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Subcommittee on Aviation Operations, Safety, and Security
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Aviation Safety: FAA Oversight of Foreign Repair Stations

**Statement of
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Inspector General
U.S. Department of Transportation**



Mr. Chairman and Members of the Subcommittee:

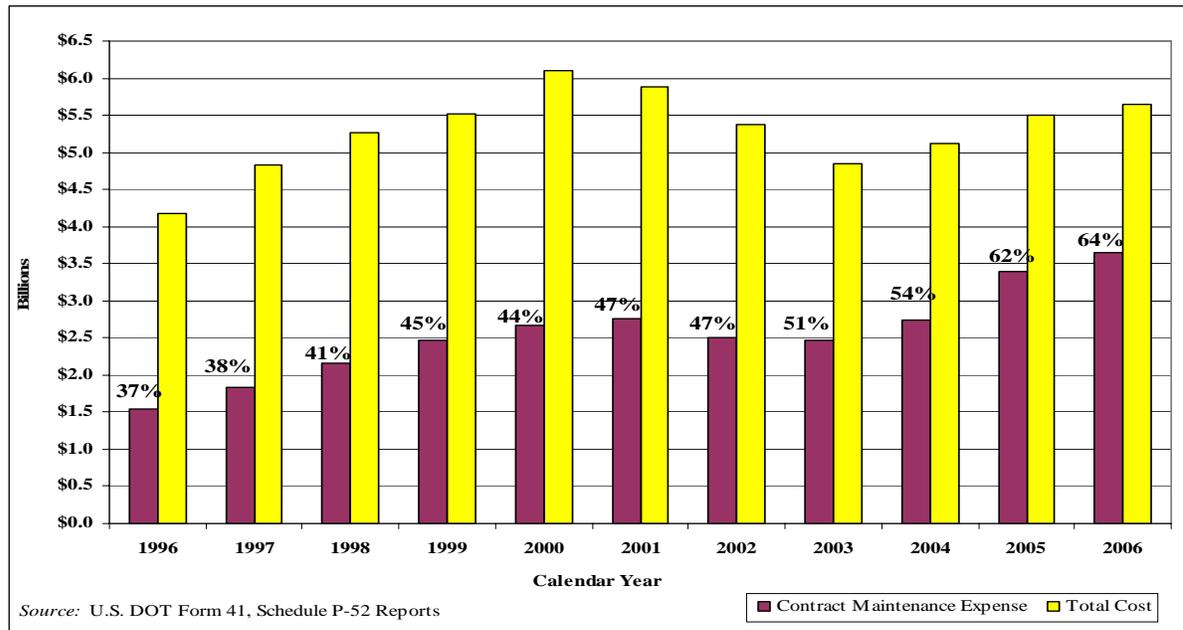
We appreciate the opportunity to testify on the Federal Aviation Administration's (FAA) oversight of foreign repair stations and facilities. Our testimony today is based on a number of our previous reports as well as our ongoing work. At the outset, it is important to note that while the United States has the most complex aviation system in the world, it is also the safest. Multiple layers of controls in air carrier operations and maintenance processes, along with FAA's oversight, are largely responsible for the high level of safety that we have seen in the last 5 years.

This safety record is a remarkable accomplishment given the many changes occurring within the industry. For example, air carriers continue to struggle for profitability and are aggressively working to cut costs by reducing in-house staff, renegotiating labor agreements, and increasing the use of external repair facilities—many of which are located in foreign countries.

Today's aviation environment continues to evolve. Since 2001, eight commercial air carriers have gone through bankruptcy and one has ceased operations. Fuel prices remain high, and this makes cost control a key factor in both the sustained profitability and overall survival of an airline. Personnel and aircraft maintenance are also significant cost areas within an air carrier's operations, and air carriers have been outsourcing, or contracting out, more maintenance to domestic and foreign repair stations to reduce these costs. Outsourcing maintenance is also a means for air carriers to accommodate the increasingly global nature of air travel. That is, having maintenance contracts with facilities around the world permits air carriers to readily obtain needed maintenance repairs and services.

Air carriers have outsourced maintenance for years to both domestic and foreign repair facilities. These facilities can complete repairs for less cost and provide services in areas (such as engine repair) that would otherwise require air carriers to have specialized equipment and staff. Many air carriers outsource their engine work to the original equipment manufacturers because of the level of expertise and the product warranties that the manufacturers can provide. However, in recent years, use of external repair facilities has become more prominent. From 1996 to 2006, while total maintenance costs fluctuated, air carriers continued to increase the percentage of maintenance dollars spent on outsourced maintenance—from 37 percent to 64 percent. In 2006, \$3.7 billion of the \$5.7 billion spent on maintenance was outsourced (see figure 1).

Figure 1. Percentage Increase in Outsourced (Contract) Maintenance Expense for Major Air Carriers¹ From 1996 to 2006



Neither FAA nor the Department maintain information on how much maintenance air carriers outsource to foreign facilities, but our work shows that the number of foreign FAA-certificated repair stations repairing U.S. aircraft has increased from 344 in 1994 to 698 in 2007. We have emphasized that the issue is not where maintenance is performed but that maintenance requires effective oversight.

However, we have identified challenges in FAA's ability to effectively monitor the increase in outsourcing. For example, in July 2003, we reported² that FAA had not shifted its oversight of aircraft maintenance to the locations where the maintenance was performed. Although air carriers were using external repair stations to perform more of their maintenance work, FAA was still focusing most of its inspections on the maintenance work that air carriers performed within their own facilities.

FAA has taken a number of steps to improve its oversight, and we will discuss some of those improvements today. However, the continuous growth in outsourcing underscores the need for FAA to remain vigilant in continually improving its oversight.

¹ Alaska Airlines, America West Airlines, American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, Southwest Airlines, United Airlines, and U S Airways.

² OIG Report Number AV-2003-047, "Review of Air Carriers' Use of Aircraft Repair Stations," July 8, 2003. OIG reports and testimonies can be found on our website: www.oig.dot.gov.

Today, I will begin by briefly discussing the regulatory differences between foreign and domestic repair stations. I will then move to two areas that we see as key in FAA's efforts to effectively oversee outsourced air carrier maintenance—including that performed by foreign repair stations and facilities.

- **Regulatory differences between domestic and foreign repair stations:** FAA-certificated maintenance facilities are referred to as repair stations. FAA has certificated (or licensed) 698 foreign repair stations to perform work on U.S. aircraft. The issuance of an FAA certificate means that FAA has determined that the facilities have the equipment, personnel, and inspection systems to ensure that repairs are completed according to FAA standards. Unlike U.S. repair stations, foreign repair stations must first demonstrate a need to obtain an FAA certificate—that is, the facility must show that it has potential customers with U.S.-registered aircraft. Also, foreign repair station certificates are only valid for a 1- to 2-year period.

These requirements are more stringent than those mandated for domestic repair stations. However, foreign repair stations are currently exempt from some FAA requirements that domestic repair stations must meet. For example, FAA requires domestic repair stations to have drug and alcohol programs to periodically test employees performing maintenance but does not require foreign repair stations to perform drug and alcohol testing on their employees.

- **Strengthening safety oversight of repair stations and non-certificated repair facilities:** During the past 8 years, FAA has taken important steps to move its safety oversight for air carriers and repair stations to risk-based systems. FAA's new oversight system applies to both domestic and foreign repair stations. It is designed to help FAA inspectors focus their outsourced maintenance oversight on areas that pose the greatest safety risks. FAA is clearly on the right path; however, the risk-based systems are not yet at an end state.

FAA cannot effectively implement a risk-based system for oversight of aircraft maintenance if it does not know where the maintenance is performed. In July 2003 and December 2005,³ we reported that FAA did not have good systems for determining which repair facilities air carriers were using to perform their most critical maintenance. FAA has developed new inspector guidance and air carrier processes to address this problem, but these efforts still fall short of providing FAA with the information it needs. For example, FAA has developed a voluntary process for air carriers to report the top 10 critical maintenance providers used each quarter. However, as long as the process is voluntary, FAA cannot be assured that it is getting the accurate and timely information needed to determine

³ OIG Report Number AV-2006-031, "Review of Air Carriers' Use of Non-Certificated Repair Facilities," December 15, 2005.

where it should focus its inspections. Further, we reported that FAA was not aware that non-certificated repair facilities performed critical repairs for U.S. air carriers. Our review of 19 air carrier maintenance vendor lists showed that all 19 air carriers used non-certificated repair facilities to some extent. We identified over 1,400 non-certificated repair facilities performing maintenance, and more than 100 of these facilities were located in foreign countries. FAA's efforts to improve its oversight in this area are still underway.

- **Ensuring that inspectors are well-positioned to adequately oversee maintenance outsourcing:** FAA has approximately 3,821 inspectors located in offices throughout the United States and in other countries. FAA inspectors must oversee both domestic and foreign aspects of air carriers' maintenance operations—a task made more difficult by the rapidly changing aviation environment. The pace of these changes makes it imperative for FAA to maintain a sufficient number of inspectors to perform safety oversight and place them in the right locations.

In the next 5 years, 51 percent of the current inspection workforce will be eligible to retire. However, this is only one of the challenges that FAA faces with its inspectors. For example, FAA does not have a staffing model to determine the number of inspectors needed and where they should be placed. Until FAA develops a staffing model, it will not be able to make the most effective use of its resources.

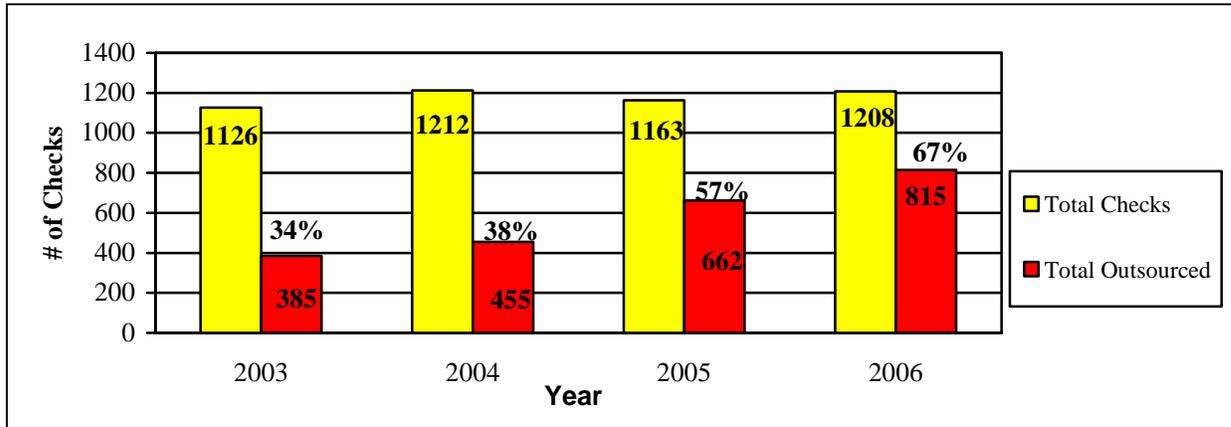
I would now like to discuss the changes occurring in the aviation industry, regulatory differences, and these two key areas in further detail.

Recent Trends in Outsourcing

We are conducting a review of the type and quantity of maintenance that air carriers are outsourcing; we plan to report on this review later this year. We are finding that the amount, or quantity, of maintenance that air carriers outsource continues to climb. Further, the work that U.S. air carriers outsource includes everything from repairing critical components, such as landing gear and engine overhauls, to performing heavy airframe maintenance checks, which are a complete teardown and overhaul of aircraft. As shown in figure 2, nine major air carriers⁴ we reviewed increased the percentage of heavy maintenance they outsourced to certificated repair stations from 34 percent in 2003 to 67 percent in 2006.

⁴ The carriers represent a cross-section of nine of the largest network and low-cost air carriers and included AirTran Airways, Alaska Airlines, America West Airlines, Continental Airlines, Delta Air Lines, JetBlue Airways, Northwest Airlines, Southwest Airlines, and United Airlines. Because American Airlines, the largest U.S. air carrier, has retained its heavy maintenance as opposed to making a significant shift to outsourcing, we did not include it in our review.

Figure 2. Percentage of Heavy Airframe Maintenance Checks Outsourced for Nine Major Air Carriers From 2003 to 2006

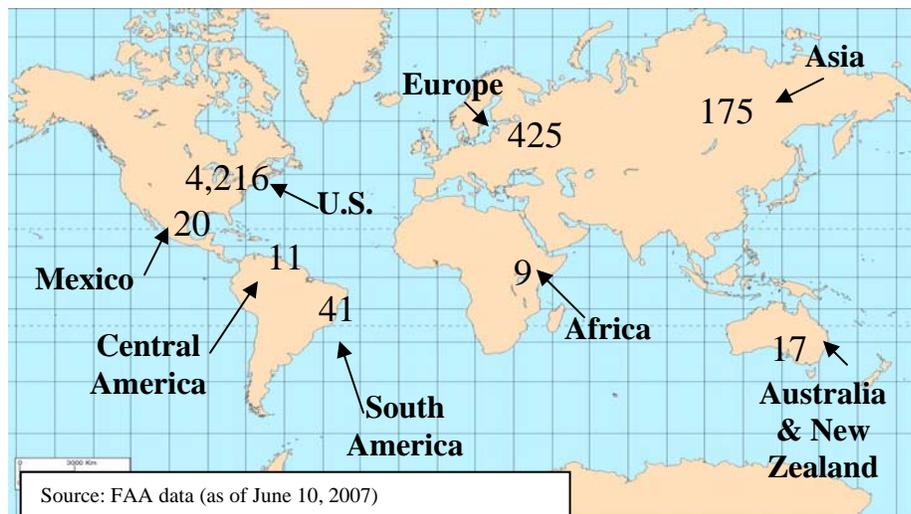


Source: Air carrier data

Of the heavy maintenance outsourced by the nine carriers in 2006, 35 percent was sent to foreign maintenance providers, up from 21 percent in 2003. The trend in outsourcing is significant and underscores the need for FAA to ensure that it has accurate information on where critical maintenance is performed so it can target its inspection resources.

Repair stations certificated by FAA are located worldwide, as shown in figure 3. There are currently 4,216 domestic and 698 foreign FAA-certificated repair stations available for use by U.S. air carriers.

Figure 3. Locations of FAA-Certificated Repair Stations



In addition, there are approximately 900 repair facilities in Canada that could be used by U.S. air carriers. Under a reciprocal agreement with the United States, Canadian officials certify and monitor operations at these facilities. FAA oversees work

performed on U.S. aircraft. At least two major U.S. carriers use Canadian facilities to perform heavy airframe maintenance, and, as I will discuss later, air carriers also use domestic and other foreign non-certificated repair facilities to perform aircraft maintenance.

Regulatory Differences Between Domestic and Foreign Repair Stations

FAA has approved 698 repair stations in countries around the world to perform work on U.S. aircraft. While FAA verifies that the repair stations have the equipment, personnel, and inspection systems to ensure that repairs are completed according to FAA standards, the repair stations are under the regulatory control of a foreign governmental authority. As a result, there are some requirements that FAA does not impose on the facilities. For example, FAA does not require foreign repair stations to conduct background checks or drug and alcohol testing on their employees. There are also other differences between foreign and domestic repair stations (see table 1).

Table 1. Regulatory Differences Between Domestic and Foreign Repair Stations

Regulatory Difference	<i>Domestic</i> FAA-Certificated Repair Stations	<i>Foreign</i> FAA-Certificated Repair Stations
<i>Duration of FAA Certificate</i>	Certificate lasts indefinitely	Certificate must be renewed every 1 to 2 years
<i>Fees for Certification</i>	Do not pay FAA for certification	Pay FAA for certification and renewal costs
<i>Drug and Alcohol Testing Program</i>	Required to have a program	Not required to have a program
<i>Certificated Mechanics</i>	Certain personnel, such as return to service and supervisory personnel, must be FAA-certificated	Personnel are not required to be FAA-certificated <i>(Note: Personnel must meet certain training and qualification requirements. Mechanics may be certificated by the aviation authority where they are located.)</i>
<i>Security Regulations</i>	Repair stations on commercial airport property are subject to security requirements	Repair stations are not subject to U.S. security requirements

Source: OIG

As table 1 demonstrates, foreign repair stations must comply with more stringent requirements, in some respects, than domestic repair stations to get and maintain their FAA certification. For example, foreign repair station applicants must show the need to obtain an FAA certificate. That is, applicants must be able to show that they have customers with U.S.-registered aircraft or customers with parts used on U.S.-registered aircraft. U.S. repair station applicants do not have to meet these criteria. Also, an FAA foreign repair station certificate is only valid for a 1- to 2-year period.

Foreign repair stations must pay for comprehensive annual or biannual FAA-required inspections in order to maintain, or renew, their certificate, whereas domestic repair stations can hold their certificates indefinitely. Conversely, in some areas, such as personnel requirements, domestic repair stations are held to more stringent provisions than their foreign counterparts. For example, U.S. repair stations must employ FAA-certificated mechanics to approve all repairs; foreign repair stations are not held to this requirement.

However, some foreign countries may have their own mechanic licensing requirements that are just as stringent as those required of FAA-certificated mechanics. For example, one country we visited requires its mechanics to be at least 21 years old and have a minimum of 48 months of aviation experience. Also, this country's mechanics are certificated for a specific size of aircraft. In contrast, FAA-certificated mechanics must be at least 18 years old and have a minimum of 30 months of aviation experience; also, they can work on aircraft of any size.

In 2003, we identified another difference between foreign and some domestic repair stations—repair stations located on commercial U.S. airport property must comply with U.S. security requirements. Repair stations located on foreign airport property in foreign countries are not subject to U. S. security requirements. The level and depth of security programs in other countries, including background checks, are subject to the government requirements in the country where the repair station operates.

To address security concerns at aircraft repair stations, Congress included a provision in the Federal Aviation Reauthorization Act (Vision 100),⁵ which required the Transportation Security Administration, in consultation with FAA, to issue a final rule imposing security standards on foreign and domestic repair stations by August 2004. The rule has not yet been issued.

⁵ Vision 100 – Century of Aviation Reauthorization Act, Pub. L. No. 108-176 (2003).

Strengthening Safety Oversight of Repair Stations and Non-Certificated Repair Facilities

FAA has strengthened its repair station oversight through implementation of a risk-based oversight system for both domestic and foreign repair stations. The system is designed for inspectors to use information obtained from data analysis to focus their oversight on areas with the greatest safety risks. In our view, a risk-based system is even more crucial to FAA's ability to maximize its inspection resources and travel budget given the increasingly global nature of the airline industry. Risk-based oversight should significantly enhance FAA's ability to focus its inspections; however, we have identified a number of concerns that FAA must address to continue advancing the program.

FAA Must Ensure That Its New Risk-Based Oversight System for Repair Stations Is Effective

In July 2003, we reported that FAA oversight had not shifted to where the maintenance was actually being performed. Instead, inspectors continued to focus inspections on in-house air carrier maintenance. For example, inspectors completed 400 inspections of in-house maintenance at 1 air carrier but only 7 inspections of repair stations. This occurred even though this carrier contracted out nearly half of its maintenance that year.

We also reported that 138 repair stations in Germany, France, and Ireland were not inspected by FAA at all. Under a bilateral agreement with the European Joint Aviation Authorities, FAA permitted foreign authorities to inspect FAA-certificated repair stations on its behalf to prevent duplicative inspections and reduce the financial burden on foreign repair stations. However, FAA did not have an adequate method to monitor the surveillance performed by other authorities. For example, most of the inspection files we reviewed that FAA received from the foreign authorities were either incomplete, written in a foreign language, or otherwise difficult to comprehend.

Since our 2003 report, FAA officials have worked closely with the aviation authorities of other countries to improve the surveillance they perform on FAA's behalf. For example, FAA is no longer limited in the number of inspections it can perform to verify the quality of foreign aviation authority inspections. However, we are concerned that FAA is still not regularly visiting the facilities in the countries where agreements exist with other aviation authorities. For example, FAA international field office inspectors had not conducted any spot inspections of one major foreign engine repair station in 5 years (2001-2006). In addition, FAA inspectors for 1 air carrier that used the repair station had not visited the facility within the same 5-year period, even though the repair station had performed maintenance on 39 (74 percent) of the 53 engines repaired for the air carrier.

In recent years, FAA has made significant progress in improving its repair station oversight. For example, under FAA's old inspection system for repair stations, inspectors were instructed to perform one inspection of each facility per year and could review any aspect of the repair station's operations. Inspectors were not required to provide detailed information on the areas they inspected or the issues identified. Since October 2005, inspectors have been required to review 15 areas within repair station operations to obtain a baseline assessment of each facility. Using the information from this assessment, inspectors can focus their oversight on risk areas identified within the facility. Further, the information generated from this oversight will be available for review by all FAA inspectors to assist them in targeting their inspections more effectively.

For the new oversight system to be successful, FAA needs to ensure that its inspectors receive the training they need to properly implement the new processes. FAA must also ensure that it has reliable processes for determining where maintenance is performed.

FAA Must Have Adequate Processes for Determining Where the Most Critical Maintenance Is Performed and How it Should Be Monitored

In 2003, we reported that FAA inspectors did not have effective procedures for determining which FAA-certificated repair stations air carriers were using to perform maintenance that could impact the airworthiness of their aircraft. In December 2005, we reported that FAA was unaware of air carriers' use of non-certificated repair facilities to perform critical maintenance.⁶ These facilities are not covered under FAA's routine oversight program and do not have the same regulatory requirements as repair stations that obtain certification from FAA.

Air carriers are required to provide—and FAA must approve—a list of substantial maintenance providers, which are repair stations that can conduct major repairs on the air carrier's aircraft. These procedures are designed to provide inspectors with information on where air carriers intend to send their substantial maintenance. However, the information that air carriers provided did not always represent the facilities they actually used or show the quantity of work they sent to each facility. For example, we identified one foreign repair station designated as a "substantial maintenance provider" for a major U.S. carrier even though it had not conducted any significant maintenance work for the air carrier in almost 3 years. FAA's surveillance should be better targeted to those repair facilities that air carriers use regularly.

⁶ In our December 2005 report, we identified critical repairs as those repairs categorized as Required Inspection Items by each air carrier. Required Inspection Items are mandatory maintenance activities that, due to the importance to the overall airworthiness of the aircraft, must be independently inspected by a specially trained inspector after the work is completed.

FAA's new process for identifying certificated repair stations that air carriers use to perform maintenance is not effective. In response to our July 2003 report, FAA implemented a system in fiscal year 2007 for both air carriers and repair stations to submit quarterly utilization reports. These reports are supposed to show the quantity, or volume, of critical repairs that maintenance providers perform for air carriers and repair stations. However, submission of this information is not mandatory. FAA's Flight Standards staff advised us that a new rule would be required to make volume reporting mandatory and that they believed air carriers would provide the requested information voluntarily. Early indicators show that air carriers are submitting the reports. Our review of FAA records for nine air carriers showed that as of March 23, 2007, seven of the nine air carriers had submitted quarterly utilization reports for the quarter ending December 2006. FAA must ensure that air carriers file these reports in a timely manner.

Our primary concerns with the reports are that (1) air carriers do not include all repair stations that provide critical component repairs and (2) FAA does not validate the information provided. Air carriers are only requested to report the top 10 substantial maintenance providers used—the ones most frequently used per quarter. The reports do not have to include repair stations that perform high-volume, critical component repairs on parts such as wheels and brakes because FAA's definition of substantial maintenance does not include component repairs. Further, without some form of data verification, FAA cannot be assured that air carriers have provided accurate and complete information. If the reports are to be an effective means for FAA to track and accurately target those repair facilities that air carriers use the most, a more thorough process will be needed.

FAA needs to develop a mechanism to identify non-certificated repair facilities performing critical maintenance for air carriers. In December 2005, we reported that air carriers were using domestic and foreign repair facilities that were not certificated by FAA to perform critical and scheduled⁷ aircraft maintenance. FAA was unaware of this practice. Air carriers have used non-certificated facilities for years, but it was widely believed that these facilities principally performed minor aircraft work on an as-needed basis. However, we determined that both domestic and foreign non-certificated facilities can and do perform the same type of work as FAA-certificated repair stations, including scheduled and critical maintenance. We examined records at three air carriers and identified 6 domestic and foreign facilities that performed scheduled maintenance and 21 that performed maintenance critical to the airworthiness of the aircraft.

⁷ This maintenance is required to be performed at regularly scheduled times, such as inspections required after the aircraft has flown a designated number of hours (e.g., inspections of crew and passenger oxygen, aircraft fuselage, wings, and engines).

We are especially concerned that air carriers rely on non-certificated facilities to perform scheduled maintenance tasks that the air carriers can plan for well in advance. For example, we identified an air carrier's use of a non-certificated facility to perform work on three aircraft that was required for compliance with an FAA Airworthiness Directive. Other critical repairs we found included adjustments to flight control systems and removal and replacement of an engine.

FAA does not know how many non-certificated maintenance facilities air carriers currently use because it does not maintain a list of the facilities. We sampled 19 air carriers, and all 19 were using non-certificated facilities to some extent. We identified over 1,400 non-certificated repair facilities performing maintenance, and more than 100 of these facilities were located in foreign countries, such as Aruba, Belize, Bermuda, Dominican Republic, El Salvador, Guatemala, Haiti, and Mexico. It is important to note that in many instances, air carriers contracted with facilities in these locations to ensure that they had a maintenance source in locations where there were no FAA-certificated repair stations available.

Nevertheless, permitting non-certificated facilities to perform critical maintenance is an important issue that FAA must address. To do so, FAA must first determine which non-certificated facilities perform critical and scheduled maintenance and then decide if it should limit the type of work these facilities can perform.

FAA Cannot Rely on Air Carrier Oversight Programs for Non-Certificated Repair Facilities

FAA permits air carriers to use domestic and foreign non-certificated facilities as long as the work is approved by an FAA-certificated mechanic. However, this is not an adequate substitute for an FAA-certificated repair facility because non-certificated facilities do not have the safeguards and controls for maintenance repair and oversight that is required at FAA-certificated facilities. Differences in FAA requirements for these two types of maintenance operations are illustrated in table 2.

Table 2. Differences in Requirements for FAA-Certificated Repair Stations and Non-Certificated Facilities

FAA Requirement	Certificated Repair Station	Non-Certificated Repair Facility
Annual FAA Inspections	Required	Not Required
Quality Control System	Required	Not Required
Report Failures, Malfunctions, and Defects	Required	Not Required
Designated Supervisors and Inspectors	Required	Not Required
Training Program	Required	Not Required
Facilities and Housing*	Required	Not Required

*If authorized to perform airframe repairs, certificated repair stations must have facilities large enough to house the aircraft they are authorized to repair.

Source: OIG analysis

We found that air carrier quality systems under which these repairs were performed were not as effective as they should have been. This was particularly true in the areas of mechanic training and oversight of these facilities.

Non-certificated repair facilities are not required to employ designated supervisors and inspectors to monitor maintenance work as it is being performed. Relying solely on the expertise of an individual mechanic to ensure that repairs are completed properly is an inadequate control mechanism. In our view, this is the reason FAA requires added layers of oversight, such as designated supervisors and inspectors, in its certificated facilities.

In our December 2005 report, we stated that neither FAA nor the six air carriers we visited provided adequate oversight of the work performed at non-certificated repair facilities. The air carriers we reviewed relied primarily on telephone contact to monitor maintenance performed at these facilities rather than conducting on-site reviews of the actual maintenance work. In contrast, as an added level of quality control, air carriers often assign on-site representatives to monitor the work performed at certificated repair stations.

Despite the differences in quality controls and oversight that exist between certificated and non-certificated maintenance facilities, there are no limitations on the scope of work that non-certificated repair facilities can perform. For example, we looked at critical repairs performed under special authorizations at 1 air carrier and

found that over a 3-year period, 14 of the 19 (74 percent) repairs were performed at non-certificated repair facilities. Examples of the work performed include landing gear checks, lightning strike inspections, and door slide replacements. In contrast, FAA-certificated repair stations are limited to completing only the specific maintenance tasks that FAA has determined the facility is capable of performing.

FAA agreed that it needs to place more emphasis on the oversight that air carriers provide to non-certificated facilities and that it needs to gather more information on the type of work these facilities perform. FAA's efforts in this area are still underway. If FAA is to achieve the planned improvements in oversight of outsourced maintenance, it will need to obtain definitive data on where air carriers are getting the maintenance performed, including critical and scheduled maintenance work done at non-certificated repair facilities, so that it can focus its inspections to areas of greatest risk.

Ensuring Inspectors Are Well-Positioned To Adequately Oversee Maintenance Outsourcing

In June 2005, we reported that FAA needed to ensure that its inspection workforce was adequately staffed. Currently, FAA has approximately 3,821 inspectors located in offices throughout the United States and other countries. FAA has assigned a portion of its inspector workforce to verify that foreign facilities used by U.S. air carriers continue to meet FAA standards. As shown in table 3, FAA has 86 International Field Office inspectors. Of these 86 inspectors, approximately 47 are located abroad (i.e., Germany, England, and Singapore).

Table 3. FAA International Field Office Inspectors and Their Areas of Responsibility

International Field Office (IFO)	Number of Inspectors	Area of Responsibility	Number of Foreign Repair Stations
Dallas IFO	5	Mexico	20
Frankfurt IFO	26	Europe (excluding the United Kingdom), Africa, and the Middle East	300
London IFO	13	United Kingdom	162
Miami IFO	20	South America, Central America, and the Caribbean	52
San Francisco IFO	14	Australia, New Zealand, Japan, Korea, Philippines, Fiji, Taiwan, and other Asian-Pacific Island Nations	61
Singapore IFO	8	China, Hong Kong, India, Indonesia, Malaysia, Singapore, Thailand, and other Asian-Pacific Nations	103
TOTAL	86 Inspectors		698 Repair Stations

Source: FAA data (as of June 10, 2007)

FAA will never have enough inspectors to oversee every aspect of aviation operations. However, FAA faces challenges in balancing potential inspector retirements with the number of inspectors it is able to hire. This year, 27 percent (or 1,037 of the 3,821) of the current inspector workforce will be eligible to retire. By 2012, 51 percent of the workforce will be eligible to retire. To counter this trend, FAA requested funding to hire an additional 203 aviation safety inspectors in its fiscal year 2008 budget submission. In 2006, FAA hired 538 inspectors, but lost 226 (181 to retirements and 45 for other reasons). However, FAA will need to know where to place inspectors to make the most effective use of its resources.

FAA Needs a Process To Determine Inspector Placement

FAA does not have a process to determine the number of inspectors needed and where they should be placed. FAA has made at least two attempts to develop a staffing model to determine the appropriate number of and best locations for its inspectors. However, neither of the two models provided FAA with an effective approach to allocate inspector resources. During our review of FAA oversight of financially distressed and low-cost air carriers, we found inconsistencies in the way that FAA allocated inspectors among field offices. For example, two FAA offices had the same number of inspectors assigned to oversee the air carriers in their geographic areas

even though one of those carriers had twice as many aircraft and 127 percent more flights than the other.

Until FAA develops an effective staffing model, it will not be able to determine where inspectors should be placed to make the most effective use of its resources. The important implications of the changing U.S and global aviation environment that we have discussed today are expected to be key drivers of future inspector staffing needs. Air carriers' outsourcing of aircraft maintenance, FAA's shift to a system safety oversight approach, and safety inspectors' attrition and retirement are all significant changes that must be considered in determining staffing needs. FAA advised us that it has hired an independent contactor to conduct a study to determine the most effective staffing mechanism. However, completion of this process is likely years away.

Mr. Chairman, that concludes my statement. I would be pleased to address any questions that you or other Members of the Subcommittee might have.

The following pages contain textual versions of the graphs and charts found in this document. These pages were not in the original document but have been added here to accommodate assistive technology.

Aviation Safety: FAA Oversight of Foreign Repair Stations

Section 508 Compliant Presentation

Figure 1. Percentage Increase in Outsourced Maintenance Expense for Major Air Carriers From 1996 to 2006

(Year) 1996	Of the total maintenance cost, 37 percent was outsourced maintenance expense.
(Year) 1997	Of the total maintenance cost, 38 percent was outsourced maintenance expense.
(Year) 1998	Of the total maintenance cost, 41 percent was outsourced maintenance expense.
(Year) 1999	Of the total maintenance cost, 45 percent was outsourced maintenance expense.
(Year) 2000	Of the total maintenance cost, 44 percent was outsourced maintenance expense.
(Year) 2001	Of the total maintenance cost, 47 percent was outsourced maintenance expense.
(Year) 2002	Of the total maintenance cost, 47 percent was outsourced maintenance expense.
(Year) 2003	Of the total maintenance cost, 51 percent was outsourced maintenance expense.
(Year) 2004	Of the total maintenance cost, 54 percent was outsourced maintenance expense.
(Year) 2005	Of the total maintenance cost, 62 percent was outsourced maintenance expense.
(Year) 2006	Of the total maintenance cost, 64 percent was outsourced maintenance expense.

Source: United States Department of Transportation Form 41, Schedule P-52 Reports

Figure 2. Percentage of Heavy Airframe Maintenance Checks Outsourced for Nine Major Air Carriers From 2003 to 2006

(Year) 2003	1,126 total checks; of this amount, 385 (or 34 percent) were outsourced.
(Year) 2004	1,212 total checks; of this amount, 455 (or 38 percent) were outsourced.
(Year) 2005	1,163 total checks; of this amount, 662 (or 57 percent) were outsourced.
(Year) 2006	1,208 total checks; of this amount, 815 (or 67 percent) were outsourced.

Source: Air carrier data

Figure 3. Locations of Federal Aviation Administration-Certificated Repair Stations

United States	4,216 Repair Stations
Mexico	20 Repair Stations
Central America	11 Repair Stations
South America	41 Repair Stations
Europe	425 Repair Stations
Africa	9 Repair Stations
Asia	175 Repair Stations
Australia and New Zealand	17 Repair Stations

Source: Federal Aviation Administration data (as of June 10, 2007)

Table 1. Regulatory Differences Between Domestic and Foreign Repair Stations

Regulatory Difference	Duration of FAA Certificate	For domestic FAA-certificated repair stations: Certificate lasts indefinitely	For foreign FAA-certificated repair stations: Certificate must be renewed every 1 to 2 years
Regulatory Difference	Fees for Certification	Domestic FAA-certificated repair stations: do not pay FAA for certification	Foreign FAA-certificated repair stations: Pay FAA for certification and renewal costs
Regulatory Difference	Drug and Alcohol Testing Program	Domestic FAA-certificated repair stations: Are required to have a program	Foreign FAA-certificated repair stations: Are not required to have a program
Regulatory Difference	Certificated Mechanics	For domestic FAA-certificated repair stations: Certain personnel, such as return to service and supervisory personnel, must be FAA-certificated	For foreign FAA-certificated repair stations: Personnel are not required to be FAA-certificated <i>(Note: Personnel must meet certain training and qualification requirements. Mechanics may be certificated by the aviation authority where they are located.)</i>
Regulatory Difference	Security Regulations	For domestic FAA-certificated repair stations: Repair stations on commercial airport property are subject to security requirements	For foreign FAA-certificated repair stations: Repair stations are not subject to U.S. security requirements

Source: OIG

Table 2. Differences in Requirements for Federal Aviation Administration-Certificated Repair Stations and Non-Certificated Facilities

Federal Aviation Administration Requirement: Annual Federal Aviation Administration Inspections	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities
Federal Aviation Administration Requirement: Quality Control System	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities
Federal Aviation Administration Requirement: Reporting of Failures, Malfunctions, and Defects	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities
Federal Aviation Administration Requirement: Designated Supervisors and Inspectors	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities
Federal Aviation Administration Requirement: Training Program	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities
Federal Aviation Administration Requirement: Facilities and Housing	Required at Federal Aviation Administration-Certificated Repair Stations	Not Required at Non-Certificated Facilities

Note to Facilities and Housing Requirement: If authorized to perform airframe repairs, certificated repair stations must have facilities large enough to house the aircraft they are authorized to repair.

Source: Office of Inspector General analysis

Table 3. Federal Aviation Administration Field Office Inspectors and Their Areas of Responsibility

Dallas International Field Office	5 Inspectors	Area of Responsibility: Mexico	20 Foreign Repair Stations
Frankfurt International Field Office	26 Inspectors	Area of Responsibility: Europe (excluding the United Kingdom), Africa, and the Middle East	300 Foreign Repair Stations
London International Field Office	13 Inspectors	Area of Responsibility: United Kingdom	162 Foreign Repair Stations
Miami International Field Office	20 Inspectors	Area of Responsibility: South America, Central America, and the Caribbean	52 Foreign Repair Stations
San Francisco International Field Office	14 Inspectors	Area of Responsibility: Australia, New Zealand, Japan, Korea, Philippines, Fiji, Taiwan, and other Asian-Pacific Island Nations	61 Foreign Repair Stations
Singapore International Field Office	8 Inspectors	Area of Responsibility: China, Hong Kong, India, Indonesia, Malaysia, Singapore, Thailand, and other Asian-Pacific Nations	103 Foreign Repair Stations

Totals shown in table 1 are as follows: 86 total international field office inspectors and 698 total foreign repair stations.

Source: Federal Aviation Administration; data are as of June 10, 2007