



U.S. DEPARTMENT OF TRANSPORTATION  
**OFFICE OF INSPECTOR GENERAL**

**FAA Has Not Effectively Overseen  
Southwest Airlines' Systems for  
Managing Safety Risks**

**FAA**

Report No. AV2020019

February 11, 2020





## FAA Has Not Effectively Overseen Southwest Airlines' Systems for Managing Safety Risks

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*Self-initiated*

Federal Aviation Administration | AV2020019 | February 11, 2020

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### What We Looked At

On March 9, 2015, the Federal Aviation Administration (FAA) established requirements for air carriers to implement a formal, top-down approach to identifying and managing safety risks, known as safety management systems (SMS). However, recent events have raised concerns about FAA's safety oversight, particularly for Southwest Airlines, one of the largest passenger air carriers in the United States. In early 2018, our office received a hotline complaint regarding FAA's oversight of Southwest Airlines and a number of operational issues at the carrier. Then, in April 2018, Southwest Airlines Flight 1380 suffered an engine failure that resulted in the first U.S. passenger fatality in over 9 years. We initiated an audit to assess FAA's oversight of Southwest Airlines' systems for managing risk.

### What We Found

Our review identified a number of concerns regarding FAA's safety oversight of Southwest Airlines. First, Southwest Airlines continues to fly aircraft with unresolved safety concerns. For example, FAA learned in 2018 that the carrier regularly and frequently communicated incorrect aircraft weight and balance data to its pilots—a violation of FAA regulations and an important safety issue. Southwest Airlines also operates aircraft in an unknown airworthiness state, including more than 150,000 flights on previously owned aircraft that did not meet U.S. aviation standards—putting 17.2 million passengers at risk. In both cases, the carrier continues operating aircraft without ensuring compliance with regulations because FAA accepted the air carrier's justification that the issues identified were low safety risks. Second, FAA inspectors do not evaluate air carrier risk assessments or safety culture as part of their oversight of Southwest Airlines' SMS. This is because FAA has not provided inspectors with guidance on how to review risk assessments or how to evaluate and oversee a carrier's safety culture. As a result, FAA cannot provide assurance that the carrier operates at the highest degree of safety in the public's interest, as required by law.

### Our Recommendations

FAA concurred with all 11 of our recommendations to improve its oversight of Southwest Airlines' systems for managing risk and provided appropriate planned actions and completion dates.

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# Memorandum

Date: February 11, 2020

Subject: ACTION: FAA Has Not Effectively Overseen Southwest Airlines' Systems for Managing Safety Risks | Report No. AV2020019

From: Matthew E. Hampton  
Assistant Inspector General for Aviation Audits 

To: Federal Aviation Administrator

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Safety is the Federal Aviation Administration's (FAA) top priority, including overseeing the safety programs of large air carriers. On March 9, 2015, FAA established requirements for all part 121<sup>1</sup> air carriers to implement a formal, top-down approach to managing safety risks, known as safety management systems (SMS).<sup>2</sup> Under this approach, FAA and air carriers are to develop systems to identify hazards and implement corrective actions that mitigate risk. Specifically, air carriers must identify root causes for hazards and proactively manage risk to prevent accidents.

However, recent events have raised concerns about FAA's safety oversight, particularly for Southwest Airlines, one of the largest part 121 carriers in the United States. In early 2018, our office received a hotline complaint regarding FAA's oversight of Southwest Airlines and a number of operational issues at the carrier, such as alleged pilot training deficiencies and inaccurate information being provided to pilots prior to flight. Then, on April 17, 2018, Southwest Airlines Flight 1380 suffered an engine failure, and debris penetrated the aircraft cabin, resulting in the first U.S. passenger fatality in over 9 years. As a result of these events, we initiated an audit to review FAA's safety oversight of Southwest Airlines. Specifically, our objective was to assess FAA's oversight of Southwest Airlines' systems for managing risk.

We conducted this audit in accordance with generally accepted Government auditing standards. Exhibit A details our scope and methodology. Exhibit B lists the organizations we visited or contacted.

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<sup>1</sup> Operating Requirements: Domestic, Flag, and Supplemental Operations, 14 CFR Part 121.

<sup>2</sup> Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders, 14 CFR Parts 5 and 119.

We appreciate the courtesies and cooperation of Department of Transportation representatives during this audit. If you have any questions concerning this report, please call me at (202) 366-0500 or Tina Nysted, Program Director, at (404) 562-3770.

cc: The Secretary  
DOT Audit Liaison, M-1  
FAA Audit Liaison, AAE-100

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## Background

In its role as a safety regulator, FAA establishes regulatory standards to ensure safe operations in the National Airspace System. However, the Agency also recognizes that compliance with regulations alone is insufficient to guarantee safety. To align with international standards and enhance safety, FAA issued regulations<sup>3</sup> in 2015 requiring all part 121 air carriers to develop and implement SMS. FAA required air carriers to implement SMS in order to identify and analyze all potential hazards and mitigate risk to an acceptable level based on each carrier's operating environment. Given its regulatory role, FAA is responsible for ensuring that air carriers' SMS effectively manage safety risk—including compliance with existing regulatory standards.

FAA's requirement for air carriers to establish SMS occurred in tandem with a wider shift in the Agency's approach to safety oversight. Specifically, beginning in 2015, FAA began transitioning from an oversight model that emphasized enforcement to one that stresses a more collaborative approach. According to FAA, this collaborative approach, called the Compliance Program,<sup>4</sup> is intended to achieve rapid compliance with its regulations from the air carriers. FAA's Compliance Program provides inspectors with multiple options for addressing non-compliance, ranging from Compliance Actions (CA) to legal enforcement action, based on the facts and circumstances surrounding the non-compliance. The program provides CAs as an appropriate recourse when the non-compliance was neither intentional nor reckless. In contrast to a legal enforcement action, such as a civil penalty or certificate revocation, CAs allow an air carrier to address a non-compliance in accordance with a corrective action plan agreed upon with FAA. In those situations, FAA also emphasizes education and training over penalizing air carriers—as long as the carrier is "willing and able" to take corrective action—as a means to address regulatory violations.

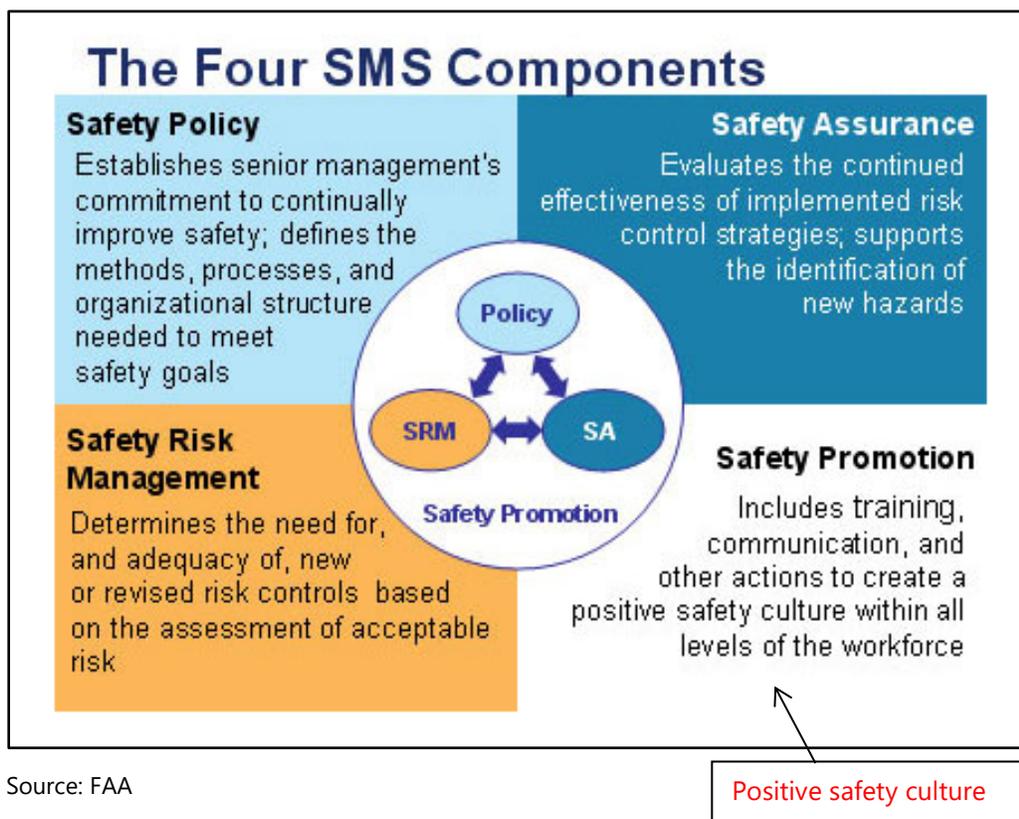
An SMS includes systematic procedures, practices, and policies designed to help organizations effectively manage safety risk. These systems are comprised of four functional components: safety policy, safety risk management, safety assurance, and safety promotion (see figure 1).

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<sup>3</sup> Safety Management Systems for Domestic, Flag, and Supplemental Operations Certificate Holders, 14 CFR Parts 5 and 119.

<sup>4</sup> FAA changed the name of its "Compliance Philosophy" to "Compliance Program" in October 2018.

Figure 1. Components of Safety Management Systems



Source: FAA

Safety culture is an intangible, but always critical, concept that underlies safety management and is the basis for the SMS requirements for air carriers. FAA defines safety culture as the shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands. To effectively meet shared safety goals, both FAA and air carriers must demonstrate a safety culture that establishes and maintains an environment conducive to safe and efficient aviation activities.

The essential goal of any SMS—be it an air carrier's SMS or the SMS of the regulator responsible for safety oversight—is to provide for a systematic approach to achieving acceptable levels of safety risk. According to FAA, an SMS does not take the place of regular FAA oversight, inspection, and audits to ensure compliance with regulations.

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## Results in Brief

### **FAA does not adequately oversee Southwest Airlines' systems for managing risk.**

Our review identified a number of concerns and gaps regarding FAA's safety oversight of Southwest Airlines. First, Southwest Airlines continues to fly aircraft with unresolved safety concerns. For example, FAA learned in 2018 that the carrier regularly and frequently communicated incorrect aircraft weight and balance data to its pilots. According to FAA officials, this is a violation of FAA regulations and an important safety issue, as an airplane's weight and center of gravity<sup>5</sup> can greatly affect its performance and safety. Southwest Airlines also operates aircraft in an unknown airworthiness state, including more than 150,000 flights on previously owned aircraft that did not meet U.S. aviation standards—putting 17.2 million passengers at risk. In both cases, the carrier continues operating aircraft without ensuring compliance with regulations because FAA accepted the air carrier's justification that the issues identified were low safety risks. Second, FAA inspectors do not evaluate air carrier risk assessments or safety culture as part of their oversight of Southwest Airlines' SMS. This is because FAA has not provided inspectors with guidance on how to review risk assessments or evaluate safety culture as part of its oversight of the carrier. As a result, FAA cannot provide assurance that the carrier operates at the highest degree of safety in the public's interest, as required by law.<sup>6</sup>

We are making recommendations to improve FAA's oversight of Southwest Airlines' systems for managing risk.

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## FAA Does Not Adequately Oversee Southwest Airlines' Systems for Managing Risk

FAA's oversight of Southwest Airlines' safety management system has been ineffective, resulting in a number of ongoing concerns. FAA improperly relies on Southwest Airlines' risk assessments to justify continued non-compliance with safety regulations. Additionally, FAA lacks guidance for inspectors to oversee Southwest Airlines' systems for managing risk.

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<sup>5</sup> The center of gravity is the point at which the total weight of the aircraft is assumed to be concentrated, and the center of gravity must be located within specific limits for safe flight.

<sup>6</sup> 49 U.S.C. § 44701 (d); 49 U.S.C. § 44702.

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# FAA Improperly Relies on Southwest Airlines' Risk Assessments To Justify Continued Non-Compliance With Safety Regulations

FAA establishes regulatory standards to control risks and ensure safe operations in the National Airspace System. The Agency defines regulatory non-compliance as behavior or performance contrary to regulatory standards and states this is an unacceptable risk. While FAA has the authority to provide an exemption from a regulatory requirement, the Administrator must determine that the exemption is in the public interest and that it provides an equivalent level of safety. Yet, our review found that Southwest Airlines operates its fleet of aircraft with frequent weight and balance errors. The carrier also operates previously owned airplanes in unknown states of airworthiness. In both cases, Southwest Airlines continued to operate aircraft that were not in compliance with FAA safety regulations.

## Southwest Airlines Operates Aircraft With Incorrect Weight and Balance Calculations

In January 2018, FAA learned that Southwest Airlines was providing inaccurate aircraft weight and balance information to pilots prior to take-off. An airplane's weight and center of gravity can greatly affect its performance and safety. Inaccurate weight and balance information could pose a safety issue for pilots because a violation of the weight and balance limits can result in hazardous or catastrophic conditions, including during take-off and landing. As such, FAA regulations require that air carriers provide accurate weight and balance information to pilots prior to take-off. However, Southwest Airlines continues operating aircraft with frequent weight and balance errors because FAA relies on the carrier's risk assessment indicating this is a low risk, rather than requiring the airline to comply with its regulatory requirements. This essentially allows the carrier to use its SMS as a substitute for compliance, which directly contradicts regulations.<sup>7</sup>

### *Southwest Airlines' Weight and Balance Non-Compliances Have Persisted for Nearly 2 Years*

Southwest Airlines has traditionally relied on individuals to manually count and load baggage and cargo onto its aircraft. In order for this process to provide accurate weight and balance information to pilots, workers must properly record the number of bags and the location where they are loaded onto the aircraft. Workers then provide the information to a gate agent, who types it into a computer so that the information can be transmitted to the pilots. However, FAA

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<sup>7</sup> 14 CFR § 5.3(c).

determined that errors are occurring during the physical counting and loading of bags, as well as the data entry portion.

Due to the ongoing weight and balance discrepancies, Southwest filed a voluntary self-disclosure on this issue in February 2018 through the Agency's Voluntary Disclosure Reporting Program (VDRP). Under this program, FAA accepts a voluntary disclosure and does not take enforcement action when certain conditions are met—including a requirement that the carrier take immediate action to terminate the conduct that resulted in the violation.

Although the carrier disclosed a discrepancy for a specific flight, FAA had already opened an investigation into weight and balance inaccuracies due to an increase in the number of safety reports filed by Southwest pilots. As part of the investigation, FAA and Southwest Airlines reached an agreement on how to address the weight and balance issues through a series of steps the carrier would take. These carrier actions included the following:

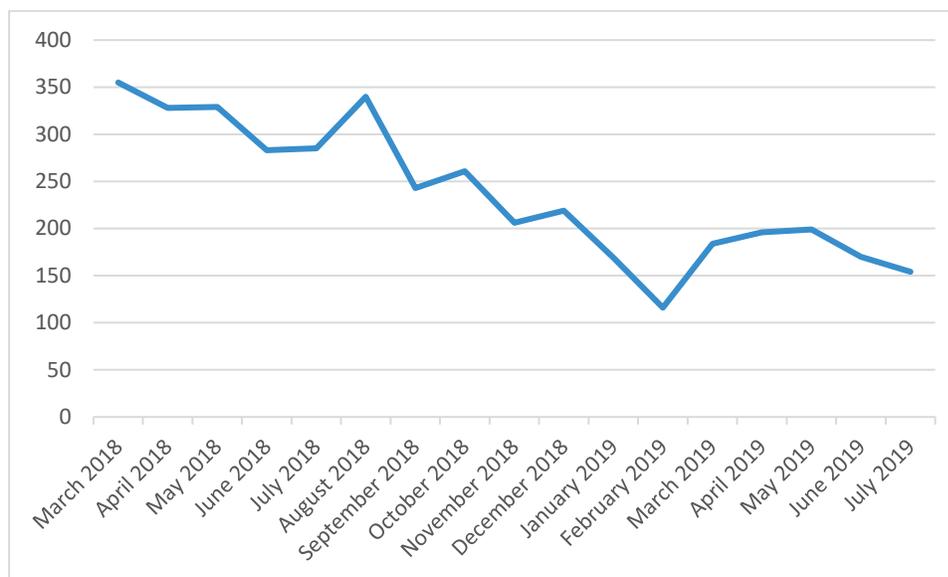
- Audit 25 percent of its daily flights to determine the frequency of potential violations.
- Investigate any discrepancy over 300 pounds.
- Continue reporting variances greater than 1,500 pounds through VDRP.

While FAA required the carrier to investigate discrepancies of 300 pounds or more to determine the root cause, we found that inspectors did not ensure Southwest Airlines fulfilled its requirements or verify that the carrier took the agreed-upon actions. As a result, these discrepancies have continued for nearly 2 years. Figure 2 below shows more than 4,000 errors of 300 pounds or more, by month from March 2018 through July 2019.<sup>8</sup>

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<sup>8</sup> Data were limited to March 2018 through July 2019 due to FAA's agreement with Southwest Airlines while the investigation was open.

Figure 2. Number of Weight and Balance Discrepancies of 300 Pounds or More, by Month



Source: OIG analysis of FAA data

While the overall trend is decreasing, the carrier continues to operate with weight and balance issues that are inconsistent with FAA regulations and represent safety issues.

#### *FAA Violated Its Own Guidance in Addressing Non-Compliance by the Carrier*

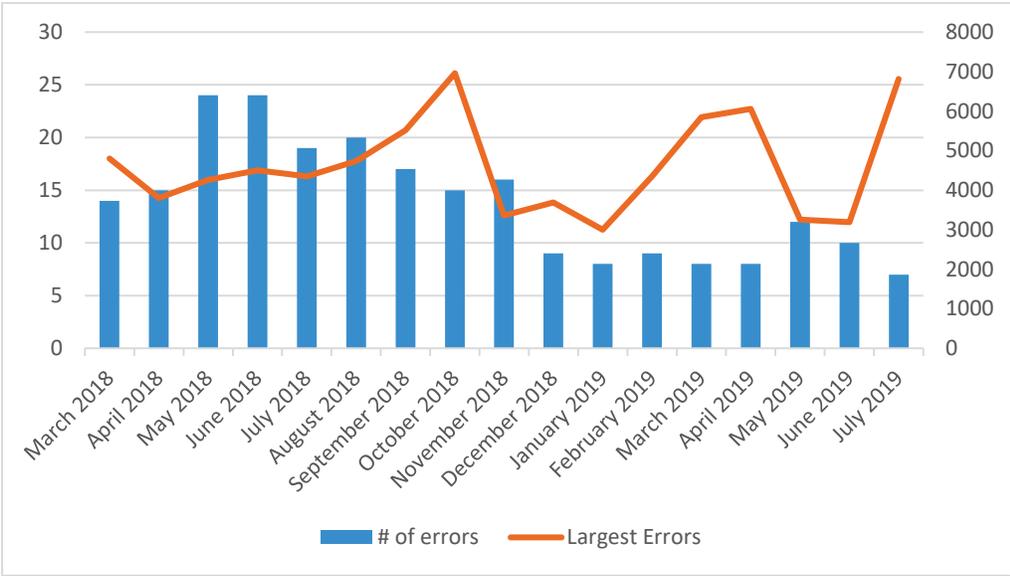
From early 2018 until August 2019, FAA allowed Southwest Airlines to continue reporting inaccurate and non-compliant weight and balance data based on the carrier's risk determination. During this time, local oversight staff worked with other FAA groups to address the issues and updated senior FAA managers regarding the ongoing weight and balance inaccuracies.

Specifically, FAA regulations<sup>9</sup> require that airlines report accurate weight and balance data, but the Agency has no definition for "accurate." Southwest Airlines submitted an analysis showing that any error less than 1,500 pounds—i.e., the total weight or balance differential caused by incorrect documentation or cargo not loaded into the correct part of the aircraft—did not negatively impact safety. Although FAA did not accept this definition of "accurate," FAA used Southwest Airlines' analysis to establish a threshold for reporting non-compliances. As such, FAA allowed the carrier to continue to report non-compliances greater than 1,500 pounds—i.e., any above the threshold that Southwest identified as low

<sup>9</sup> 14 CFR § 121.665.

risk—through VDRP. As shown in figure 3 below, Southwest reported from 7 to 24 incidents per month of discrepancies greater than 1,500 pounds between March 2018 and July 2019. The largest discrepancies range from just under 3,000 to nearly 7,000 pounds.

Figure 3. Number of Weight and Balance Discrepancies of 1,500 Pounds or More and the Maximum Discrepancy, by Month



Source: OIG analysis of FAA data

However, in allowing the carrier to use VDRP in this manner, inspectors did not adhere to FAA guidance. Specifically, FAA inspectors did the following:

- Accepted multiple reports even though the non-compliance had not ceased.
- Allowed the carrier to submit repetitive events under a single disclosure.
- Failed to follow up and ensure the carrier investigated the non-compliance and determined the root cause of the events.

The FAA principal inspector deemed these actions acceptable because the airline justified inaccurate weight and balance calculations as a low risk. Additionally, the inspector stated handling the non-compliances in this manner would minimize the administrative burden within the local oversight office. These decisions indicate a need to ensure FAA inspectors in the local oversight office are trained on the purpose and proper use of VDRP.

Finally, despite the prolonged nature of the non-compliances, the local oversight office did not seek to determine the root cause of the ongoing issues. Instead,

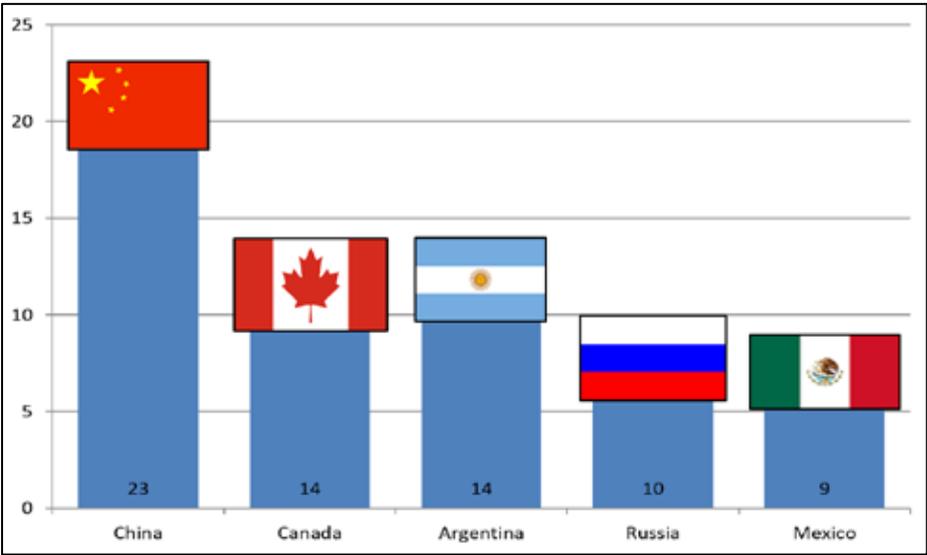
FAA granted the carrier multiple extensions to determine the root cause and then granted additional time for the carrier to implement corrective actions even though the principal inspector did not feel the carrier had identified the true cause. According to FAA managers, this was because they believed that the root cause is the responsibility of the carrier and the inspectors should not be involved in that process. However, these statements are contradictory to FAA guidance that requires inspectors to work with air carriers to determine the root cause of safety concerns.

The decisions made by the principal inspector and FAA managers, combined with their lack of action on significant discrepancies, ultimately caused the Agency to close its weight and balance investigation with no enforcement action. More importantly, the carrier did not resolve the issues and has continued to operate flights with weight and balance non-compliances with FAA's knowledge for nearly 2 years after FAA first identified the issue. This is contrary to the Compliance Program's intent for a carrier to achieve rapid compliance with FAA regulations.

### **Southwest Airlines Continues To Operate Aircraft in Unknown Airworthiness Conditions**

In December 2017, FAA began identifying discrepancies with 88 previously owned aircraft that Southwest Airlines purchased primarily from foreign carriers. Seventy of these 88 aircraft were purchased from air carriers in 5 different countries (see figure 4). FAA regulations state that air carriers can add U.S.-manufactured aircraft that were operated by foreign operators to their fleet once FAA ensures the aircraft conforms to U.S. aviation standards.

Figure 4. Number of Previously Owned Aircraft Purchased by Country



Source: OIG analysis

Southwest Airlines acquired and FAA designees approved these 88 aircraft between 2014 and 2018. In 2017, FAA inspectors began identifying potentially serious gaps in Southwest Airlines’ process for verifying the condition of the aircraft, including undocumented major repairs and aircraft records not complying with regulatory standards. This was due to designated airworthiness representatives (i.e., designees) not following established procedures for ensuring aircraft conform to U.S. standards. In addition, designees relied on air carrier-provided summary data to verify that the aircraft conformed to U.S. standards rather than conducting a comprehensive review of aircraft records themselves. As a result, Southwest Airlines operated these aircraft in unknown airworthiness conditions, including operating more than 150,000 flights on aircraft that were later determined to have deficiencies that had been missed during the certification process—putting as many as 17.2 million passengers at risk.

*FAA Designees Approved 71 of the 88 Previously Owned Aircraft the Same Day the Carrier Submitted Them for Approval*

As part of the conformity process, aircraft owners who purchase foreign-operated aircraft must apply to FAA and certify that the aircraft is airworthy, maintenance records comply with FAA requirements, and all applicable airworthiness directives have been met. In addition, the aircraft must be inspected by an approved source (i.e., air carrier, FAA-certified repair station, or mechanic) to ensure it meets airworthiness standards before FAA or its designee can begin their review process to determine whether to issue an airworthiness certificate. The carrier must then ensure the aircraft conforms to any additional requirements it might have prior to using the aircraft to carry passengers in the United States. Once the carrier completes these steps, FAA validates both the information provided and the condition of the aircraft in order to issue an airworthiness certificate. This validation includes reviewing aircraft records and physically inspecting the aircraft to verify it conforms to its design specifications—including applicable airworthiness directives and major repairs and alterations.

According to FAA, the entire process of ensuring that aircraft conform to U.S. standards and approving the aircraft for service normally takes 3 to 4 weeks per aircraft and is primarily accomplished by aviation representatives designated to perform this work on FAA's behalf (i.e., designees). However, our review of Southwest's airworthiness certificates found that FAA designees approved 71 of the 88 aircraft *on the same day* as the repair station inspection (see figure 5 below).

Figure 5. Southwest Airlines' Application for FAA Airworthiness Certificate

A. REGISTERED OWNER (file shows as certificate of aircraft registration)		IF DEALER, CHECK HERE		
NAME Southwest Airlines Co.		ADDRESS 2702 Love Field Dr. # HDQ-4GC, Dallas, TX 75235-1908		
B. AIRCRAFT CERTIFICATION BASIS (check applicable blocks and complete items as indicated)				
<input checked="" type="checkbox"/>	AIRCRAFT SPECIFICATION OR TYPE CERTIFICATE DATA SHEET (Give No. and Revision No.) A16WE, Rev. 54	<input checked="" type="checkbox"/>	AIRWORTHINESS DIRECTIVES (check if all applicable ADs are complied with and give the number of the last AD COMPLIANT available in the library section of the file of application) LG2015-07	
<input checked="" type="checkbox"/>	AIRCRAFT LISTING (Give page number(s)) N/A	<input checked="" type="checkbox"/>	SUPPLEMENTAL TYPE CERTIFICATE (List number of each STC incorporated) See attached list of STC's incorporated	
C. AIRCRAFT OPERATION AND MAINTENANCE RECORDS				
<input checked="" type="checkbox"/>	CHECK IF RECORDS IN COMPLIANCE WITH 14 CFR section 91.417	TOTAL AIRFRAME HOURS 43,183.07	<input type="checkbox"/>	EXPERIMENTAL ONLY (Enter hours flown since last certificate issued or renewal)
D. CERTIFICATION - I hereby certify that I am the registered owner (or his agent) of the aircraft described above, that the aircraft is registered with the Federal Aviation Administration in accordance with Title 49 of the United States Code 44101 et seq. and applicable Federal Aviation Regulations, and that the aircraft has been inspected and is airworthy and eligible for the airworthiness certificate requested.				
DATE OF APPLICATION 04/16/2015		NAME AND TITLE (print or type) Agent of Owner		
SIGNATURE		SIGNATURE		
E. THE AIRCRAFT DESCRIBED ABOVE HAS BEEN INSPECTED AND FOUND AIRWORTHY BY: (Complete the section only if no CFR part 135 type applies)				
<input checked="" type="checkbox"/>	14 CFR part 121 CERTIFICATE HOLDER (Give Certificate No.)	<input type="checkbox"/>	CERTIFICATED MECHANIC (Give Certificate No.)	
<input checked="" type="checkbox"/>	CERTIFICATED REPAIR STATION (Give Certificate No.) HN6593N			
F. AIRCRAFT MANUFACTURER (Give name or list)				
DATE 04/16/2015		TITLE Aviation Technical Services Manager, QC		
SIGNATURE		SIGNATURE		
G. THE CERTIFICATE REQUESTED				
<input checked="" type="checkbox"/> ORIGINAL AIRWORTHINESS CERTIFICATE				
<input type="checkbox"/> AMENDMENT OR MODIFICATION OF CURRENT AIRWORTHINESS CERTIFICATE				
H. INSPECTION FOR A SPECIAL FLIGHT PERMIT UNDER SECTION VII				
I. FAA REPRESENTATIVE CERTIFICATION				
DATE 04/16/2015		OFFICE ANM-01		
FAA INSPECTOR'S SIGNATURE AND NO.		FAA DESIGNEE'S SIGNATURE		
SIGNATURE		SIGNATURE		

Source: OIG analysis of FAA documents

According to designees we interviewed, they used the carrier's summary documentation to complete their review expeditiously to meet the air carrier's timelines, rather than performing an independent analysis.

*Despite Identifying Discrepancies, FAA Allows the Carrier To Continue Operating the Previously Owned Aircraft*

Three years after designees approved the first aircraft, FAA inspectors from the local oversight office began identifying maintenance discrepancies with these aircraft during routine surveillance. The inspectors identified concerns with improper repairs. They also identified supporting documentation that was not translated into English during the conformity process. In accordance with FAA regulations,<sup>10</sup> Southwest Airlines and/or FAA should have identified and addressed these issues during the conforming process—and *before* the carrier operated the aircraft in commercial service and carried passengers in the United States.

After the local oversight office brought the issues to the carrier's attention, FAA and Southwest Airlines agreed to a 2-year action plan for the carrier to verify that the 88 aircraft conformed to U.S. aviation standards. The initial actions taken did not identify discrepancies with the aircraft (e.g., undocumented repairs). The carrier then agreed to perform comprehensive paperwork reviews for these aircraft and in-depth physical inspections of the aircraft as part of scheduled maintenance. In November 2018, the principal maintenance inspector coordinated with senior FAA officials to recommend that Southwest Airlines perform immediate, limited visual inspections on 34 aircraft based on surveillance findings and the initial results from the carrier's paperwork reviews. Southwest performed overnight inspections on the 32 aircraft, for which records were still being reviewed, but did not identify any discrepancies during the inspections. The carrier completed the paperwork reviews in December 2018 and identified 44 alternative methods of compliance used to address Airworthiness Directives and 360 major repairs that were previously unknown.

Contrary to FAA regulations,<sup>11</sup> FAA agreed to allow Southwest Airlines to continue operating these aircraft under the agreed upon action plan for nearly 2 additional years (until July 2020) while completing the comprehensive inspections and repairs on all 88 aircraft. Similar to the weight and balance issue, this is also contrary to the Compliance Program's intent for a carrier to achieve rapid compliance with FAA's regulations. According to the principal maintenance inspector, Southwest Airlines was allowed to continue operating aircraft without ensuring they conform to U.S. aviation standards because the carrier reviewed the

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<sup>10</sup> Airworthiness Certificates, 14 CFR Part 21, Subpart H.

<sup>11</sup> Aircraft Requirements, 14 CFR Part 121, Subpart H.

issues they felt posed the highest risk and did not identify additional discrepancies.

Southwest Airlines provided the first summary of its comprehensive inspection findings in February 2019, identifying additional undocumented or non-conforming repairs on 5 of the 10 aircraft inspected. The next summary update in July 2019 highlighted findings on nine additional aircraft. As of October 4, 2019, the carrier had completed inspections for 39 of the 88 aircraft, of which 24 (or 62 percent) had undocumented, nonconforming, or unverifiable repairs. Examples of findings related to major repairs included improper repairs to vapor barriers<sup>12</sup> and fuselage skin. According to FAA, improperly installed major repairs and failure to comply with associated inspection requirements have a negative impact on the airworthiness and safe operation of an aircraft, which could cause a catastrophic event.

In total, Southwest Airlines operated more than 150,000 flights on these 24 aircraft with confirmed safety deficiencies, putting as many as 17.2 million passengers at risk. These findings demonstrate that the process used by Southwest Airlines and FAA to issue airworthiness certificates on these aircraft was insufficient to ensure they met U.S. aviation standards prior to being placed into commercial passenger service. However, FAA allowed Southwest Airlines to continue flying 49 of the 88 aircraft without verifying they conform to U.S. aviation standards, continuing to put the passengers on these aircraft at risk.

Further, the local inspection office did not communicate these concerns to the FAA office responsible for overseeing the designees that approved the aircraft. According to FAA, this is because the local inspectors were unaware of FAA's process for providing feedback to designee oversight officials and lacked access to the Agency's system for reporting deficiencies identified after the airworthiness certificate has been issued. As a result, oversight officials considered the designees involved with these aircraft as "the best we have" and were unaware of potential concerns with aircraft certification.

On October 24, 2019, our office formally briefed FAA on the concerns raised in this report. Following that meeting, FAA's Director of Audit and Evaluation sent a letter to the Federal Aviation Administrator requesting immediate action to ensure the airworthiness of the remaining aircraft, including the potential suspension or revocation of the airworthiness certificates. FAA subsequently requested that Southwest Airlines perform additional risk assessments to determine the safety of the remaining aircraft. While we are encouraged by the prompt action by the Director of Audit and Evaluation, we question how the

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<sup>12</sup> Vapor barriers prevent fuel or fuel vapors from leaking into cargo or passenger compartments and coming into contact with a possible ignition source, which could result in fire or explosion.

Agency's response resolves the concern that 49 Southwest Airline aircraft continue to operate in an unknown airworthiness condition.

Ultimately, in the case of both the weight and balance errors and airworthiness concerns, FAA used the air carrier's SMS risk assessments to justify continued non-compliance with safety regulations. This occurred, in part, because the Agency lacks management controls to ensure Southwest Airlines and FAA inspectors do not use SMS as a substitute for regulatory requirements. As a result, FAA cannot ensure Southwest Airlines operates at the highest possible degree of safety in the public interest as required.

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## **FAA Has Not Provided Inspectors With the Guidance Needed To Oversee Southwest Airlines' Safety Management System**

FAA inspectors are not consistently evaluating the carrier's safety risk assessments as part of their oversight of the Southwest Airlines' SMS. Further, FAA has not evaluated safety culture as part of the carrier's SMS.

### **FAA Inspectors Do Not Consistently Evaluate Southwest Airlines' Safety Risk Assessments**

FAA lacks guidance on how inspectors should evaluate air carrier safety risk assessments. The risk assessment is a key component of SMS that carriers must use to determine whether identified hazards represent an unacceptable risk, identify root causes, and develop corrective actions to mitigate the risk. According to senior FAA managers, the local oversight staff were not prepared to oversee SMS at the time it was accepted because the implementation process and training had been rushed by the Agency to meet regulatory deadlines. In addition, the manager of FAA's SMS program office stated that they do not want inspectors to view SMS as a stand-alone program. As a result, inspectors have not been able to effectively assess the carrier's system for managing risk.

FAA's SMS Program Office raised concerns that Southwest Airlines may have devised a process that allows them to potentially bypass these assessments that are required by regulation. For example, FAA inspectors approved major pilot training program changes proposed by Southwest Airlines without considering whether the carrier evaluated the potential safety impacts of those changes. The changes were intended to address new requirements for carriers to train pilots to recover from unexpected events such as stalls and bounced landings. According to FAA's Manager of Air Carrier Training Systems and Voluntary Safety Programs Branch, the updates represent the biggest change to pilot training in decades. Yet, FAA inspectors never reviewed the carrier's risk assessment to ensure factors

unique to Southwest Airlines, such as ongoing operational challenges and its operating environment, were considered in the development of the training. Had inspectors attempted to review the assessment, they would have determined that Southwest Airlines did not conduct a risk assessment, as required, for this new training program.

Similarly, FAA did not evaluate Southwest Airlines' risk assessment related to a serious incident in February 2019. This incident resulted in both wings of an aircraft being damaged after impacting the runway during the first of three unsuccessful landing attempts into Bradley International Airport in Windsor Locks, CT, before diverting to another airport. Southwest Airlines operated the flight with 146 passengers into known, adverse weather conditions including turbulence, low-level wind shear,<sup>13</sup> and significant gusting winds in excess of speeds its pilots are trained for. During its investigation after the incident, FAA identified a number of factors, including pilots' loss of aircraft control, wind shear, and gusting cross-winds. This led FAA to make a series of recommendations to the carrier, including to "consider evaluating the need to include gusts in all wind limits," which it currently does not do. However, FAA was unaware that the carrier's risk assessment had determined these factors did not represent hazards. As a result, FAA missed an opportunity to determine whether the carrier's risk assessment under its SMS was effective in achieving the highest possible degree of safety.

### **FAA Inspectors Have Not Assessed Southwest Airlines' Safety Culture Despite Widespread Concerns**

Many officials throughout FAA have expressed concern about the safety culture at Southwest Airlines. Safety culture is a key tenet of an effective SMS program. However, FAA does not assess safety culture as part of its oversight because the Agency has not provided inspectors with appropriate guidance on how to evaluate air carrier safety culture and how it should be factored into inspectors' oversight.

FAA representatives—ranging from senior executives to local inspectors—expressed concerns about the safety culture at Southwest Airlines. For example, the Associate Administrator for Aviation Safety cautioned in a March 2019 letter that "a breakdown in the relationship between Southwest and [the Aircraft Mechanics Fraternal Association (AMFA)]<sup>14</sup> raises concern about the ongoing effectiveness of the airline's safety management system." In another example, in response to a whistleblower investigation regarding Southwest mechanics being pressured not to document aircraft discrepancies, FAA's Quality Control and

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<sup>13</sup> Wind shear is a change in wind speed and/or direction over a short distance.

<sup>14</sup> AFMA is the labor group representing mechanics at Southwest Airlines.

Investigations Branch observed that “there is the absence of a ‘Just Safety Culture.’ Safety Promotion, a key part of an effective SMS seems to be deficient.”

In addition, 28 of 46 (61 percent) oversight staff we interviewed, including senior level managers, raised concerns about the culture at Southwest Airlines. Figure 6 below includes examples of statements we obtained during interviews with various levels within FAA’s Flight Standards Service indicating concerns with the safety culture at Southwest Airlines.

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Figure 6. Statements From FAA Officials Regarding Southwest Airlines Safety Culture

- The safety culture at Southwest Airlines consists of using “diversion, distraction, and power” to get what the company wants.
- Regarding Southwest Airlines bypassing the local oversight office by going directly to FAA Headquarters when there is a disagreement, “They’ve always done that—just more blatant now.”
- “Southwest’s management is very skilled in what they have to do. If it costs money, they won’t do it.”
- “Whatever Southwest puts on paper for us to see never seems to get done the way they wrote it.”
- “It’s not a positive culture with these issues at Southwest Airlines. Arrogance gets the best of them.”
- Southwest’s attitude toward FAA appears to take the form of “I’ll respond to you when I damn well please.”

Source: OIG interviews with FAA officials

Despite these concerns, when faced with a request for Southwest to begin operating flights to Hawaii—a process that requires an even higher attention to safety—FAA managers stated they could not consider safety culture-related concerns in the approval process because the carrier otherwise met the technical requirements. As a result, FAA approved major operational changes for Southwest Airlines without addressing inspectors’ and senior management concerns with safety culture, the critical element underlying the carrier’s risk identification and mitigation processes.

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## Conclusion

FAA is charged with safely overseeing the busiest and most complex air transportation system in the world. While FAA’s Compliance Program offers a

new strategy for working with air carriers to address safety risks, the Agency's oversight must remain robust to ensure carriers identify the root cause of violations and implement effective corrective actions. Given the significant unresolved safety concerns that FAA has identified at Southwest Airlines, it is clear that the Agency is not yet effectively navigating the balance between industry collaboration and managing safety risks at the carrier. Taking immediate actions to address identified safety issues at Southwest Airlines, improve oversight processes and guidance for addressing identified concerns in the future, and reinforce the importance of managing risks will be critical steps to ensure the safety of the traveling public.

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## Recommendations

To improve FAA's oversight of Southwest Airlines' safety management system, we recommend that the Federal Aviation Administrator:

1. Ensure Southwest Airlines complies with regulatory requirements to provide accurate weight and balance information to pilots, or grant an exemption that justifies the non-compliance being in the public interest.
2. Retrain inspectors at the local oversight office for Southwest Airlines on the purpose and proper use of the Voluntary Disclosure Reporting Program.
3. Train managers and inspectors of the local oversight office on their roles and responsibilities to work with Southwest Airlines for root cause analysis.
4. Enhance management controls to ensure designated airworthiness representatives comply with established procedures to verify that aircraft conform to U.S. airworthiness standards.
5. Develop a management control to ensure that designated airworthiness representatives verify the completeness and accuracy of maintenance records, and do not rely on air carrier provided summary data to make airworthiness determinations.
6. Complete a compliance review of other certificates issued by the designated airworthiness representatives used by Southwest Airlines.
7. Ensure Southwest Airlines complies with regulatory requirements that the 88 previously owned aircraft conform to U.S. aviation standards.

8. Train inspectors on FAA's process to provide feedback on designated airworthiness representatives when corrective actions are needed, and provide inspectors access to the system used to provide feedback.
9. Develop and implement a management control to ensure air carriers and inspectors do not use Safety Management Systems as a substitute for regulatory compliance.
10. Develop and implement guidance on how to evaluate air carrier safety risk assessments to ensure the carrier has performed a comprehensive analysis, identified root causes, and established appropriate corrective actions.
11. Develop and implement inspector guidance on how to evaluate air carrier safety culture and how it should be factored into oversight decisions.

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## Agency Comments and OIG Response

We provided FAA with our draft report on December 12, 2019, and received its formal response on January 30, 2020, which is included as an appendix to this report. FAA concurred with all 11 of our recommendations and provided appropriate actions and completion dates. Accordingly, we consider all recommendations resolved but open pending completion of the planned actions.

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## Actions Required

We consider recommendations 1 through 11 resolved but open pending completion of planned actions.

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## Exhibit A. Scope and Methodology

We conducted this performance audit between July 2018 and December 2019 in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

To assess FAA's oversight of Southwest Airlines, we reviewed relevant Federal laws as well as FAA policy and guidance on risk analysis, oversight of air carrier and FAA designees. In addition, we interviewed officials from FAA headquarters, Southwest Airlines certificate management office, Aircraft Certification Office, Aircraft Evaluation Group, and others regarding FAA oversight of Southwest Airlines. We also interviewed union officials, FAA designees, and air carrier personnel.

To compute the number of flights performed and the estimated number of passengers at risk, we downloaded flight data from the Bureau of Transportation Statistics' website for flight specific information and passenger load information. We then extracted records for all flights performed on 88 previously owned aircraft prior to Southwest Airlines completing comprehensive physical inspections. Our calculations for the number of flights performed and the estimated number of passengers at risk were limited to flights performed on or before April 30, 2019, due to the lack of more current flight and passenger data.

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## Exhibit B. Organizations Visited or Contacted

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### FAA Facilities

#### Headquarters

Flight Standards Service

Office of Air Carrier Safety Assurance

Air Carrier Division C

Office of Audit and Evaluation

Office of Accident Investigation & Prevention

Office of Investigations

Air Carrier Branch (Operations)

Air Carrier Training Systems and Voluntary Safety Programs Branch

Safety Analysis & Promotion Division

Safety Risk Management Division

Quality Control and Investigations Branch

Evaluations Program Branch

Delegation Program Branch

#### Field Offices

Southwest Airlines Certificate Management Office

Seattle Aircraft Evaluations Group

Transport Airplane Directorate, Seattle Aircraft Certification Office Branch

Seattle Flight Standards District Office

Alaska Airlines Certificate Management Office

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### Other Organizations

Southwest Airlines, Dallas, TX

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## Other Organizations (cont'd)

Aviation Technical Services, Everett, WA

Aircraft Mechanics Fraternal Association, Centennial, CO

National Transportation Safety Board, Washington DC

Southwest Airlines Pilots Association, Dallas, TX

Transport Workers Union of America, Dallas, TX

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## Exhibit C. List of Acronyms

AMFA	Aircraft Mechanics Fraternal Association
CA	Compliance Actions
CMO	Certificate Management Office
DOT	Department of Transportation
FAA	Federal Aviation Administration
OIG	Office of Inspector General
RAP	Repair Assessment Program
SMS	Safety Management System
SWA	Southwest Airlines
VDRP	Voluntary Disclosure Reporting Program

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## Exhibit D. Major Contributors to This Report

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SENIOR ANALYST

SENIOR AUDITOR

SENIOR TECHNICAL WRITER

SENIOR COUNSEL

SENIOR STATISTICIAN

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## Appendix. Agency Comments



# Federal Aviation Administration

## Memorandum

Date: January 30, 2020

To: Matthew E. Hampton, Assistant Inspector General for Aviation Audits

From: H. Clayton Foushee, Director, Office of Audit and Evaluation, AAE-1 

Subject: Federal Aviation Administration's (FAA) Response to Office of Inspector General (OIG) Draft Report: FAA Has Not Effectively Overseen Southwest Airlines' Systems for Managing Safety Risks

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We agree that the Southwest Airlines (SWA) FAA Certificate Management Office (CMO) did not perform in accordance with existing guidance by allowing 88 aircraft (the "Skyline" aircraft) to enter service through SWA's conformity process, which lacked a comprehensive conformity inspection for used aircraft. Regarding performance weight and balance, we agree the SWA CMO, at times, did not perform in accordance with existing guidance. Once FAA leadership became aware of these issues, the agency took or oversaw various actions described below to address the safety matters articulated in the OIG draft report.

### Leadership & Culture

Apart from actions aimed at addressing these safety matters in particular, on June 23, 2019, the FAA appointed a new CMO leadership team, to help remedy systemic concerns with the internal and external relationships of the SWA CMO. This team continues to address deficiencies in the work functions and culture inside the SWA CMO by improving communications and building trust. The new leadership team has taken multiple steps to improve the overall office environment.

### SWA Skyline Aircraft

- In April 2018, the SWA CMO rescinded SWA's ability to conduct conformity inspections prior to adding any aircraft to revenue service. The SWA CMO now participates in the conformity process for all aircraft.

- In October 2019, SWA assessed all data from earlier repair assessments of the Skyline fleet. The FAA directed SWA to review the service history of the remaining aircraft for evidence of incidents and accidents, tail strikes or hard landings, and repairs to fatigue-critical baseline structure. This review also included the effects of airworthiness directives (AD) or maintenance instructions released after 2018, evaluation of flight operations quality assurance data and digital flight data recorder information that indicated fatigue in primary structural or fatigue-critical areas, and trends related to other aircraft from the same country or region.
- We continue to monitor SWA's completion of the Repair Assessment Program (RAP) for the Skyline aircraft. As of January 8, 2020, SWA reported that it had completed the full RAP review on 67 aircraft and evaluated 752 repairs (i.e., 76% of the 88 aircraft complete). On 38 of the 67 aircraft reviewed, Southwest reported 125 total findings related to the primary structure, of which 19 were undocumented repairs substantiated via equivalency; 18 were undocumented repairs that did not meet equivalency, and 88 were documented repairs that did not conform. Additionally, Southwest reported 69 findings related to composite structures, which is not considered to be fatigue-critical on these aircraft. SWA reports all non-conforming repairs to composite structures have been replaced. SWA reported no overflown follow-up requirements from previous ADs. SWA also reported that all undocumented non-equivalent and non-conforming repairs have been removed and replaced. The Skyline RAP appears to be on track to be completed by the mutually agreed accelerated deadline, with the final aircraft scheduled for RAP induction on the evening of January 31, 2020. Any Skyline aircraft not receiving the RAP inspections and repairs by January 31, 2020, will be grounded until the RAP work is completed.
- The FAA is investigating the performance of the Designated Airworthiness Representatives hired by SWA to do the initial conformity inspections and will address all identified shortcomings.

#### SWA Weight & Balance

- In July 2018, the FAA's Alaska Airlines CMO conducted an independent evaluation of the SWA performance weight and balance program, as well as the activities of the SWA CMO. The Alaska Airlines CMO determined that the approach to safety assurance was appropriate and that SWA's actions improved the performance weight and balance program. While weight and balance control is critical for the safety of flight operations, the issues at SWA rarely involved a baggage miscount that significantly affected aircraft loading. Nevertheless, these types of errors remain of concern and an area of continued CMO surveillance. The FAA opened a weight and balance enforcement case, but closed it because SWA had reported the underlying violation under the FAA's Voluntary Disclosure Reporting Program. Thereafter, the FAA pursued the matter as a compliance action.
- Additionally, between September 2019 and October 2019, the SWA CMO completed 202 custom data collection tools on performance weight and balance. This surveillance resulted in a compliance action on October 29, 2019. The FAA continues to monitor SWA's implementation of corrective measures.

- In addition to the increased surveillance by the SWA CMO, the airline integrated new technology to better manage its baggage count and is working to implement this technology with cargo as well.
- The agency is considering various compliance and enforcement actions to ensure the weight and balance procedures at SWA comply with the applicable regulations. In addition to the open compliance action against SWA for performance weight and balance, the FAA proposed a civil penalty against SWA in an unrelated case on empty operating weight.

We concur with all the recommendations and plan to implement each recommendation by the following dates:

<b>Recommendations</b>	<b>Target Action Date</b>
7	March 31, 2020
2 and 3	July 31, 2020
1, 4, 5, 6, 8, 9, and 11	September 30, 2020
10	September 30, 2021

We appreciate this opportunity to respond. Please contact H. Clayton Foushee at (202) 267- 9000, with questions or if you require additional information.

# U.S. DOT IG Fraud & Safety Hotline

[hotline@oig.dot.gov](mailto:hotline@oig.dot.gov) | (800) 424-9071

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