

The Boeing Company

# 2025 Chief Aerospace Safety Officer Report

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## Message from the Chief Aerospace Safety Officer

The history of aerospace has shown us the importance of long-term investments in the systems, processes and technologies that make our industry the safest form of transportation.

Boeing in recent years has increased its strategic investments in capabilities to drive improvements in the safety of our products and services, and to contribute to the industry's shared goal of safety.

As Boeing's second Chief Aerospace Safety Officer, I am privileged to lead teams that are strengthening the safety of our products and services, and I'm proud to share progress on long-term initiatives we started when this independent office was founded in 2021.

It is well understood in our industry that continuous learning is required to achieve the highest levels of safety. The multiple ways we at Boeing are learning – and applying that knowledge – continues to expand. Our learning informs how we design and build our products, how we gather and assess operational data, and how we flow safety improvements back into our engineering processes and out to those who operate and maintain our products.

Our team is the steward and integrator of the enterprise Safety Management System (SMS), which plays a significant and growing role in our company.

Over the past several years we have been working to grow our enterprise SMS. Our perspective broadened after a serious accident in early 2024 involving a mid-exit door plug on a 737-9 that separated from the airplane during flight. We sought guidance – from our regulator, from our customers, from a panel of industry experts, from our own employees. We learned ways to accelerate the alignment, integration and adoption of the enterprise SMS deeper into our three business units and, importantly, far beyond our engineering function into our design, production and product support, as well as our supply chain.

The SMS became a key integrating capability in each business unit's safety and quality plan. At the same time, our teams continued to make progress on global safety collaborations, data analytics, data sharing initiatives, customer training and support programs, and other long-term investments that help raise the bar ever higher on safety. This gives me confidence that we are on the right path on our safety journey.

This annual report summarizes our progress.



Don Ruhmann

Safety Officer

**Boeing Chief Aerospace** 

### Our safety culture

Fostering transparency, openness and accountability for the way we work



Our safety practices Enabling predictive risk management through data analytics and insights



### Our safety collaborations

Leading with humility for a safer industry, collaborating with customers, regulartors and others

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## What's new: Highlights from advancements made in the last 12 months

### Strengthening our safety culture

- Enhanced and encouraged use of Speak Up, Boeing's confidential and anonymous reporting channel for product and services safety, quality and compliance concerns. The yearly volume of reports increased by 220%.
- Deployed required safety and quality training to nearly 160,000 employees, focused on their role in identifying and reporting potential product hazards.
- Published on Boeing's external website an immersive timeline of events in history that shows how Boeing and the aerospace industry have applied learnings from accidents, technological achievements and people – to further advance aviation safety.
- Doubled the number of Boeing teammates in the SMS Champions Program to more than 1,000. The program enables participants to gain a greater understanding of SMS and advocate for its use as they go about their work.

Why it matters

- Improving our safety practices
- Developed and submitted to the U.S. Federal Aviation Administration (FAA) a comprehensive set of actions to address recommendations made in an expert panel's safety review.
- Implemented more than 20 Design Build Safety reviews, in which teams apply the SMS Safety Risk Management practice to ensure engineering requirements are being translated into production of defect-free airplanes.
- Supported the continued improvement in the percentage of FAA-delegated Organization
  Designation Authorization (ODA) unit members
  who, in a 2024 survey, reported being able to
  perform their delegated duties free from interference.
- Implemented no-notification product safety and quality audits at five Commercial Airplanes sites, in addition to regularly scheduled audits. These audits evaluate product conformance to specified technical requirements.
- Expanded the sources and systems monitored for safety data throughout the product lifecycle, and widened the application of machine learning to augment Boeing teams in proactively identifying and addressing potential hazards.

### Collaborating for a safer industry

- Engaged more than 300 airline operators in developing and implementing comprehensive, integrated solutions that further strengthen operational safety.
- Convened the third annual Boeing Aviation Safety Conference, bringing together nearly 300 top experts from across the aviation industry, including representatives from 90 carriers, pilot associations and regulatory agencies, to exchange knowledge, best practices and insights on industry challenges.
- Launched a series of new multimedia task aids to help operators' maintenance crews ensure the safety of the airplanes they work on.

Safety is the foundation of everything we do and our teammates take that personally — knowing every decision, every detail matters and must be done with transparency and accountability. Safety is about ensuring every person who flies on, uses, operates, designs, builds or services Boeing products gets to their destination safely.

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## Strengthening Our Safety Culture

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### Enhancements in safety reporting mechanism

Speak Up, Boeing's confidential and anonymous reporting channel for product and services safety, quality and compliance concerns, saw strong reporting growth in 2024.

Boeing had a 220% increase in total reports made in the Speak Up tool from 2023 to 2024.

Boeing enhanced this system in several ways in the past year as a direct result of feedback from teammates. Specifically, employees expressed a desire for greater confidentiality when voicing product safety concerns as well as improved transparency regarding how those concerns are addressed. In response, Boeing enhanced the Speak Up channel with a more user-friendly interface that prioritizes those needs.

The company increased transparency by providing those who submit reports real-time status updates on their submissions, as well as access to their own private dashboard where they can review and track their reports. Employees also now have access to a broader array of Speak Up data analytics, including volume and outcomes of reporting.

To further strengthen confidentiality and independent investigations, Boeing deployed training to all personnel involved in the process. The company established a new protocol to ensure that Speak Up reports are not assigned to the direct manager of a teammate who submits a report, thus ensuring a third party evaluates and resolves the issue.



"We've received a large increase in Speak Up submittals recently, and we encourage that. It means our teammates are more comfortable raising issues, and it helps Boeing become a more transparent workplace."

Julie Brightwell

737 chief project engineer

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### Learning engagements

In 2024 Boeing deployed required safety and quality training to nearly 160,000 employees, focused on their role in identifying and reporting potential product hazards. This video- and web-based training included real-life examples involving Boeing employees, and a discussion guide for managers to facilitate team sessions about ways to apply the learning. Boeing provided leaders and teams the tools and training needed to foster a culture that prioritizes safety, encourages communication about safety, and focuses on ongoing improvements.

Across the company, Boeing conducted safety and quality stand downs focused on engaging and listening to employees. Each business deployed employee involvement teams along with senior leaders to pause operations, discuss safety and quality related topics, and solve identified issues.

Boeing recognizes the need to foster among teammates a Positive Safety Culture, an environment where everyone prioritizes, communicates and continuously improves product safety. To that end, employee onboarding in the Commercial Airplanes Foundational Training Center now includes a four-hour facilitated session focused on connecting hearts and minds to the importance of each teammate's work to the safety of Boeing's products and services. The session highlights the role of manufacturing and quality employees as aerospace professionals who make a personal commitment to product safety.

As well, employees must see a Positive Safety Culture supported by an informed and engaged management team. Boeing introduced Safety Management System and Positive Safety Culture curriculum for managers as part of a Leaders in Foundational Training program. The facilitator-led course is interactive and provides time for discussion about ways for managers to bring the concepts back to their teams.



The Safety Experience at Boeing immersive digital platform centers around an interactive aerospace safety timeline.

## Broadening the reach of safety lessons from the past

In 2024, Boeing published on its external website an <u>interactive timeline</u> of aerospace events and developments that shows how Boeing and the industry have applied learnings from accidents, technological achievements and people to further advance aviation safety.

The timeline is just one element of a larger immersive digital learning platform called the Safety Experience. Boeing developed the Safety Experience to promote a culture of continuous learning and improvement regarding aviation safety. The platform, which launched in 2023, features a wealth of knowledge in the form of conversations with experts, video storytelling and other content that illustrates how lessons from the past continue to inform today's innovations.

The platform is a digital extension of the Safety Experience Center at Boeing in Everett, Washington, where Boeing completed upgrades in 2024. The center enables employees and visitors to deepen their understanding of Boeing's commitment to safety. It brings together 100-plus years of industry safety practices, engineering knowledge, innovations and insights from accident investigations.

## SMS advocates at every level

Safety promotion is increased when teammates learn from peers. To that end, Boeing doubled the number of participants in the SMS Champions Program in 2024 compared with the previous year. This five-week, virtual training and development program takes a grassroots approach to fostering a Positive Safety Culture. It supports the continuous improvement of Boeing's SMS while promoting each champion's professional growth as they promote SMS principles in their work teams. More than 1,000 employees throughout the enterprise participated across five cohorts in 2024, and the program continues. Quarterly alumni meetings keep champions engaged and abreast of the latest developments in our SMS.

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## Improving Our Safety Practices

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## Taking action after expert panel safety review

In 2024, Boeing developed a comprehensive set of actions designed to improve its safety culture, increase awareness and understanding of the company's Safety Management System (SMS), and empower employees to speak up about product safety and quality issues without concerns of retaliation.

The actions were aligned with recommendations in a February 2024 report released by an expert panel operating with authority from the U.S. Federal Aviation Administration (FAA) to review Boeing's safety culture. The review was part of the Aircraft Certification, Safety & Accountability Act passed in 2020.

Each action is either complete or substantially underway. They include:



**Conducted** Positive Safety Culture training for specific employee and manager audiences and strengthened Speak Up reporting channel. **Deployed** SMS training to all employees, enhanced the SMS Champion Program and submitted Boeing's implementation plan to meet additional requirements for the FAA's mandatory SMS rule. **Focused** on increasing the capacity of and enhancing the technical excellence and independence of Boeing employees who are authorized to perform certain functions on behalf of the FAA.

**Hired** a human factors chief engineer and continued to build our expertise around human factors related to design, manufacturing, maintenance and training.

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## Applying Safety Risk Management and Safety Assurance

A key component of a fully integrated Safety Management System (SMS) is proactively identifying potential hazards to product safety and controlling the risks they pose. At Boeing, this work starts with the design of products and continues into the production environment.

**Build Audit:** 

An ongoing initiative called Design Build Safety brings together teams that take a three-phased approach to ensure that engineering requirements are being translated into production of defect-free airplanes. Along the way, the teams apply the SMS Safety Risk Management practice to identify potential hazards and manage risks.

**Conducting a Design** 



## Focusing on safety-critical items:

Teams identified critical areas that could present potential risks during the installation process and areas where a defect, malfunction or other issue could pose a potential safety hazard for all commercial airplane models. These include major structures and key systems such as the horizontal stabilizer. For each critical area, integrated engineering and production teams conduct Design Build Audits, where they review engineering drawings, manufacturing plans, build records and service history to proactively identify areas of risks – for example, if an engineering requirement wasn't properly translated into the build plan. The team then observes the physical build process involving these critical safety items on the manufacturing floor and documents areas of potential risk to the build, including aspects such as human factors, work instructions, inspections and tooling usage. Establishing Control plans:

The cross-functional team uses the audit results to analyze potential risks and develop appropriate additional controls to eliminate or mitigate those risks. The team may use engineering processes, such as Technical Design Reviews, to help determine whether enhanced controls in engineering drawings, installation plans, or even design changes are necessary to eliminate or mitigate risk to product and employee safety.

Design Build Safety teams are applying the SMS Safety Assurance component to monitor and measure the effectiveness of the risk controls and operational processes. This helps to ensure that the safety objectives are being met as expected.

Key performance indicators are monitored across programs and at the highest business unit leadership levels.

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## Improvements in Organization Designation Authorization (ODA)

Boeing continues to make progress on several fronts to strengthen the ODA program and improve the independence of Boeing employees selected as ODA unit members who are authorized to perform certain functions on behalf of the FAA.

In coordination with the FAA, these initiatives focus on improving ODA oversight, its administration, the unit member appointment process and the development of skills. A significant portion of the initiatives focus on increasing the support system for ODA unit members and ensuring they can perform their delegated duties free from interference. Progress includes:



**Completed** the first full year operating under a new organization structure in which unit members report independently to functional engineering leaders who have extensive certification and safety backgrounds. Continued operations of the Office of the ODA Ombudsperson, solidifying more than two years of direct support to ODA unit members and bi-annual reporting to the Aviation Safety Committee of the Board of Directors. The ODA Ombudsperson program is the first of its kind for any major aerospace manufacturer with FAA regulatory oversight. Benefited from engineering ODA unit members helping to create and disseminate design practices in a variety of technical areas. Boeing's design practices, which now number over 2,700, incorporate lessons learned and best practices over Boeing's long history. Unit members also participate in technical design reviews, where frank and transparent discussions are held among engineers and independent expert reviewers.

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To understand the progress of these initiatives, Boeing, with FAA oversight, once again commissioned an external company to survey ODA representatives to better understand perceptions of interference and integrity culture. Of the more than 900 Boeing employees who received the survey in 2024, there was a strong response rate of 67%.

When asked if they have encountered a situation where they perceived interference directed at them in the last 12 months, 8.9% indicated that they had experienced interference, **down** from 12.1% in 2023 and 13.9% in 2022. Among non-Boeing (suppliers) representatives, zero respondents indicated that they had perceived interference within the past 12 months, **down** from 3.4% in 2023 survey results. Additionally, more than 99% of both Boeing and non-Boeing unit members indicated they would know how to report a concern of interference or where to find information to report.

## Broadening the application of safety data analytics

Boeing is applying data analytics throughout the design, production and operation of the company's products.

Data analytics are a powerful part of the Safety Management System through the Aerospace Safety Analytics team and the Boeing Safety Intelligence platform, which uses machine learning algorithms and advanced modeling techniques to deliver safety insights about Boeing products and services to internal teams. The platform is focused on data that measures how Boeing's products and services conform to designs and comply with regulatory requirements, in addition to how they perform in the fleet.

Over the past year, Boeing teams continued to expand the data sources and systems monitored throughout the product lifecycle. They used artificial intelligence and machine learning to help teams proactively identify potential hazards and develop plans to address them. Examples include:

Applying text mining technology to review in-service airplane data, which integrates with digital engineering models, and can lead to insights about component or system issues that design engineers can use for potential improvements.

Using algorithms to augment the work of Boeing teams identifying potential safety issues or making safety determinations in engineering, production and in-service support.



Analyzing automatic dependent surveillance-broadcast (ADS-B) data for airplane approaches and landings to identify potential systemic long-landing trends and sharing insights with operators to help prevent runway overruns.

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## Enhancing internal safety and quality audits



The company invested in its internal audit capability to strengthen the link between safety and quality across the business units. Gaetano (Tom) Sciortino joined Boeing in late 2024 to lead the growing Internal Audit organization. In January 2025, the team began no-notification product audits at five Commercial Airplanes sites, in addition to regularly scheduled audits. Safety and Quality audits evaluate product conformance to specified technical requirements. They are aimed at revealing any systemic issues that could drive the need for process improvements.

## Driving excellence in safety artifacts

An effort to deepen the company's technical excellence in safety-related disciplines began five years ago with the establishment of a functional chief engineer for Safety & Airworthiness. One example of that effort: In 2024, Boeing established a new Safety & Airworthiness Focused Engineering (SAFE) Lab to provide support for engineers who are developing safety artifacts as part of the certification process for products. Safety artifacts are the documents, data and analyses that serve as evidence that a particular system or component meets requirements and is safe to operate.

Engineers are trained in this work through the Safety Engineering College, a curriculum of virtual courses about system safety assessments, functional hazard assessments or other safety analyses required as part of producing a safety artifact. This new centralized, online resource is designed to make it easier for engineers to access the training and resources they need to perform their roles. Downloadable solution kits provide the processes, design practices and tools needed to produce safety artifacts. When engineers need help determining whether their approach is accurate, they consult with experts at the SAFE Lab for clarification and guidance.

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## Collaborating For a Safer Industry

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## Working with operators

Boeing has now engaged more than 300 airline operators in developing and implementing comprehensive, integrated solutions that further strengthen the operational safety of the global air transportation system. This includes enhanced flight crew support to more than 235 global operators via Flight Operations Representatives, highly experienced professionals who serve as advisers to air carriers' flight operations safety programs.

Boeing also continues to provide competency-based training and assessment (CBTA) for operators' pilots and maintenance teams. The CBTA approach blends technical knowledge with skills in leadership, such as teamwork, communications and workload management – which help crews more readily apply their learning. A total of 45 customers have taken advantage of this program. To date, Boeing has conducted 17 workshops with training leaders representing 110 airline operators and 25 regulatory bodies.



Boeing instructor Ann Kieffer watches from the observer's seat in a simulator as pilot trainees demonstrate competencies.

In 2024, Boeing expanded a series of multimedia task aids to help operators' maintenance crews ensure the safety of the airplanes during repair. These task aids are supplemental to Aircraft Maintenance Manuals and include easy-to-follow videos and animated 3D simulations that mechanics can use while performing a repair or preparing for an upcoming task. They cover critical topics such as predictive maintenance enhanced troubleshooting and handling run-on torque -- the initial resistance encountered when threading a self-locking nut onto a bolt, a procedure vital for ensuring aircraft safety.

## Continued support for global aviation safety

Boeing has safety teammates stationed around the world who work with aviation stakeholders to better understand regional safety issues, identify potential safety hazards, provide direct technical assistance and foster the sharing of lessons learned. These teams collaborate with country-specific and regional stakeholders to create a safer and more efficient global aviation system. One example is sponsoring safety management system training as part of critical personnel training and development. Another example is the creation of regional safety information-sharing groups dedicated to operators of Boeing aircraft; these venues provide operators the chance to learn from one another, while keeping Boeing informed of challenges and hazards seen in operations.

This type of engagement with stakeholders complements a range of highly organized efforts designed to advance data sharing based on industry best practices. The collaboration among all stakeholders is essential to both identifying and mitigating hazards in the aviation ecosystem. Numerous regional entities are supported by Boeing experts around the world to foster transparency and partnership, enhancing the access to key data and maturing analyses, which is at the center of a data-driven approach to continuing to improve safety globally.

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## Best practices and knowledge exchange

For the third consecutive year, Boeing hosted a gathering of safety experts to exchange knowledge, best practices and insights on industry challenges. In February 2025, the company conducted its annual Boeing Aviation Safety Conference, bringing together nearly 300 of the brightest minds from across the aviation industry, including representatives from 90 carriers, pilot associations and regulatory agencies. The gathering provides a forum for open dialogue about common challenges and innovative solutions to further enhance aviation safety.



## Providing insight on airplane safety through accident statistics

For 56 years, Boeing has published statistics on commercial jet accidents with the goal of helping stakeholders understand and act upon data related to the safety of air travel worldwide. While the most recent edition of the <u>Statistical Summary of Commercial Jet Airplane Accidents</u> shows an increase in airplane accidents globally in 2024 compared to 2023 – one of the safest years on record – it also shows a continued downward trend in accident rates, hull loss rates and fatal accident rates across recent decades. For example, between the last two decades, fatal accident rates have declined by 65% while flight departures have increased by 20%. These long-term gains in aviation safety require everyone in the industry to learn from accidents and near-misses and to take proactive measures that will help keep air travel the safest form of transportation.



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