



**In Pursuit of Safety:** Strengthening the  
Governance and Controls of Boeing Inc.



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# Boeing currently stands at a pivotal juncture in their history

## Previously

Boeing is a prominent aerospace company known for its high-quality products. The Boeing 737 MAX, part of the fourth generation of the Boeing 737 family, aimed to improve fuel efficiency and extend the range compared to its predecessors.

## Disaster Unfolds

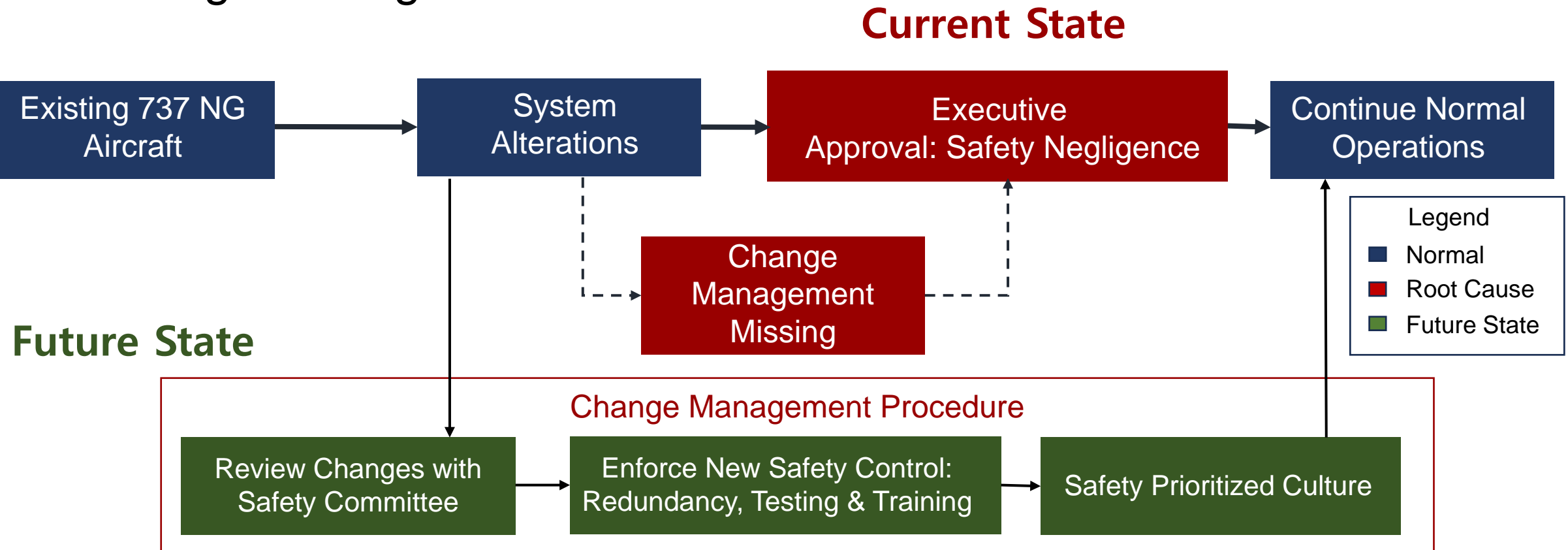
On October 29, 2018, Lion Air Flight 610, a Boeing 737 MAX 8 en route from Jakarta to Pangkal Pinang, experienced technical issues soon after departing Soekarno-Hatta International Airport. The plane subsequently went into a steep dive and crashed into the Java Sea about 13 minutes after takeoff, prompting an inquiry into IT Governance and Control procedures.



## Overcoming Challenges

What **measures** should Boeing implement to **enhance safety**, rebuild public confidence, and prevent a recurrence of such incidents?

# Boeing will transform into a safety prioritized culture to better organize their change management



With proper governance & control in place, alongside with safety prioritized culture, Boeing could avoid a second crash and gain back the reputation

# We urge an organizational transformation in governance, controls, and a cultural shift towards safety

## **GOVERNANCE**

- Restructuring the leadership and decision-making framework within Boeing
- Clarify responsibilities and ensure that safety-related decisions are made with appropriate input and oversight from relevant stakeholders.

## **CONTROLS**

- Enhancing controls to implement robust systems and processes that monitor, manage, and mitigate risks associated with aircraft design changes and practices around safety regulations and policies.

## **CULTURAL SHIFT**

- Instill a mindset and set of organizational behaviors that prioritize safety
- Foster a culture of transparency, accountability, and continuous improvement in safety practices.

# Boeing should establish a safety committee to oversee safety across all operations

The primary objective is to ensure any system design change, updated safety measures, policies has been carefully reviewed and correctly approved to make sure safety controls in place and minimizing risks associated with aircraft manufacturing and operations



## Roles

- Appointing a Chief Safety Officer who will be held accountable for all safety-related matters
- Chief Engineer Officer, Chief Supply Chain Operations, Chief Quality Operations, and Chief Compliance Officer be responsible
- Chief Legal Officer, Subject Matter will be consulted
- Working Group Representatives



## Responsibility

- Review and approve safety protocols, standards and procedures
- Review system/design changes from the perspective of safety
- Monitor safety compliance and conduct regular safety audits
- Responding to safety incident reports and concerns
- Meet bi-weekly or more frequently if urgent safety matters arise



## Authority

- Authority spans across all departments and levels of the organization
- Hold the final authority on approving safety protocols, guidelines, and recommendations.
- Enforce safety regulations and policies.
- Authority to allocate budget and resources for safety initiatives.

# Boeing will develop set standards for each of their controls to detect and prevent flaws in design

## Internal Testing

- All 737 MAXs should have multiple simultaneous AoA sensors
- Weekly checks and standards to ensure equipment meets criteria
- Develop 1-2 edge cases per major upgrade to account for unlikely scenarios

## Training Controls

- Enforce training for all 737 MAX pilots twice a month
- Simulate emergency situations monthly and teach pilots how to manage these situations effectively
- Test pilots on system malfunctions monthly to ensure adequate understanding and competencies

## External Security Compliance

- Set weekly meetings with the FAA while developing changes to the 737 MAX
- All project design phases need to incorporate regulators
- Reach out to external bodies and work to have an independent audit every two quarters

## Process Change Management

- Incorporate a thorough step-by-step process for any changes made to the system
- Compare each modification to a set safety and regulations document
- When developing a modification, consider and account for several possible risks and mitigations

**Set Standards Will Provide Boeing With Clear Metrics and KPIs**

# A cultural shift towards prioritizing safety and increased engineering standards is imperative to regain stakeholder trust

Leadership Involvement is pivotal in this process

## Communication



Maintain open lines of communication regarding the causes of the crash, the steps taken to prevent future occurrences, and the progress on safety measures.



Regularly disseminate information about safety procedures, learning from past mistakes, and industry best practices.



Integrate safety as a non-negotiable core value within the company's mission and operational principles.

## Safety Promotion



Implement robust safety training programs for all employees, tailored to their roles and responsibilities



Emphasize the importance of safety in daily operations through continuous, comprehensive safety tests for all employees



Employees at all levels are held accountable for adhering to and promoting safety standards.

# Measuring the performance of our initiatives is critical to ensuring continuous adherence to the recommended procedures

	Metric	Calculation	Description	Y1.5 Success
Safety Performance	Incidents/ Accidents Rate	# Incident / Total flights for the year	Track incidents reported by airlines.	Decrease to <b>0%</b>
	Defects Rate	Defected parts/Total Parts	Defections such as sensor failure, system malfunctioning	Decrease to <b>0%</b>
	System Testing Accuracy	Accurate outcome/Total Testing	Validating the system against requirements	Increase to <b>90%</b>
Compliance	Audits Outcome	# of findings for incompliance	Tracking the number and severity of findings	Decrease by <b>50%</b>
	Supplier Safety Compliance	# of findings for incompliance	Measure vendor compliance	Decrease by <b>15%</b>
Training	Training Completion Rate	Completed Training/Total Training Required	Ensure pilots are properly trained for new system	Increase to <b>100%</b>
	Employee Safety Test Accuracy	Average score for the safety training programs' written test	Measure organization wide safety awareness	Reach to <b>85%</b>



# A two-year cultural transformation at Boeing is necessary to integrate the governance and control procedures

Tasks / Activities	Q1	Q2	Q3	Q4	Q5 & on
Assessment of Current Regulatory Compliance					
Appointment of Chief Safety Officer					
Formation of Safety Committee					
Develop Roadmap for Internal Controls					
Pilot Safety Education					
Regular Safety Examinations					
Ongoing System Monitoring					
Testing Phase					
Ongoing External Audits					

# Boeing can prevent significant financial distress by investing in this strategy

Costs of our Recommendation	
Grounding Opportunity Cost (1 Year)	<b>\$900M Per Quarter</b>
Annual Salaries of Committee Members	\$500K <b>(Recurring)</b>
Testing & Training Cost	\$1M Monthly <b>(Recurring)</b>
CSO Certification Cost	\$2.5K <b>(One-Time Fee)</b>

\$3.6B

Indirect Costs	
Norwegian Air Contract Fallout	\$11.5B
Airline Compensation	\$5B

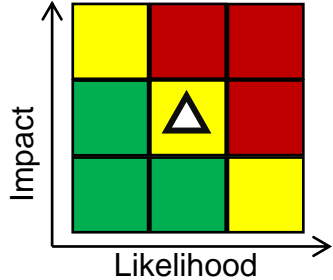
\$16.5B

Direct Costs	
Customer Compensation	\$8.6B
Extra Production Costs	\$5B
Increased Costs	\$6.3B
Victim Compensation	\$100M

\$20B

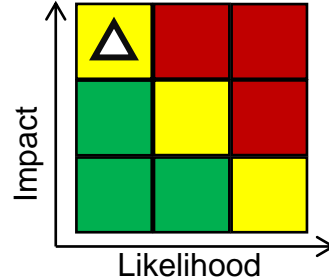
# Boeing will be able to mitigate any possible risks

## Organizational Resistance to Change



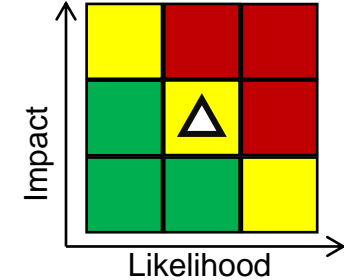
- Extensive change management efforts, including clear communication, training, and involvement of employees in the process.
- Involve the employees, ensuring the training and dialogue is relevant to their roles and responsibilities

## Ineffective Governing Committee



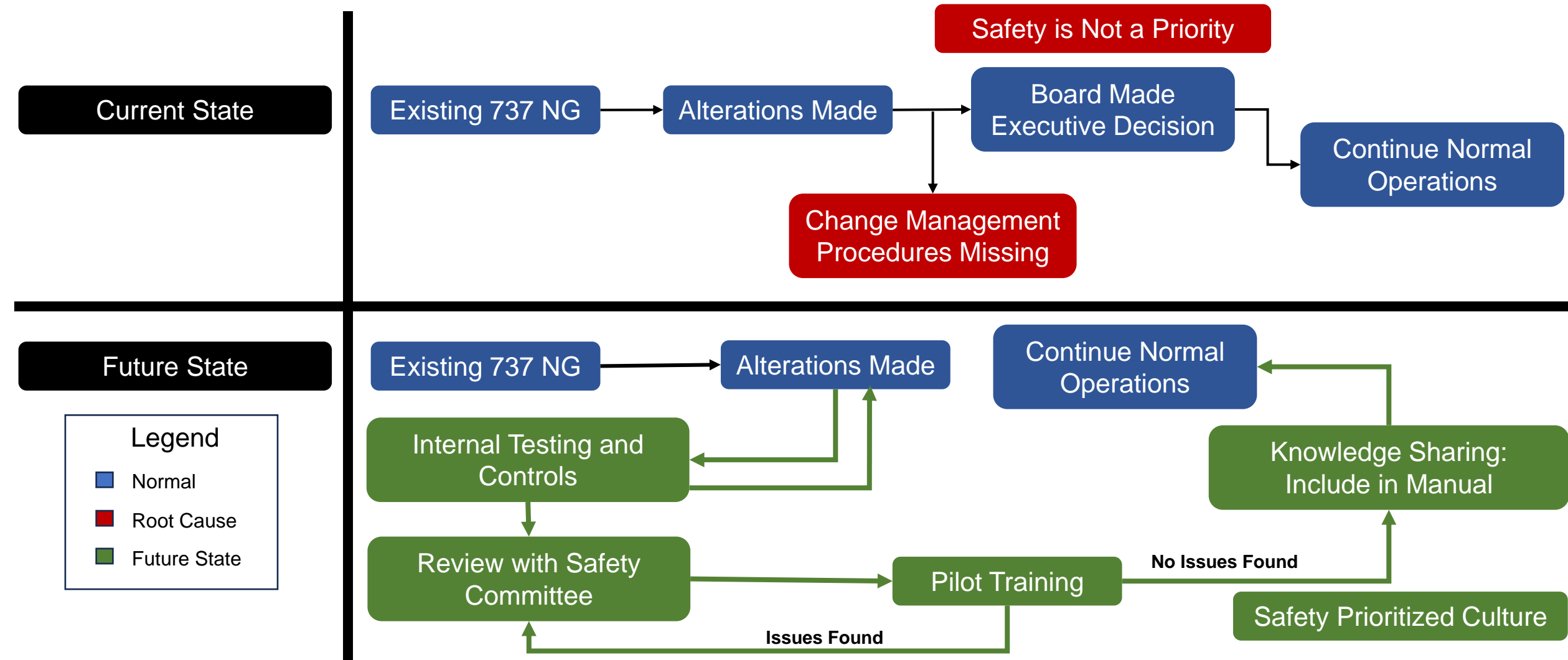
- Ensure that the committee is composed of individuals with diverse expertise and perspectives
- Governance Charter to act as a guide to help make decisions and inform accountability

## Over-reliance on FAA Audits



- Implement a robust internal safety management system (SMS) that goes beyond regulatory requirements and incorporates proactive risk assessment and mitigation measures
- Encourage employees to stay informed about industry trends and best practices.

# Boeing will transform into a safety-prioritized culture to better organize their change management



# Charting a Safer Course



1

## GOVERNANCE

Reinforce a governance structure that prioritizes safety over all else, ensuring decisions are made with utmost due diligence

2

## INTERNAL CONTROLS

Detect and prevent safety risks by carefully scrutinizing every process and process change

3

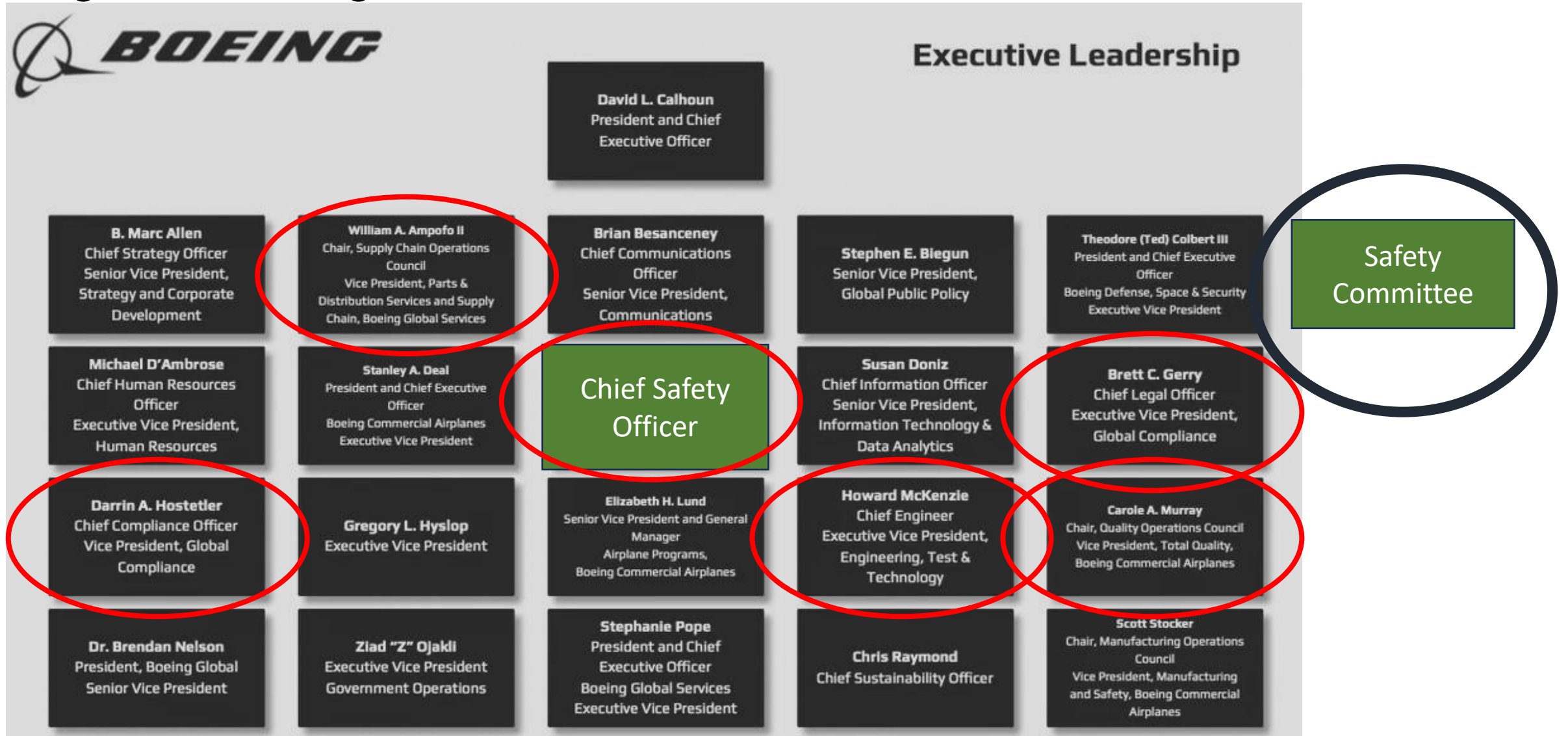
## CULTURE

Cultivate a culture where safety is ingrained in every action and every decision. We all share in the duty to protect each other and our customers.

We understand that change can be challenging, but we are committed to supporting every team member through this transition. Together, we will build a safer, more resilient organization.

# APPENDIX

# Target State: Organizational Chart



# Safety Committee RACI Matrix

	CEO	Chief Safety Officer	Chief Legal Officer	Quality Operations Chair	Chief Engineer	Chief Compliance Officer	Subject Matter Experts	Working Group
Review and approve safety protocols, guidelines	I	A	C	R	R	R	C	R
Review system/design changes from the perspective of safety	I	A/R	C	I	R	R	C	R
Monitor compliance and conducting regular safety audits	I	R	C	I	R	A/R	C	R
Respond to safety incident reports and concerns	I	A	C	R	R	R	C	R
Report safety findings to CEO for situational awareness	I	A/R	C	R	R	R	C	R



# Detailed Explanation of IT Controls

## Sensor Redundancy

Multiple AoA sensors to prevent a single failure from causing a safety issue

## Quality Assurance

Checks and standards, including inspection, testing, and verification to ensure equipment meets criteria

## Edge Cases and Failure Modes

Testing unlikely scenarios is essential to uncover potential vulnerabilities that may not be apparent traditionally

## Simulator Training

Helps pilots become proficient in managing situations related to MCAS and other systems

## Emergency Situations

Pilots must be trained to handle these situations in a safe and effective manner

## System Malfunctions

Pilots must be trained to diagnose and respond to these effectively

# Detailed Explanation of IT Controls

## Collaborate Closely with FAA

Makes sure that regulators have a more active role in overseeing the safety regulation process

## Involve Regulators in Design Phase

Ensures safety standards are met from the beginning and prevents issues during certification

## Regular Audits by External Bodies

Independent organizations conduct periodic reviews to ensure ongoing safety and regulatory compliance

## Change Management System

Well-defined process for evaluating and implementing changes to the aircraft's systems

## Modification Review & Approval

Ensures that any modifications meet safety and regulatory requirements.

## Assess Impact on Safety

Considers potential risks and hazards and attempts to mitigate any effects on safety

# Details on Financial Analysis

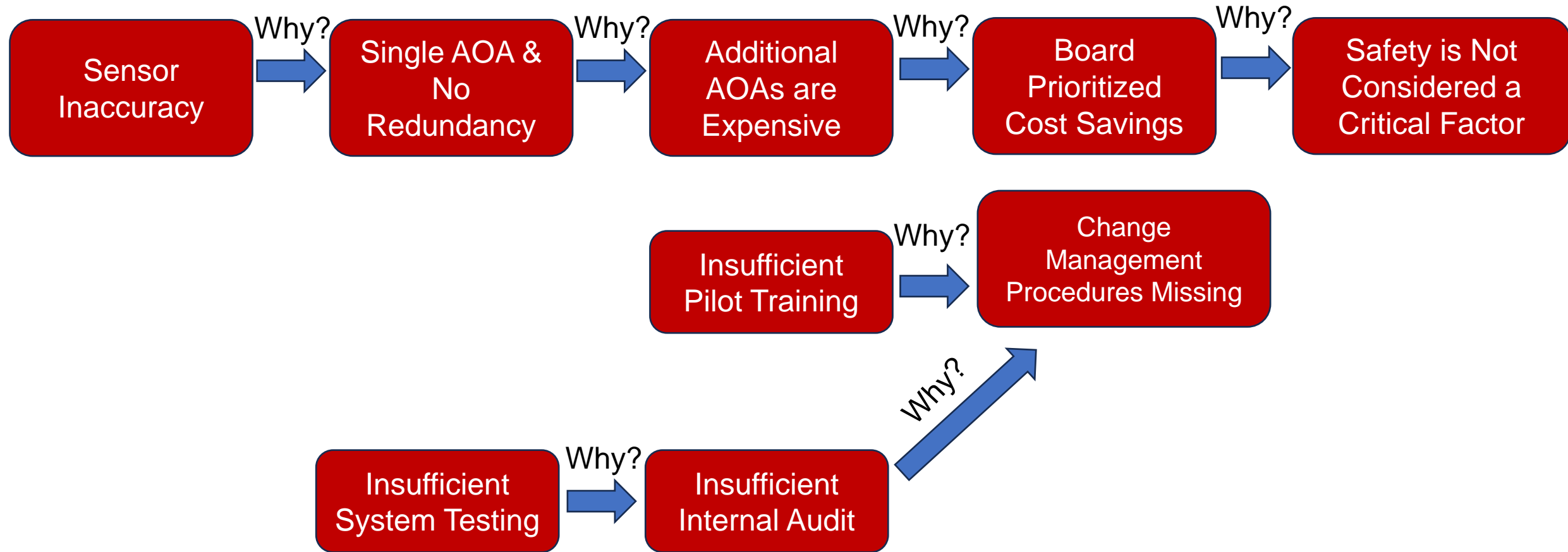
## Our Recommendation

Sensor Cost	\$0 - Boeing manufactures the sensors and they are already built into the 737 Max
Simulator Training - Yearly	\$5 billion per year that would occur whether or not the planes are grounded
High-End CSO Salary - Yearly	\$80 thousand is the high end of CSO salaries
CSO Certification – One-Time	CSO certification cost is \$2.5 thousand
Grounding Cost - Quarterly	Boeing incurs a cost of \$900 million per quarter that they cannot fly the 737 Max

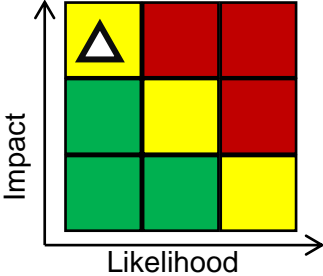
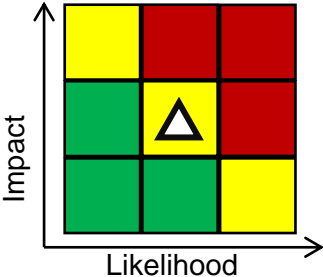
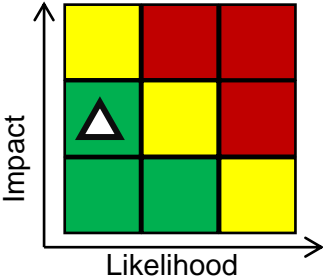
## The prospect of another threat

Customer Compensation – One-Time	Customers getting money back from flights total \$8.6 billion
Increased Costs – One-Time	Boeing incurred a \$6.3 billion for disaster recovery following the crash
Jet Storage – Yearly/Quarterly	Almost 12 thousand 737 Max Planes needed to be stored for a year, totaling \$600 million in costs
Production Costs – One-Time	Disruption of the production chain incurred \$5 billion according to Boeing's report
Victim Compensation – One-Time	Boeing paid a total of \$100 million to families of the victims in the crash
Norwegian Air Contract – One-Time	Contract for 97 aircrafts fell through following the crash, selling at \$55 million on average each
Airline Compensation – One-Time	Airline contracts have clauses built in for customer ticket cancellation and switching costs, totaling \$5 billion incurred by Boeing

# Root Cause Analysis



# Additional Risks and Mitigations

RISK	SEVERITY	MITIGATION
<b>Inadequate Testing Protocols</b> The testing protocols may not cover all critical scenarios or may fail to detect potential issues, leaving vulnerabilities in the safety system.	 <p>A 3x3 risk matrix with Impact on the y-axis and Likelihood on the x-axis. The matrix is color-coded: Red for high severity (top-right 2x2 cells), Yellow for medium severity (top-left, middle-left, middle-right, and bottom-right cells), and Green for low severity (bottom-left and bottom-middle cells). A white triangle marker is located in the top-left cell (High Impact, Low Likelihood).</p>	<ul style="list-style-type: none"><li>• Conduct thorough risk assessments to identify potential failure points and design tests to address these areas specifically</li><li>• Involving diverse teams to develop a structured approach to identify and include edge cases</li></ul>
<b>Public Perception</b> Public perception and stakeholder confidence in Boeing could be fragile due to the recent tragedy. The successful implementation of safety initiatives will be closely scrutinized.	 <p>A 3x3 risk matrix with Impact on the y-axis and Likelihood on the x-axis. The matrix is color-coded: Red for high severity (top-right 2x2 cells), Yellow for medium severity (top-left, middle-left, middle-right, and bottom-right cells), and Green for low severity (bottom-left and bottom-middle cells). A white triangle marker is located in the middle-right cell (Medium Impact, Medium Likelihood).</p>	<ul style="list-style-type: none"><li>• Implement a robust communication strategy demonstrating Boeing's commitment to safety, transparency, and continuous improvement.</li><li>• Engage with stakeholders, including customers, regulators, and the public, to rebuild trust.</li></ul>
<b>Ineffective Trainings</b> Training programs may not sufficiently equip employees with the necessary skills and knowledge to prioritize safety.	 <p>A 3x3 risk matrix with Impact on the y-axis and Likelihood on the x-axis. The matrix is color-coded: Red for high severity (top-right 2x2 cells), Yellow for medium severity (top-left, middle-left, middle-right, and bottom-right cells), and Green for low severity (bottom-left and bottom-middle cells). A white triangle marker is located in the middle-left cell (Medium Impact, Low Likelihood).</p>	<ul style="list-style-type: none"><li>• Regularly assess the effectiveness of training through feedback loops and practical evaluations.</li><li>• Synergize with the FAA to check the training procedures.</li><li>• Provide additional resources and support for employees who may require extra assistance.</li></ul>

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