EXECUTIVE SUMMARY

In the wake of the Alaska Airlines Flight 1282 accident on January 5, 2024, and the findings issued by the Organization Designation Authorizations for Transport Airplanes Expert Review Panel (Expert Review Panel),[1] the FAA gave Boeing 90 days to provide a comprehensive plan to improve its safety management and quality assurance, including in the supply chain. This document, coupled with the more detailed narrative Boeing will provide to the FAA's Integrated Review Team (IRT) and the information the Company will present at our May 30 senior leader meeting, is Boeing's comprehensive Product Safety and Quality Plan.

This submission begins with the significant containment and mitigation actions the Company took in the immediate aftermath of the accident. The document next discusses Boeing's new Key Performance Indicators (KPIs) of production system health and associated control limits for each KPI. These metrics will enable continuous assessment of factory health and provide early warning of emerging quality and safety risks. They also will facilitate tracking of Boeing's improvement under the Product Safety and Quality Plan and guide decisions about system readiness for rate increases.

Shortly after the January 5 accident, Boeing undertook a major effort—including consultation with experts, airline customers, and stakeholders[2]—to identify additional short- and long-term improvements in seven specific areas: (i) fully implementing the Company's Safety Management System (SMS) across the production system; (ii) simplifying and enhancing processes and procedures; (iii) reducing incoming defects from suppliers; (iv) improving employee training; (v) ensuring total production system compliance; (vi) strengthening Boeing's culture of safety and quality through engagement and communication; and (vii) simplifying installation and build plans. The sections below describe Boeing's planned key initiatives in each area, milestones already achieved, long-term plans for further improvement, and metrics to objectively track progress. This submission concludes by describing Boeing's responsive actions to the FAA's Special Audit Item (SAI) findings and the Expert Review Panel recommendations—actions that in many respects overlap with those the Company is undertaking in the seven attention areas.[3]

[1] The Panel was established pursuant to Section 103 of the Aircraft Certification, Safety, and Accountability Act of 2020.
[2] These experts and stakeholders include the FAA through its Special Audit Item findings and regular check-ins; the Expert Review Panel; Admiral Kirkland Donald, U.S. Navy (Ret.), and his independent assessment team; and Boeing's employees and internal audits.
[3] This submission addresses the SAI issues on a preliminary basis—the Company's response to the SAI is not due until July 23, 2024.

Boeing respectfully submits that this plan and its initiatives reflect, and are in the best traditions of, the commitment to continuous learning and improvement that has helped make commercial aviation the safest mode of transportation.

I. Immediate Containment and Mitigation

After the January 5 accident, Boeing acted promptly to implement the following containment and mitigation actions focused on the safety of its production operations and supply chain:

- **Improvements directed at Boeing's production system:**
  - Revised the build plans, training, maintenance planning, aircraft manual documentation, removal requirements and inspection criteria for the Mid-Exit Door (MED) plug;
  - Instituted additional controls to prevent defects in the MED plug and similar structures and assemblies;
  - Added conformance inspections to nine critical build points;
  - Processed fleet and production inspection findings through Boeing's SMS and Quality Management System (QMS);
  - Published alerts on removals and rework, signed by all factory employees;
  - Hosted representatives from 737 airline customers to review Boeing's production and quality procedures, and to provide feedback;
  - Appointed a recognized safety and quality leader, Admiral Kirkland Donald, to independently assess Boeing's production system; and
  - Implemented a revised management and salaried compensation model focused on quality and safety, with aligned key performance indicators across all programs.

- **Improvements directed at Boeing's supply chain:**
  - Instituted additional controls at Spirit to prevent defects in the MED plug and similar structures and assemblies;
  - Added new inspections at Spirit, as well as pre-shipment approval requirements on fuselages prior to shipment to Boeing;
  - Added competency assessments for all supplier mechanics doing structural work at Boeing sites; and
  - Issued supplier bulletins to strengthen focus on conformance and reduce the risks of defects being shipped.

II. Key Performance Indicators

A significant component of the Product Safety and Quality Plan is the identification of six critical, safety-focused production health KPIs:

(i) Employee Proficiency (measures share of employees currently staffed to commercial programs who are proficient);
(ii) Notice of Escape (NoE) Rework Hours (measures rework due to Fabrication and supplier-provided escapes to Final Assembly);
(iii) Supplier Shortages (measures Fabrication and supplier shortages/day);
(iv) Rework Hours per airplane (measures total rework hours per airplane in Final Assembly);
(v) Travelers at Factory Rollout (measures jobs traveling from Final Assembly); and
(vi) Ticketing Performance (measures average escapes per ticketed airplane).

Each KPI also has associated control limits and defined criteria that will trigger corrective action and SMS risk monitoring.

The KPIs have been established and operationalized across BCA programs. These KPIs will provide real-time insights into production system health, enabling the Company to identify and remediate potential quality and thus potential safety hazards before they fully mature. They also will aid in monitoring tangible improvements from the Product Safety and Quality Plan and determining system readiness for potential future rate increases and the pace of those increases.

III. Product Safety and Quality Plan Attention Areas

a. Safety Management System

Over the last several years, Boeing has developed a strong, enterprise-wide SMS. To strengthen and deepen the reach of this SMS in the production system, the Company is pursuing three main initiatives: (i) streamlining employee reporting channels; (ii) addressing traveled work risk; and (iii) deepening the integration of Boeing's SMS with the QMS.

Employee reporting. The Speak Up system is Boeing's main SMS channel for employee reporting about safety or quality issues and incorporates options to report such issues confidentially and anonymously. Boeing is enhancing this system in a number of ways, including a more user-friendly reporting interface and increased promotion of the benefits of reporting and the confidentiality protections for reportants. These promotion efforts already have had a positive effect, with submissions increasing more than 500% in the first two months of 2024 compared to the same period in 2023. The changes to Speak Up will also include additional training for intake personnel and implementation of advanced data analytics to permit expanded risk analysis. Boeing intends to make further changes to the system to accommodate increased scale as employees continue to become more comfortable with the reporting process.

The Company will measure the effectiveness of these efforts through surveys of Speak Up reportants and by examining a variety of quantitative metrics.

Traveled work. To reduce traveled work, Boeing has implemented a "move ready" process—737 airplanes may not move to the next factory position until identified build milestones are completed, unless a Safety Risk Assessment (SRA) is conducted and a mitigation plan is in place. Boeing has thus far identified criteria for critical build milestones for several final assembly positions and spread awareness of the new process through production floor training, banners, and badge extenders. Over the coming year, Boeing will deploy the move ready criteria and SRA process on the 737, 787, 767, and 777 programs.

Systems integration. Boeing has made progress in integrating the SMS and QMS. Workshops attended by key safety leaders identified two processes (Supplier Notification of Escape and Multi-Unit Nonconformances) where additional SMS structure will help identify and mitigate risk. Boeing is also implementing well-defined SMS triggers and enhanced Production Safety Review Boards into the QMS to better identify production safety risks, track those risks as appropriate in the SMS Risk Register, and drive mitigating action. Boeing is evaluating the success of this effort through metrics that measure, on both an absolute and relative basis, the number of issues and events addressed through these safety processes. Over the next twelve months, Boeing will continue integrating its safety and quality systems, with expanded data-driven reporting and analysis, increased management system oversight, and the implementation of new controls and thresholds for tracking production issues through the SMS Risk Register.

b. Simplification of Processes and Procedures

Boeing has a robust, complex framework of quality processes and command media, which it is working to simplify and improve through a number of initiatives. First, Boeing is comprehensively assessing the approximately 400 QMS command media to remove redundancies, eliminate contradictions, and create a simpler architecture that is easier to understand, apply, and navigate. Second, in streamlining and improving command media, Boeing is placing particular emphasis on stamping, pickups, and removals. The creation of clearer, more concise processes in these areas will help employees better understand their obligations, execute work instructions, and deploy solutions to overcome roadblocks.

Boeing has made substantial progress and is driving further improvement in this area:

- **Command media assessment.** A dedicated team held a three-day workshop in April and is working to establish the methodology and framework for the command media assessment. The team is also finalizing a matrix showing the current state of QMS command media, and will soon begin constructing the new command media architecture and reviewing and dispositioning specific QMS process documentation.
- **Pickups and removals.** Boeing has taken a number of important actions to strengthen

these processes. In January 2024, Boeing alerted the 737 workforce of rework and removal documentation requirements, including an interim measure prohibiting anyone except Manufacturing and Quality team leads from initiating a removal. Subsequently, Boeing introduced new mandatory removal training across all programs and tightened restrictions in the Common Manufacturing Execution System on who can initiate a removal. The responsible team is also identifying and implementing specific changes to strengthen the pickup and removal processes.

- **Stamping.** A team of subject matter experts has identified stamping-related risks caused by traveled work and rework, developed specific command media modifications to drive consistency and repeatability in the stamping process, and deployed new training to educate employees on their stamping obligations. The team is also developing a systematic stamping resolution plan.

Boeing will measure the effectiveness of these initiatives through internal compliance scorecards, more frequent internal audits, and close management review of these and other data sources, to ensure that simplification is driving better quality and safety outcomes.

c. Supply Chain Defect Reduction

Boeing has worked diligently over the last several years, under difficult external conditions, to enhance its processes for supplier oversight and monitoring. To further ensure that parts from suppliers are conforming and compliant, the Company has developed four main initiatives: (i) strengthening its data and analytics capabilities to provide proactive notification of supplier issues, including the creation of an advanced analysis tool; (ii) standardizing supplier oversight actions to prioritize safety and quality, including through the implementation of a common supplier engagement model; (iii) simplifying and improving supplier quality processes; and (iv) driving industry change and dialogue about quality and safety issues.

Boeing's initial accomplishments and further planned actions for each initiative include:

- **Data analytics.** Boeing has validated the new analysis tool based on historical data, and has established a team dedicated to analyzing quality risk in the supply chain and directing appropriate action. The team will create a phased pilot, testing, and implementation plan for the tool and provide sustained support after its launch.
- **Supplier oversight.** Boeing is establishing an escalation process to address supplier quality issues through measures ranging from increased monitoring to canceling work. This process has already resulted in the dedication of additional oversight resources to quality issues at Spirit and Daher. The escalation process is a key element of the broader supplier engagement model, which is under development. Boeing is also working with its direct suppliers to define a shared oversight process for tier 2 and tier 3 suppliers.
- **Simplify supplier quality processes.** This initiative will streamline and clarify Boeing's

supplier oversight procedures, consistent with the broader command media and process simplification initiative discussed above. Boeing is currently revising its governance processes to help suppliers better understand their quality requirements, tighten acceptance criteria for supplier traveled work or defects, and drive better supplier quality performance. As part of this effort, Boeing is comprehensively reviewing its supply chain contracts to identify opportunities for simplification and improvement.

- **Industry engagement.** Boeing is working actively with industry partners to discuss the aerospace industry's quality challenges and risks, identify remedial actions, and develop industry standards to drive improvements. Boeing will continue these efforts and is also creating a framework to support SMS standards and adoption across the supply base.

These initiatives will be tracked with specific metrics—including measures of NOE rework hours and supplier-caused nonconformance rework hours—to ensure continuous improvement in reducing supplier defects.

d. Training

While Boeing offers extensive training on production-related subjects, its training programs must adapt to new workforce challenges including smaller pools of qualified applicants and high employee turnover. Once Boeing finishes implementing its planned enhancements in late 2024, new manufacturing and quality employees will receive up to two more weeks of foundational training, followed by enhanced structured on-the-job training (SOJT).

Since February, Boeing has added over 300 hours of coursework to its foundational training curriculum for new mechanics and inspectors as well as those who need or request additional training. This material includes new courses on SMS Positive Safety Culture, regulatory and process compliance, critical production skills, and quality-focused topics. Boeing is also strengthening its SOJT curriculum, including with access to workplace coaches and peer trainers. The SOJT curriculum revisions will be implemented throughout 2024. The Company will also train and assess manufacturing employees with less than a year's experience on the production floor (less than two years for Quality employees) for proficiency with safety, quality, and compliance requirements.

To continue improving the Company's training over time, Boeing will solicit continuous employee input through Safety and Quality events; Seek, Speak and Listen sessions; and other qualitative and quantitative feedback.

e. Production System Compliance

Following the January 5 accident, and informed by the FAA's SAI findings, Boeing has targeted improvement in four critical areas of production system compliance: Foreign Object Debris (FOD) control; tool control; parts and materials control; and employees' adherence to work instructions. Boeing has significantly enhanced its daily reviews and audits in all four

priority areas and throttled production activities upon discovering significant non-compliances. It also has implemented additional short- and long-term corrective actions in each of these areas:

- **FOD control.** In the first quarter of 2024, Boeing began work on an enhanced FOD control plan involving command media revisions; additional training, signage, messaging, and guidance; and other internal process changes. Boeing has implemented some of these enhancements in its 737 factory, including improved FOD zone designations, assignment of responsibility for FOD control at each work area to individual "shop floor" managers, and deployment of additional training. Boeing is further refining its FOD prevention metrics to enable immediate response to FOD "hot spots" using focused messaging, Safety and Quality events, oversight, and other measures. The Company also expects to disseminate supplemental command media and associated instructions on FOD control by the end of this year.
- **Tool control.** Since January, Boeing has improved tool control by retraining first line workers on current processes, communicating expectations to employees on the importance of compliance, and adding an assessment on tool control to the foundational training curriculum. Boeing also has implemented further mitigation measures that include dispositioning noncompliant tools in containment areas and ensuring that tools can be released from containment only if found to conform with relevant command media. Boeing has committed to ensuring that its tool control processes reflect industry best practices, including by centralizing responsibility for tool control; installing tracking technology into tools and containers; requiring mechanics to obtain, control, and return tools at centralized locations; and strengthening lost tool controls.
- **Parts and materials control.** Boeing has taken meaningful steps to strengthen parts and materials controls, including by centralizing responsibility for work-in-progress (WIP) racks and enhancing the Company's digital apparatus for tracking parts and materials, with the goal of ensuring that all parts are properly labelled and accounted for in WIP racks. Boeing is also working to tighten accountability for non-compliances and improve inventory control.
- **Work instruction adherence.** Boeing has undertaken measures—including additional training, coaching, and opportunities for feedback—to ensure mechanics follow work instructions and product data definitions. The Company will track progress through mechanic assessments and adherence checks across its factories by the end of 2024.

f. Engagement and Communications

Boeing is committed to effectively engaging and communicating with all employees to strengthen its culture of safety, quality, and compliance. Building off of its efforts over the last several years, Boeing is pursuing four main initiatives: (i) holding full-day quality stand downs and Safety and Quality events across the Company; (ii) creating and supporting Employee Involvement Teams ("EITs") to conduct weekly problem-solving sessions and review employee

ideas for improving the production system; (iii) establishing a leadership program for manufacturing, quality, and fulfillment managers; and (iv) improving the Company's messaging about safety, quality, and compliance.

These efforts are well underway. Since January 5, the Company has hosted 20 quality stand downs at every major facility in BCA, with more than 70,000 employees participating to share their perspectives on improving safety, quality, and compliance. The stand downs have generated more than 35,000 suggestions, spurring more than 5,600 completed action items. BCA will now transition from stand downs to holding quarterly Safety and Quality events to maintain focus on these issues.

Over the last four months, Boeing has developed EIT training materials and an implementation guide, along with a plan to phase in EITs throughout BCA by early 2025. All programs and various fabrication facilities and delivery centers have launched EIT programs, with 300 EITs now operating. Boeing is also soliciting nominations for Safety and Quality Awards and creating new awards focused on SMS and product safety.

To strengthen the performance and capabilities of manufacturing and quality leaders, Boeing is creating an upskilling program for supervisors and managers, instituting basic management training for all 737 program leaders, and aligning similar content already in use in other BCA programs. Boeing is also simplifying and augmenting internal communications about safety and quality and working to enhance the Company's culture and equip leaders with resources to effectively convey these messages. For example, the Company has rolled out a set of new, targeted communications to accompany implementation of the new Product Safety and Quality Plan, and is expanding promotion of Boeing's SMS across multiple channels. Boeing also has deployed more digital and physical signs on the factory floor and is creating displays to educate the production workforce on safety, quality, and compliance topics.

Boeing will track the direct implementation of these initiatives, using measures such as the number of Safety and Quality events, EITs and resulting improvement ideas, and upskilling programs completed. It will also evaluate the results of these initiatives in terms of defect reductions and improvements in employee sentiment on safety and quality as measured through periodic surveys. Finally, it is enhancing these surveys to more directly measure safety and quality aspects of Company culture.

g. Installation Plan Improvements

Installation Plan (IP) work instructions, which translate often-complex engineering requirements, can be difficult for mechanics to understand. Boeing is implementing a plan to (i) examine the design-build process for opportunities to enhance the safety of critical systems and structures, and (ii) simplify and clarify work instructions in IPs.

Boeing's initiative to improve the design-build process is using design-build audits ("DBAs") of critical structures and systems to identify and mitigate production and maintenance risk. A number of critical 737 structures and systems have been identified for DBAs, with Boeing having completed five DBAs and incorporated twenty-three resulting improvements. DBAs of safety critical areas will be performed across all programs in the coming years. The effectiveness of the resulting enhancements will be measured by examining Continued Operational Safety Program-reportable quality escapes.

Boeing is also simplifying and clarifying IP work instructions. This initiative will implement improvements across programs (beginning with the 737), and provide mechanics and inspectors ready access to all relevant information for performing their tasks. Boeing has begun revising IPs, including deployment of a proof-of-concept IP for a shim and drill on the 737. More proof-of-concept revisions are planned for the months ahead. Boeing will assess these improvements through relevant KPIs, surveys and interviews, and analysis of Speak Up reports.

IV. Special Audit Items

The SAI identified issues falling into nine categories: part and material control, tool control, FOD, work instructions, stamping, training, documentation/command media, engineering, and quality escapes. While most of these findings are addressed in the attention areas described above, three findings—Boeing quality escapes; Boeing liaison engineering and Material Review Board (MRB) issues; and Boeing's approach to Spirit-related findings—warrant separate treatment.

Quality escapes. Boeing is addressing these findings systemically to both resolve the immediate quality concerns and disseminate best practices to the factory. Boeing will provide Corrective Action Plans for the SAI quality escapes to the FAA as part of its SAI submission in July. These corrective actions will be deployed across programs. Boeing has taken interim actions to address the specific findings identified in the SAI—loose or noncompliant fastener installation, riding conditions, and FOD escapes—including through enhanced quality reviews, additional controls in the form of revised drawing requirements, planned work instruction improvements, and other process enhancements. Boeing will track these mitigation efforts through monitoring under its tiered QMS oversight model, which entails self-assessments, management reviews, and process management by both internal and external stakeholders.

Liaison engineering and MRB. Boeing is working to ensure continued compliance with the terms and intent of applicable regulations, including by clarifying and strengthening processes for submitting data to the FAA and improving engineering guidance documents. Boeing will track its SAI-related engineering actions and continue to ensure the compliance and consistency of its internal engineering requirements and procedures.

Spirit SAI findings. As the Production Approval Holder, Boeing is responsible for its production system, including parts and assemblies originating from suppliers. Recognizing this

responsibility, Boeing is working diligently to support Spirit's implementation of improved control systems that ensure the consistency and conformity of parts and the manufacturing process. All Spirit-specific SAI findings—parts and materials control, FOD, work instructions, stamping, and engineering—are being jointly investigated by Spirit and Boeing and integrated with the Boeing root cause corrective actions to facilitate containment and best practice adoption at both companies. Boeing and Spirit are tracking compliance and the companies' progress through monitoring, verification, and internal and external audit activities.

V. Expert Review Panel Recommendations

Boeing agrees with the findings and recommendations of the Expert Review Panel, and the Company's detailed action plans and deliverables for each recommendation have been submitted to the FAA over the last two months. Boeing has already adopted some of the Panel's recommendations and is working on implementing the rest. In all cases, Boeing is confident the actions it is taking to address the findings will enhance the Company's safety culture, SMS, QMS, Organization Designation Authorization (ODA), and design practices. Boeing's responsive actions fall into the following areas:

- **Safety culture.** Boeing is undertaking actions to deepen leadership and employee alignment to a positive safety culture, conduct improved safety culture assessments, and enhance safety reporting mechanisms. Fundamentally, these actions focus on simplifying employee guidance and ensuring employees understand their part in Boeing's safety culture, no matter their job role.
- **SMS.** In addition to the actions noted in the SMS section above, Boeing is also taking steps to reinforce the understanding of SMS's basic pillars and each employee's role in ensuring the SMS's success; implement additional safety metrics and spread awareness of those metrics throughout the workforce; and continuously reinforce and mature the SMS and integrate it with Boeing's QMS.
- **ODA.** Boeing is continuing its efforts to strengthen its ODA system to foster greater independence, advocacy, and recognition. These efforts build off of the success of the Company's recent restructuring of the Engineering Unit Member organization, which unit members have responded to positively in survey results. Boeing's ongoing initiatives in this area include further restructuring the ODA management system, enhancing support for unit members at small and remote sites, and implementing additional changes to address interference and retaliation concerns. Boeing also is taking steps to expand the pipeline of unit members.
- **Human factors and pilot input.** Boeing is implementing initiatives to elevate and enhance the influence of human factors and experts, such as the creation of an enterprise-wide Human Factors Chief Engineer position. The Company also is formalizing and strengthening the role of pilots and flight test personnel in the airplane design process.

While not a specific recommendation of the Panel, Boeing has developed and implemented standard design practice documentation, as well as structured Technical Design Reviews, to ensure engineering quality in human factors and other disciplines.

Over the long-term, Boeing is committed to sustaining these efforts and ensuring the continued improvement of its safety culture, implementation of SMS, and strengthening of its ODA.