

**Section 103 Organization Designation  
Authorizations (ODA) for Transport Airplanes  
Expert Panel Review Report**

Final Report

**Aircraft Certification, Safety, and Accountability Act of 2020 (Pub. L. 116-260, Div. V), Section 103**

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# Table of Contents

1. Executive Summary .....	4
2. Expert Panel Review.....	6
2.1 Congressional Mandate .....	6
2.2 Scope of the Expert Panel Review .....	6
2.3 Safety Culture Principles .....	9
2.4 Safety Management and SMS Principles .....	10
2.5 FAA ODA Principles .....	12
2.6 Expert Panel Timeframe and Methodology .....	13
3. Observations of Boeing’s Safety Culture, SMS, ODA, and Related Topics .....	16
3.1 Timelines of Events Informative to the Expert Panel .....	16
3.2 General Observations .....	22
3.3 Observations on Safety Culture.....	22
3.4 Observations on Safety Management and Safety Management Systems.....	22
3.5 Observations on ODA .....	24
3.6 Observations on Human Factors and Human Systems Integration.....	25
3.7 Observations on Boeing’s Board of Directors References to Safety Management..	26
3.8 Observations on Safety as the Highest Priority or Top Priority.....	29
4. Findings and Recommendations.....	31
4.1 Safety Culture.....	31
4.2 SMS .....	33
4.3 ODA .....	36
4.4 Other Matters Consistent with the Public Interest in Aviation Safety .....	39
5. Appendices .....	41
Appendix A. Expert Panel Membership.....	41
Appendix B. Acronyms and Definitions .....	45
Appendix C. Referenced Documents .....	48

## 1. Executive Summary

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This report conveys the findings and recommendations of the Organization Designation Authorization (ODA) Expert Review Panel (herein referred to as the “Expert Panel” or “Panel”) formed under Section 103 of the 2020 Aircraft Certification, Safety, and Accountability Act (ACSAA), Pub. L. 116-260, Div. V, § 103<sup>1</sup> (herein referred to as the “the Act”). The Act identifies the Administrator of the Federal Aviation Administration (FAA) and Congressional committees of jurisdiction as recipients of this report.

The Act requires the Expert Panel to review the safety management processes and their effectiveness for each holder of an ODA for the design and production of transport airplanes.<sup>2</sup> The Act also requires the Expert Panel to make recommendations to the Administrator regarding suggested actions to address any deficiencies found after review of the matters listed in Section 103(a)(2) of the Act. The Expert Panel concluded that recommendations for The Boeing Company<sup>3</sup> (herein referred to as “Boeing”) and the FAA are consistent with the requirements of the Act and with the public interest in aviation safety. The Expert Panel expects that the FAA Administrator will review the recommendations and reinforce them as appropriate.

Section 103(a)(3) of the Act defines the required composition of the Expert Panel. Appendix A of this report identifies the Expert Panel membership.

The Expert Panel focused its review on safety culture, safety management systems (SMS), and ODA, while also evaluating other topics of concern for the safety of the flying public.

Following its review, the Expert Panel identified 27 findings and 53 associated recommendations. The findings and recommendations are based upon the Panel’s expertise and review of more than 4,000 pages of Boeing documents, seven surveys, over 250 interviews, and meetings with Boeing employees across six company locations.

A summary of the Expert Panel’s work is as follows:

- The Expert Panel observed a disconnect between Boeing’s senior management and other members of the organization on safety culture. Interviewees, including ODA Unit Members (UM), also questioned whether Boeing’s safety reporting systems would function in a way that ensures open communication and non-retaliation. The Expert Panel also observed inadequate and confusing

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<sup>1</sup> Section 103, *Expert Review of Organization Designation Authorizations for Transport Airplanes*, Aircraft Certification, Safety, and Accountability Act (ACSAA), 2020.

<sup>2</sup> Section 137(6), *Definitions*, of ACSAA 2020, defines transport airplanes as a transport category airplane designed for operation by an air carrier or foreign air carrier type-certificated with a passenger seating capacity of 30 or more or an all-cargo or combi derivative of such an airplane. This definition limited the scope of the panel review to Boeing Commercial Airplanes (BCA), a business unit of The Boeing Company.

<sup>3</sup> As stated in [The Boeing Company’s 2023 4Q Form 10-K](#), The Boeing Company, together with its subsidiaries is one of the world’s major aerospace firms. Boeing is organized based on the products and services offered through three reportable segments: Commercial Airplanes (BCA); Defense, Space & Security (BDS); and Global Services (BGS). <https://investors.boeing.com/investors/reports/default.aspx>

implementation of the five components of a positive safety culture (Reporting Culture, Just Culture, Flexible Culture, Learning Culture, and Informed Culture).

- The Expert Panel found Boeing's SMS procedures reflect the International Civil Aviation Organization (ICAO) and the FAA SMS frameworks. However, the Boeing SMS procedures are not structured in a way that ensures all employees understand their role in the company's SMS. The procedures and training are complex and in a constant state of change, creating employee confusion especially among different work sites and employee groups. The Expert Panel also found a lack of awareness of safety-related metrics at all levels of the organization; employees had difficulty distinguishing the differences among various measuring methods, their purpose, and outcomes.
- Boeing's restructuring of the management of the ODA unit decreased opportunities for interference and retaliation against UMs, and provides effective organizational messaging regarding independence of UMs. However, the restructuring, while better, still allows opportunities for retaliation to occur, particularly with regards to salary and furlough ranking. This influences the ability of UMs to execute their delegated functions effectively.
- The Expert Panel also found additional issues at Boeing that affect aviation safety, which include inadequate human factors consideration commensurate to its importance to aviation safety and lack of pilot input in aircraft design and operation.

The Act did not direct the Expert Panel to investigate specific airplane incidents or accidents, or to make recommendations toward a specific airplane incident or accident, which either occurred prior to or during the Expert Panel's work. However, on several occasions during the Expert Panel's activities, serious quality issues with Boeing products became public. These quality issues amplified the Expert Panel's concerns that the safety-related messages or behaviors are not being implemented across the entire Boeing population.

Within six months of the issuance of this report, Boeing should review the recommendations contained in this report and develop an action plan that includes a milestone-based approach that comprehensively addresses each recommendation. Boeing should then share that action plan, including implementation dates with the FAA.

Successful adoption of the recommendations is expected to improve the level of safety provided by Boeing to its workforce, operators, and the public. While the Expert Panel focused on Boeing as an ODA holder, the enclosed findings and recommendations may assist other companies with similar authorizations to implement successful safety culture, SMS, or ODA programs.

The professional opinions expressed in this report solely belong to the Expert Panel and is not representative of any employer, organization, or other group or individual.

## 2. Expert Panel Review

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### 2.1 Congressional Mandate

To fulfill the requirements of Section 103 of the Act, the FAA solicited and selected the Expert Panel which convened on March 1, 2023. This report makes recommendations to the FAA Administrator regarding suggested actions to address deficiencies found by the Expert Panel's review of:

- A. The extent to which the holder's safety management processes promote or foster a safety culture consistent with the principles of the International Civil Aviation Organization Safety Management Manual, Fourth Edition (International Civil Aviation Organization Doc. No. 9859) or any similar successor document.
- B. The effectiveness of measures instituted by the holder to instill, among employees and contractors of such holder that support organization designation authorization functions, a commitment to safety above all other priorities.
- C. The holder's capability, based on the holder's organizational structures, requirements applicable to officers and employees of such holder, and safety culture, of making reasonable and appropriate decisions regarding functions delegated to the holder pursuant to the organization designation authorization.
- D. Any other matter determined by the Administrator for which inclusion in the review would be consistent with the public interest in aviation safety.

### 2.2 Scope of the Expert Panel Review

This section of the report describes the Expert Panel's interpretation of the language in the Act and how those meanings informed the Expert Panel's activities.

Section 137(6) of ACSAA defines transport airplanes as a transport category airplane designed for operation by an air carrier or foreign air carrier type-certificated with a passenger seating capacity of 30 or more or an all-cargo or combi derivative of such an airplane. This helped limit the scope of the Expert Panel's review to certain business units of Boeing.

The Act requires the Expert Panel to review certain holders of an FAA issued ODA. Under Title 14, Code of Federal Regulations (CFR) part 183, the FAA granted Boeing four ODA types: Major Repair & Alteration (MRA), Production Certificate (PC), Supplemental Type Certificate (STC), and Type Certificate (TC).

#### The Expert Panel's Interpretation of Section 103(a)(2)(A) of the Act

The Act requires the Expert Panel to review, "... *the extent to which the holder's safety management processes promote or foster a safety culture....*" Since Boeing received its ODA in 2009, the Expert Panel considered safety management policies, processes, and activities from 2009 through February 2024 (the completion of the Expert Panel's review).

The Expert Panel interpreted the words “*safety management processes*” to include those processes covered by Boeing’s SMS.

The Act also requires the Expert Panel to perform its review using, “*the principles of the International Civil Aviation Organization (ICAO) Safety Management Manual, Fourth Edition (International Civil Aviation Organization Doc. No. 9859), or similar successor document.*” The Expert Panel’s work used ICAO’s Safety Management Manual, Fourth Edition, 2018 (herein referred to as “ICAO Safety Management Manual”), as a standard of review and as guidance. Chapter Three of the ICAO Safety Management Manual addresses the topic of safety culture. The Expert Panel found ICAO’s safety culture framework to be consistent with safety culture models used by FAA and the National Aeronautics and Space Administration (NASA). In addition to the ICAO Safety Management Manual, the Expert Panel referred to FAA and NASA materials on safety culture.

### The Expert Panel’s Interpretation of Section 103(a)(2)(B) of the Act

Section 103(a)(2)(B) of the Act requires the Expert Panel to review “*the effectiveness of measures instituted by the holder to instill, among employees and contractors of such holder that support organization designation authorization functions, a commitment to safety above all other priorities.*”

The Expert Panel interpreted the language “... employees or contractors ... that support organization designation authorization functions....” to mean the personnel directly assigned to delegated design and production functions.

The Expert Panel used the Oxford Languages definition for “effectiveness,” meaning “the degree to which something is successful in producing a desired result.”<sup>4</sup>

For the words “measures instituted,” the Expert Panel interpreted the phrase as to either be synonymous with “actions taken” or a measure of the results of an action taken. The former meaning drove the Expert Panel to seek actions taken by Boeing in support of its objective. The latter interpretation led the Expert Panel to seek qualitative or quantitative measurements Boeing used to assess the action taken.

Therefore, to evaluate the effectiveness of measures instituted (i.e., desired results of actions taken) by Boeing, the Expert Panel identified:

- Boeing’s objectives for safety culture, safety management, and ODA, as described in both Boeing enterprise-level policies and procedures, and in policies and procedures applicable to Boeing Commercial Airplanes (herein also referred to as “BCA”), a business unit within Boeing.
- Boeing’s qualitative or quantitative measurements used to assess the results of its actions taken toward safety culture, safety management, or ODA.

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<sup>4</sup> “Effectiveness.” Google’s English dictionary provided by Oxford Languages. February 2024.

The Expert Panel interpreted the words “*to instill ... a commitment to safety above all other priorities*” as the combination of actions taken to successfully produce the desired result described in each version of Boeing’s Safety Management System Policy.<sup>5</sup>

The Expert Panel conducted its review of safety culture, safety management, and ODA, and compared the review results to both industry reference materials and to the Expert Panel members’ experiences. The Expert Panel structured this report to align with the topics of safety culture, safety management, ODA, and additional topics affecting aviation safety.

### The Expert Panel’s Interpretation of Section 103(a)(2)(C) of the Act

Section 103(a)(2)(C) of the Act requires the Expert Panel to specifically consider Boeing’s “... *organizational structures, requirements applicable to officers and employees of [Boeing], and safety culture...*” when evaluating Boeing’s capability “... *of making reasonable and appropriate decisions regarding [ODA] functions delegated to ...*” Boeing by the FAA.

Boeing’s organizational structure includes three business units, Boeing Commercial Airplanes (BCA), Boeing Defense, Space, & Security (BDS), and Boeing Global Services (BGS), all three of which are supported by functions, such as Engineering Test & Technology, Human Resources, Legal, and Communications.

Boeing organizes applicant and UMs within the BCA business unit and the Engineering Test & Technology function.

Boeing also organizes employees, with their primary role being safety management, SMS, and Product Safety, to report into the Chief Aerospace Safety Office (CASO), which resides in the Engineering Test & Technology function.

Overall, Boeing provided to the Expert Panel multiple presentations and documents, as well as offered multiple discussions that described the various organizational structures that supported safety culture, safety management, and ODA.

The Expert Panel recognized the “*requirements applicable to officers and employees of [Boeing]*” to be contained in the Memorandum of Understanding between the FAA and Boeing, as the Holder.

Boeing’s management structure emphasizes senior executive leadership identifying a variety of enterprise-level objectives. These objectives can be further distributed through subordinate organizations and are used to define operating activities. Boeing then uses a variety of feedback mechanisms to evaluate operational compliance and performance against the objectives.

Therefore, to support evaluation of Boeing’s capability “... *of making reasonable and appropriate decisions regarding [ODA] functions ...*,” the Expert Panel also referred to

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<sup>5</sup> [BOEING SAFETY MANAGEMENT SYSTEM POLICY](http://www.boeing.com/resources/boeingdotcom/principles/safety/SMS_Policy.pdf), The Boeing Company, Revision January 2024 [www.boeing.com/resources/boeingdotcom/principles/safety/SMS\\_Policy.pdf](http://www.boeing.com/resources/boeingdotcom/principles/safety/SMS_Policy.pdf).



Boeing's enterprise-level safety objectives published in its Safety Management System Policy.

### 2.3 Safety Culture Principles

Dr. James Reason, a pioneering scholar of safety culture, in his seminal work on managing risks of organizational accidents provides a discussion on safety culture which is reflected in the ICAO Safety Management Manual. Dr. Reason offered:

... a safety culture can be socially engineered by identifying and fabricating its essential components and then assembling them into a working whole. It is undoubtedly true that a bad organizational accident can achieve some dramatic conversions to the 'safety faith', but these are all too often shortlived. A safety culture is not something that springs up ready-made from a near death experience, rather it emerges gradually from the persistent and successful application of practical and down-to-earth measures. There is nothing mystical about it. Acquiring a safety culture is a process of collective learning, like any other. Nor is it a single entity. It is made up of a number of interacting elements, or ways of doing, thinking and managing that have enhanced safety health as their natural byproduct."<sup>6</sup> (Reason, 1997, p. 192)

The Expert Panel used Dr. Reason's safety culture model that consists of five components, which collectively, would cultivate a positive safety culture. The five components include: Reporting Culture, Just Culture, Flexible Culture, Learning Culture, and Informed Culture. Boeing adopted these same five components in its Positive Safety Culture structure. The components are also used by numerous government, academic, and industry organizations including NASA and the FAA. The Expert Panel considered each of the five safety culture components throughout its review.

The Expert Panel reflected on ICAO's description regarding the interdependence of safety culture and safety management:

Safety culture is arguably the single most important influence on the management of safety. If an organization has instituted all the safety management requirements but does not have a positive safety culture, it is likely to underperform. Effective safety management empowers a positive safety culture, and a positive safety culture empowers effective safety management. (ICAO Safety Management Manual, p 3-1, 3-2)<sup>7</sup>

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<sup>6</sup> Reason, James. T. "Managing the Risks of Organizational Accidents." 1997, p. 192. Ashgate Publishing Co.

<sup>7</sup> International Civil Aviation Organization (ICAO), Doc 9859, Safety Management Manual, Fourth Edition, p. 3-1, 3-2. INTERNATIONAL CIVIL AVIATION ORGANIZATION, 2018.

## 2.4 Safety Management and SMS Principles

The Act also requires consideration of Boeing's safety management processes with specific interest in the way these processes promoted or fostered a safety culture. The Expert Panel recognized certain safety management and SMS principles described in the ICAO Safety Management Manual and in FAA publications.

The topic of SMS in aviation has been around for more than 30 years. The FAA provides the following description of SMS and its principles:

Technology and system improvements have made great contributions to safety. However, part of being safe is about attitudes and paying attention to what your surroundings are telling you. Whether through data or through the input of employees and others, recognizing that many opportunities exist to stop an accident is the first step in moving from reactive to predictive thinking. SMS is all about decision-making. Thus, it has to be a decision-maker's tool, not a traditional safety program separate and distinct from business and operational decision making.<sup>8</sup> (FAA)

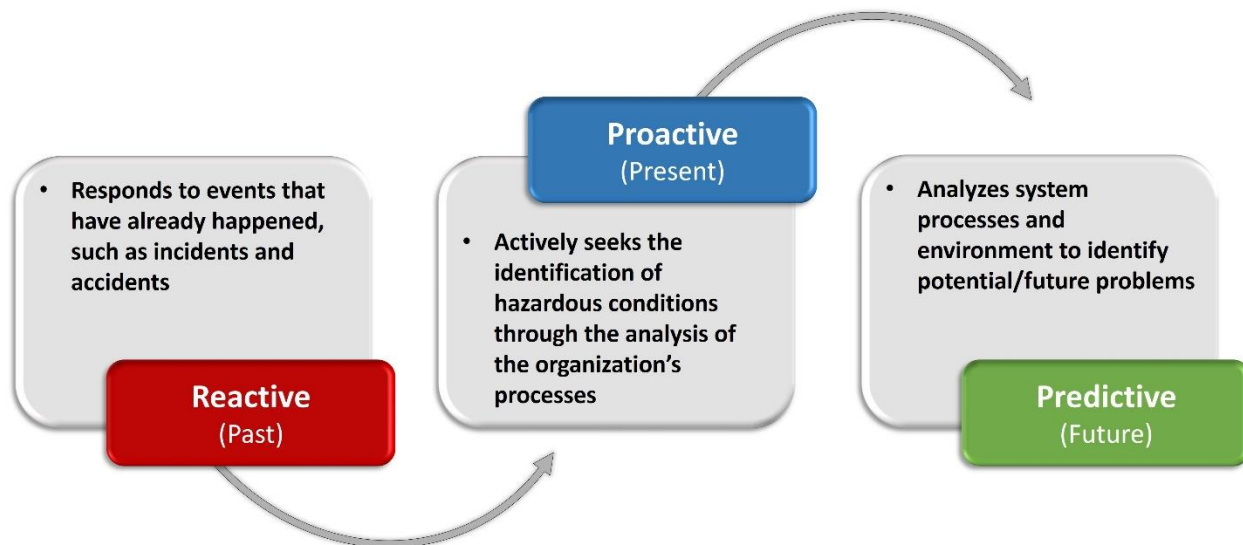
The FAA further describes connections between SMS, organizational behaviors, and safety culture and how SMS addresses the organization's role in safety.

SMS requires the organization itself to examine its operations and the decisions around those operations. SMS allows an organization to adapt to change, increasing complexity, and limited resources. SMS will also promote the continuous improvement of safety through specific methods to predict hazards from employee reports and data collection. Organizations will then use this information to analyze, assess, and control risk. Part of the process will also include the monitoring of controls and of the system itself for effectiveness. SMS will help organizations comply with existing regulations while predicting the need for future action by sharing knowledge and information. Finally, SMS includes requirements that will enhance the safety attitudes of an organization by changing the safety culture of leadership, management, and employees. All of these changes are designed to help the organization incorporate all three forms of rationale - reactive, proactive, and predictive thinking.<sup>9</sup> (FAA)

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<sup>8</sup> [Safety Management System](http://www.faa.gov/about/initiatives/sms/explained), FAA. February 2024. [www.faa.gov/about/initiatives/sms/explained](http://www.faa.gov/about/initiatives/sms/explained)

<sup>9</sup> [Safety Management System](http://www.faa.gov/about/initiatives/sms/explained), FAA. February 2024. [www.faa.gov/about/initiatives/sms/explained](http://www.faa.gov/about/initiatives/sms/explained)



**Figure 1 – SMS Addressing the Organizations Role in Safety (FAA)**

The FAA further states:

SMS has generated wide support in the aviation community as an effective approach that can deliver real safety and financial benefits. SMSs integrate modern safety concepts into repeatable, proactive processes in a single system, emphasizing safety management as a fundamental business process to be considered in the same manner as other aspects of business management.

The structure of SMS provides organizations greater insight into their operational environment, generating process efficiencies and cost avoidance. Some participants have found that benefits begin to materialize even in the early reactive stages of implementation. This continues as organizations evolve to incorporate all three phases - reactive, proactive, and predictive - into their processes.<sup>10</sup> (FAA)

The FAA also describes SMS as “an evolutionary process in system safety and safety management. SMS is a structured process that obligates organizations to manage

<sup>10</sup> [Safety Management System](http://www.faa.gov/about/initiatives/sms/explained), FAA. February 2024. www.faa.gov/about/initiatives/sms/explained

safety with the same level of priority that other core business processes are managed.”<sup>11</sup>

The FAA’s expectation that SMS “... *obligates organizations to manage safety with the same level of priority that other core business processes are managed*”<sup>12</sup> helped form a basis for the Expert Panel’s evaluation.

The Expert Panel also recognized the extent to which Boeing appeared to have connected its SMS to its ODA.

## 2.5 FAA ODA Principles

In the 1920s, Congress provided the FAA authority to delegate discretionary functions. The 2005 change to 14 CFR part 183 subpart D<sup>13</sup> expanded organizational delegations (i.e., ODAs) to allow an organization with demonstrated competence, integrity, and expertise in aircraft certification functions to apply for an ODA.

Delegations allow the organizations to make findings and issue certificates, i.e., perform discretionary functions in engineering, manufacturing, operations, airworthiness, or maintenance on behalf of the Administrator. An ODA includes an ODA holder and the ODA unit, both of which have specific responsibilities.

- The ODA holder is the parent organization to which the FAA grants an ODA. In the context of the Expert Panel’s work, the ODA holder is The Boeing Company.
- The ODA unit is an identifiable group of two or more individuals within the ODA holder’s organization that perform the specifically delegated discretionary functions on behalf of the FAA.

When acting as a representative of the Administrator, an individual is required to perform in a manner consistent with the policies, guidelines, and directives of the FAA. When performing a delegated function, an individual is legally distinct from, and must act independent of, the ODA holder.

The Expert Panel used 14 CFR part 183 subpart D and the detailed requirements from FAA Order 8100.15B<sup>14</sup> as standards for assessing Boeing as an ODA holder and ODA unit. Qualifications to hold an ODA most relevant to the Expert Panel’s assessment were:

- Have sufficient facilities, resources, and personnel, to perform the functions.
- Have sufficient experience with FAA requirements, processes, and procedures to perform the functions.
- Have sufficient, relevant experience to perform the functions.

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<sup>11</sup> [Safety Management System](https://www.faa.gov/about/initiatives/sms/explained), FAA. February 2024. [www.faa.gov/about/initiatives/sms/explained](https://www.faa.gov/about/initiatives/sms/explained)

<sup>12</sup> [Safety Management System](https://www.faa.gov/about/initiatives/sms/explained), FAA. February 2024. [www.faa.gov/about/initiatives/sms/explained](https://www.faa.gov/about/initiatives/sms/explained)

<sup>13</sup> 14 CFR part 183 subpart D, *Safety Assurance*. Federal Register, Vol. 70, No. 197, p. 59932-59949. October 13, 2005.

<sup>14</sup> FAA Order 8100.15B, *Organization Designation Authorization Procedures*, dated May 16, 2013.

- Comply with the procedures contained in its approved procedures manual.
- Give ODA UMs sufficient authority to perform the authorized functions.
- Ensure that no conflicting non-ODA unit duties or other interference affects the performance of authorized functions by ODA UMs.
- Cooperate with the Administrator in his performance of oversight of the ODA holder and the ODA unit.

The principles of safety culture, as described in the ICAO Safety Management Manual, also align with the expected environment the ODA holder is expected to create for an ODA unit and its UMs, under 14 CFR part 183 subpart D.

## 2.6 Expert Panel Timeframe and Methodology

The FAA selected experts<sup>15</sup> convened its first meeting the week of March 1, 2023, at FAA Headquarters in Washington, DC. The initial meetings focused on interpreting Section 103 requirements and developing an approach for discovering and collecting data and information. Prior to the initial meetings, members of the Expert Panel signed two Non-Disclosure Agreements (NDA), one with the FAA and one with Boeing.

More than 4,000 pages of documents received from Boeing were stamped as Boeing Proprietary. The NDAs inhibited the Expert Panel from using assistants to aid in discovery. The NDAs also precluded including proprietary information in this report.

The Expert Panel met as a plenary at least 2 hours per week from March 2023 to February 2024, where the Expert Panel further refined the discovery process, conducted workshops, or received presentations from Boeing or from the FAA. During the weekly meetings, the Expert Panel aligned on subsequent requests to Boeing in support of Expert Panel plans.

Boeing provided two points-of-contact (POC), and all requests were communicated through the POC. Collaboratively, the Expert Panel and the POC established a process that allowed the Expert Panel to request and receive documents from Boeing. All Boeing documents were marked for release to the Expert Panel for use within the parameters of the NDA.

In April 2023, the Expert Panel visited a Boeing facility in the Puget Sound region to meet with members of Boeing's Chief Aerospace Safety Office (CASO) and administrators of the Boeing ODA. This meeting provided the Expert Panel direct contact with Boeing leadership and allowed the company an opportunity to present its safety culture, SMS, and ODA topics.

The Expert Panel created three teams to facilitate the discovery process and to identify, review, and summarize information from documentation, surveys, and interviews.

- The documentation team analyzed more than 100 procedures and policies to determine the extent to which Boeing documentation helped promote or foster a safety culture, instill a commitment to safety above all other priorities, and

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<sup>15</sup> Expert Panel Membership specified in Appendix A of the report

support Boeing's decision-making capabilities with respect to its ODA, and other issues affecting safety. The team identified 41 documents (Boeing Proprietary) that defined procedures, technical guidance, and organizational structure for Boeing and for BCA.

- The survey team analyzed responses from seven surveys conducted by Boeing, the International Association of Machinists and Aerospace Workers (IAM), and the Society of Professional Engineering Employees in Aerospace (SPEEA) unions. The survey team gauged the maturity of Boeing's safety culture, SMS, and ODA changes by categorizing the responses as positive or negative in relation to the corresponding mandate in the Act. The team conducted predominately qualitative analyses, including analysis of the surveys' quantitative results, and emphasized the interpretation of sentiments and nuances within the survey responses.
- The Expert Panel developed interview questions to gain insight on how well Boeing fostered its safety culture, instilled a commitment to safety, and/or enhanced its decision-making with respect to ODA, and other issues affecting safety management. More than 250 in-depth interviews were conducted of Boeing and of FAA employees. Each interview lasted at least one-hour and occurred over the course of 11 weeks. The interviews with Boeing employees, some of whom were IAM or SPEEA union members, occurred across six Boeing locations or virtually, and included employees at all levels of the Boeing organization from line workers to senior executives and a member of the Board of Directors. The interviews with FAA employees included executives, managers, and Organization Management Teams (OMT), some of whom were also members of the National Air Traffic Controllers Association (NATCA) and the Professional Aviation Safety Specialists, AFL-CIO (PASS). Interview questions for FAA employees were developed to align with the requirements in the Act and behaviors that support a safety culture consistent with the elements specified in the ICAO Safety Management Manual, NASA, and FAA materials. Post-interviews, the interview team developed criteria to evaluate the interviewee responses.

The Expert Panel also engaged the FAA data analytics experts, who helped analyze interview and survey results and provide assessments. Through the discovery, data collection, and analysis process, the documentation, survey, and interview teams met separately and collectively on a regular basis to develop the findings and recommendations specified in Section 4 of this report.

Throughout the Expert Panel's work, Boeing responded to documentation requests, arranged logistics for interviews, and provided Boeing subject matter experts for workshops related to subjects of the Expert Panel's review.

The Expert Panel sought to establish a working relationship based upon Boeing's published Seek, Speak & Listen (SS&L) habits.

In May 2021, the company also introduced Seek, Speak & Listen (SS&L) habits. These habits are embedded in everything we do to

help us create a culture of trust, care and connection by encouraging employees to seek out different perspectives, to speak up with ideas or concerns, and to listen and learn from one another. By practicing these habits, Boeing is building stronger teams and achieving better business outcomes.<sup>16</sup>

Each interview with Boeing employees started with an opening statement that the Expert Panel was "...*very interested in hearing your perspective on each topic.*" However, it appeared to some Expert Panel members that Boeing employees viewed the Expert Panel's work as an audit; not an opportunity to collaborate. Interviewees asked minimal questions of the experts. Some interviewees mentioned a briefing was provided by Boeing legal prior to the interviews.

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<sup>16</sup> [2023 Boeing Chief Aerospace Safety Officer Report](https://www.boeing.com/sustainability/our-principles/caso-report), The Boeing Company.  
<https://www.boeing.com/sustainability/our-principles/caso-report>

### **3. Observations of Boeing's Safety Culture, SMS, ODA, and Related Topics**

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#### **3.1 Timelines of Events Informative to the Expert Panel**

Figure 2 of this report provides a timeline of the FAA, ACSAA, and Boeing milestones as well as certain Boeing-related in-service events that helped inform the Expert Panel's work. While the Expert Panel did not investigate in-service events, the timing of each event provided insight to safety culture, safety management, or ODA activities.

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2005	<ul style="list-style-type: none"> <li>• FAA establishes the Organization Designation Authorization (ODA) program, 14 CFR part 183</li> </ul>
2009	<ul style="list-style-type: none"> <li>• FAA provides Letters of Designation authorizing Boeing to have multiple ODAs</li> <li>• FAA publishes Advanced Notice of Proposed Rulemaking (ANPRM) for SMS for product/service providers</li> </ul>
2013	<ul style="list-style-type: none"> <li>• FAA grounds Model 787-8 airplanes, lithium-ion battery failures</li> </ul>
2015	<ul style="list-style-type: none"> <li>• As part of its settlement with the FAA involving multiple potential and pending enforcement cases, BCA pledges to implement its SMS plan that meets internationally accepted standards</li> </ul>
2018	<ul style="list-style-type: none"> <li>• Fatal accident involving a Model 737-700 (Next Generation) airplane, failure of the left engine and subsequent depressurization</li> <li>• Fatal accident involving a Model 737-8 (MAX) airplane (Lion Air)</li> </ul>
2019	<ul style="list-style-type: none"> <li>• Fatal accident involving a Model 737-8 (MAX) airplane (Ethiopian Airlines)</li> <li>• FAA grounds Models 737-8 and 737-9 (MAX) airplanes</li> <li>• Boeing launches a Speak Up program for employees to report concerns confidentially</li> <li>• Boeing's Board of Directors establishes an Aerospace Safety Committee to increase effectiveness of its oversight of safety in all aspects of operations</li> </ul>
2020	<ul style="list-style-type: none"> <li>• FAA accepts Boeing's voluntary SMS for BCA</li> <li>• ACSAA Section 102, "Safety Management Systems," requires the FAA to promulgate SMS rules applicable to companies who hold both a Type Certificate and a Production Certificate</li> </ul>
2021	<ul style="list-style-type: none"> <li>• Boeing establishes the Chief Aerospace Safety Office (CASO) and appoints its first Chief Aerospace Safety Officer</li> <li>• FAA determines BCA's SMS meets FAA's expectations and operates as intended</li> <li>• Boeing uses its SMS to satisfy certain requirements of a 2021 Settlement Agreement between the FAA and Boeing</li> <li>• Boeing introduces Seek, Speak, &amp; Listen</li> </ul>
2022	<ul style="list-style-type: none"> <li>• FAA issues Notice N 8100.17, ODA Holder interference with ODA Unit Members (UMs) and Communication between UMs and the FAA</li> <li>• Boeing establishes Office of the ODA Ombudsman</li> </ul>
2023	<ul style="list-style-type: none"> <li>• FAA issues Notice of Proposed Rulemaking (NPRM) proposing expansion of 14 CFR part 5 (SMS)</li> <li>• FAA issues Notice N 8100.18, Updated Policy on ODA Holder interference with ODA UMs and Communication between UMs and the FAA</li> <li>• ACSAA Section 103, Expert Review Panel convenes</li> </ul>
2024	<ul style="list-style-type: none"> <li>• Accident involving a Model 737-9 (MAX) airplane, detachment of a mid-cabin door plug</li> <li>• FAA grounds Model 737-9 (MAX) airplanes</li> <li>• Boeing increases efforts on safety and quality in response to the detachment of a mid-cabin door plug accident</li> </ul>

**Figure 2 – Milestones in Safety Management and ODA, and Significant Boeing Events**

The events specified in Figure 2 of this report also provided critical insights on the evolution of safety management, SMS, and ODA. Three of the events that occurred in 2009, 2015, and 2017 specifically provided insight to the evolution of safety management systems at Boeing and are described further as:

**2009** The FAA issued an Advanced Notice of Public Rulemaking (ANPRM)<sup>17</sup> related to SMS for organizations who design or manufacture aviation products. The FAA requested public comments to a set of questions and topics related to SMS. Numerous organizations, including Boeing, responded to this ANPRM. The Expert Panel observed in Boeing's response to the ANPRM a range of support and concerns for implementing SMS, such as –

Q5. If you have voluntarily developed, or are in the process of developing an SMS, what impact has SMS had on your organization in terms of enhanced safety and compliance with existing CFRs?

Response: *"... while we embrace the concepts and principles of SMS, and believe there are potential benefits from a formal SMS implementation effort, the actual benefits to safety and compliance for our organization are expected to be small."*

Q6. Which types of product/service providers should be required to have an SMS and which, if any, should not?

Response: *"Boeing believes that safety management system concepts and principles can potentially provide valuable tools for organizational safety risk management for any organization with safety risk exposure, including aviation product and service providers. Ideally, these would be voluntarily adopted and integrated into the management activity of individual organizations, and become widely recognized as industry best practice, obviating the need for regulatory action."*

Q8. What are your main concerns and recommendations in making the transition to an SMS regarding the following? a. Documentation requirements (e.g., developing or updating manuals, policies, procedures, standard operating procedures). b. Record-keeping requirements (e.g., hazard identification data, risk assessment data, corrective actions). c. Collection, sharing, and management of safety information (e.g., protection of and access to personally identifiable information, proprietary information).

Response: *"The existing Boeing safety processes and activities include mature safety data collection and record-keeping systems that span the*

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<sup>17</sup> Advance Noticed of Proposed Rulemaking (ANPRM) for SMS for Design and Manufacturing organizations. Federal Register. Vol. 74, No. 140, p. 36414-36417. July 23, 2009.

*product life-cycle. In the event that FAA develops regulation requiring SMS for design and manufacturing organizations, the regulatory language and advisory material should be non-prescriptive and flexible enough to allow the continued operation of existing successful and effective systems.”*

*The successful operation of safety risk management in the global air transportation system requires effective information flow in a variety of contexts: within organizations; across company boundaries; between industry sectors; and between industry, regulatory and investigative agencies. Harmonization of standards for recording, reporting, and communicating safety data and information offers potentially significant benefit.”*

Q16. What are your concerns and recommendations regarding the FAA making the transition to requiring SMS of product/service providers (e.g., schedule for implementation, FAA acceptance and approval procedures, oversight)?

Response: *“Boeing’s first and foremost concern is that potential SMS regulations do not undo or disrupt effective, efficient safety systems in place today.”*

**2015** Boeing entered into a settlement agreement with the FAA that included, in part, a statement that read, “BCA pledges to implement the Safety Management System (SMS) plan BCA developed to meet internationally accepted standards, throughout the company's activities.”<sup>18</sup>

Also in 2015, the FAA published 14 CFR part 5<sup>19</sup>, which addressed new regulations for Safety Management Systems and was applicable only to certain air operators and not applicable to organizations who design or manufacture aviation products.

**2017** The Aircraft Certification Service within the FAA established a Voluntary SMS Program that allowed the FAA to assess an applicant’s voluntary SMS program in accordance with the requirements in National Aerospace Standard (NAS) 9927<sup>20</sup> or with 14 CFR part 5. The FAA encouraged industry to implement

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<sup>18</sup> [Boeing Agrees... to Enhance its Compliance Systems to Settle Enforcement Cases](https://www.faa.gov/newsroom/boeing-agrees-pay-12-million-and-enhance-its-compliance-systems-settle-enforcement-cases?newsId=). FAA Press Release, December 22, 2015. <https://www.faa.gov/newsroom/boeing-agrees-pay-12-million-and-enhance-its-compliance-systems-settle-enforcement-cases?newsId=>

<sup>19</sup> 14 CFR part 5, Safety Management Systems. Federal Register. Vol. 80, No. 5, p. 1308-1328. January 8, 2015.

<sup>20</sup> National Aerospace Standard (NAS) 9927, “Safety Management Systems and Practices for Design and Manufacturing”, was developed by the Aerospace Industries Association and the General Aviation Manufacturers Association to assist design and manufacturing organizations in voluntarily implementing an SMS.

SMS into their regular business processes and gain FAA recognition of their SMS program.

Following the fatal airplane accidents in 2018 and 2019, Boeing executed the following developments related to safety management and SMS.<sup>21</sup> Boeing's 2021 and 2022 Chief Aerospace Safety Officer Reports<sup>22</sup> provided additional description of activities that Boeing accomplished, some of which connected safety with ODA and with the Engineering function. In the following paragraphs, the use of the term "Board" refers to Boeing's Board of Directors.

**2019** The Board announced the formation of a Committee on Airplane Policies and Processes ("CAPP") to review the effectiveness of Boeing's policies and procedures for the design and development of airplanes. The CAPP met between April and August 2019 and submitted recommendations to the Board on August 26, 2019.

The Board established the Aerospace Safety Committee ("ASC") as a permanent committee of the Board to oversee and ensure the safe design, development, manufacture, production, operation, maintenance, and delivery of the company's aerospace products and services. The Board also amended the company's Corporate Governance Principles to include safety-related experience as one of the criteria it will consider in choosing future directors.

Boeing launched the "Speak Up" portal, an internal online platform to provide a centralized channel for employees to report confidentially concerns related to product, services, or workplace safety, ethical business conduct, or production quality. Boeing subsequently highlighted the "Speak Up" portal as an additional channel for UMs in the FAA's ODA program to report concerns of undue pressure.

Boeing announced that the Board had adopted the recommendations proposed by the CAPP, including, among others: (i) developing a Product and Services Safety organization reporting to the Chief Engineer and the ASC; (ii) realigning Boeing's engineers within the engineering function so that all company engineers report up to the Chief Engineer (who reports directly to the Boeing's Chief Executive Officer ("CEO")); (iii) establishing a Design Requirements Program; and (iv) modifying the Continued Operation Safety Program to require all safety reporting be provided to the Chief Engineer for review.

Boeing announced that the company would implement the CAPP's recommendations, including the realignment of all company engineers under the Chief Engineer and the creation of a Product and Services Safety organization, the leader of which reported directly to the Chief Engineer and the ASC. The

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<sup>21</sup> [COURT OF CHANCERY OF THE STATE OF DELAWARE IN RE THE BOEING COMPANY DERIVATIVE LITIGATION](https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf): Consol. C.A. No. 2019-0907-MTZ. Retrieved November 15, 2023. <https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf>

<sup>22</sup> [2022 Chief Aerospace Safety Officer Report](#), The Boeing Company.

company also announced it would expand companywide the implementation of SMS then under development to enhance safety procedures.

Boeing announced the Board had separated the roles of Board Chair and CEO. Following the change, Director David Calhoun assumed the role of non-executive chairman. In connection with the year-end compensation process for 2019, the Board's Compensation Committee modified its approach to assessing CEO and executive performance with respect to safety, including to require consultation with the ASC.

- 2020** The Board amended Boeing's Corporate Governance Principles to provide expressly for claw backs of incentive compensation from executives who violate or engage in negligent conduct in connection with supervising someone who violates any Boeing policy, law or regulation compromising safety of Boeing's products or services and that could be expected to have a material adverse impact on Boeing, its customers or the public.

The Board amended Boeing's Corporate Governance Principles to require that the Board Chair be elected from among the independent directors.

Boeing launched a "Seek, Speak, & Listen" initiative led by senior management and functional leaders to encourage employees to proactively seek out and raise concerns related to product safety and other subjects.

Introduced Design Practices to give the company a standard method to capture, protect, maintain, integrate, and share critical technical and engineering knowledge and lessons learned.

FAA accepted Boeing's SMS for the BCA business unit that signified BCA had implemented SMS that meets the intent of 14 CFR part 5, Safety Management Systems, NAS 9927, Safety Management System Practices for Design and Manufacturing, as well as ICAO Annex 19.

- 2021** Boeing created the position of Chief Aerospace Safety Officer (reporting to the Chief Engineer) to lead the Global Aviation Safety program.

Boeing also implemented Technical Design Reviews to drive transparent dialogues with the engineering experts early in the design process to reduce risks and errors while ensuring product requirements are met.

Boeing restructured its ODA Administration and Airplane Safety organizations so they are separate from the design engineers and business units. This was to reinforce the independence from the design engineering organizations.

- 2022** Boeing established an ODA Ombudsperson Program to provide ODA unit members with a neutral third party to advise and assist ODA unit members with any work-related concerns.

Boeing also established Integrated Product Teams for specific initiatives, including the Enterprise Safety Management System, Global Aerospace Safety Initiative, and the Aerospace Safety Analytics and Safety Experience at Boeing.

## 3.2 General Observations

Referencing Boeing's Seek, Speak, & Listen behaviors, the Expert Panel observed throughout the discovery and assessment process that attention was given to Speak, with little or no attention given to Seek or Listen. The Expert Panel provided numerous opportunities throughout its engagements with Boeing for it to seek information from the Expert Panel's experiences on approaches to safety culture, SMS, or ODA. The Expert Panel received minimal questions from Boeing during these engagements.

Throughout the Expert Panel's work, the panel requested from Boeing, evidence, policies, procedures, or other artifacts that demonstrated Boeing's commitment to safety above all other priorities. The panel observed documentation, survey responses, and employee interviews that did not provide objective evidence of a foundational commitment to safety that matched Boeing's descriptions of that objective.

Appendix C of this report lists the various documents and resources, which when combined with survey and interview results helped inform the Expert Panel's findings and recommendations.

## 3.3 Observations on Safety Culture

Boeing's safety culture structure also includes the components of Reporting Culture, Just Culture, Flexible Culture, Learning Culture, and Informed Culture. Boeing seems to have focused its safety culture implementation efforts on the Just Culture and Reporting Culture components. Boeing made efforts to train the topic of safety culture and employed a Safety Culture expert responsible for championing Boeing's safety culture work with leaders and integrated product teams. The Expert Panel's review of Boeing's Safety Management System Policy found explicit references to Positive Safety Culture and to Just Culture, while implied references were made to the other culture components. Interviews conducted by the Expert Panel identified that employees are confused by the different terms and the lack of explicit descriptions that clarifies these topics.

## 3.4 Observations on Safety Management and Safety Management Systems

Shortly after the two Model 737-8 (MAX) airplane accidents that occurred in 2018 and 2019, Boeing's Board of Directors and management took a series of steps<sup>23</sup> "*... to review and implement new processes related to product safety...*", and "*announced it would expand companywide the implementation of the Safety Management System ("SMS") then under development to enhance safety procedures.*"<sup>24</sup> The series of steps

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<sup>23</sup> [COURT OF CHANCERY OF THE STATE OF DELAWARE IN RE THE BOEING COMPANY DERIVATIVE LITIGATION](https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf): Consol. C.A. No. 2019-0907-MTZ. Retrieved November 15, 2023. <https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf>

<sup>24</sup> [COURT OF CHANCERY OF THE STATE OF DELAWARE IN RE THE BOEING COMPANY DERIVATIVE LITIGATION](https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf): Consol. C.A. No. 2019-0907-MTZ. Retrieved November 15, 2023. <https://www.osc.ny.gov/files/press/pdf/stipulation-of-settlement-boeing.pdf>

taken are described in Section 3.1 of the report. During interviews and Boeing presentations, employees consistently referred to the totality of these steps as the start of Boeing's "Safety Journey."

In 2022, Boeing published the 2021 Chief Aerospace Safety Officer Report, the first of such a report, which opened with the title "*Our Safety Journey*" and described this journey with:

We [Boeing] implemented a series of meaningful changes to strengthen our safety practices and culture and bring lasting improvements to aerospace safety. It is a journey of continuous improvement and we are dedicated to making daily progress and holding ourselves accountable to the highest standards. (CASO Report, 2021)

This quote explicitly connects Boeing's safety practices, culture, and daily progress, which the Expert Panel interpreted as commitments to drive positive change.

The Expert Panel reviewed policy or procedure documents that govern Boeing's SMS for the enterprise and its business units. All these documents were published between 2020 and 2023, and some documents were revised during the period of the Expert Panel's work. Within some documents, provisions for revision descriptions existed, but lacked traceability of the changes. For example, Boeing's overarching SMS manual was revised between 2022 and 2023 with the only revision description noted as "Major Rewrite." No other revision indicators were present throughout the document.

Boeing's SMS manuals described roles and responsibilities for persons with specific SMS-related positions. For the majority of employees and contractors, their roles in Boeing's SMS were mainly implied in documents covering general conduct. The Expert Panel struggled to identify effective guidance that translated Boeing's SMS expectations in each employees' role. The Expert Panel was not made aware of documents that explicitly translates content found in the top-level SMS documents into language (i.e., terms, descriptions, etc.) used most often at the working levels of the various functions across Boeing.

Within the SMS-governing document, Boeing described how its SMS supports Positive Safety Culture and then later in the document it described how safety culture is a foundational element of SMS. The documents consistently intertwined the topics of SMS and safety culture. The SMS-governing documents included a brief description of the five components of Boeing's Positive Safety Culture construct.

One of the five components of Boeing's Positive Safety Culture is an Informed Culture. Boeing described Informed Culture primarily as each employees' responsibility to complete training and the manager's responsibility for ensuring employees can get needed training for their work.

The Safety Assurance component of Boeing's SMS addresses, in part, are activities to monitor and measure the performance of its SMS. Boeing described the required measures and safety performance indicators within an SMS as integral to a Positive Safety Culture and continued learning.

The Expert Panel recognized that an effective SMS requires an employee with, at minimum, awareness of their role in the company's SMS and a proficiency adequate to perform their SMS-related roles and responsibilities, even if their daily activity doesn't use SMS or safety culture terminology.

The Expert Panel reviewed dozens of Boeing SMS documents and presentations and believed that the documentation was written in a format that focused on complying with the appropriate ICAO or FAA SMS requirements. However, Boeing's SMS documents do not effectively result in understanding by the average employee of their role in Boeing's SMS. The Expert Panel found a lack of awareness of safety-related metrics at all levels of the organization, and significant skepticism expressed by Boeing employees regarding the lasting power of the SMS implementation.

Employees also expressed their belief that SMS should not disturb existing product safety systems and should instead function in parallel. During interviews, Boeing employees highlighted that SMS implementation was not to disrupt existing safety program or systems. SMS operating procedure documents spoke of SMS as the overarching safety program but then also provided segregation of SMS-focused activities from legacy safety activities (often referred to within Boeing as Safety Review Board or SRB activities).

Boeing described SMS training required by all employees in 2021, 2022, and 2023. Interviews with persons responsible for developing and delivering the training highlighted that the training was academic in the first year, followed by more personal messaging to employees in the second year, and followed by a scenario-based course in the third year. The evolution of these training courses demonstrated a positive effort toward making the training more meaningful and impactful to employees in their daily work.

Boeing provided a view into its Safety Intelligence program, which included performance measures for SMS training. These measures included counts of employees who completed training. No measures of competency were included in the training measures.

Boeing's Chief Aerospace Safety Office demonstrated a successful safety initiative known as the SMS Champions Program, which teaches SMS principles to employee groups. The groups can then share the SMS principles with their respective work areas. This was recognized by the Expert Panel as a positive activity to organically promote SMS efforts and increase advocates for SMS. During executive interviews, the Expert Panel took the opportunity to encourage executives to implement the program in their respective organizations.

### **3.5 Observations on ODA**

Boeing was first granted individual ODAs for the BCA and BDS business entities in 2009. In 2019, the FAA approved integrating the two ODAs into a single system. The ODA unit is an independent but integrated organization within the Boeing Regulatory Administration and Airworthiness organization, which itself resides within the Chief Aerospace Safety Office in the Engineering Test and Technology operating group.



The Expert Panel reviewed the organizational structure of the ODA holder and the ODA unit to determine whether there was sufficient separation to ensure independence of UMs in conducting authorized functions. Boeing's ODA unit equated to over 1,000 persons who perform FAA delegated functions in manufacturing activities (inspection, conformity, etc.) in engineering activities (e.g., approving designs and witnessing tests), and administrative functions.

The ODA holder has provided sufficient facilities, physical resources, and support personnel for UMs to perform delegated functions.

Current personnel are sufficient, but the ability to ensure adequate experience with aviation safety requirements, processes, and procedures is declining. Similarly, sufficient, relevant, and/or current experience in the manufacturing and engineering arenas decreased as the more seasoned staff left or took retirement during the pandemic.

The reliance on dispersed engineering experience, expertise, and guidance does not appear to be coordinated or consistently monitored for sufficiency in numbers, experience, expertise, or communication channels. Some Engineering Unit Members (E-UMs) outside the Washington state area felt isolated in work and decision-making processes; they reported feeling less supported, with little organized mentoring or knowledge sharing. The lack of ability in some organizations to openly exchange information with E-UMs during the design phase of a certification project may be hampering the engineering process.

While these concerns do not interfere with the ODA UM delegated functions, it presents difficulty in fulfilling multiple roles for the more experienced members of the ODA units. The reliance on the limited experience and expertise is troubling when recruitment is difficult for the entire aviation industry. It also lessens the opportunity for knowledge to pass from one generation to the next when the more advanced experts are required to perform more and more delegated functions.

With the diminishing senior engineering resources, as mentioned above, less time may be available for the mentoring and training of less experienced engineers, which may lead to lower first pass quality on certification plans and reports, test parameters, and other documentation used to support showings of compliance.

The ability to comply with the ODA's approved procedures is present; however, the integration of the SMS processes, procedures, and data collection requirements has not been accomplished.

### **3.6 Observations on Human Factors and Human Systems Integration**

Sections 104 and 106 of ACSAA requires the FAA to increase its oversight on human factors in the certification process. In addition, Sections 112 and 124 of ACSAA requires the FAA to develop education programs to create in-house expertise in human factors.

During the development programs for the Model 757 and 767 airplanes, BCA's human factors specialists played an integral role in enhancing the design and functionality of

the airplanes' flight decks (Perrow, 1983).<sup>25</sup> These programs focused on streamlining operations, supporting human performance, ensuring safety, and providing ongoing support to the aviation industry.

At the time, BCA's human factors in flight deck design and operations were the gold standard with pilots, engineers, product support, and human factors specialists. These human factors specialists worked closely and collectively in the Seattle area. Since then, the role of human factors and its influence eroded due to a series of administrative decisions at Boeing, which includes reorganization, decentralization, downsizing, and relocating the company's headquarters.

Senior Boeing management and technical staff informed the Expert Panel during its interviews that the company is in the process of rebuilding its human factors capability within BCA.

### **3.7 Observations on Boeing's Board of Directors References to Safety Management**

The ICAO Safety Management Manual describes "*Senior management's commitment to the management of safety*"<sup>26</sup> as a basic element of a safety culture. Further, Dr. Reason added that commitment stands as a driving force for safety culture.<sup>27</sup> With respect to SMS, ICAO's Safety Management Manual also emphasizes the topic of accountability as a central characteristic of an effective SMS.

The Expert Panel reviewed Boeing's 2023 Annual Meeting of Shareholders notice (referred herein as the "2023 Proxy statement") for indicators from Boeing's Board of Directors regarding messages or actions related to safety culture, senior management's commitment to safety, accountability within an SMS, and other related topics. The 2023 Proxy statement referenced safety culture, safety management systems, and product safety in the opening messages from Boeing's Chairman, in reference to discussions on Sustainability and throughout the Compensation Discussion and Analysis section.

The Boeing Chairman's message emphasized the importance of safety culture and safety management systems by stating:

Safety remains paramount and we have taken actions across Boeing to strengthen our safety culture further and to meet our obligations to those who depend on the safety of our products. Among other steps, we have matured our enterprise-wide Safety Management System, continued to enhance our Quality Management System, and issued our first Chief Aerospace Safety

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<sup>25</sup> Perrow, Charles. "The Organizational Context of Human Factors Engineering," *Administrative Science Quarterly*, Vol. 28, No. 4, December 1983, pp. 521-541.

<sup>26</sup> International Civil Aviation Organization (ICAO), Doc 9859, *Safety Management Manual*, Fourth Edition, Chapter 3, Table 5, p. 3-4. INTERNATIONAL CIVIL AVIATION ORGANIZATION, 2018.

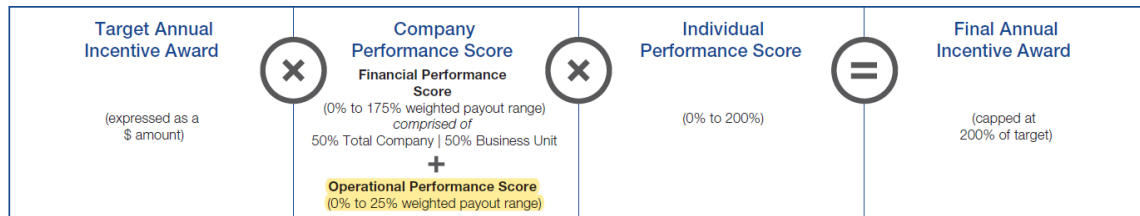
<sup>27</sup> Reason, James. T. "Managing the Risks of Organizational Accidents." 1997, Ashgate Publishing Co. p. 113

Officer Report to ensure continued transparency in our safety-related efforts.<sup>28</sup>

Under the topic of Sustainability, the Board highlighted milestones and efforts in 2022 “... to strengthen its safety practices and culture.” (2023 Proxy statement, p. 28)

Product safety appeared frequently in the Compensation Discussion and Analysis Section. The Board highlighted that the Aerospace Safety Committee consults “on identifying appropriate safety-related metrics for incentive program design and evaluating individual executive performance with respect to safety.”<sup>29</sup> The Board of Directors also detailed the use of performance metrics related to product safety and SMS when determining both Annual Incentive Pay and Long-Term Incentives. The proxy statement notes, “Individual performance is assessed under our **Seek, Speak & Listen** framework.” (2023 Proxy statement, p. 37)

The Proxy statement provided the components and formula (see Figure 3) used to calculate a Final Annual Incentive Award.



**Figure 3 – Annual Incentive Award Formula (source: 2023 Proxy statement, p.41)**

Product Safety, as a unique measure, is one of five parts of the Operational Performance score (see Figure 4).



**Figure 4 – Annual Incentive Award Formula (source: 2023 Proxy statement, p. 42)**

Looking closer at Operational Performance, Figure 5 provides details on the Product Safety target, outcomes, and final score for 2022.

<sup>28</sup> [2023 Boeing Proxy Statement](https://materials.proxyvote.com/Approved/097023/20230217/NPS_527282/HTML1/the_boeing_company-proxy2023_0002.htm), The Boeing Company.  
[https://materials.proxyvote.com/Approved/097023/20230217/NPS\\_527282/HTML1/the\\_boeing\\_company-proxy2023\\_0002.htm](https://materials.proxyvote.com/Approved/097023/20230217/NPS_527282/HTML1/the_boeing_company-proxy2023_0002.htm)

<sup>29</sup> [2023 Boeing Proxy Statement](https://materials.proxyvote.com/Approved/097023/20230217/NPS_527282/HTML1/the_boeing_company-proxy2023_0002.htm), The Boeing Company.  
[https://materials.proxyvote.com/Approved/097023/20230217/NPS\\_527282/HTML1/the\\_boeing\\_company-proxy2023\\_0002.htm](https://materials.proxyvote.com/Approved/097023/20230217/NPS_527282/HTML1/the_boeing_company-proxy2023_0002.htm)

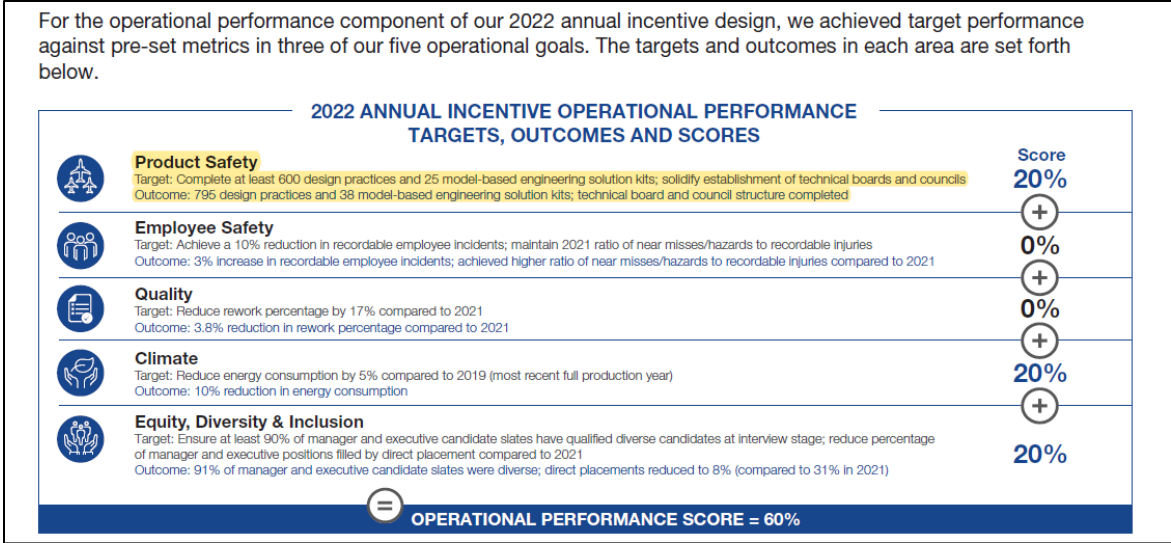


Figure 5 – Product Safety within Operational Performance (source: 2023 Proxy statement, p. 45)

Figure 6 shows the contribution of the Operational Performance Score within the final Annual Incentive Award. For 2022, the topic of Product Safety contributed 1/3 of the 15% weighted Operational Performance Score.

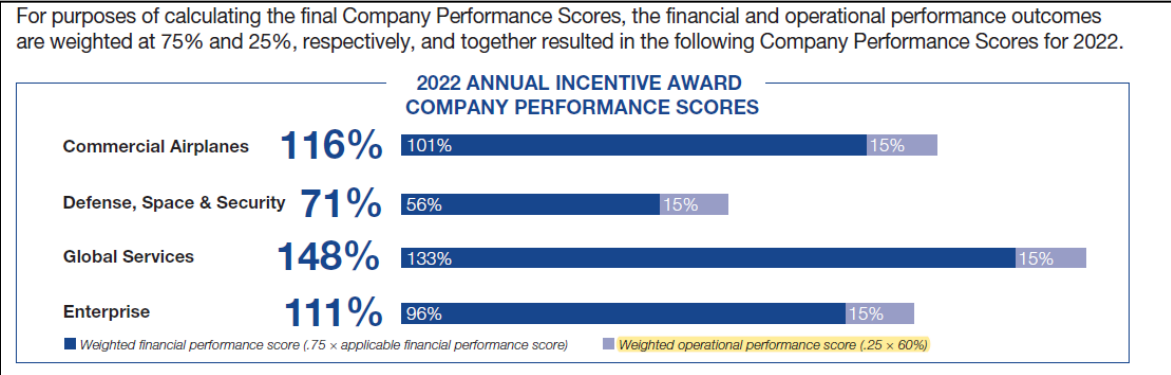


Figure 6 – Company Performance Score for 2022 Calculation for Annual Incentive Pay (source: 2023 Proxy statement, p. 45)

The Product Safety measure comprised approximately 4% of the overall 2022 Annual Incentive Award (5% of the 116% awarded).

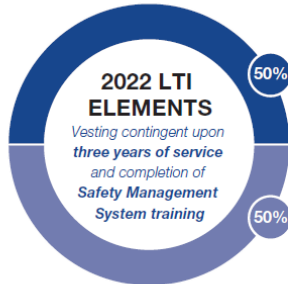
An additional component of executive compensation exists through the Long-Term Incentive Program.

Figure 7 summarizes elements of the 2022 Long-Term Incentive Program, including the requirement for executives to complete Boeing’s Safety Management System training during the year in which the program grants awards.

## COMPENSATION DISCUSSION AND ANALYSIS

### Long-Term Incentive Program

The long-term incentive program is designed to drive sustainable growth and the creation of long-term shareholder value, as well as encourage retention of key talent over a sustained time period. During 2022, our long-term incentive awards consisted of premium-priced stock options and restricted stock units.



#### Premium-Priced Stock Options (PPSOs)

- Exercise price set at **\$260.98 (120% of grant date fair value)**; will be reduced to **110%** of grant date fair value if the Company's total shareholder return exceeds median for our peer group plus Airbus over the vesting period
- **CEO may not sell or transfer shares acquired through PPSO exercise until he separates from the Company**

#### Restricted Stock Units (RSUs)

- Facilitate significant long-term stock ownership by our executives, alignment with shareholder interests and increased focus on sustainable business performance
- **CEO's vested shares will not be distributed until he separates from the Company, and thereafter in ten annual installments**

Our 2022 long-term incentive awards newly incorporate a requirement that the executive must complete our Safety Management System training during the grant year as a condition of vesting in the award. In addition, our 2022 premium-priced stock options contain a relative total shareholder return metric, under which the exercise price will be reduced from 120% of the grant date share price to 110% if the Company's total shareholder return over the three-

**Figure 7 – SMS training requirement in the Long-Term Incentive Program (source: 2023 Proxy statement, p.42)**

Consideration of product safety in compensation calculations may have changed for 2023. The Expert Panel completed its work before publication of the 2023 Proxy statement.

### 3.8 Observations on Safety as the Highest Priority or Top Priority

Boeing provided the Expert Panel with a copy of the Boeing Safety Management System Policy, dated April 2022, which states, in part, "... we make safety our top priority." Boeing revised this policy in August 2023 with the addition of a safety objective related to emergency response activities and a change to the message, "we make safety our top priority" to "safety is our foundation." A subsequent revision to the same policy in January 2024 reflected the same text as the August 2023 version but with new signatures to the policy.

The Expert Panel recognized Section 102 of ACSAA<sup>30</sup>, Safety Management Systems, states:

The Administrator shall initiate a rulemaking proceeding to require that manufacturers that hold both a type certificate and a production certificate ... have in place a safety management system that is consistent with the standards and recommended practices established by ICAO...

<sup>30</sup> Section 102, *Safety Management Systems*, ACSAA 2020

...CODE OF ETHICS.—The regulations issued ... shall require a safety management system to include establishment of a code of ethics applicable to all appropriate employees of a certificate holder, including officers (as determined by the FAA), which clarifies that safety is the organization's **highest priority** (emphasis added). (Section 102 of ACSAA)

In January 2023, in part responding to Section 102 ACSAA requirements, FAA published a Notice of Proposed Rulemaking (NPRM) for Safety Management Systems.<sup>31</sup> The NPRM included proposed regulatory language consistent with the ACSAA language:

§ 5.21 Safety policy.

(a) Any person required to have an SMS under this part must have a safety policy that includes at least the following:

(7) A code of ethics that is applicable to all employees, including management personnel and officers, which clarifies that safety is the organization's **highest priority** (emphasis added).<sup>32</sup>

The Expert Panel acknowledged that while the use of these phrases may not be uncommon, regulating the operational execution of the phrase may be challenging.

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<sup>31</sup> 14 CFR part 5, *Safety Management Systems*. Federal Register. Vol. 80, No. 5, p. 1308-1328. January 8, 2015.

<sup>32</sup> 14 CFR part 5, *Safety Management Systems*, § 5.21 *Safety policy*. Federal Register. Vol. 88, No. 7, p. 1970. January 11, 2023.

## 4. Findings and Recommendations

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The Expert Panel believed that the onus was on Boeing to demonstrate its commitment to a positive safety culture, to inculcating SMS, and to effectively administering its ODA. Boeing did provide documentation, command media, and expert testimony on its safety culture, SMS, and ODA. While the Expert Panel found Boeing had initiated efforts and established programs, the findings and recommendations indicate gaps in Boeing's safety journey. The Expert Panel proposes that all findings and recommendations are necessary to ensure aviation safety. The following findings and recommendations address the topics of safety culture, SMS, ODA, and other topics of concern for the safety of the flying public. The Expert Panel recognizes there are overlaps between these topics and subsequently in its Findings and Recommendations.

### 4.1 Safety Culture

1. **Finding:** In Expert Panel interviews, and in conjunction with union surveys conducted by the IAM and SPEEA, many Boeing employees did not demonstrate knowledge of Boeing's enterprise-wide safety culture efforts, nor its purpose and procedures.

#### **Recommendations to Boeing:**

1. Ensure safety culture communication utilize safety culture terminology that is consistent with the functional groups or disciplines receiving the messages to aid in the understanding of how safety culture applies to their work.
  2. Develop measures and metrics for personnel awareness of safety culture efforts with particular attention to site-by-site variation.
  3. Conduct periodic safety culture surveys that are led and advocated by leadership with the results returning to leadership within a timely manner for the development and implementation of corrective actions. Leadership should track and report on corrective actions on a regular basis (e.g., quarterly) through action closure.
  4. Reduce the variations in safety culture understanding among work sites (e.g., Renton, Everett, Charleston, Seal Beach) and employee groups.
2. **Finding:** In Expert Panel interviews, a majority of Boeing employees did not have skillful awareness with the concepts of Just Culture and Reporting Culture. Some employees were able to identify daily activities that fit into these two elements of safety culture. Employees were less aware of daily activities or company actions that demonstrated the components of Informed, Flexible, and Learning Culture.

#### **Recommendation to Boeing:**

5. Ensure all five components that make up the Boeing positive safety culture model are described and communicated in a manner recognizable in all functions and disciplines across Boeing to build skillful awareness.
3. **Finding:** The Expert Panel was informed that in Washington state, a tri-party Aviation Safety Action Program (ASAP) agreement between Boeing, IAM, and

the FAA is in place. However, not all Boeing sites have an ASAP with IAM, SPEEA, and non-union employees. The Expert Panel notes that confidential, non-punitive reporting systems have provided useful inputs in supporting the SMS efforts in other companies.

**Recommendation to BCA and the FAA:**

6. Establish ASAP at all Boeing sites in coordination with the FAA.
4. **Finding:** The Expert Panel learned managers that are authorized to oversee employee performance evaluations, salary decisions, promotions, and disciplinary actions might also be tasked with investigative duties in the SMS framework. This arrangement could lead to a manager investigating a report within their own reporting chain, potentially compromising Boeing's commitment to a non-retaliatory and impartial environment. This dual responsibility and authority create, among some employees, hesitation in reporting safety concerns for fear of retaliation.

**Recommendation to Boeing:**

7. Create an investigation process that is sufficiently autonomous to ensure confidence in non-retaliatory measures.
5. **Finding:** The Expert Panel could not identify a consistent and clear safety reporting channel or process within the business unit, nor a successful process in which the employee is informed of the outcome of the report. Employees did not understand how to utilize the different reporting systems, which reporting system to use and when. Employees also preferred to avoid all reporting systems, including Speak Up, and favored to report issues to their manager. The Expert Panel is concerned that this confusion about reporting systems may discourage employees from submitting safety concerns.

Speak Up is viewed within Boeing as a new reporting program (though it was established in 2019), associated with the SMS program, and is consistent with the intent of the Reporting Culture component of Boeing's positive safety culture effort. Boeing's governing document for SMS states its commitment to Speak Up as a preferred method of reporting for employees. Employee interviews revealed distrust in the anonymity of the Speak Up program, which questions the effectiveness of this reporting program. Ultimately, employees prefer to report safety issues to their managers.

The Expert Panel also found that employees who submit a report are not consistently informed of the outcome of their report.

**Recommendations to Boeing:**

8. Ensure all reporting processes and when to use the different reporting systems are clearly understood by Boeing's employees, contractors, and suppliers.
9. Provide timely feedback to the reporter on the investigation progress, including the disposition and resolution of the report.



10. Enhance and better explain the anonymity of Speak Up.

11. Ensure transparency of the investigation process resulting from submitted Speak Up reports and communicate the changes resulting from any corrective actions both divisionally and enterprise wide.

6. **Finding:** The Expert Panel could not verify whether safety concerns reported directly to the management chain were captured and resolved in a systematic manner. The Expert Panel observed that both company and contract employees use the management chain to report most concerns. This method may be effective, but it is unclear how the reported concerns are captured and resolved in a systematic manner. When employees report through the management chain, the reports are not consistently submitted into Boeing's SMS.

**Recommendation to Boeing:**

12. Create a process that requires safety-related reports submitted informally to supervisors or managers to be documented, tracked, resolved, and evaluated for safety risk under SMS policies.

7. **Finding:** This Expert Panel conducted its safety culture assessment of Boeing primarily through qualitative methods. The Expert Panel is also aware of safety culture assessments that employ quantitative methods. The Expert Panel further notes that government agencies and private companies have successfully employed safety culture assessments, in collaboration with industry, to provide actionable results and to help mature safety programs.

**Recommendations to Boeing:**

13. Dedicate and develop company resources needed to conduct periodic and thorough safety culture assessments.

14. Engage external professional organizations who conduct safety culture assessments in addition to Boeing internal safety assessment resources.

## 4.2 SMS

8. **Finding:** Similar to Finding 1, in Expert Panel interviews, and in conjunction with union surveys conducted by IAM and SPEEA, many Boeing employees did not demonstrate knowledge of Boeing's SMS efforts, nor its purpose and procedures.

**Recommendations to Boeing:**

15. Ensure SMS communications utilize SMS terminology that is consistent with the functional groups or disciplines receiving the messages to aid in the understanding of how SMS applies to their work.

16. Develop measures and metrics for personnel awareness of SMS efforts with particular attention to site-by-site variation.

17. Conduct periodic SMS surveys that are led and advocated by leadership with the results returning to leadership within a timely manner for the development and implementation of corrective actions. Leadership should

track and report on corrective actions on a regular basis through action closure.

9. **Finding:** Boeing primarily focused its SMS implementation efforts on safety risk management (SRM), which is only one fundamental pillar of the ICAO or Boeing SMS structure. To some extent, Boeing also focused on the pillar of safety policy. ICAO guidance<sup>33</sup> offers SMS is intended to be implemented as an integrated structure. Successful implementation requires all pillars of the ICAO SMS structure, which are safety policy and objectives, safety risk management, safety assurance, and safety promotion. The Expert Panel observed that these pillars have not been fully implemented.

**Recommendation to Boeing:**

18. Mature all pillars of SMS.

10. **Finding:** The Expert Panel found the complexity and amount of SMS documentation, the constant state of document changes, and the lack of clarity in the revision descriptions, creates employee confusion. This contributes to the delay and improper development of SMS at Boeing.

**Recommendations to Boeing:**

19. Tailor documentation and processes associated with safety programs, so they are clearly understood and followed by employees at all levels of Boeing.

20. Leverage the knowledge, experience, and resources that are available within the various labor organizations represented at Boeing to help inform, mature, and tailor the documentation and processes associated with the safety programs. Also increase the labor organizations participation in safety-related activities at all levels of the organization.

11. **Finding:** Boeing established an SMS Champions Program that teaches SMS principles to employee groups. The groups share the SMS principles with their respective work areas. This is recognized as a positive activity to organically spread the SMS message.

**Recommendation to Boeing:**

21. Continue to expand the SMS Champions Program across all Boeing sites and organizations.

12. **Finding:** Boeing employs a SMS dashboard to track information on safety goals with key performance indicators (KPI's) addressing SMS, conformity, compliance, and safety assurance. The Expert Panel found that there is little awareness among employees and some managers of the existence and differences among the various measuring methods, their purpose, and outcomes.

The Expert Panel is unable to distinguish between legacy tracking methods and the SMS measures. The continued separation of the legacy reporting systems is

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<sup>33</sup> International Civil Aviation Organization (ICAO), Doc 9859, *Safety Management Manual*, Fourth Edition, p. 9-32. INTERNATIONAL CIVIL AVIATION ORGANIZATION, 2018.

adding to the ineffectiveness to the KPIs under its SMS. The Expert Panel found that survey responses and interviews reflected this confusion. There is also a lack of development of measures that feed into Boeing's SMS.

**Recommendations to Boeing:**

22. Tailor metrics that evaluate SMS objectives to the worksite and to employees' multiple roles and responsibilities within the matrix organization.

23. Validate the effectiveness of the KPI measures and relate the KPIs to the associated SMS activities.

13. **Finding:** Boeing employees across all disciplines and roles expressed concerns over the lasting power of the SMS program and safety initiatives. This raises concerns about the sustainability of SMS. The lack of feedback and/or delay in providing feedback jeopardizes the longevity of SMS.

Sustainability is additionally challenged by Boeing's strategy to not disrupt legacy safety processes.

**Recommendations to Boeing:**

24. Utilize and continue early benchmarking activity as Boeing matures its SMS program. This ensures alignment of SMS data collection with its customers, stakeholders, and safety regulators.

25. Create new and update existing, near- and long-term measurable objectives related to the sustainability of the SMS.

26. Develop and continuously evaluate, evolve, and adjust a communication plan that provides status on SMS improvement targets, progress, and completions.

27. Mature its mechanisms integrating all external stakeholder safety-related feedback, inclusive of benchmarking activities, into Boeing's SMS program and communicate the results to the Aerospace Safety Committee.

28. Establish how the current system of existing policies and procedures interface or overlap with SMS to create a complete plan for addressing potential conflicts and deficiencies between SMS and legacy systems.

14. **Finding:** The ICAO Safety Management Manual describes the benefits of comprehensively applying an integrated SMS across an organization. Boeing provided evidence that it is using its SMS to evaluate product safety decisions and some business decisions. The Expert Panel's review of Boeing's SMS documentation revealed detailed procedures on how to use SMS to evaluate product safety decisions, but there are no detailed procedures on how to determine which business decisions affect safety or how they should be evaluated under SMS.

**Recommendation to Boeing:**

29. Develop detailed procedures to determine which business activities should be evaluated under SMS and how to evaluate those decisions.

15. **Finding:** The Expert Panel is concerned with the FAA's ability to effectively oversee expanding SMS regulations with respect to Boeing's implementation and recognizes the interdependence between Boeing and the FAA in the successful implementation of SMS. The Expert Panel also recognizes Boeing's efforts to prepare for the expansion of SMS regulations through 14 CFR part 5.

Interviews with FAA employees and managers also conveyed concerns about the sustainability of Boeing's SMS.

**Recommendations to the FAA:**

30. Foster an effective safety culture and prepare and publish a roadmap for workforce development to prepare its engineers and inspectors to effectively oversee SMS for design and manufacturing organizations.

31. Partner with industry to define clear measures of success for SMS implementation for design and manufacturing organizations and jointly review those measures of success on a regular basis.

**4.3 ODA**

16. **Finding:** The ODA reorganization and Boeing's UM interference training measures did not eliminate the potential for negative behavior toward UMs (e.g., limited career growth) when UMs raise safety concerns or exercise delegated functions that result in decision not favorable to the company. Interviewees shared examples of unintended consequences when concerns of potential interference and retaliation are raised. Some UMs reported changes in behavior from their leadership and unrequested changes in assignments.

Other non-UMs and UMs not performing delegated functions shared their hesitancy to collaborate with each other on compliance discussions. Some interviewees indicated discussions between UMs and the applicant were perceived as interference when the conversation around the showing of compliance became contentious.

**Recommendations to Boeing:**

32. When interference investigations are not substantiated, there may be an opportunity for improvements outside the interference procedures for which development of corrective actions could be beneficial. The outputs of the corrective actions should address both the ODA unit and applicant processes or behaviors.

33. Ensure the ODA holder and the UMs understand mentoring by UMs and helping with development of the showing can be done without interference or undue influence.

34. Ensure all employees, including UMs, can dispute and resolve concerns of retaliation when expressing or addressing concerns of compliance and/or safety. This requires clear and concise policies and transparent means of adjudication for represented and non-represented employees.

17. **Finding:** Boeing undertook many measures to ensure the capability of its ODA unit to make reasonable and appropriate decisions regarding its delegated functions. However, Boeing did not provide the Expert Panel with metrics or KPIs relative to those initiatives when asked for such data. Boeing did not produce quantifiable measures which led Expert Panel members to conclude Boeing is not actively monitoring the efficacy of these initiatives. Consequently, the Expert Panel cannot ascertain the tangible impact of Boeing's measures or to what degree Boeing instilled a commitment to safety above all other priorities among its employees supporting ODA functions.

**Recommendations to Boeing:**

35. As part of its engagement with the FAA, Boeing should assess and review the extent to which the proposed measures ensure or would instill a commitment to safety above all other priorities among its employees supporting ODA functions.

18. **Finding:** The Expert Panel is concerned that Boeing is not taking sufficient actions to maintain and expand its UM pipeline. The Expert Panel notes some positive steps have been implemented to attract and retain UMs, including incentive pay programs. However, the Expert Panel learned through interviews there is a major concern that experienced personnel are leaving and not being replaced and efforts to retain them are not effective or timely. Interviews with FAA employees found a similar problem exists in the FAA and its corresponding oversight of the ODA. Given the timeframe required to properly train a UM, and taking sufficient actions to maintain and expand its UM pipeline will be key for Boeing to maintain or expand its current production rates.

**Recommendation to Boeing:**

36. Create a more proactive and sustained approach to maintain and expand its UM workforce pipeline.

**Recommendation to the FAA:**

37. Establish or enhance retention programs for personnel to properly manage the Boeing ODA.

19. **Finding:** ODA organizational structure changes are not yet fully implemented. Some E-UMs report having little to no interaction with their new supervisors and instead still report to their previous supervisory structure, despite the “on paper” change in reporting.

None of the written procedures the Expert Panel reviewed defines how Boeing achieves its work as reflected in the new organizational structure. Instead, the documents still refer to the previous organizational structure, exacerbating the lack of effectiveness of the organizational change.

### **Recommendations to Boeing:**

38. Continue to implement the new reporting structure and ensure E-UMs and their new supervisors understand the expectations of the new organizational structure.

39. Establish a method to evaluate the effectiveness of the organizational structure change.

40. Ensure E-UMs and those they work with understand how to follow the company's stated procedures until updates that reflect the new organizational structure are released.

41. Update procedures to reflect the new organizational structure and provide the FAA with a timeline to complete this effort.

20. **Finding:** As required by FAA Order 8100.15B, Boeing as the ODA holder conducts annual self-audits that evaluate the E-UMs. Boeing's current method involves both ODA and non-ODA personnel to assess each E-UMs performance of their authorized functions. The involvement of the E-UM company supervisor, who has authority over the E-UM's compensation, career path, and annual assessment of their performance of authorized functions, could present a conflict and erode an E-UM's independence and protection from interference.

### **Recommendations to Boeing and the FAA:**

42. Evaluate BCA's annual E-UM audit of performance of authorized functions, specifically looking at the involved parties, and determine if removing non-ODA personnel including leadership during the audit would strengthen E-UM protection from interference or retaliation.

21. **Finding:** The Expert Panel notes that during its interviews, it found a variation among UMs regarding how well they felt supported by ODA management when performing their delegated functions. Specifically, non-Renton and non-Everett sites felt less supported by ODA management. The physical separation between the sites causes employees to feel communication is not at the same level as the main sites. Boeing does not appear to effectively mitigate the results of a physical separation of employees.

### **Recommendations to Boeing:**

43. Enhance the organizational support for ODA members at all Boeing sites to ensure management uniformity of the ODA.

44. Improve communication and engagement across all ODA UMs disciplines and sites.

22. **Finding:** During the Expert Panel's interviews with FAA personnel, instances were described where Boeing, as the applicant, had agreements with FAA management personnel that overruled the OMT and UM decision without their consultation.

**Recommendation to the FAA:**

45. Ensure there are policies requiring FAA management to consult with the OMT prior to making a decision regarding a disputed regulatory position and such policies are understood at all FAA levels.

**4.4 Other Matters Consistent with the Public Interest in Aviation Safety**

23. **Finding:** Based on interviews, pilot inputs within Boeing are neither directly nor consistently delivered to the highest-level decision venues where pilots did not occupy a seat at the table. Some interviewees believed that pilots views of being heard was dependent on the individuals occupying executive positions within Boeing and the organizational structure. Concerns were expressed during interviews that the chief pilot position does not reside within the organizational structure affording it the authority and responsibilities commensurate with the position equivalent to the chief engineer.

**Recommendation to Boeing:**

46. Top pilot position should carry the authority consistent with the responsibility that ensures the pilot's voice is heard and considered in safety of flight, training, and human factors related decisions.

24. **Finding:** The Expert Panel could not find command media that ensured the pilot's safety of flight concerns are adequately addressed independent of the individual occupying executive leadership positions. The Expert Panel recognizes Boeing's pilots are uniquely qualified to identify safety issues and hazards inherent to the aircraft design that may affect the safe operation of an aircraft.

**Recommendation to Boeing:**

47. Create a documented process in command media specifically designed to capture and resolve all safety of flight concerns raised by flight and test crew members. The process should ensure all safety of flight concerns are formally acknowledged and a response is provided by the appropriate management level in a timely manner. Furthermore, to maintain the highest standards of accountability and regulatory compliance, the resolution of these concerns and the entire communication chain should be provided to the FAA, upon request.

25. **Finding:** The Expert Panel observed the FAA representatives have a good, familiar working relationship with UMs in sharing information; however, interviews revealed this can lead to the FAA requesting UMs to report on areas that go beyond formally delegated functions. During the interviews, the Expert Panel heard examples of the requests which included providing information on continued operational safety issues, material review board actions, supplier management and control, and quality oversight responsibilities. These requests place the UM in the position of reporting on

items and issues that are in the purview of either Boeing as the ODA holder, or the FAA.

**Recommendation to the FAA:**

48. Ensure FAA employees do not pressure or require UMs to provide information outside of their authorized functions.

26. **Finding:** The Expert Panel understands that previous changes in Boeing's organization decentralized its human factors expertise, as discussed in Section 3 of this report concerning Human Factors and Human Systems Integration. Boeing is currently in the process of rebuilding its human factors expertise. Boeing's senior leadership expressed intent to establish human factors as a formal, stand-alone, and highly prioritized technical discipline and design practice within Boeing.

**Recommendations to Boeing:**

49. Expedite the development of human factors as a highly prioritized technical discipline and design practice within Boeing.

50. Partner with academia and industry experts to develop the human factors discipline enterprise wide, validate its effectiveness, and provide regular updates to the FAA on its progress.

27. **Finding:** Although Boeing provided the Expert Panel a roadmap to implement ODA and SMS program enhancements, at the time of the Expert Panel's review, the SMS and ODA changes described in the roadmap were not yet completed.

The Expert Panel acknowledges the concern specified in the ICAO Safety Management Manual regarding the natural drift in organizations. The Expert Panel notes the current state of implementation of Boeing's SMS and ODA changes requires continued review of these activities by both internal and external organizations.

**Recommendation to Boeing:**

51. Within six months of the issuance of this report, review the recommendations contained in this report and develop an action plan that includes a milestone-based approach to comprehensively address each recommendation and share that action plan with the FAA.

**Recommendations to the FAA:**

52. Form an interdisciplinary team to review Boeing's responses generated from recommendation 51.

53. An interdisciplinary team should engage with Boeing on a regular basis to review Boeing's progress in addressing the recommendations contained in this report to ensure sustained and adequate progress by Boeing in addressing the recommendations contained in this report.



## 5. Appendices

### Appendix A. Expert Panel Membership

Section 103, paragraph (a)(3) —	Membership Requirement—	Fulfilled by—
(A)	2 representatives of the National Aeronautics and Space Administration	<p>Dr. Immanuel Barshi Sr. Principal Investigator, Human Systems Integration</p> <p>Dr. Tracy Dillinger NASA Senior Executive Psychologist: Agency Safety Culture Program and Agency Human Factors Program</p>
(B)	2 employees of the Administration's Aircraft Certification Service with experience conducting oversight of persons not involved in the design or production of transport airplanes	<p>Michael Bartron Chief Scientific and Technical Advisor for Safety and Risk Analysis</p> <p>Linda Navarro Senior Advisor, Organization Designation Authorization (ODA) Office</p>
(C)	1 employee of the Administration's Aircraft Certification Service with experience conducting oversight of persons involved in the design or production of transport airplanes	<p>Jim Phoenix Manager, Boeing Certification Management Office</p>
(D)	2 employees of the Administration's Flight Standards Service with experience in oversight of safety management systems	<p>John Caldwell Senior Technical Advisor, Air Carrier Division</p> <p>Kavin Krum Manager, Flight Standards National Field Office, Program Office</p>
(E)	1 appropriately qualified representative, designated by the applicable represented organization, of each of —	

Section 103, paragraph (a)(3) —	Membership Requirement—	Fulfilled by—
E(i)	A labor union representing airline pilots involved in both passenger and all-cargo operations	Dr. John D. Cinnamon PhD, PE. Subject Matter Expert, Aircraft and Design Operating Group (ADO), Air Line Pilots Association, Int'l (ALPA)
E(ii)	A labor union, not selected under clause (i), representing airline pilots with expertise in the matters described in paragraph (2)	Capt. Harvey Meek Representative Coalition of Airline Pilots Association
E(iii)	A labor union representing employees engaged in the assembly of transport airplanes	Jon Holden President, District 751 International Association of Machinists
E(iv)	The certified bargaining representative under section 7111 of title 5, United States Code, for field engineers engaged in the audit or oversight of an organization designation authorization within the Aircraft Certification Service of the Administration	Jeffrey Palmer Aerospace Engineer, National Air Traffic Controllers Association
E(v)	The certified bargaining representative for safety inspectors of the Administration	William Moore Aviation Safety Inspector Professional Aviation Safety Specialists, AFL-CIO
E(vi)	A labor union representing employees engaged in the design of transport airplanes	Richard Plunkett Director of Strategic Development Society of Professional Engineering Employees in Aerospace
(F)	2 independent experts who have not served as a political appointee in the Administration and— (i) who hold either a baccalaureate or postgraduate degree in the field of aerospace engineering or a related discipline; and (ii) who have a minimum of 20 years of relevant applied experience	Dr. Javier de Luis Lecturer, Department of Aeronautics and Astronautics Massachusetts Institute of Technology  Dr. Najmedin Meshkati Professor Civil/Environmental Engineering; Industrial and Systems Engineering; USC Aviation Safety and Security Program University of Southern California

Section 103, paragraph (a)(3) —	Membership Requirement—	Fulfilled by—
(G)	4 air carrier employees whose job responsibilities include administration of a safety management system	<p>Lawrence Brinsfield Regulatory Compliance Manager, FedEx Express</p> <p>Shannon Ferrington ODA Administrator, Southwest Airlines</p> <p>Cheryl Hurst Director of Cabin and Regulatory Standards, American Airlines</p> <p>Raju Tumarada ODA Lead Administrator, United Airlines</p>
(H)	4 individuals representing 4 different holders of organization designation authorizations, with preference given to individuals representing holders of organization designation authorizations for the design or production of aircraft other than transport airplanes or for the design or production of aircraft engines, propellers, or appliances	<p>Valerie Egan Manager, ODA Administration and Compliance Administrator, Bell Textron</p> <p>Patrick Ewald ODA Lead Administrator, GE Aerospace</p> <p>Brian Farmer ODA Core Activities Director and Engineering UM Administrator, Gulfstream Aerospace Corporation</p> <p>Keith Morgan Senior Technical Fellow, Certification &amp; Airworthiness and Former ODA Lead Administrator, Pratt &amp; Whitney</p>

Section 103, paragraph (a)(3) —	Membership Requirement—	Fulfilled by—
(l)	1 individual holding a law degree and who has expertise in the legal duties of a holder of an organization designation authorization and the interaction with the FAA, except that such individual may not, within the 10-year period preceding the individual's appointment, have been employed by, or provided legal services to, the holder of an organization designation authorization referenced in paragraph (2).	Sarah MacLeod Managing Member, Law Firm of Obadal, Filler, MacLeod & Klein, P.L.L.C.

## Appendix B. Acronyms and Definitions

ACSAA	Aircraft Certification, Safety, and Accountability Act (2020)
“the Act”	Aircraft Certification, Safety, and Accountability Act, Pub. L. 116-260, Div. V, § 103 (2020)
ANPRM	Advanced Notice of Public Rulemaking
Applicant	A person, or organization, applying to the FAA for a type certificate, supplement type certificate or production certificate which may or may not include design approvals, production approvals, airworthiness certificates and airworthiness approvals.
ASC	Aerospace Safety Committee (Boeing)
BCA	Boeing Commercial Airplanes
BDS	Boeing Defense, Space, & Security
BGS	Boeing Global Services
CAPP	Committee on Airplane Policies and Processes (Boeing)
CASO	Chief Aerospace Safety Office (Boeing)
CEO	Chief Executive Officer (Boeing)
CFR	The Code of Federal Regulations
Design Practice	<p>Term used by Boeing to describe a collection of engineering design requirements, instructions, guidance, and experience into a standard. Design Practices apply to a specific topic or discipline (e.g., Structures, Electrical, Human Factors), and they also include a board comprised of Subject Matter Experts (SMEs) on the specific topic, who are charged with enforcing the design standard, and reviewing and approving any deviations to the standard.</p> <p>It is common for each design practice to contain a checklist that is used prior to release of a new design.</p>
E-UM	Engineering Unit Members
FAA	Federal Aviation Administration
IAM	International Association of Machinists and Aerospace Workers (Union)

ICAO	International Civil Aviation Organization
Interference	Title 49 of the United States Code § 44742, Interference with the Duties of Organization Designation Authorization Unit Members (d) Definitions— (1) General Applicability—The definitions contained in section 44736(c) shall apply to this section. (2) Interference — In this section, the term “interference” means- (A) blatant or egregious statements or behavior, such as harassment, beratement, or threats, that a reasonable person would conclude was intended to improperly influence or prejudice an ODA unit member’s performance of his or her duties; or (B) the presence of non-ODA unit duties or activities that conflict with the performance of authorized functions by ODA unit members.
MRA	Major Repair & Alteration
NAS	National Aerospace Standard
NASA	National Aeronautics and Space Administration
NATCA	National Air Traffic Controllers Association (FAA Union)
NDA	Non-Disclosure Agreements
ODA	Organization Designation Authorization
OMT	Organization Management Teams
PASS	Professional Aviation Safety Specialists, AFL-CIO (FAA Union)
PC	Production Certificate
POC	Point of Contact
SMS	Safety Management System
SPEEA	Society of Professional Engineering Employees in Aerospace (Union)
SS&L	Seek, Speak & Listen (Boeing)
STC	Supplemental Type Certificate
TC	Type Certificate

Transport airplanes	Section 137(6) of ACSAA (2020), defines transport airplanes as a transport category airplane designed for operation by an air carrier or foreign air carrier type-certificated with a passenger seating capacity of 30 or more or an all-cargo or combi derivative of such an airplane. This definition differs from 14 CFR §25 Airworthiness Standards: Transport Category Airplanes, and thereby, limits the scope of the panel's review to only Boeing Commercial Airplanes (BCA) for the purposes of this report.
UMs	Unit Members

## Appendix C. Referenced Documents

Footnote No.	Referenced Documents
1.	Section 103, <i>Expert Review of Organization Designation Authorizations for Transport Airplanes</i> , Aircraft Certification, Safety, and Accountability Act (ACSAA), 2020.
2.	Section 137(6), <i>Definitions</i> , of ACSAA 2020, defines transport airplanes as a transport category airplane designed for operation by an air carrier or foreign air carrier type-certificated with a passenger seating capacity of 30 or more or an all-cargo or combi derivative of such an airplane. This definition limited the scope of the panel review to Boeing Commercial Airplanes (BCA), a business unit of The Boeing Company.
3.	As stated in <a href="#">The Boeing Company's 2023 4Q Form 10-K</a> , The Boeing Company, together with its subsidiaries is one of the world's major aerospace firms. Boeing is organized based on the products and services offered through three reportable segments: Commercial Airplanes (BCA); Defense, Space & Security (BDS); and Global Services (BGS). <a href="https://investors.boeing.com/investors/reports/default.aspx">https://investors.boeing.com/investors/reports/default.aspx</a>
4.	"Effectiveness." Google's English dictionary provided by Oxford Languages. February 2024.
5.	<a href="#">BOEING SAFETY MANAGEMENT SYSTEM POLICY</a> , The Boeing Company, Revision January 2024 <a href="http://www.boeing.com/resources/boeingdotcom/principles/safety/SMS_Policy.pdf">www.boeing.com/resources/boeingdotcom/principles/safety/SMS_Policy.pdf</a> .
6.	Reason, James. T. "Managing the Risks of Organizational Accidents." 1997, p. 192. Ashgate Publishing Co.
7.	International Civil Aviation Organization (ICAO), Doc 9859, <i>Safety Management Manual</i> , Fourth Edition, p. 3-1, 3-2. INTERNATIONAL CIVIL AVIATION ORGANIZATION, 2018.
8.	<a href="#">Safety Management System</a> , FAA. February 2024. <a href="http://www.faa.gov/about/initiatives/sms/explained">www.faa.gov/about/initiatives/sms/explained</a>
9.	<a href="#">Safety Management System</a> , FAA. February 2024. <a href="http://www.faa.gov/about/initiatives/sms/explained">www.faa.gov/about/initiatives/sms/explained</a>
10.	<a href="#">Safety Management System</a> , FAA. February 2024. <a href="http://www.faa.gov/about/initiatives/sms/explained">www.faa.gov/about/initiatives/sms/explained</a>
11.	<a href="#">Safety Management System</a> , FAA. February 2024. <a href="http://www.faa.gov/about/initiatives/sms/explained">www.faa.gov/about/initiatives/sms/explained</a>



12.	<a href="http://www.faa.gov/about/initiatives/sms/explained">Safety Management System</a> , FAA. February 2024. www.faa.gov/about/initiatives/sms/explained
13.	14 CFR Part 183 subpart D, <i>Safety Assurance</i> . Federal Register, Vol. 70, No. 197, p. 59932-59949. October 13, 2005.
14.	FAA Order 8100.15B, <i>Organization Designation Authorization Procedures</i> , dated May 16, 2013.
15.	Expert Panel Membership specified in Appendix A of the report
16.	<a href="https://www.boeing.com/sustainability/our-principles/caso-report">2023 Boeing Chief Aerospace Safety Officer Report</a> , The Boeing Company. <a href="https://www.boeing.com/sustainability/our-principles/caso-report">https://www.boeing.com/sustainability/our-principles/caso-report</a>
17.	Advance Noticed of Proposed Rulemaking (ANPRM) for SMS for Design and Manufacturing organizations. Federal Register. Vol. 74, No. 140, p. 36414-36417. July 23, 2009.
18.	<a href="https://www.faa.gov/newsroom/boeing-agrees-pay-12-million-and-enhance-its-compliance-systems-settle-enforcement-cases?newsId=">Boeing Agrees... to Enhance its Compliance Systems to Settle Enforcement cases</a> . FAA, December 22, 2015. <a href="https://www.faa.gov/newsroom/boeing-agrees-pay-12-million-and-enhance-its-compliance-systems-settle-enforcement-cases?newsId=">https://www.faa.gov/newsroom/boeing-agrees-pay-12-million-and-enhance-its-compliance-systems-settle-enforcement-cases?newsId=</a>
19.	14 CFR part 5, <i>Safety Management Systems</i> . Federal Register. Vol. 80, No. 5, p. 1308-1328. January 8, 2015.
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