THE STATE OF DESIGN ENGINEERING IN AEROSPACE AND DEFENSE

A Survey of Design Engineers and Managers

SEPTEMBER 2025

molex

INTRODUCTION

What does it take to innovate in an industry where failure is not an option?

The aerospace and defense industry is built on a foundation of rigorous design and uncompromising standards, where deep engineering expertise and unrelenting reliability are the critical links to mission success.This long-standing commitment to reliability and performance has defined the most trusted suppliers.

AI and open standards are driving a new wave of innovation, reshaping the industry with more autonomous platforms. While these technologies promise to enhance creative problem-solving and reduce costs, integrating them presents significant challenges.

The data from this survey uncovers new, surprising insights while also confirming established knowledge. This report analyzes the data-driven realities of this evolution, exploring the impact of key technology innovations and examining the human elements at the center of this change: the cultural divide between leadership and engineering and the critical skills needed to succeed.

EXECUTIVE SUMMARY

The aerospace and defense industry is being reshaped by the rapid adoption of AI and the industry-wide shift to open standards. This **survey of 1,021 engineering stakeholders** found a surprisingly high rate of AI adoption, often outpacing formal corporate policies. The data confirms that building AI competency is no longer optional, with **86%** of those surveyed viewing it as a core requirement for future success. At the same time, **96%** of the industry is adopting or actively investigating open standards, making interoperability a foundational principle for next-generation system design.

These technological shifts are challenging design engineers to meet anticipated needs for power and cybersecurity. While optimism for new technologies is high, significant concerns remain, and a traditional perception gap between leadership and design engineers persists. Despite these challenges, an overwhelming **97%** of professionals recommend a career in the field, reflecting a deep appreciation for the job security and sense of mission it provides.

METHODOLOGY AND PARTICIPANTS

Research Goal

The primary research goal was to capture quantitative data on trends impacting design engineers at aerospace and defense original equipment manufacturers (OEMs), prime contractors and suppliers, focusing on technology innovation, industry trends, evolving skills requirements and the varying priorities and perceptions among engineers and management.

Methodology

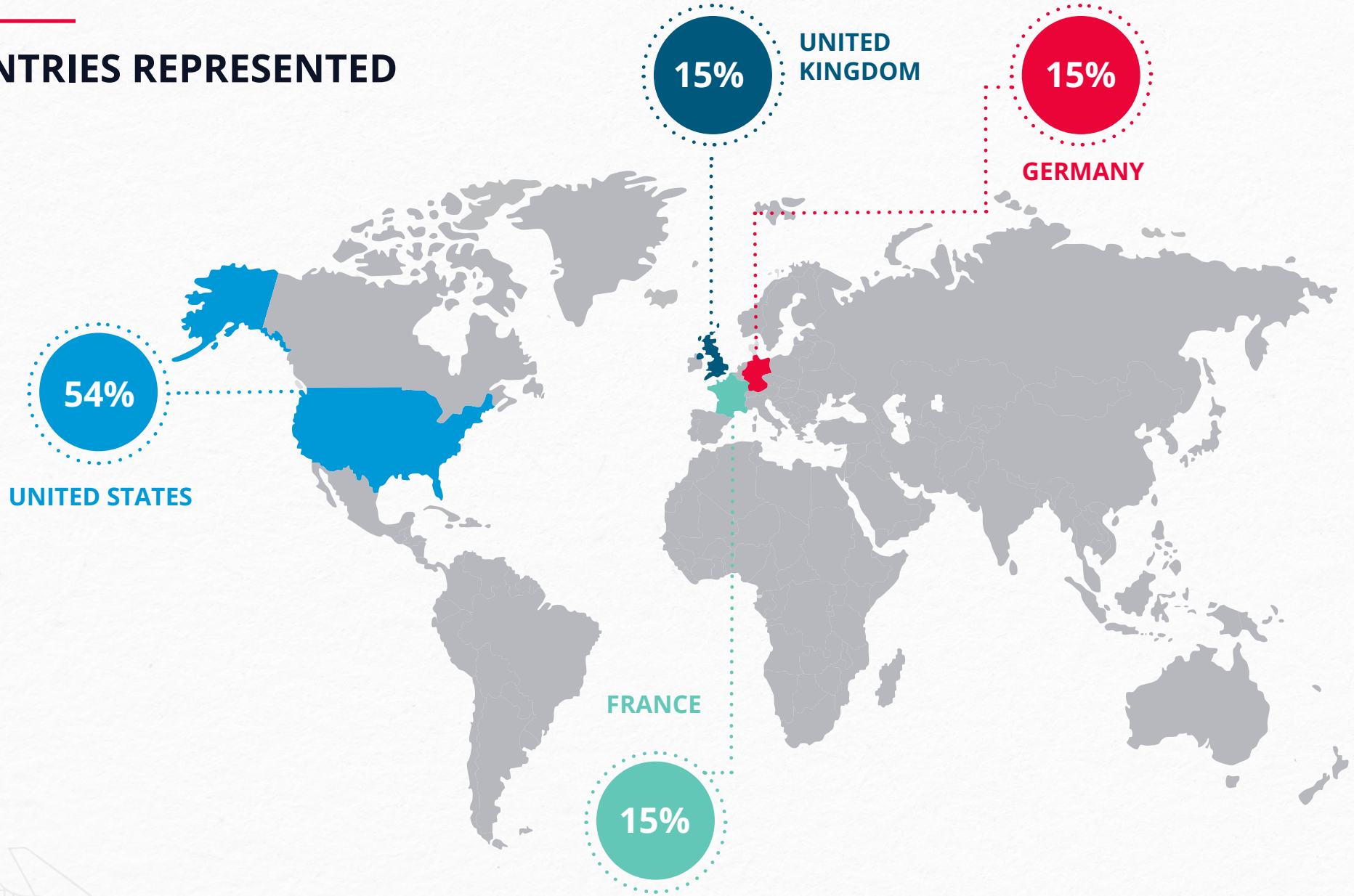
A diverse group of design engineering stakeholders from all levels of the organization was invited to participate in an online survey. The survey asked about their experiences and opinions regarding technology innovation, industry trends and professional development. The survey was fielded in English, German and French. Responses were captured between June 30 and July 18, 2025.

Participants

A total of 1,021 qualified participants completed the survey. At the time of the survey, all participants had direct responsibility (hands-on or management) for design engineering at an OEM, prime contractor or Tier 1 or sub-system supplier in the aerospace and defense industry in the United States, United Kingdom, France or Germany.

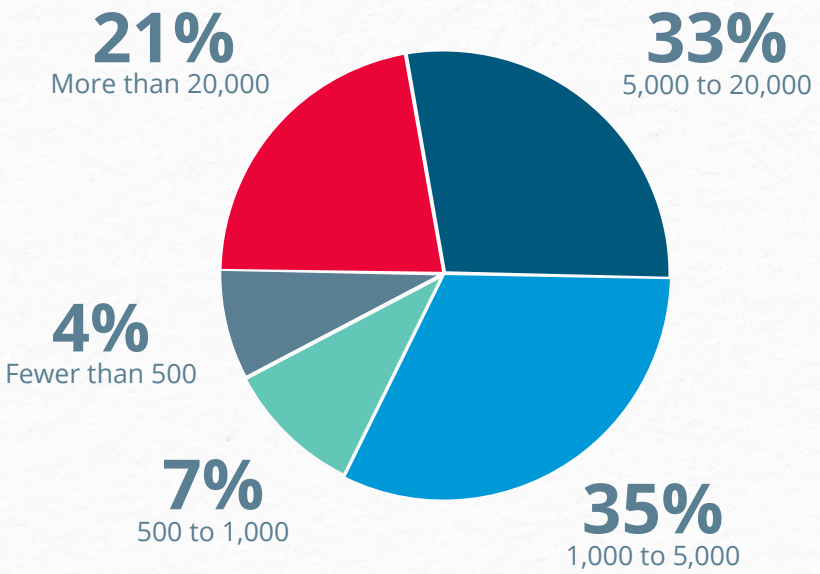
Percentages may not add up to 100% due to rounding.

COUNTRIES REPRESENTED

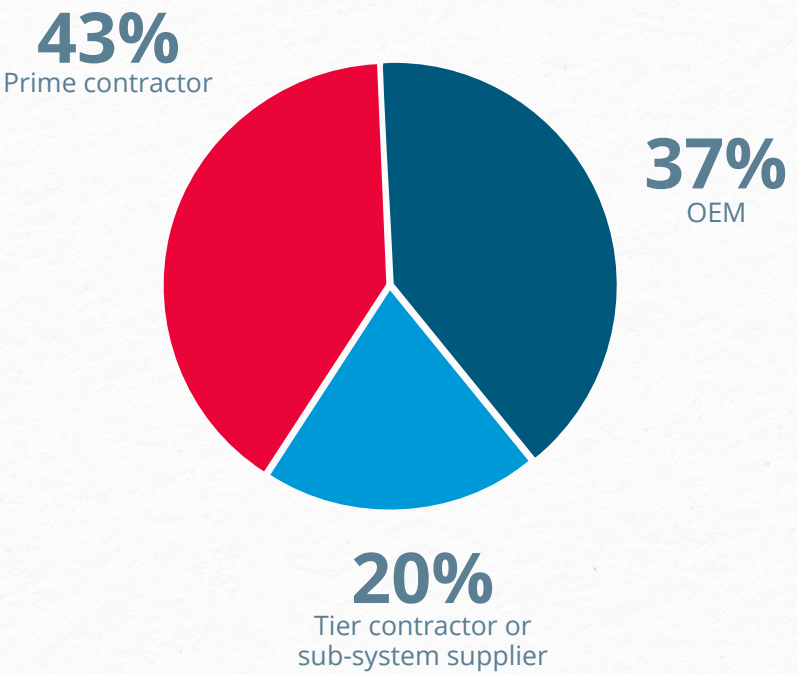


COMPANIES REPRESENTED

Company Size (# of employees)

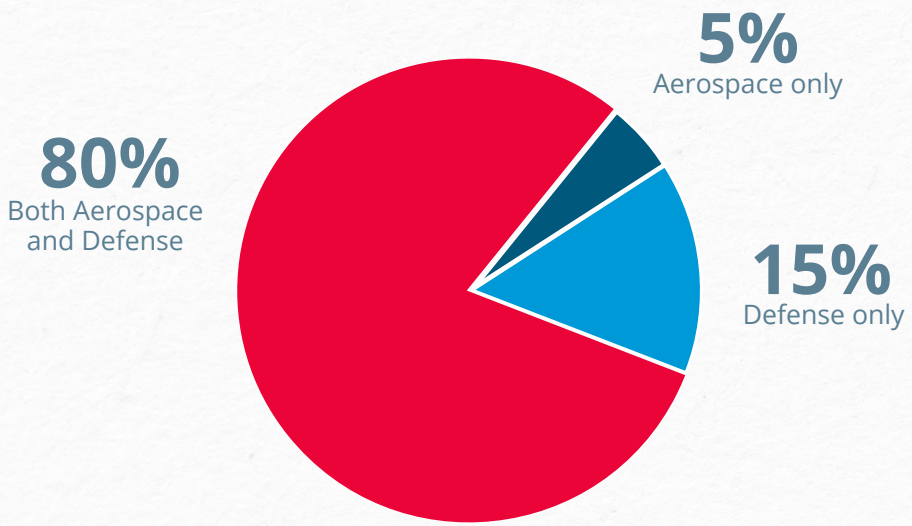


Type of Company



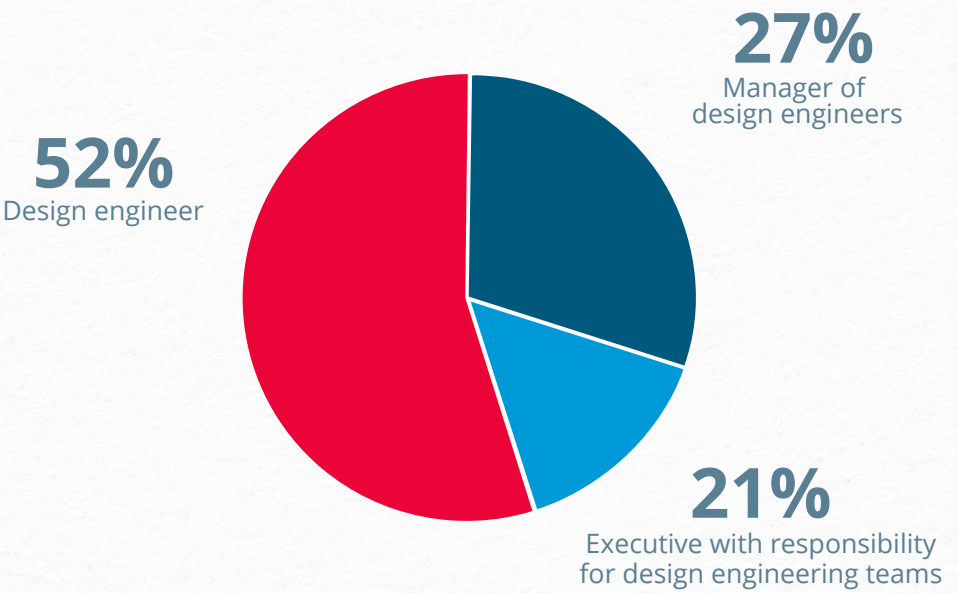
COMPANIES REPRESENTED

Industry



INDIVIDUALS REPRESENTED

Role



DETAILED FINDINGS

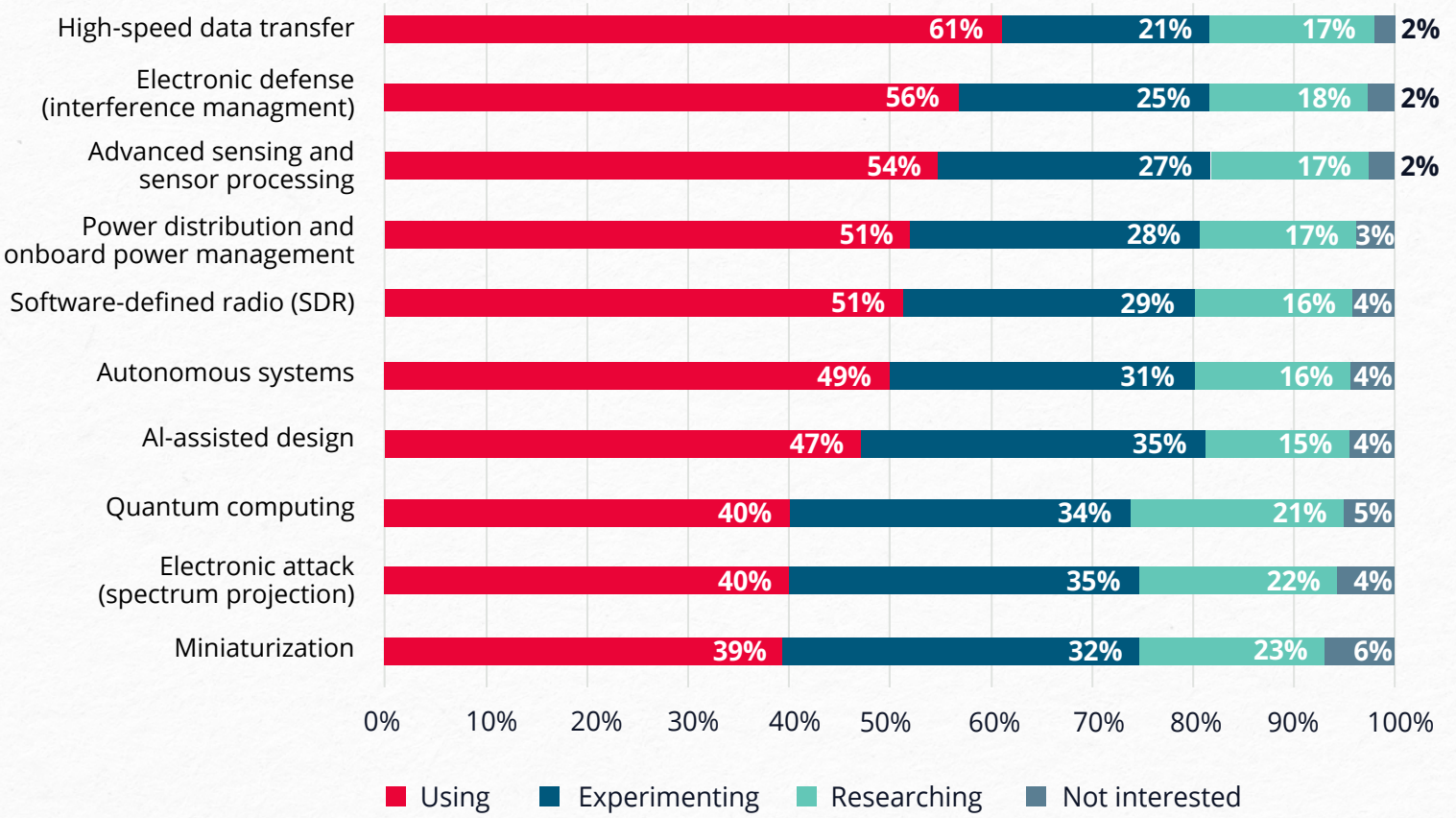
The Innovation Use Divide

THE INNOVATION USE DIVIDE

A critical perception gap regarding AI adoption separates leadership from their engineering teams in the aerospace and defense industry. While this wave of AI innovation is met with a shared enthusiasm across all roles, the data uncovers a disconnect between leadership and their engineering teams. The following data explores this gap and how it manifests in practice.

QUESTION:

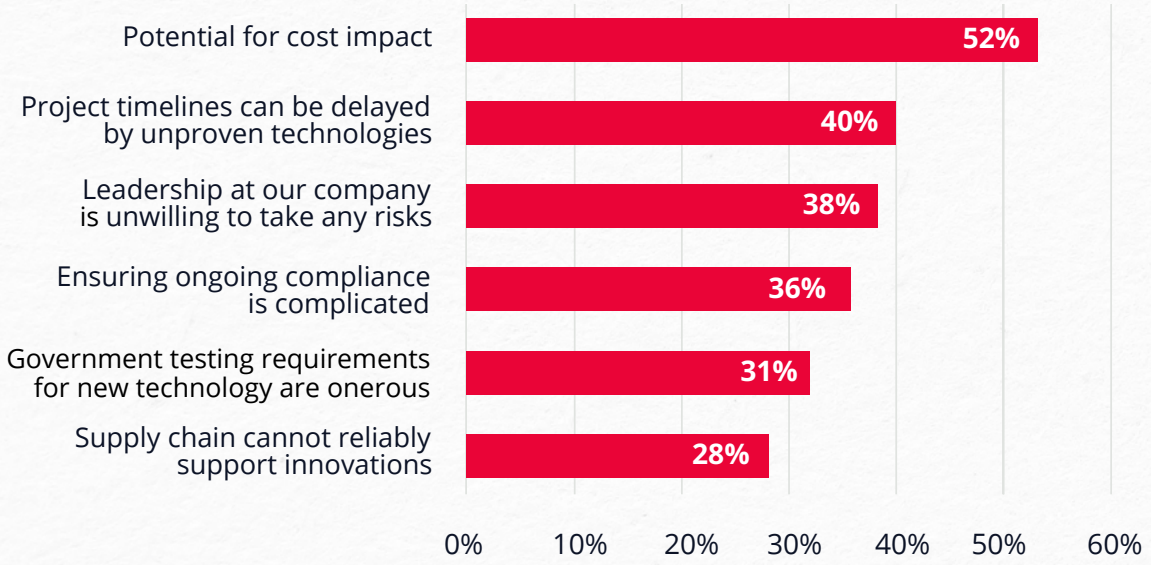
For each of the following innovations, please indicate your company's current adoption for design of electrical systems and interconnect architecture for aerospace or defense applications.



WEIGHING COST AND RISK AGAINST OPPORTUNITY

QUESTION:

To the best of your knowledge, why is your company's leadership cautious about experimenting with innovations for electrical systems and interconnect architecture for your company's aerospace or defense applications? Choose all that apply.



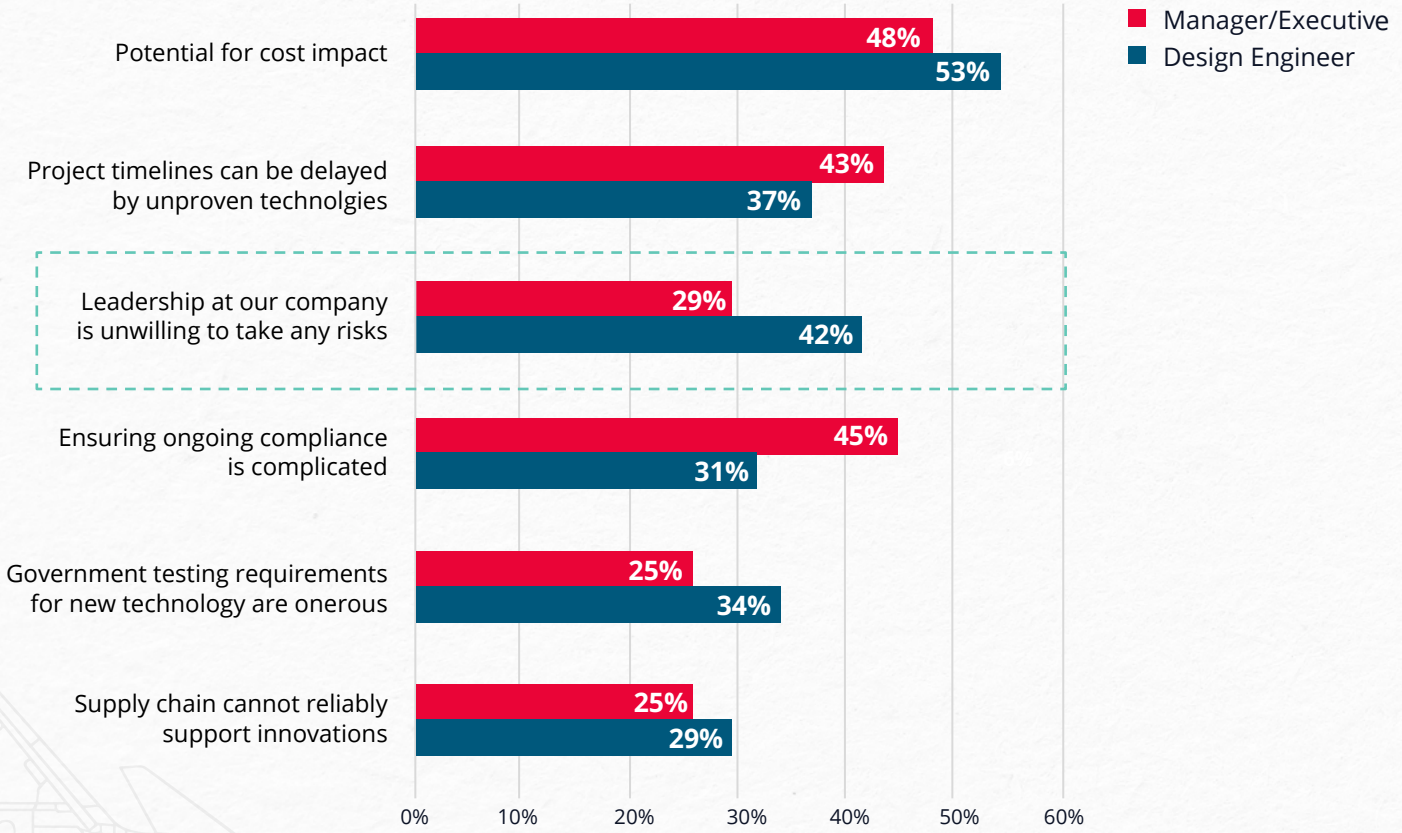
KEY TAKEAWAY:

Leadership's caution is driven by pragmatic business realities, with potential cost impact **(52%)** being the top consideration. This focus on financial risk over other factors highlights the budget pressures facing aerospace and defense company leaders.

THE PERCEPTION GAP, ILLUSTRATED

QUESTION:

To the best of your knowledge, why is your company's leadership cautious about experimenting with innovations for electrical systems and interconnect architecture for your company's aerospace or defense applications? Choose all that apply.



KEY TAKEAWAY:

While cost is the top concern overall, the data reveals a critical perception gap in how risk is viewed. Design engineers are **13%** more likely than leaders to believe their company is "unwilling to take any risks," highlighting a differing view of innovation culture from that of the front lines.

DETAILED FINDINGS

AI at the Tipping Point: Navigating the Promise and Perils of Adoption

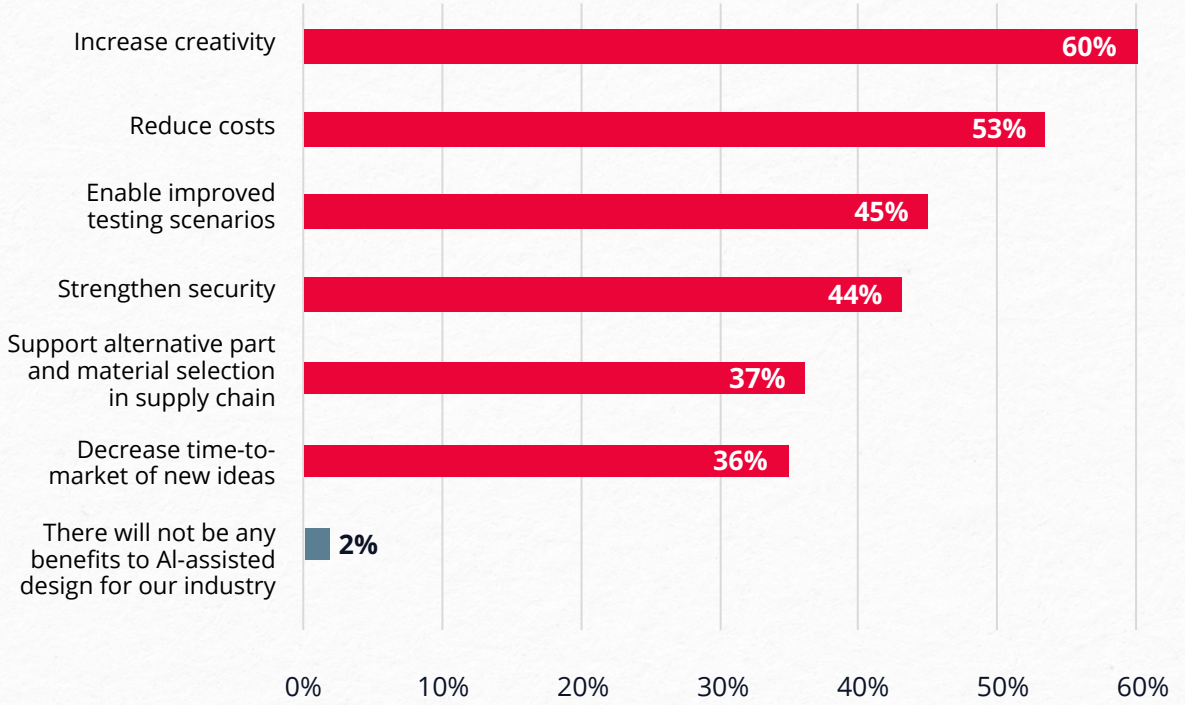
AI AT THE TIPPING POINT

A near-universal belief in the promise of AI is fueling a powerful wave of grassroots adoption by engineers that is outpacing formal corporate governance. **98%** of stakeholders surveyed expect AI-assisted design to be beneficial, with increased creativity cited as its top advantage. This optimism is driving engineers to use these tools frequently, often outpacing formal corporate policies.

Rapid adoption presents a strategic dilemma for aerospace and defense organizations. The findings detail how they are attempting to harness the clear benefits of AI while managing the significant risks. Later in this section, the data shows a remarkable **81%** of the workforce has concerns about using AI, and there are considerable regional differences in formal tool approval.

QUESTION:

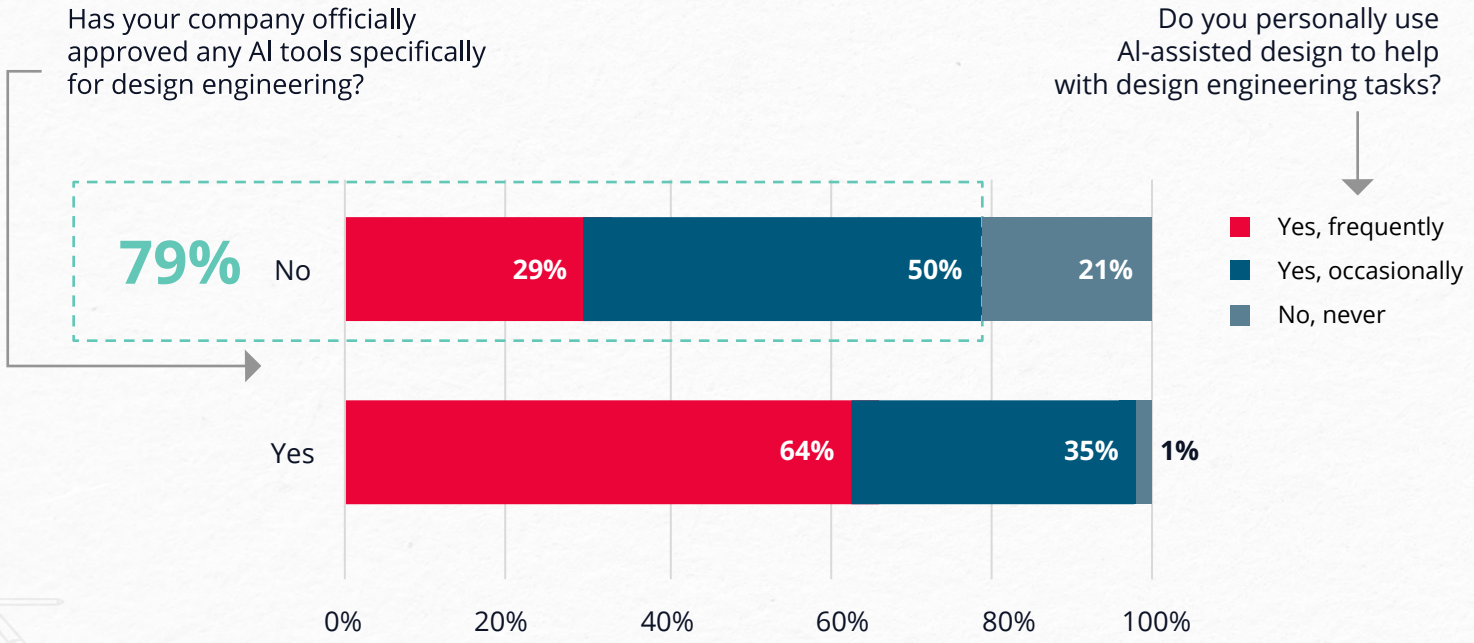
In your opinion, how could AI-assisted design benefit the aerospace and defense industry? Choose all that apply.



THE RISE OF “SHADOW AI”

QUESTION:

Has your company officially approved any AI tools specifically for design engineering? *-and-* Do you personally use AI-assisted design to help with design engineering tasks?



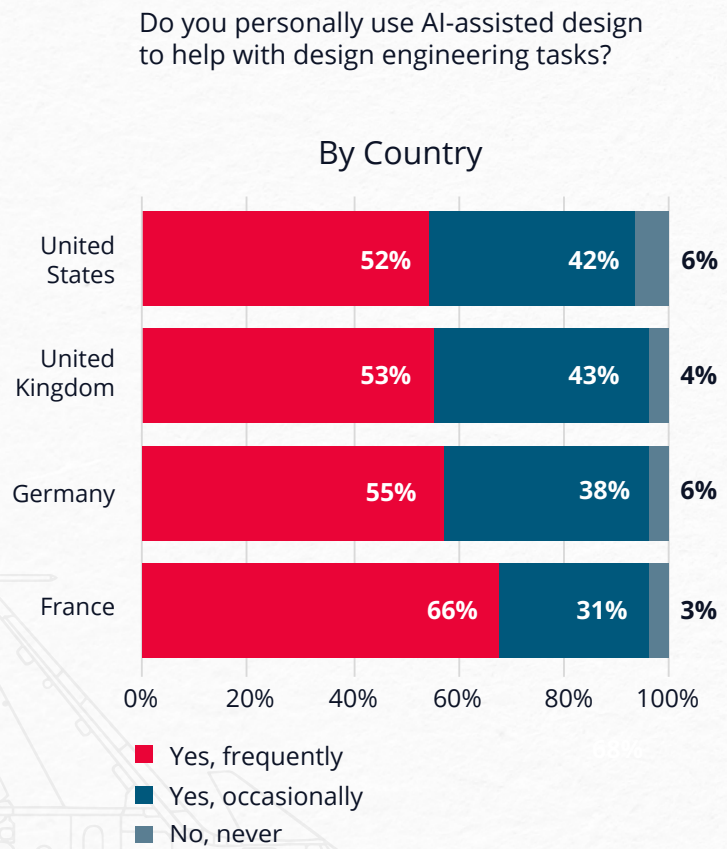
KEY TAKEAWAY:

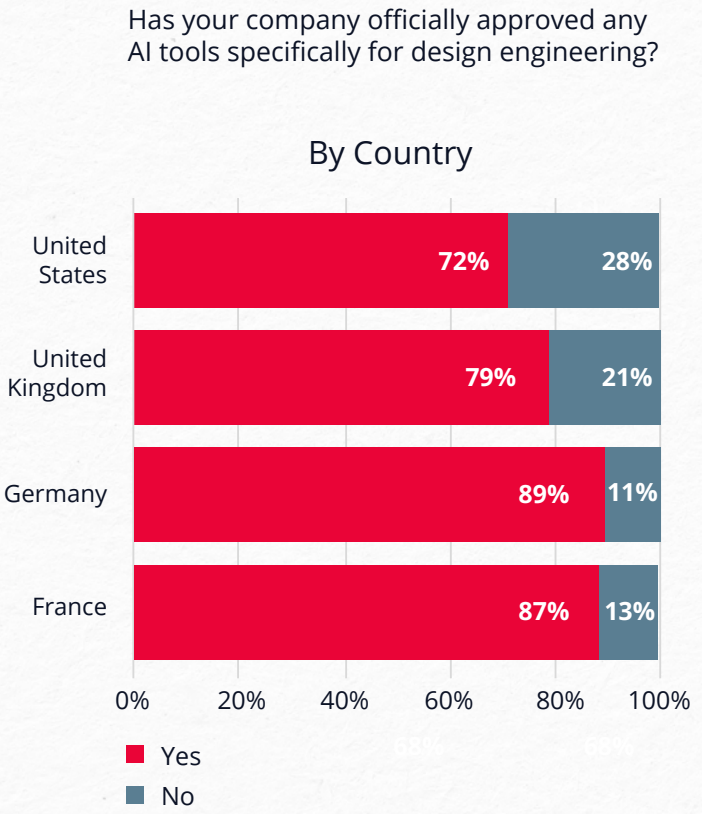
AI tools are being rapidly adopted, often before formal corporate policies have been established. In fact, **79%** of design engineers whose companies have not officially approved any AI tools are using them anyway.

EUROPE LEADS THE WAY IN FORMAL AI TOOL APPROVAL

QUESTION:

Do you personally use AI-assisted design to help with design engineering tasks? *-and-* Has your company officially approved any AI tools specifically for design engineering?





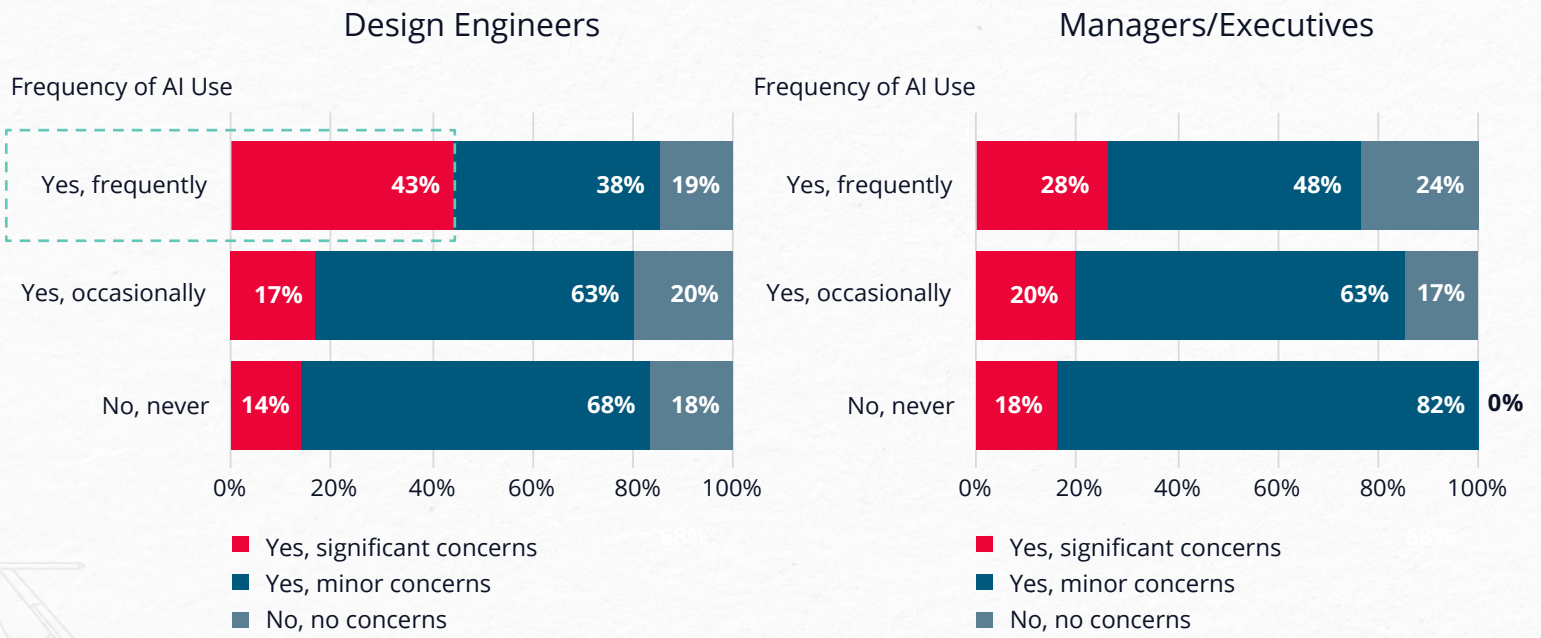
KEY TAKEAWAY:

European aerospace and defense companies are leading in formal AI tool approval, a trend that correlates with higher reported usage. France, with one of the highest approval rates **(87%)**, has the highest rate of frequent AI use among its engineers **(66%)**. Conversely, the United States has the lowest AI tool approval rate in the survey **(72%)** and the lowest rate of frequent use **(52%)**.

WHY FRONTLINE ENGINEERS HAVE THE GREATEST AI CONCERNS

QUESTION:

Do you personally have any concerns about using AI in the design engineering process?



KEY TAKEAWAY:

Hands-on experience uncovers the real complexities of AI, with concerns growing as usage becomes more frequent. Among design engineers who use AI regularly, **43%** report "significant concerns" compared to just **17%** who use it occasionally.

DETAILED FINDINGS

Open Standards: The New Blueprint for Defense

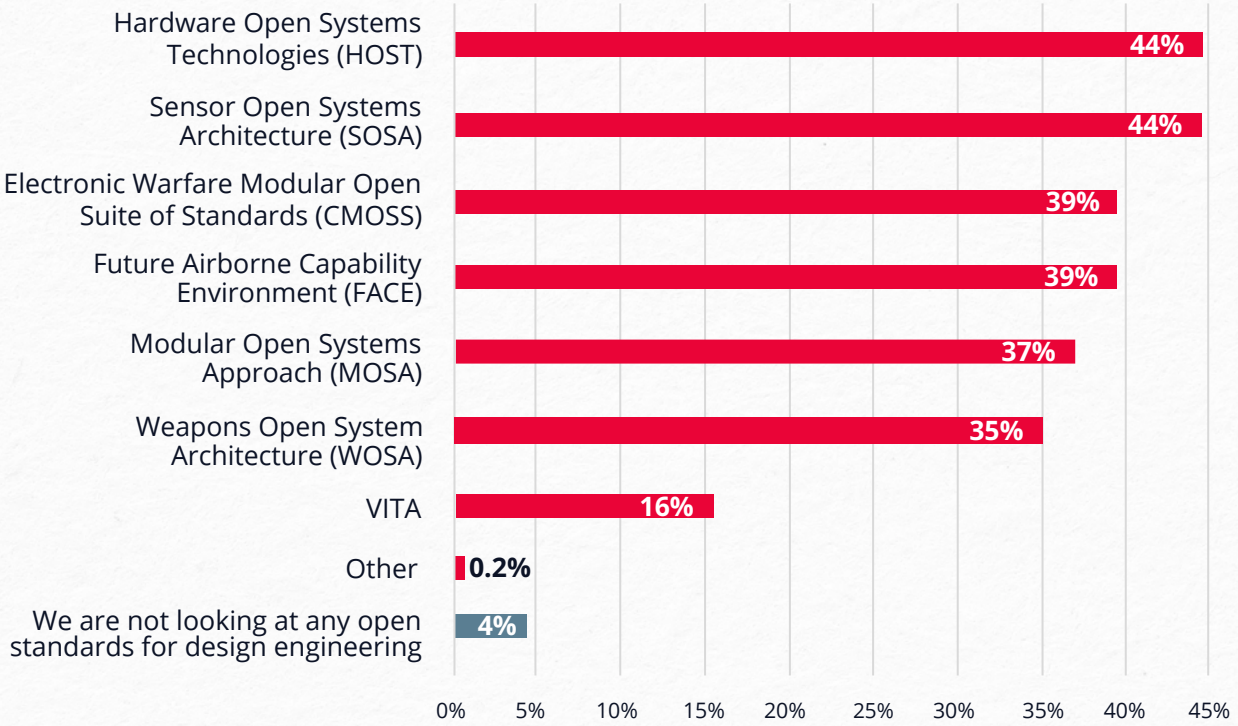
OPEN STANDARDS: THE NEW BLUEPRINT FOR DEFENSE

The shift toward open standards has become a defining force in mission-critical engineering. These non-proprietary system architectures are propelled largely by government mandates for interoperability, and **96%** of companies surveyed are now actively evaluating or adopting them. This signals a decisive move away from the proprietary architectures that have long defined the industry.

While the mandate is clear, its execution remains a work in progress, with only **39%** of companies reporting full implementation—as detailed later in this section. The data highlights the industry's progress and underscores the value that both engineers and leaders place on this new vision.

QUESTION:

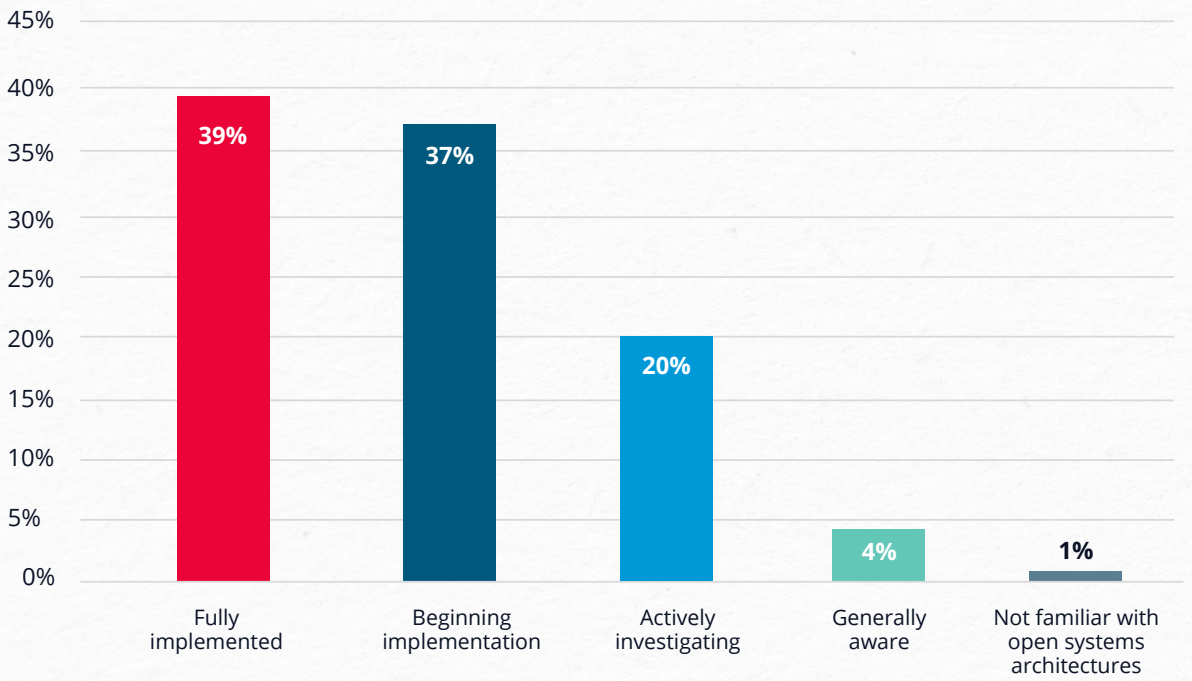
Is your company evaluating or adopting any open standards for design engineering? Choose all that apply.



FROM INVESTIGATION TO IMPLEMENTATION

QUESTION:

How would you describe your company's adoption of open systems architectures?



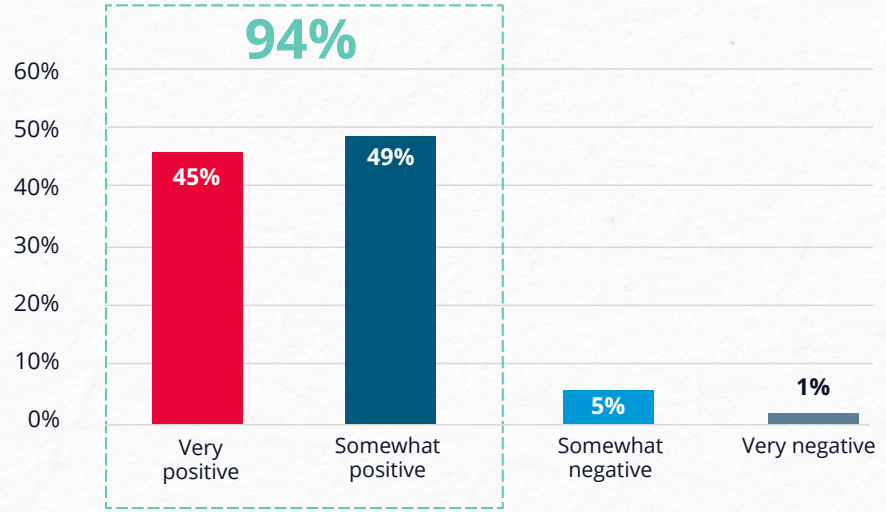
KEY TAKEAWAY:

The industry is in a clear state of transition regarding the adoption of open systems architectures. While **39%** of companies report being fully implemented, a majority **(57%)** are in the earlier stages—either beginning implementation or actively investigating.

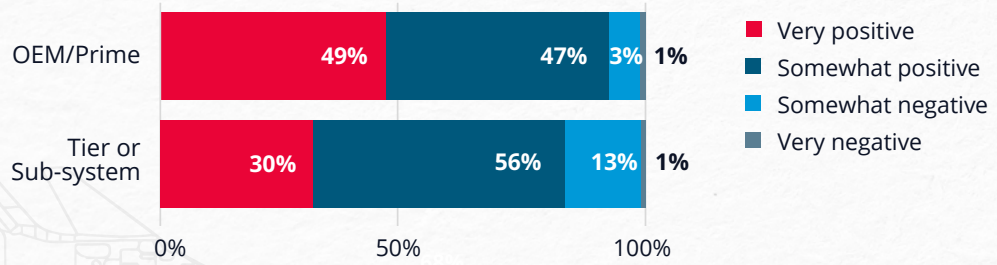
ENGINEERS AND LEADERS AGREE ON THE VALUE OF OPENNESS

QUESTION:

What is your personal opinion about the value of open standards for improving the design of new systems?



By Type of Company

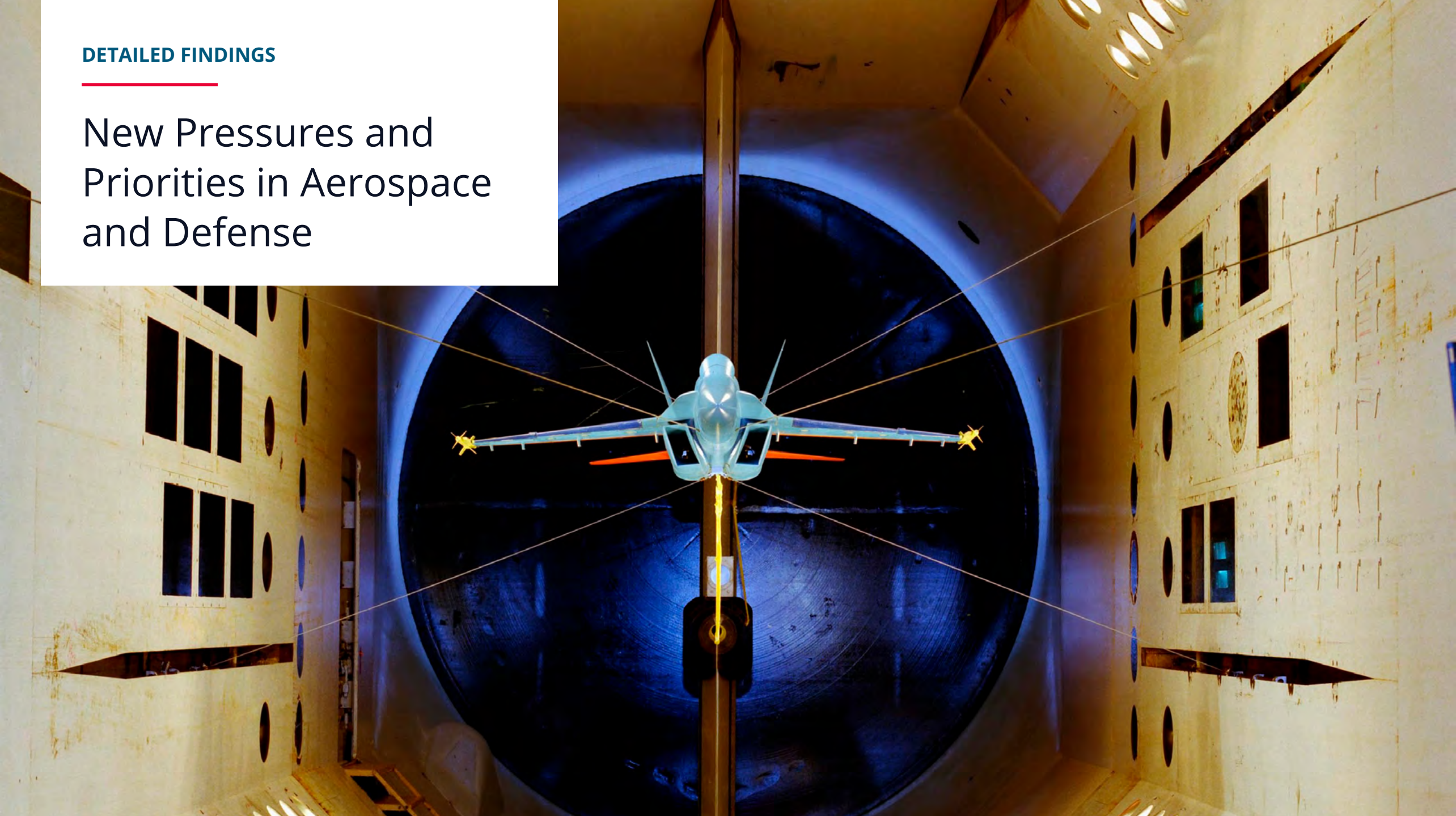


KEY TAKEAWAY:

An overwhelming majority **(94%)** of respondents hold a positive opinion about the value of open standards for improving new system design. This indicates strong and consistent agreement on the issue, although Tier 1 and sub-system suppliers are somewhat less enthusiastic, likely because of concerns over increased competition and a loss of proprietary advantage.

DETAILED FINDINGS

New Pressures and Priorities in Aerospace and Defense



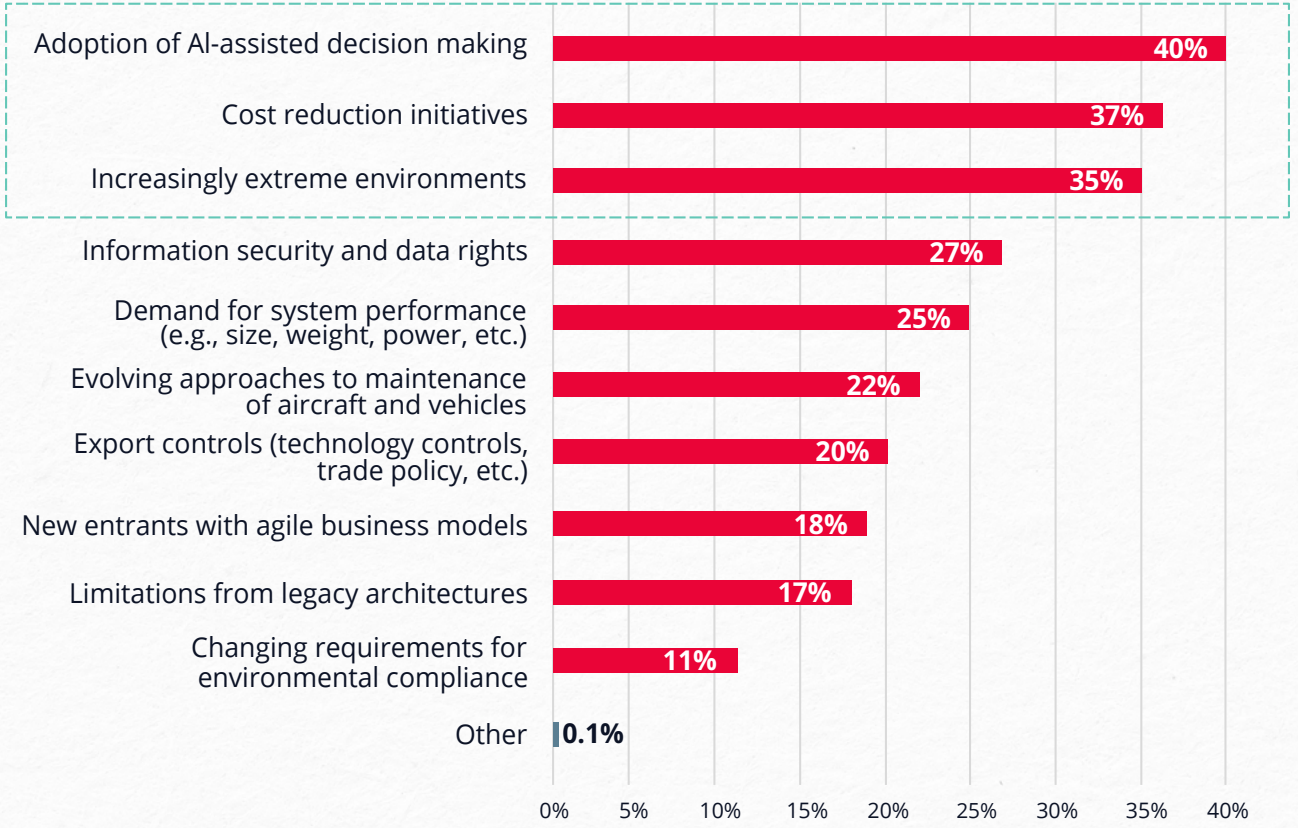
NEW PRESSURES AND PRIORITIES IN AEROSPACE AND DEFENSE

As the industry looks ahead to the next decade, the data reveals a clear consensus on the strategic forces that will reshape aerospace and defense. The emerging landscape is shaped by AI adoption, persistent cost pressures and the need to design for extreme environments. These forward-looking priorities will require a heightened level of innovation and expertise. Both new and familiar forces are fundamentally reshaping the priorities that engineering teams must navigate.

This development raises the stakes for core engineering principles. The findings illustrate how these trends are creating immediate and tangible pressures on core reliability and compliance requirements.

QUESTION:

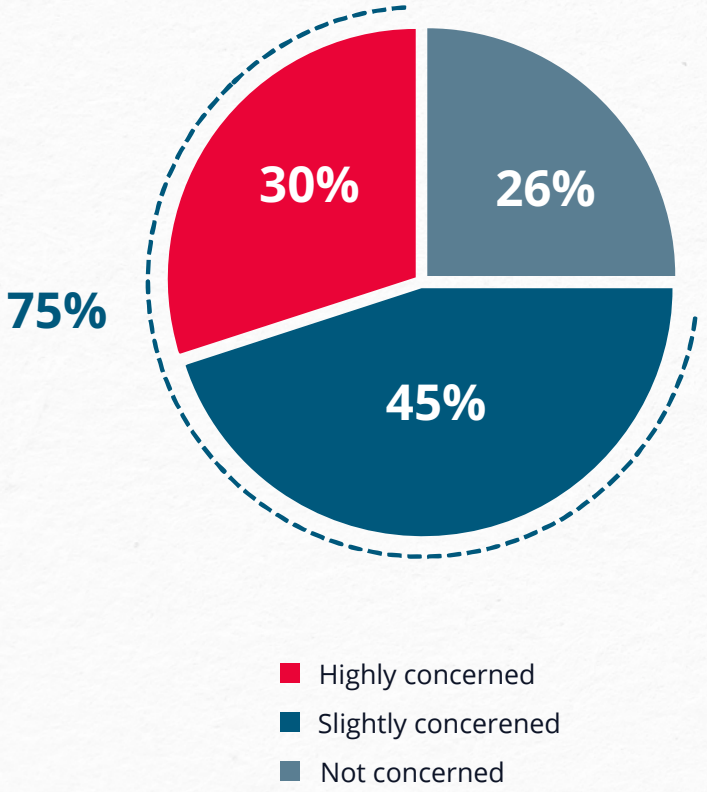
In your opinion, what factors will have the BIGGEST impact on aerospace and defense design engineering in the next 10 years? Choose up to 3 of the following.



THE RISING STAKES OF RELIABILITY

QUESTION:

In general, how concerned are your organization's design engineers about your company's reputation for reliability?



KEY TAKEAWAY:

Reputations are on the line. **Three out of four** design engineers report being concerned about their company's reputation for reliability, with **30%** stating they are "highly concerned" about the issue.

DETAILED FINDINGS

The Expertise Needed for the Modern Mission

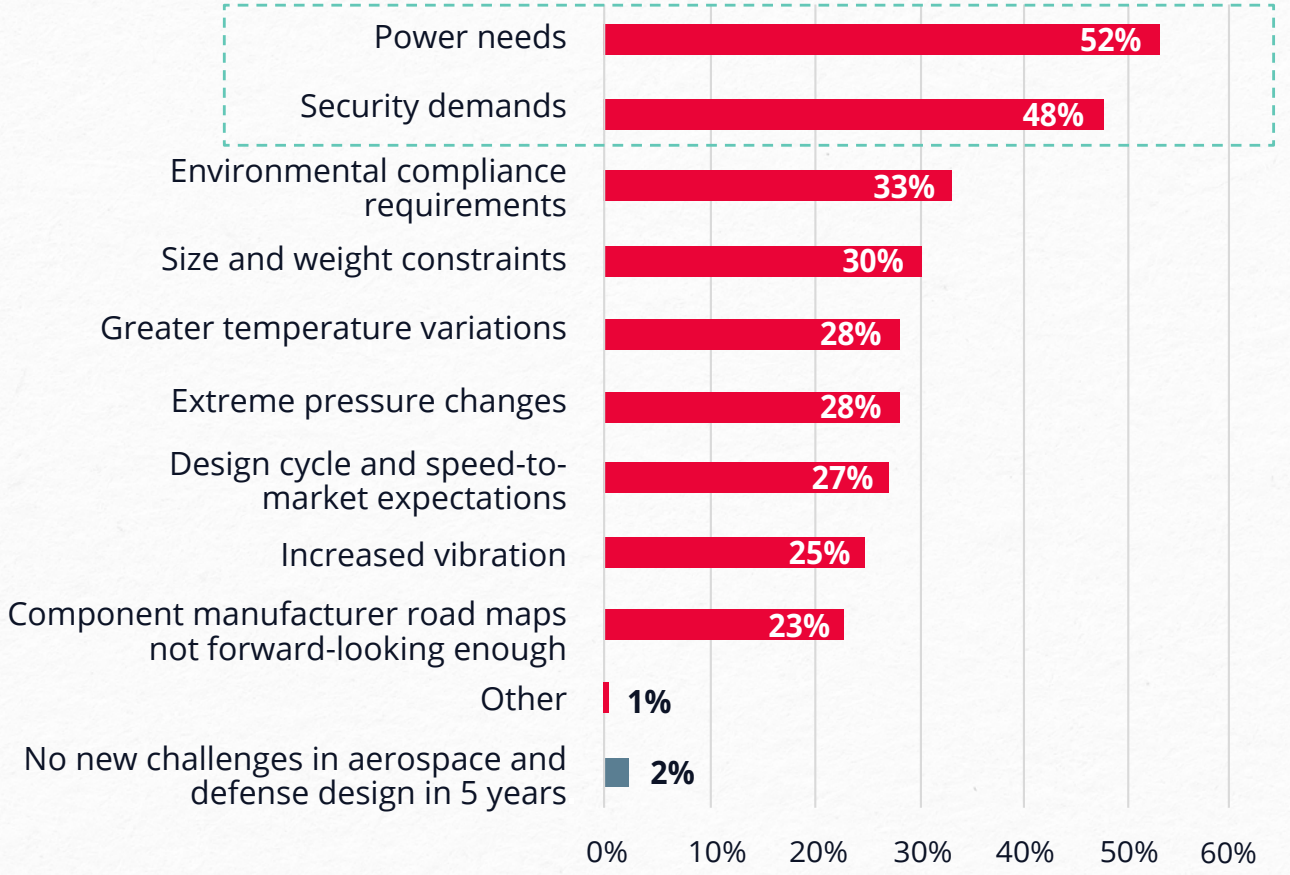
THE EXPERTISE NEEDED FOR THE MODERN MISSION

Rising power requirements **(52%)** and increasing security demands **(48%)** have become the two most critical challenges for today's design engineers. The data highlights a clear consensus on this shift, driven by increasing electrification and connectivity. Meeting this new reality requires advanced engineering expertise.

To meet these challenges, aerospace and defense companies are implementing deliberate skill-development strategies. The results demonstrate their strategic investments in capabilities essential to maintaining their competitive advantage and highlight how key competencies like cybersecurity have become a shared responsibility.

QUESTION:

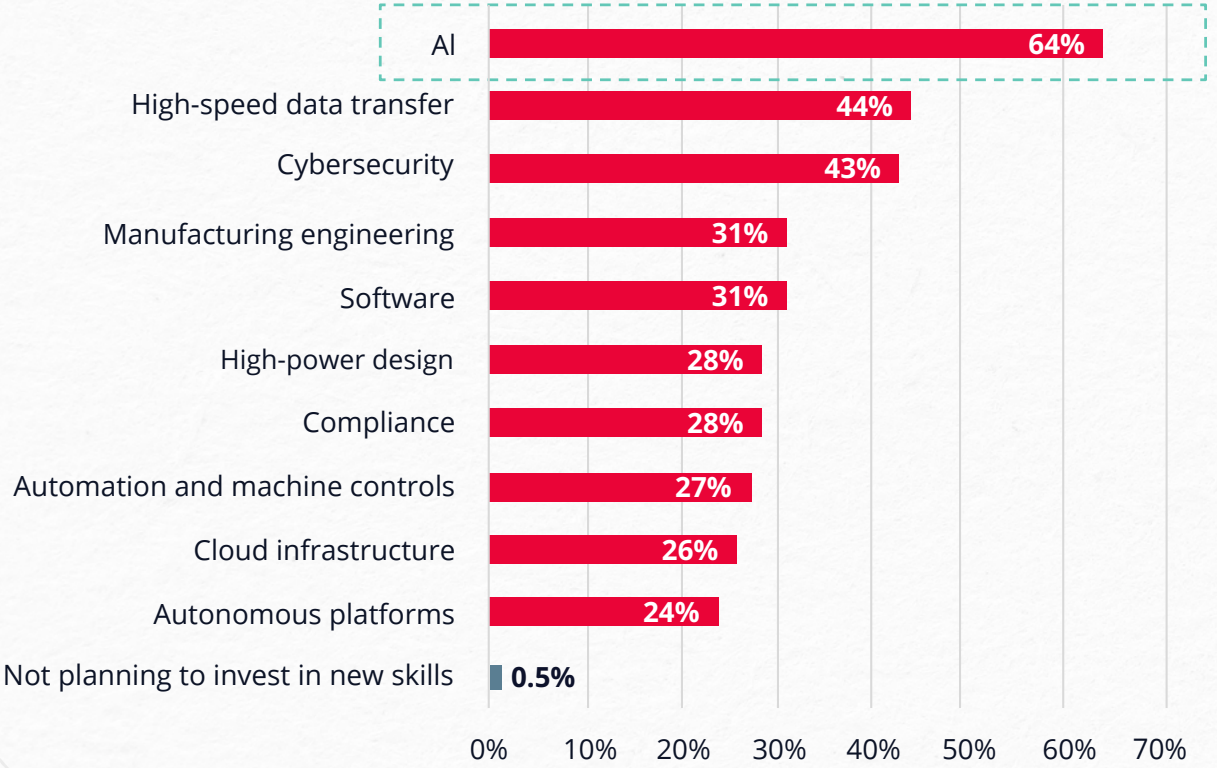
What factors have become more challenging for aerospace and defense design engineers to deal with in the past five years? Choose all that apply.



AI AND CYBERSECURITY TOP THE TRAINING AGENDA

QUESTION:

What types of skills are your design engineering teams planning to invest in over the next 12 months? Choose all that apply.



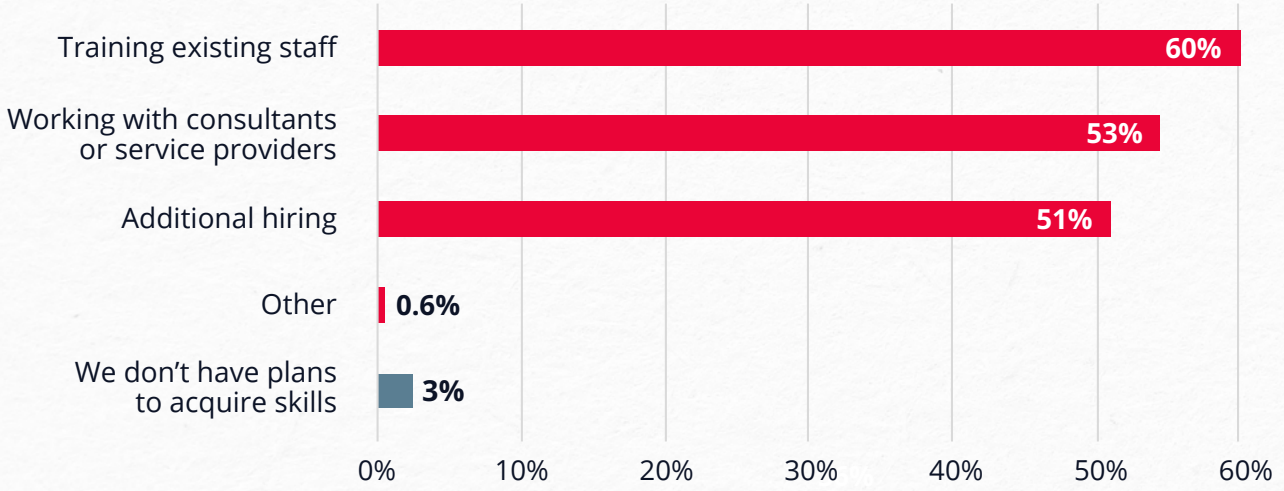
KEY TAKEAWAY:

Over the next 12 months, design engineering teams plan to invest heavily in skills related to their top challenges. AI **(64%)** is the top investment priority, followed by high-speed data transfer **(44%)** and cybersecurity **(43%)**.

A MULTI-PRONGED APPROACH TO ACQUIRING SKILLS

QUESTION:

How is your company planning to acquire additional skills for your design engineering team? Choose all that apply.



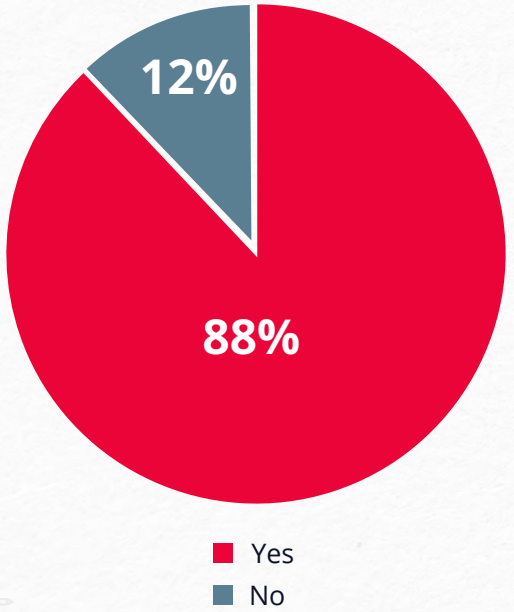
KEY TAKEAWAY:

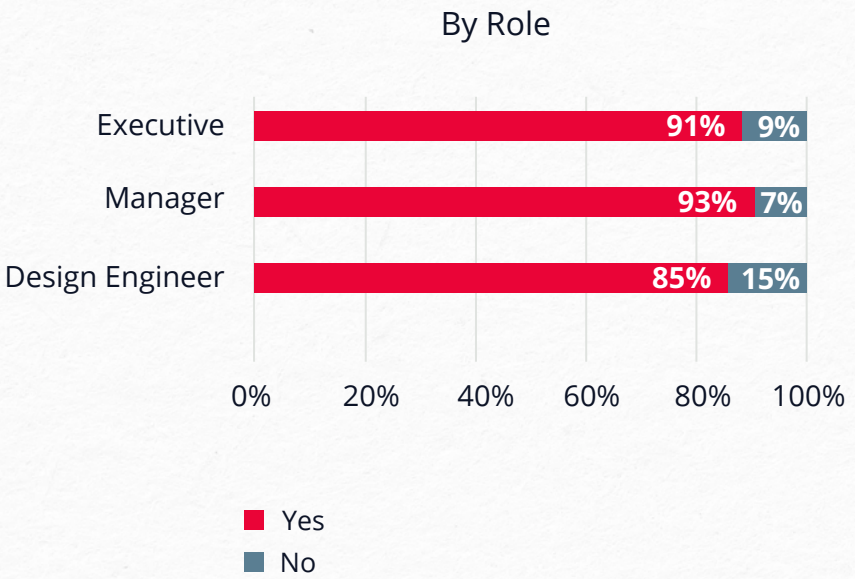
Aerospace and defense companies are taking a balanced approach to closing the skills gap. They are prioritizing training existing staff **(60%)** while also working with consultants **(53%)** and hiring new talent **(51%)**.

CYBERSECURITY: A RESPONSIBILITY FOR ALL

QUESTION:

Have you personally gained additional skills or experience with cybersecurity for design engineering in the past five years?





KEY TAKEAWAY:

A remarkable **88%** of all stakeholders have personally acquired additional skills in cybersecurity over the past five years. This trend extends to the highest levels of leadership, with **93%** of managers and **91%** of executives also reporting they have upgraded their skills in this critical area.

DETAILED FINDINGS

The Aerospace and Defense Career: A Demanding but Rewarding Path

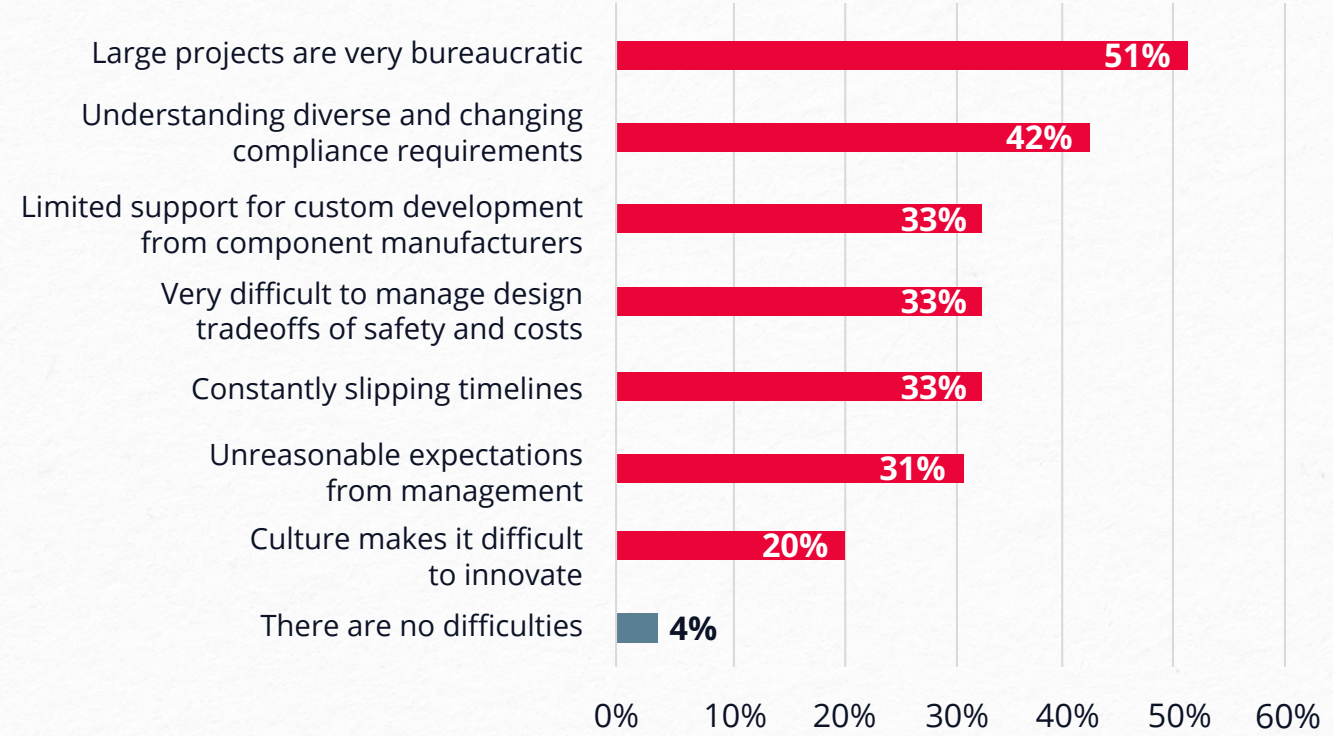
A DEMANDING BUT REWARDING CAREER PATH

A career in aerospace and defense is defined by a distinct balance of significant challenges and compelling rewards. The data shows that navigating bureaucracy is the top professional difficulty **(51%)**, which ranks significantly higher than other challenges including changing compliance requirements **(42%)** and managing design tradeoffs **(33%)**.

Beyond technologies and trends, the human aspect of the data in this section reveals what truly drives these professionals. The findings provide a clear explanation for why, despite the field's demanding nature, an overwhelming **97%** of respondents recommend their career path to the next generation.

QUESTION:

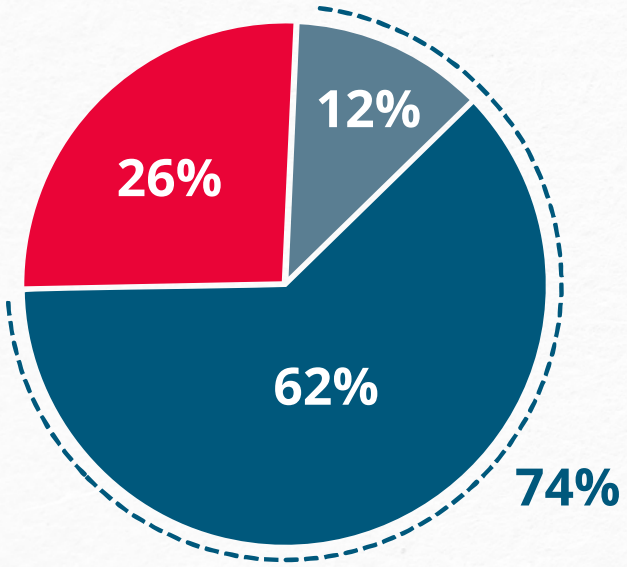
What are the most difficult aspects of a career in design engineering for an aerospace and defense company? Choose all that apply.

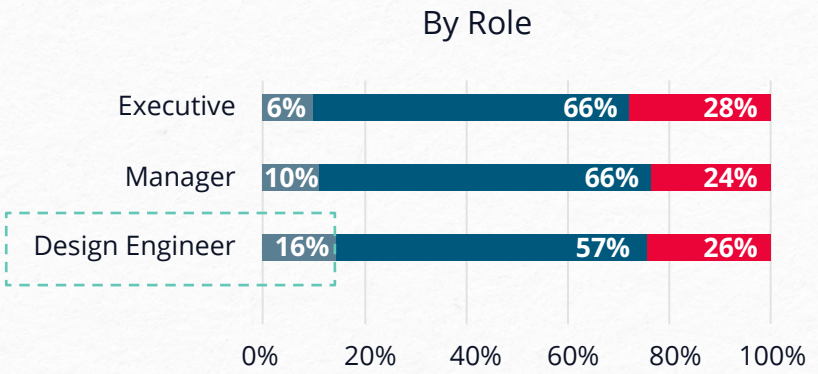


NAVIGATING REGULATORY CHANGES

QUESTION:

How difficult is it for your organization's design engineers to keep up with changing compliance demands?





- Not difficult
- Somewhat difficult
- Very difficult

- Not difficult
- Somewhat difficult
- Very difficult

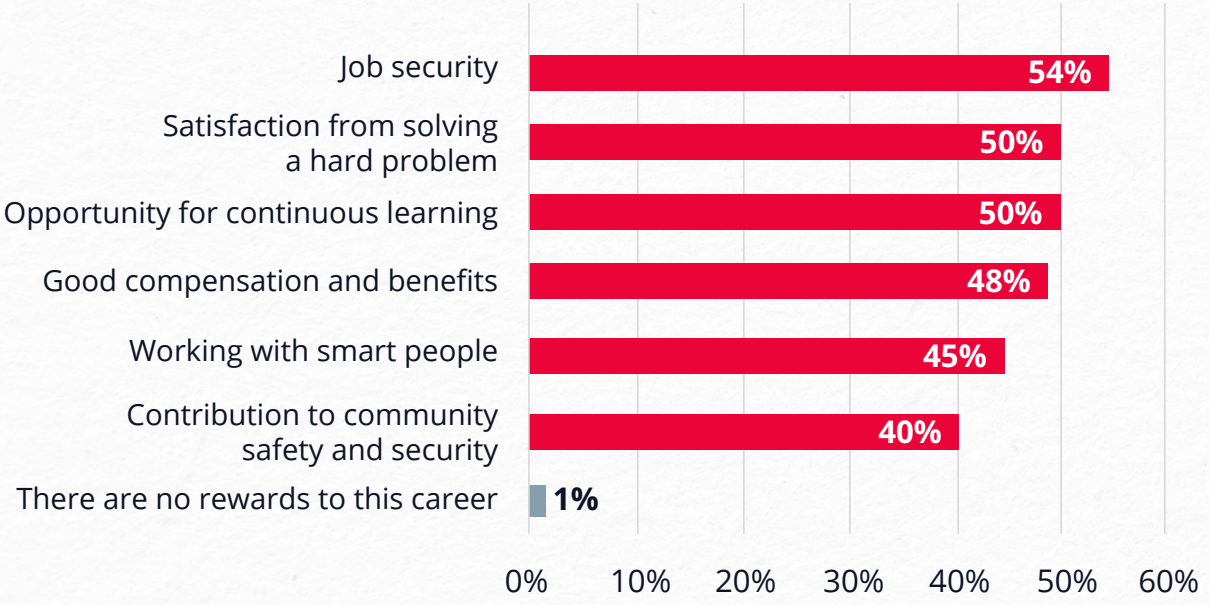
KEY TAKEAWAY:

Navigating the regulatory landscape is a major professional challenge. In fact, **74%** of stakeholders find it "somewhat difficult" or "very difficult" to keep up with evolving compliance demands, a challenge felt most acutely by frontline design engineers.

THE ENDURING APPEAL OF A DEMANDING CAREER

QUESTION:

What are the most REWARDING aspects of a career in design engineering for an aerospace and defense company? Choose all that apply.



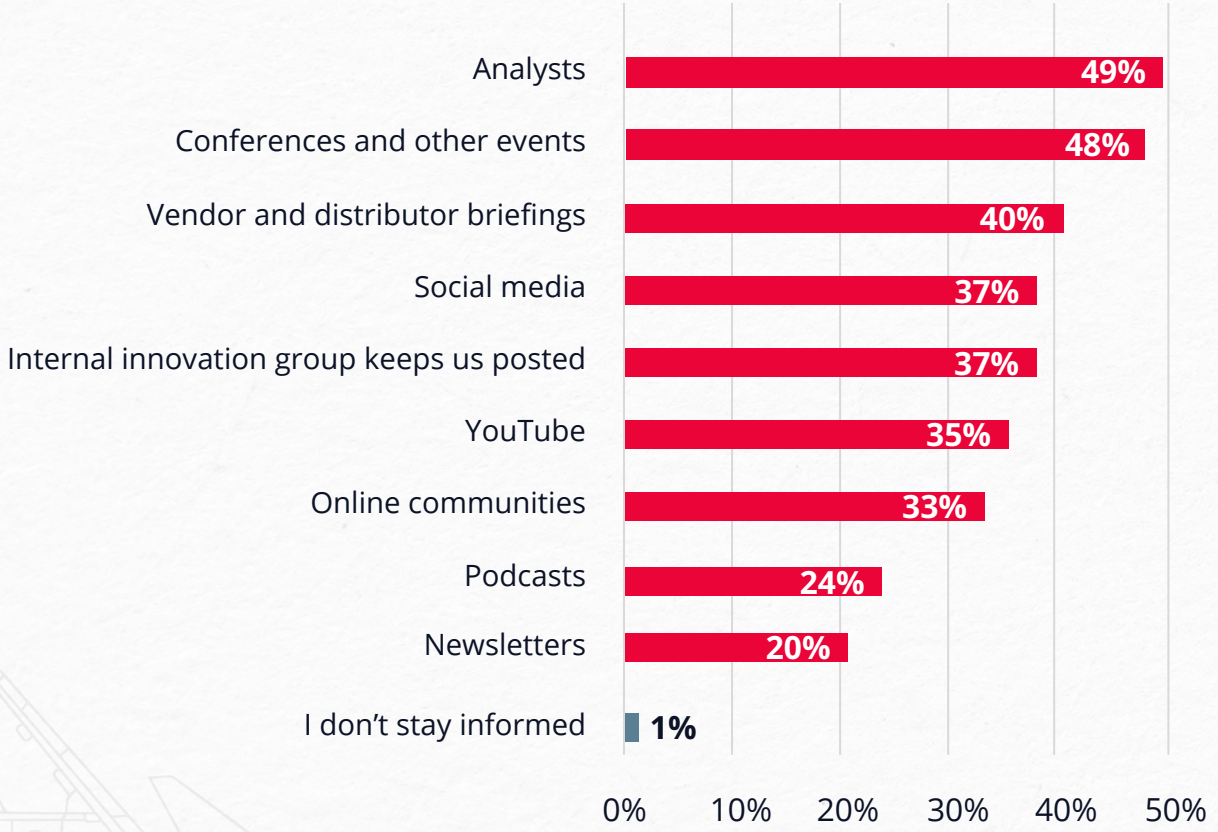
KEY TAKEAWAY:

While bureaucracy remains a notable challenge, a career in aerospace and defense continues to attract professionals with its significant rewards. The most valued aspects include job security **(54%)**, the satisfaction of solving a hard problem **(50%)** and opportunities for continuous learning **(50%)**.

ANALYSTS AND CONFERENCES ARE TOP INFORMATION SOURCES

QUESTION:

How do you personally stay informed about evolving technology and industry trends that impact your design engineering work?



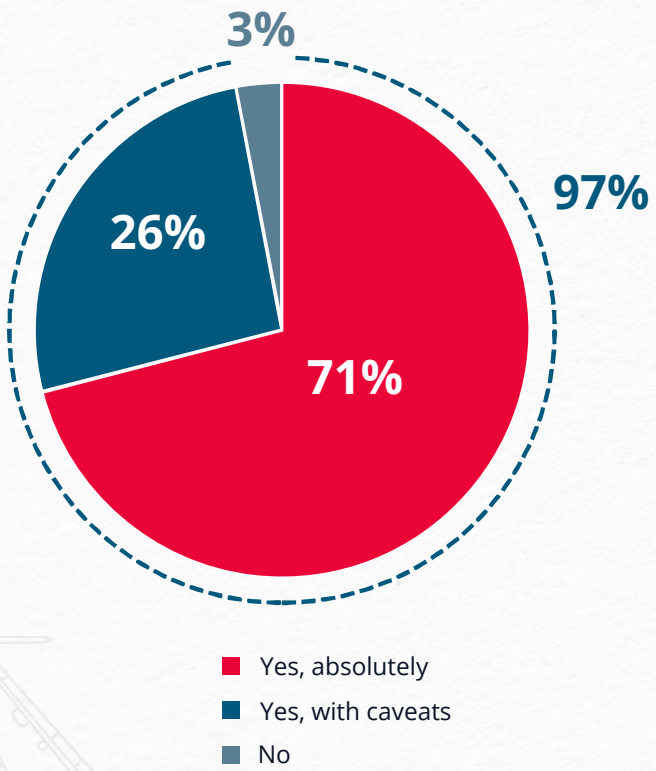
KEY TAKEAWAY:

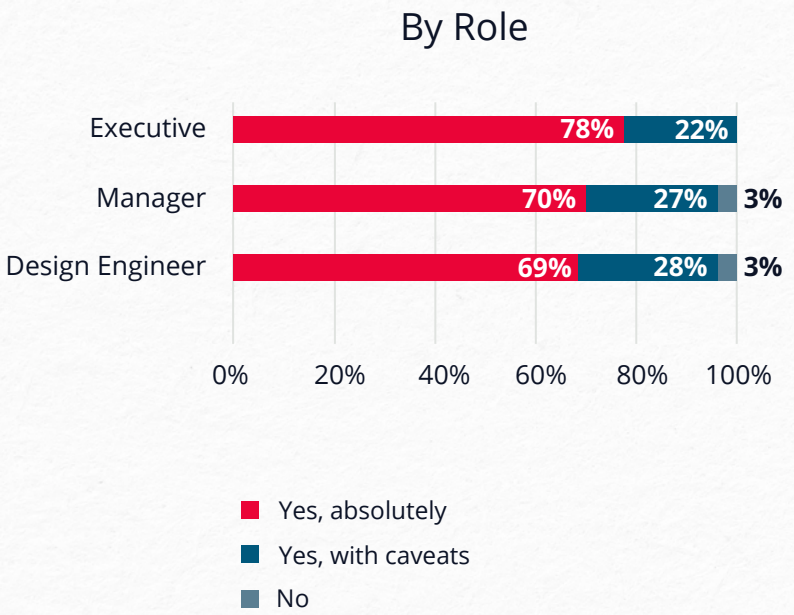
Aerospace and defense professionals prioritize credible, expert-led information. Traditional sources like analysts **(49%)** and conferences **(48%)** are the top choices for staying informed, followed by direct vendor and distributor briefings **(40%)**.

AN OVERWHELMING CONSENSUS ON CAREER VALUE

QUESTION:

Would you recommend a career in the aerospace and defense industry to a young person interested in design engineering?





KEY TAKEAWAY:

There is broad consensus on the value of an aerospace and defense career, with **97%** of survey respondents recommending it to the next generation. This powerful endorsement highlights the deep sense of mission and stability that defines the profession, even amid significant challenges.

CONCLUSION

Meeting the Mission with Expertise and Partnership

The findings of this report point to a significant industry evolution, driven by the rapid adoption of AI and the mandate for open standards. These technological shifts, coupled with escalating technical pressures in power and security, have redefined the modern mission. Success in this new environment now also depends on a culture of true partnership. This requires cross-functional alignment and effective change management to bridge the divide between leadership and engineering.

Molex and AirBorn, a Molex company, provide the proven expertise, comprehensive capabilities, global scale and manufacturing footprint required to navigate and deliver amid this market transformation. With a combined heritage of 140 years in resilient connector innovation and more than 19,000 ruggedized products, Molex applies this specialized expertise to solve the industry's most complex challenges. This work ranges from developing ruggedized interconnects for aerospace and defense aircraft to engineering high-speed, EMI-shielded connectors for autonomous operations and secure data transmission. By delivering modular, scalable components that meet rigorous aerospace and defense standards, Molex provides the trusted foundation for mission-critical reliability.

While reliability is non-negotiable in these high-stakes applications, innovation can set the leading suppliers apart from the rest. How does a supplier in aerospace and defense balance reliability and innovation? For Molex and AirBorn, customer collaboration is the key, achieved through a structured voice of the customer program that actively brings customer insights into early product development, helping co-create solutions that address evolving aerospace and defense needs. By embedding customer requirements throughout the innovation cycle, Molex anticipates market shifts and delivers solutions with and for the world's leading customers.

To learn more about how Molex is enabling the future of aerospace and defense, visit: **Molex Solutions for Defense Applications**

Additional Resources:

Molex Solutions for Aerospace Applications

Molex Solutions for Space Applications

FOR MORE INFORMATION

Molex is a global electronics leader committed to making the world a better, more connected place. With a deep heritage in mission-critical applications, Molex provides technology innovation for the aerospace and defense industry. AirBorn, a Molex company, strengthens this commitment by bringing specialized expertise in rugged, high-reliability interconnects for the most demanding aerospace and defense environments. Through trusted customer relationships, deep engineering expertise and proven product reliability, Molex realizes the infinite potential of *Creating Connections for Life*. For more information, visit www.molex.com.

molex.com

Dimensional Research® provides practical market research for technology companies. We partner with our clients to deliver actionable information that reduces risks, increases customer satisfaction, and grows the business. Our researchers are experts in the applications, devices, and infrastructure used by modern businesses and their customers.

dimensionalresearch.com

molex creating connections for life