the task, but hold little hope that it will change any time soon.

The United States' performance in aviation maintenance regulatory review and revision compared to the rest of the world appears to be quite grim. There is no one to be found in the industry or within the regulator that is happy about this issue. Transport Canada, have been active in the [FAR](#) Part 65/66 review process, and are a good example of how a revision to a regulation can happen in a timely fashion.

The 1997 [GAO](#) report included strong recommendations that [FAR](#) Parts 65/66 and 145 have the review and revision process concluded quickly, since then there has been no change, most people say it is worse than ever.

3.9.1 Comments Gathered on the Regulator Review Process (Direct Quotes)

The United States, supposedly a world leader in aviation, should be embarrassed with its' slow and archaic regulatory review and revision process. Review and revision of Parts 65/66 and 145 have been in process for about 9-10 years. Both rules are stalled in the process with no action toward implementation in process that would provide for implementation within the next two years.

The [EEC](#), consisting of 11 European country's [JAA](#) developed and implemented both [JAR](#) Parts 66 and 147 in about 3½ years. These updated and harmonized rules, correspond to the US [FAA](#) Parts 65 and 147, are now recognized and followed by all EEC member states.

Transport Canada, the Canadian aviation regulatory body, reviewed, revised and produced a simplified version of their Aviation Maintenance Engineer (AME) rule (equivalent to the US [A&P](#)) in 2½ years. It was completed in house, with the input from industry, labor, and other interested parties. This significantly revised rule will become effective in June 1999.

[FAA](#) inspectors feel that Parts 66 and 145 will never come to rule. They feel it's certain that they will all be retired before it happens.

The industry has changed over the last 25 years; the [FAA](#) has also changed, Part 145 has not changed.

All of the [FARs](#) from 65 and up are poor, Part 25 is the best.

3.10 CONCLUSIONS

The aviation maintenance industry is staffed by people that know and understand their mission, and respect rules, regulations and regulators. There is no question that safety and continuous improvement is the primary objective. Repair station, airline, and the [FAA](#) personnel who oversee day-to-day operations are the backbone of our aviation maintenance safety system. They strive, regardless of what is going on above their levels of responsibility, to get the job done safely, efficiently and to make the operation better in every way they can.

The [GAO](#) 1997 report, [FAA Oversight of Repair Stations Needs Improvement](#), registered concern over inspection frequency and quality, and the methodology of major repair station oversight and inspection performed by the FAA. Every indication leads to the conclusion that these issues have been addressed, and solved, and this part of the system is working well. This does not mean that there are not remaining issues and problems that need to be addressed. The critical problems and issues, however, have been rectified. The safety of aviation maintenance is under control, with high quality oversight and frequent inspection from the FAA.

It was clear during the fieldwork that repair station people felt free to be more candid and forthright with their comments, more willing to discuss specifics. [FAA](#) personnel, while concerned about areas that need improvement, were somewhat reluctant to spell out specifics, choosing most often to keep their comments to generalities. The reasons for the difference seemed to stem from the FAA's being constantly bombarded with criticism and rarely being given positive recognition for the job they have to do. There is also reluctance, for obvious reasons, on the part of the FAA folks in the field to be too critical of those up the line.

Relations between the Repair Stations and [FAA](#) are best at the field level. There is an atmosphere of mutual respect, each understanding the role of the other. It was reassuring to observe that the relationships between the [PMIs](#), [ASIs](#) and the Repair Stations are, for the most part, positive. Given this, both the FAA in the field and the Repair Stations have difficulty with the FAA's systems, processes, communications from above, headquarters operations, and senior management (leadership). FAA staff in the trenches suggests that they keep things going well, in spite of what goes on at levels above the Regions.

The [FAA](#) is a very large organization that has monumental responsibilities. The organization is constantly under the microscope of public opinion, media scrutiny, congressional review and political pressure. They are under a constant barrage of often subjective, unsupported criticism from all quarters. The general public and the majority of the media have no idea, concept, or understanding of the complexity and difficulty of the FAA's task. It seems that when the system is running well they receive no credit, but when there is an accident or serious incident, they receive more blame than is deserved. Given all the above, the FAA has some serious and difficult problems to solve, issues to address, and processes that need improvement.

The aviation maintenance safety system works. It is meeting the objective of ensuring that work at major repair stations is in compliance with all rules, regulations, and procedures. The concern is the amount of unnecessary effort required, the frustrations in dealing with differing interpretations of the same subject, the lost productivity for both industry and the [FAA](#), and the high costs this generates.

3.11 RECOMMENDATIONS

1. Review the organizational structure and operations of the [FAA](#) nine geographic regions. The comment that there are nine FAAs in operation out there is heard frequently. Each Regional Office is setting its' own policies and may differ widely their in interpretation of rules, regulations, and procedures. The regional organizational structure is in place to maintain sufficient management control over the system and keep the day to day operations on track. There is reason to believe, given some of the comments gathered during this project, that there is presently too much autonomy at the regional level, and that revisions to communication and management control procedures are required.
2. Aviation technical manuals, documentation and job task cards need to be reviewed and the need for industry standardization addressed. The [FAA](#) needs to challenge the aviation industry associations to meet this need by developing the necessary standards. If the industry cannot accomplish the task without rulemaking, the FAA should evaluate the situation and propose standardization rules as required. (Effective industry standards for Non-Destructive Testing, Guidelines for Maintenance Training, and Maintenance Human Factors Programs are examples of what can be accomplished.)
3. The worldwide safety improvements made through Human Factors in Aviation Maintenance and Inspection, and Error Management Programs needs to be recognized. The [FAA](#) should review the reasoning used by other international aviation regulatory agencies that caused them to include Maintenance Human Factors Programs in their operational rules. Objective consideration should be given to similar rulemaking in the US.

4. [FAA](#) Aviation Safety Inspector (Airworthiness) training needs to be reviewed for appropriate content, and effectiveness. The willingness of airlines and repair stations to participate in the field training and/or on-the-job training of [PMIs](#) and [ASIs](#) should be accepted and included in the FAA's program.
5. Provide online communications through [FAA](#)'s outstanding web site, [FAA.GOV](#), as to the status of all in process and proposed rulemaking. The information should contain current status, work currently in process, expected completion of such work, proposed release date of [NPRM](#), if applicable, and/or the expected release date of rules. The same status information on pending Advisory Circulars and other procedural information should also be available on the web site.
6. Develop an open, easily accessed process for mediation and/or arbitration of disputes between [PMIs](#)/[ASIs](#) and maintainers in the field. This should be an open, non-threatening, objective system where differing interpretation of rules and regulations can be quickly resolved. This could be accomplished with a simple referee review board, with follow on resolution steps up to and including binding arbitration. Enlist the participation of industry to help develop this process.
7. Conduct a formal, in depth, evaluation of current regulatory review, revision and change. There is sufficient input from every quarter that provides more than enough motivation and justification to move forward. After the review has been conducted and the results evaluated, necessary process revisions and changes should be made quickly. Though many in the [FAA](#) consider it to be world's leader, they should look to their counterparts in Canada and the [EEC](#) for guidance on how to improve the US system.
8. [FAA](#) leadership needs to spend more time meeting and working with personnel at the operational level of industry, and within their own ranks. Relying primarily on a small group of internal FAA senior management, technical representatives, and leaders of industry associations, and special interest groups, does not necessarily provide them with a clear view of what is going on within the industry. The FAA needs to work toward obtaining unfiltered, unbiased, information from the people who have to get the job done by doing it.

3.12 REFERENCES

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