



DRIVING QUALITY AND PROFIT WITH COMPLIANCE:
**SUCCESS STRATEGIES
FOR A&D SUPPLIERS**



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DRIVING QUALITY AND PROFIT WITH COMPLIANCE: SUCCESS STRATEGIES FOR A&D SUPPLIERS

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Executive Summary

Executive Summary

The Aerospace and Defense industries are currently going through record change, albeit in very different ways. The Aerospace industry has worked through some of its high-profile new product introduction issues over the past several years, and is now reporting record deliveries as well as continued record back logs. This momentum is driving unprecedented levels of pressure to ramp up production and realize cost efficiencies as quickly as possible.

The fortunes of Defense contractors have not been as rosy over the past several years. The industry continues to tighten its belt with the reduction in Department of Defense (DoD) spending and budget through sequestration. However, this is being slightly buoyed with increased exports and recent revisions to sequestrations. Not surprisingly, the flat or decreasing revenue of the largest defense contractors is only further focusing efforts on efficiency and quality, especially the cost of quality.

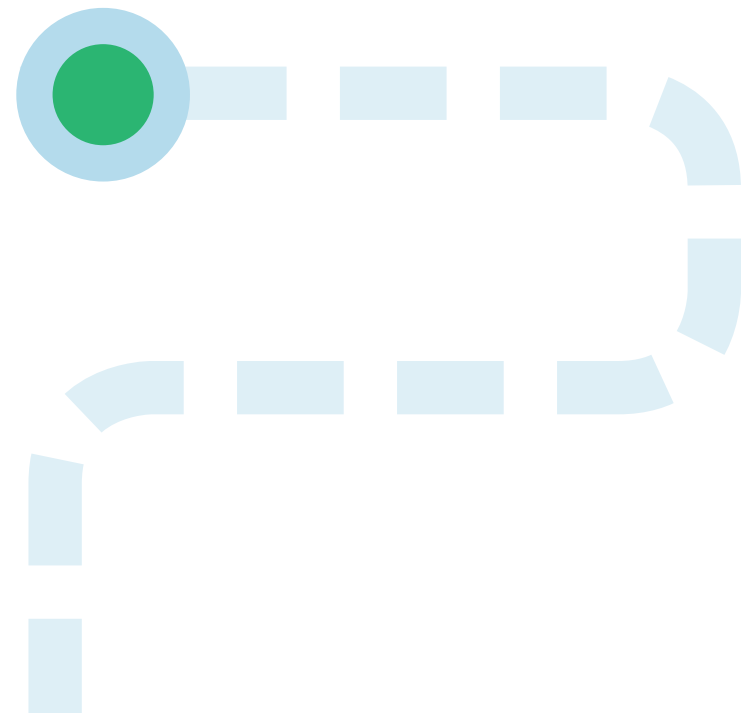
These industry trends are having a profound impact on the supplier networks that support A&D companies like Airbus, Boeing, Lockheed Martin, and Raytheon. Today, these companies are consolidating suppliers and demanding more, meaning those suppliers that can best address the needs and demands of customers will win more than the fair share of business.

Today, suppliers are being judged on the ability to demonstrate robust and auditable quality systems, show awareness

and mitigate risk of cyber security issues, eliminate all counterfeit products, comply with critical regulations like OSHA, REACH, or ITAR, and deliver on engineering, manufacturing, and supply chain commitments. All of these pressures point toward the need for next-generation quality and compliance solution adoptions in the supplier network.

In this eBook, LNS Research will provide actionable recommendations on how A&D suppliers can meet all of these requirements and more, including:

- The Status of the Aerospace and Defense industry
- Taking a next-generation approach to quality and compliance
- The benefits of improved performance visibility





SECTION 1

Understanding the Data Used in This eBook

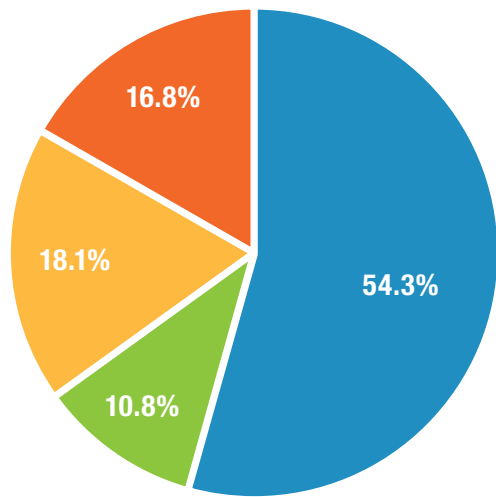
The LNS Research Quality Management Survey

It is important to set the stage for the supporting data used throughout this eBook. The 2013-2014 LNS Research Quality Management Survey has been completed by over 500 executives and other senior leaders, coming from a variety of company sizes and geographies across a range of industries. The survey questions drill down into the challenges and opportunities that companies face, strategic objectives data, and the most important goals currently being pursued around quality.

54.3% of companies were from discrete manufacturing in-

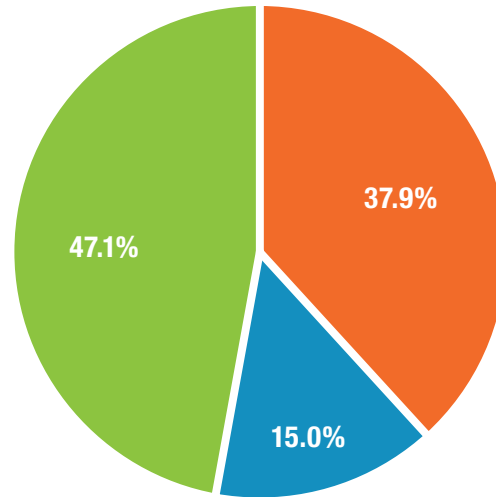
dustries, with the remainder coming from F&B/CPG, life sciences, and process manufacturing. Just over half were from North America, followed by just under a quarter from Europe. Almost half, 47.1%, were from small companies, with 37.9% from large companies and the remainder from mid-sized companies. Select A&D data will be highlighted throughout the eBook as well.

Because LNS Research’s surveys remain open continuously, this eBook will use data dating back to 2012 in some cases for comparison, which includes another 400+ respondents.



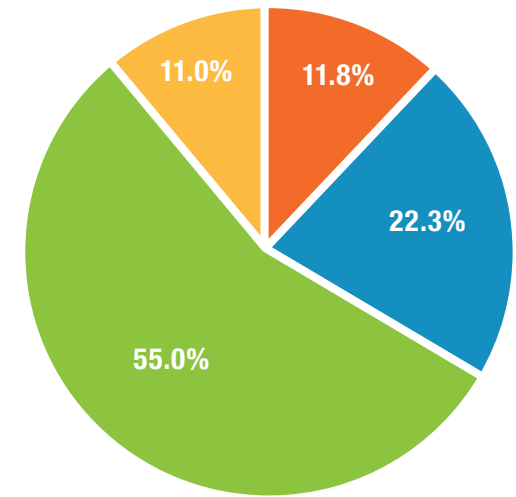
COLOR BY INDUSTRY

- Discrete Man
- F&B / CPG
- Life Sciences
- Process Man



COLOR BY COMPANY REVENUE

- Large: \$1BB+
- Medium: \$250MM - \$1BB
- Small: \$0 - \$250MM



COLOR BY HQ LOCATION

- Asia / Pacific
- Europe
- North America
- Rest of the World



SECTION 2

The Status of the A&D Industry

Industry Overview

The A&D industry as a whole experienced its best year ever in 2013, and nearly all signs point to an even better 2014. According to PwC's "Aerospace and Defense 2013 Year in Review and 2014 Forecast" report, the top 100 A&D companies reported revenue growth of 4% to \$719 billion and operating profits reaching

double digit growth (10%) to \$66 billion. With the decrease in defense budgets and spending still impacting the Defense sector, a majority of growth was driven by a surge in commercial aviation. The Aerospace sector continues on its longest, most profitable growth cycle (four years and counting) in history.

A&D Top 10

REVENUE (US\$ MILLIONS)

#	COMPANY	2013	2012	CHANGE
1	Boeing	86,623	81,698	6%
2	Airbus	78,693	72,587	8%
3	Lockheed Martin	45,358	47,182	-4%
4	United Technologies	34,101	29,089	17%
5	General Dynamics	31,218	31,513	-1%
6	BAE Systems	28,406	28,376	0%
7	Northrop Grumman	24,661	25,218	-2%
8	Rolls-Royce	24,227	19,349	25%
9	Raytheon	23,706	24,414	-3%
10	GE Aviation	21,911	19,994	10%

*Source: PwC's Aerospace & defense 2013 year in review and 2014 forecast

Aerospace in 2014 and Beyond

As stated, much growth was driven from the largest Aerospace companies. As presented in PwC's report, of the top 100 performers' \$719 billion revenue in 2013, \$86 billion came from Boeing, followed by \$76 billion from Airbus. Both organizations set records for aircraft deliveries. The sector as a whole reported its highest ever backlog of more than 10,000 planes, and production was more than double when compared to a decade ago. Despite these impressive numbers, the top 100 performers still struggle to achieve double-digit operating margins.



Defense in 2014 and Beyond

After the \$40 billion Defense budget cuts took effect in March 2013, PwC's report indicated that the industry experienced another modest decline in revenue. Most companies reported slowing or stagnant operating margin improvements. The good news for the Defense sector, however, is the U.S. Congress passed the Bipartisan Budget act of 2013, which mitigates some of the sequestration's impact on spending for two years. This has many industry leaders feeling more hopeful, but it puts pressure on the next set of budgetary changes in two years and what they will mean for the near and distant future of the sector.



Understanding the Two Sectors

Essentially, this is a tale of two similar but very different industries. Aerospace is experiencing record growth in revenue and orders, while Defense is experiencing many challenges to simply maintain current performance—most of which are out of Defense companies' control. Despite these differences, both are focused on investing in and performing well in a number of areas, including:

- Regulations: ITAR, OSHA, REACH, NDAA
- Sustainability
- Quality Assurance
- Cybersecurity
- Anti-Counterfeiting
- Engineering, Manufacturing, and Supply Chain Excellence

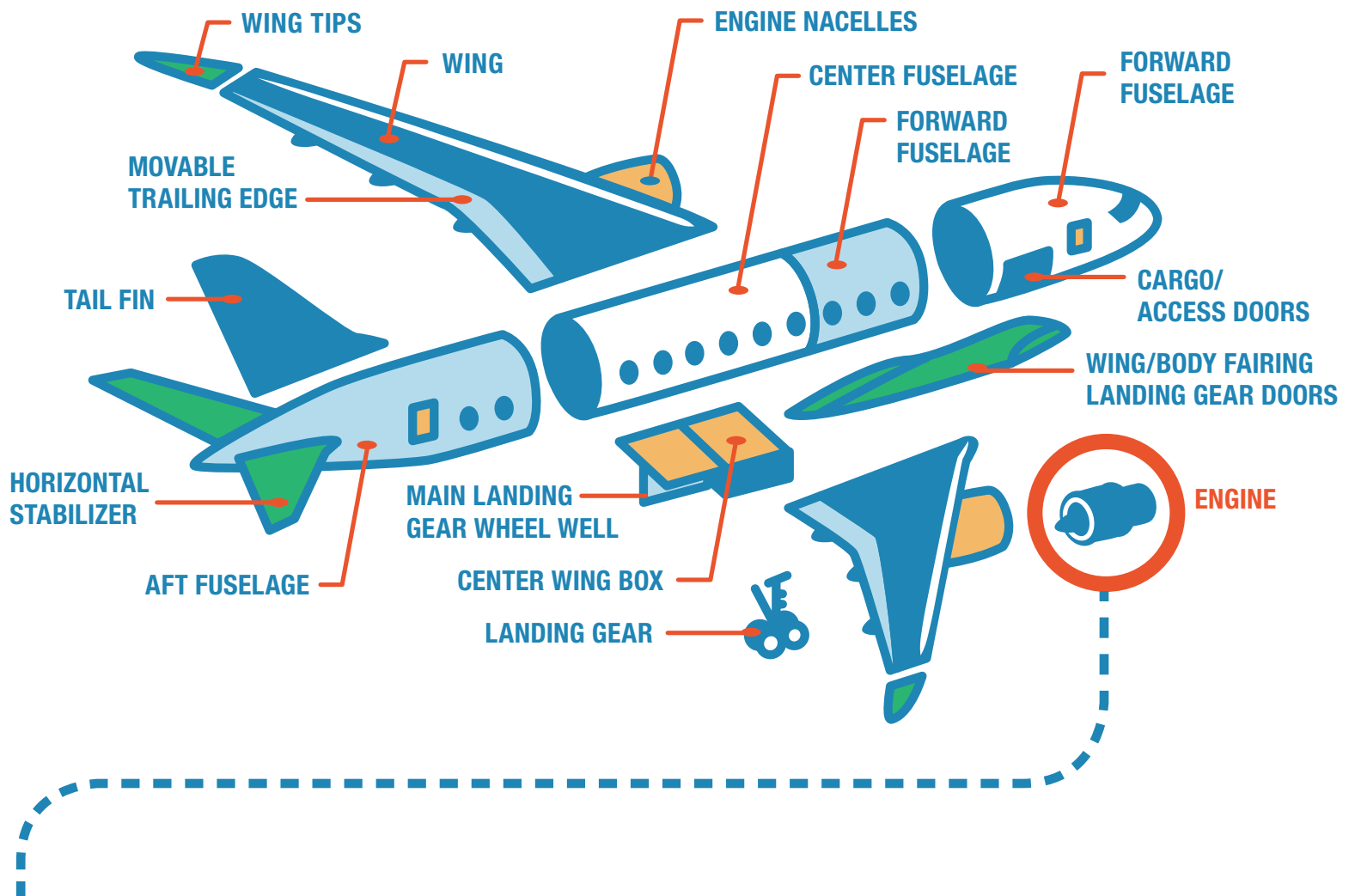
Interestingly, each of these areas is connected by two common themes: quality and compliance. Because quality and compliance strategies and technologies aim to help mitigate risks, reduce costs, and meet regulatory requirements, the top 100 A&D companies are only increasing focus on them.



What Does This Mean for Suppliers?

The quality and compliance rigor once reserved only for strategic suppliers is now being pushed out to all levels of the supply chain. Large A&D companies—OEMs and Tier 1 suppliers alike—are becoming more discerning, while simultaneously holding Tier 2, 3, and more upstream suppliers increasingly accountable for performance. Consider the complexity

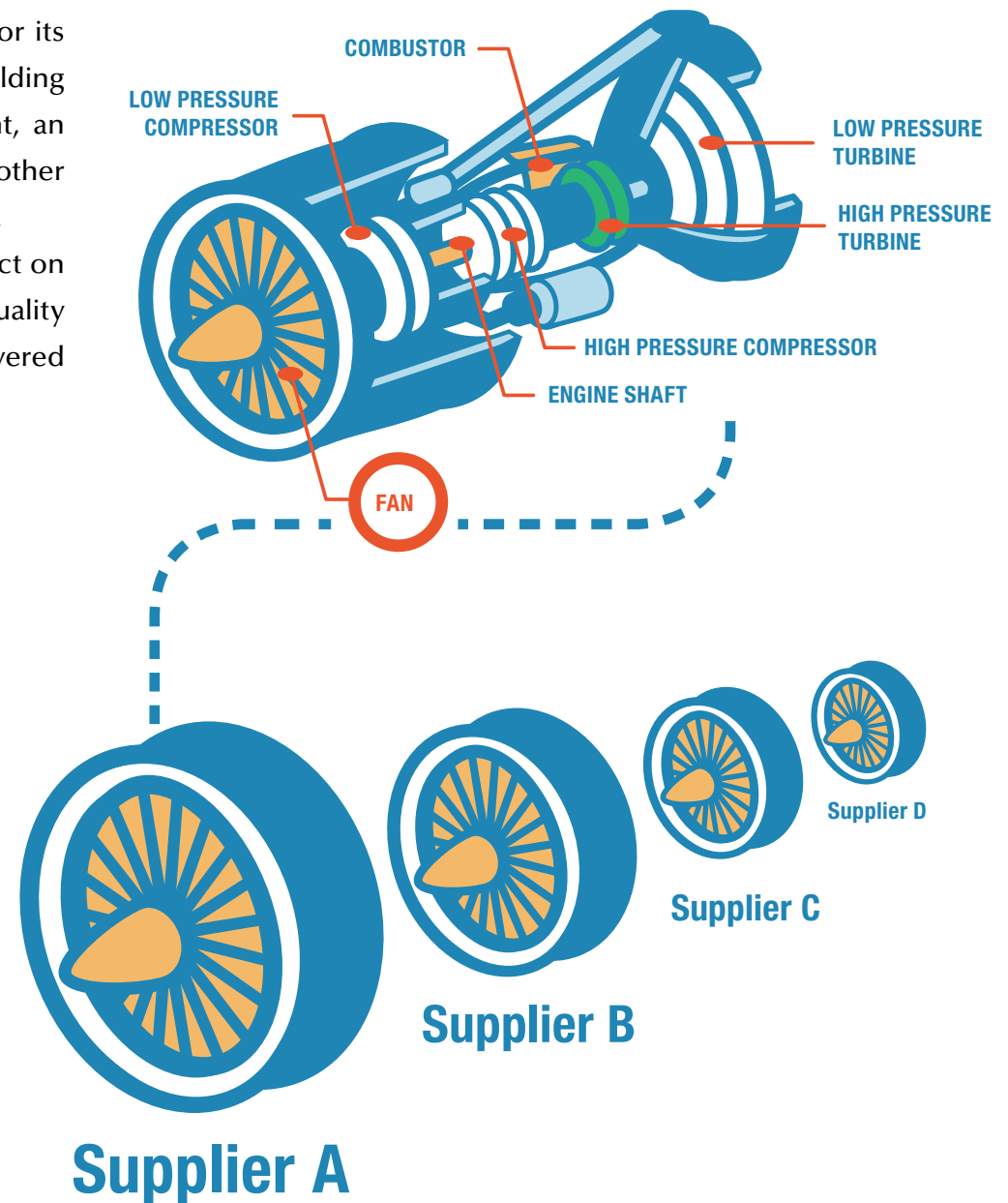
of a commercial airplane, visualized below. The potential for error in the delivery of each part introduces a number of risk factors and cost implications up and down the supply chain. The engine highlighted below is followed upstream on the next page.



As is the case with the complexities of an engine, there can easily be hundreds of parts and components required for its delivery. And while one supplier may specialize in building airplane engines, as shown in the graphics to the right, an engine's parts—such as its fan—often come from another supplier and face an entirely different set of complexities.

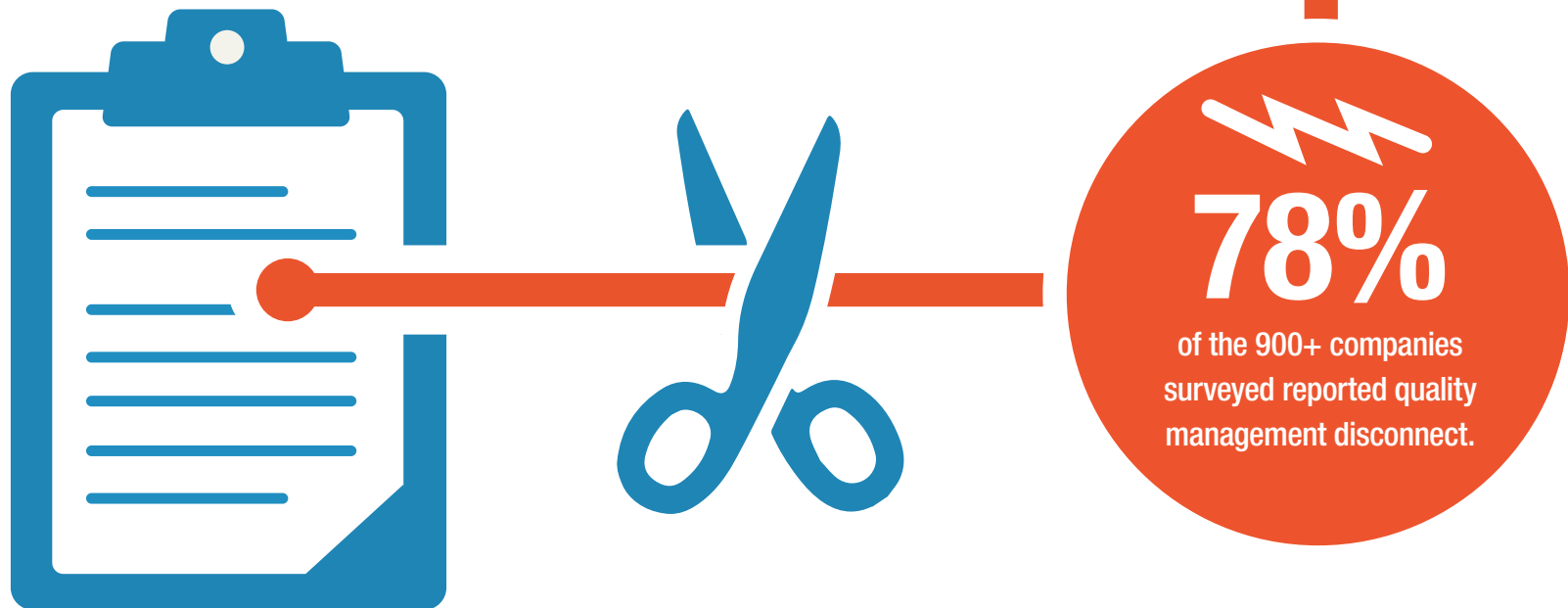
Given the depth of A&D supply chains and their impact on performance, large companies are requiring that key quality and compliance information can be recorded and delivered across the product lifecycle, such as:

- Supply chain delivery information
- Item-level traceability
- Manufacturing and quality performance data
- Test and inspection data
- Audits
- EH&S performance data



Supplier Requirements Are Increasing

As is the case with investment in next-generation quality and compliance technology and strategies at the large company level, more suppliers are following suit to differentiate from competitors and win new business. Suppliers that can deliver visibility into quality performance and demonstrate compliance will rise to (or at least remain at) the top. This comes at a challenging time, however, because nearly every organization surveyed—more than 3 out of 4—reported operating in a state of quality management disconnect across the value chain.

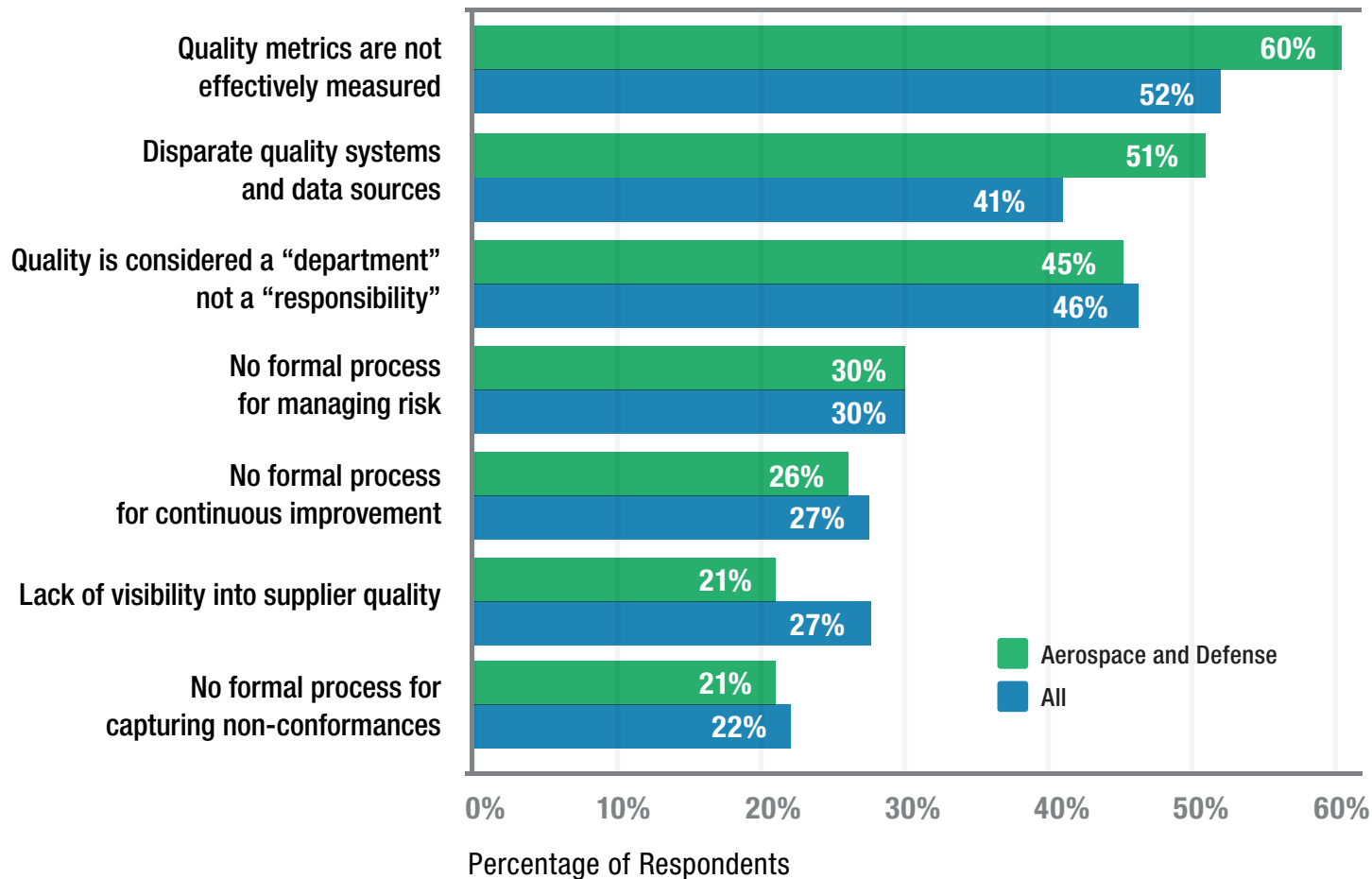


The Sources of Disconnect

LNS Research’s recent quality management survey helps to put these sources of disconnect into perspective. As shown below, more than half of A&D companies reported challenges with effectively measuring quality metrics and having too many disparate systems and data sources for managing quality.

45% reported a challenge with personnel considering quality a “department” rather than a “responsibility.” Overcoming these challenges is top-of-mind for many A&D suppliers in particular, where quality and compliance consistency is vital.

Top Quality Management Challenges





SECTION 3

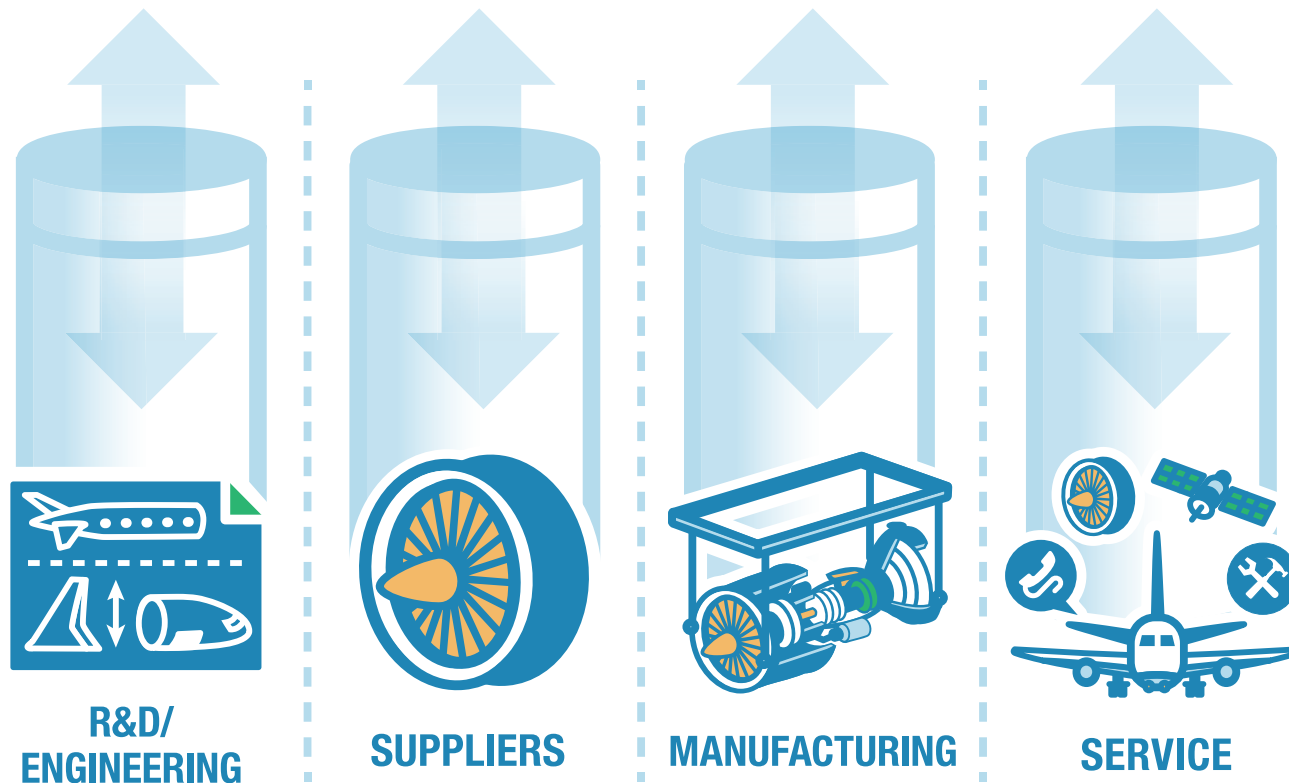
Taking a Next-Generation Approach to Quality and Compliance

The State of Quality and Compliance Today

As stated, 78% of companies exist in a state of quality management disconnect. Essentially, professionals not just in the manufacturing environment but across the value chain are being asked to do more with less quality and compliance resources than leading competitors. Additionally, the cost of maintaining fractured systems and data sources across R&D, the supplier network, manufacturing, and up through service can only put more burden on an already constrained

budgetary situation for many A&D suppliers.

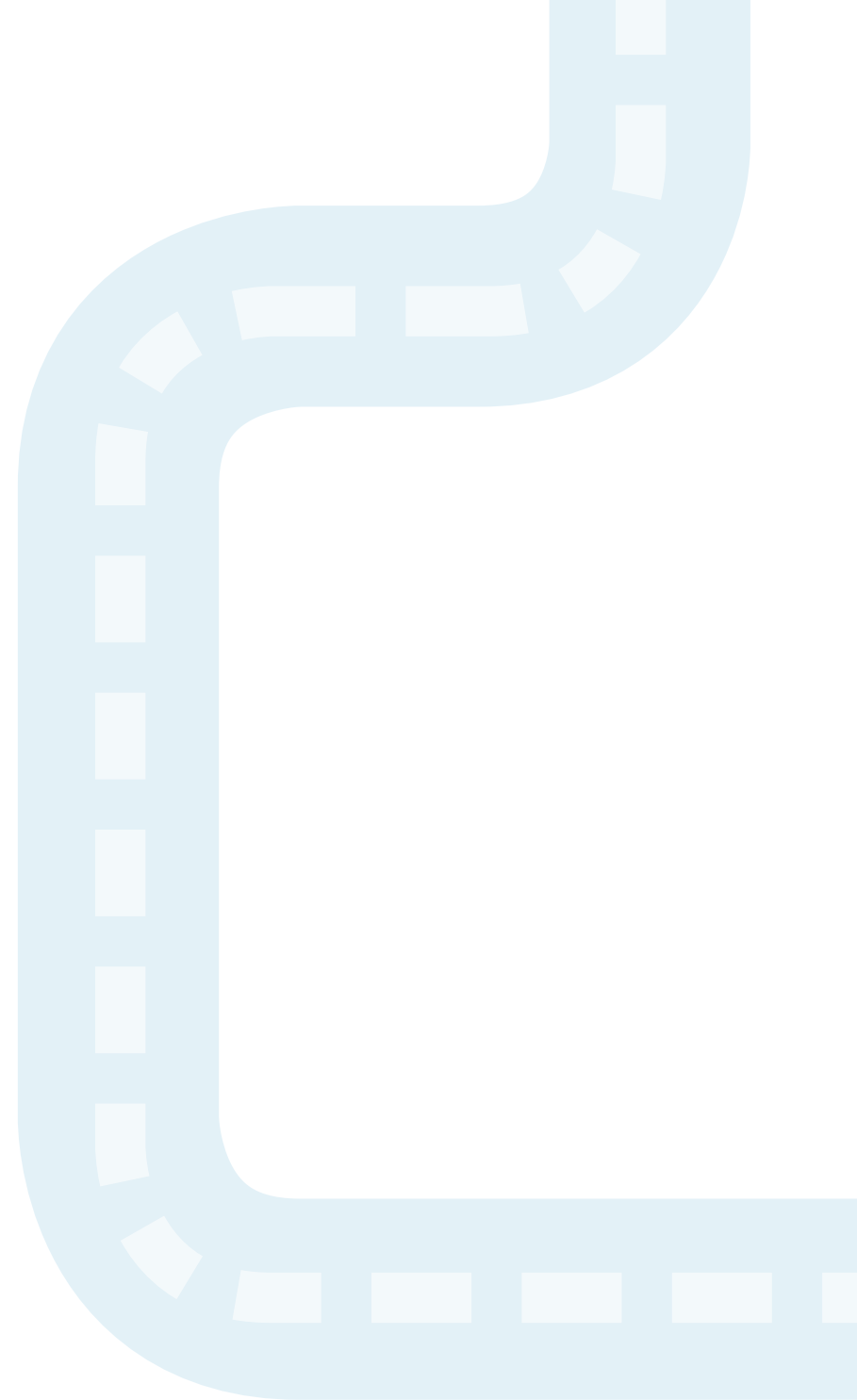
What many organizations are facing today begins to look like the graphic below—quality and compliance managed in silos. Obviously, when quality and compliance data and content are siloed in such a way the return on that information is far less. Ideally, there should be a quality and compliance hub at the center of these data sources and systems, acting as the streamlined intermediary for sharing information and interacting.



Quality and Compliance on a Unified Platform

Holistic solutions for easily deploying and scaling quality and compliance are relatively new, especially for organizations like A&D suppliers with limited IT budgets. Today, however, advancements to quality and compliance technology—particularly with constantly improving functionality and increasingly widespread use of cloud-computing—solutions like Enterprise Quality Management Software (EQMS) are delivering the level of functionality needed to meet and even exceed customer requirements.

Today's EQMS solutions centralize, standardize, and streamline end-to-end business processes and quality data. They act as a platform for cross-functional communication and collaboration by bringing together people, processes, and technology from across the value chain. By automating traditionally manual quality processes with EQMS, companies are able to better manage operational risk, work together to resolve quality issues with root cause analyses on nonconformances, demonstrate a more robust quality and compliance record, and more.

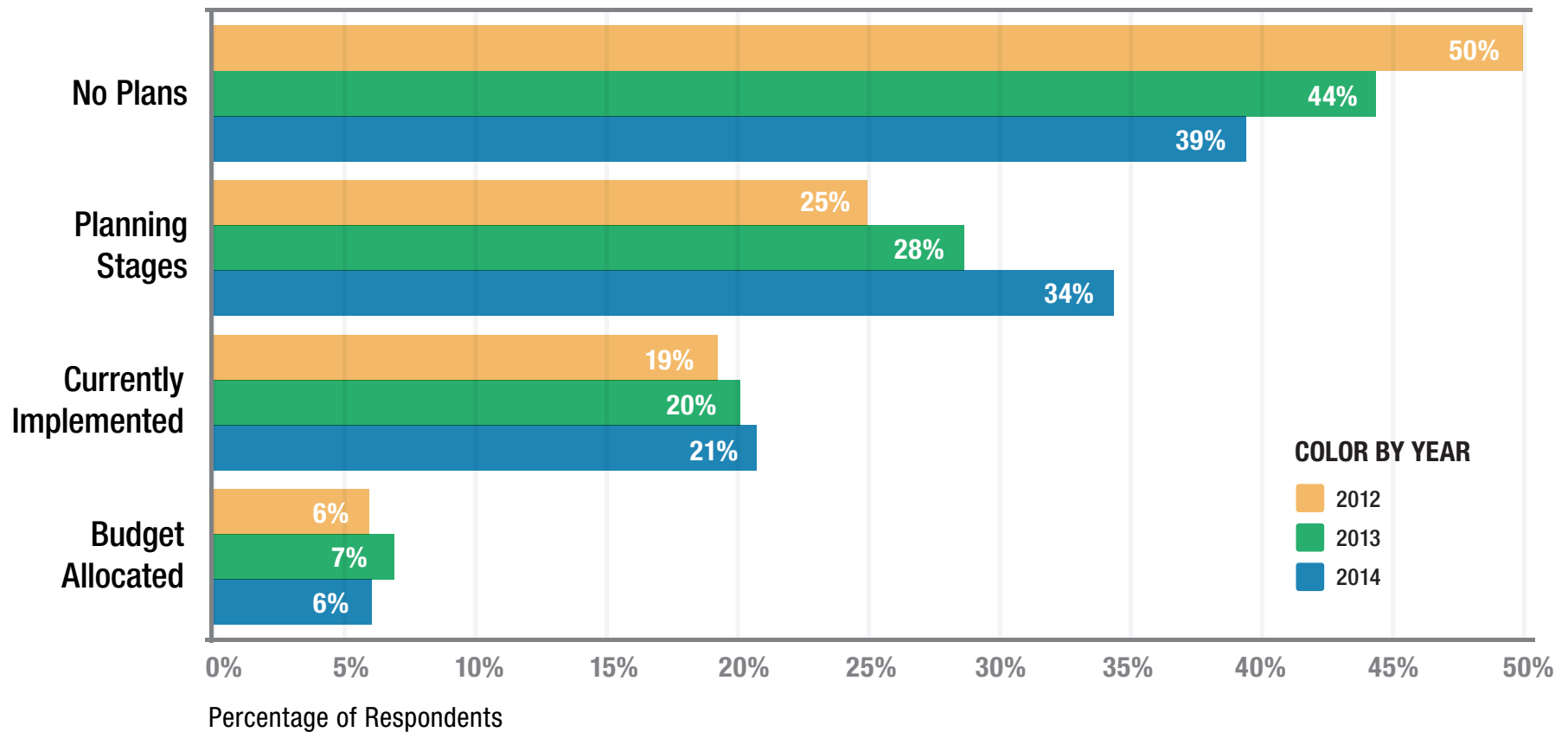


EQMS Adoption: 2012-2014

Adoptions of EQMS have been on the rise since LNS Research's first survey in 2012. As shown in the bar chart, impressively, each of the "No plans," "Planning stages," and "Currently implemented" selections indicates rising awareness and adoptions of EQMS. While the percent of currently implemented solutions continues to rise, what is most

notable are those organizations that have shifted from having no plans to being in the planning stages of an adoption. The number of organizations in the planning stages in 2014 is 36% higher than in 2012. LNS expects to see this trend continue and possibly even accelerate.

EQMS Implementation

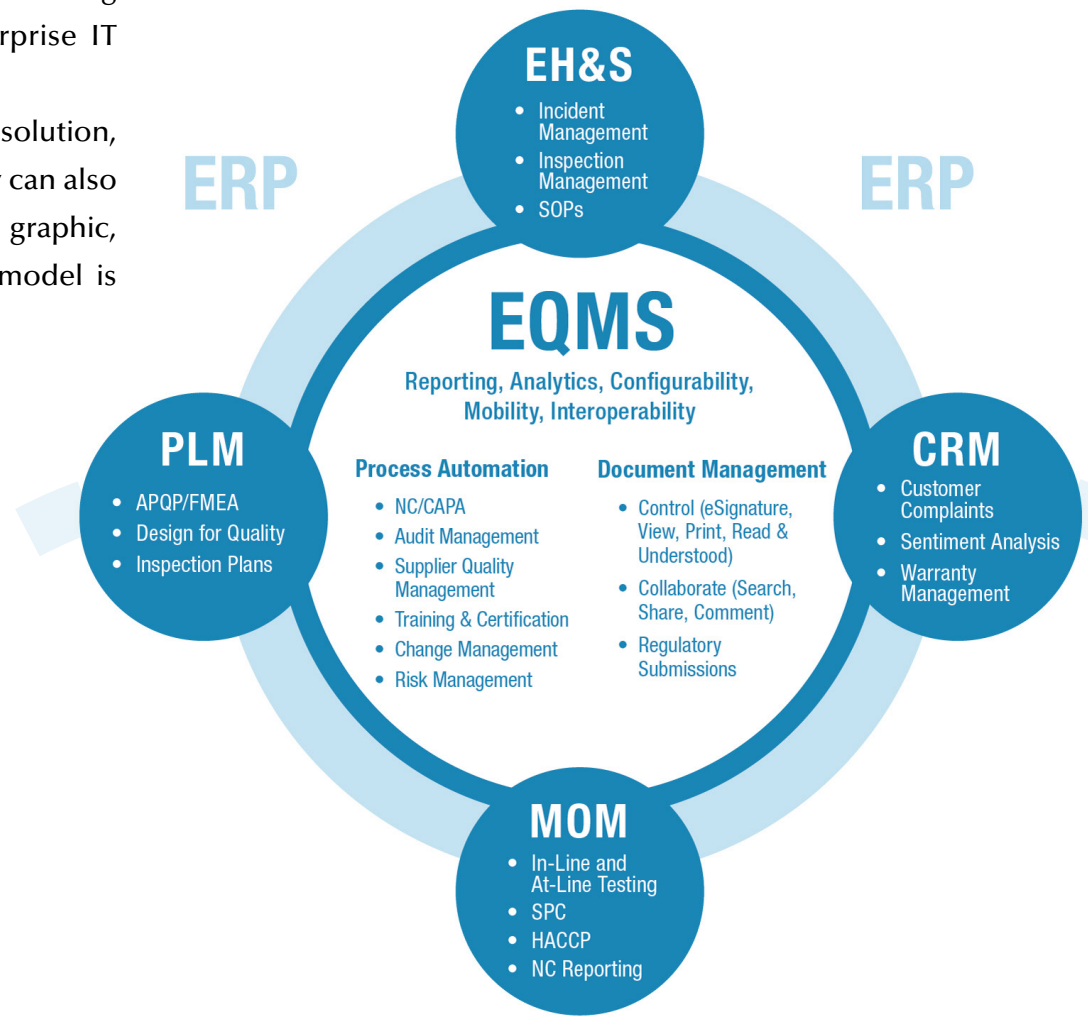


EQMS: The Quality and Compliance Hub

EQMS acts as a hub for quality and compliance process data and content, connecting traditionally disparate systems, including Environment, Health, and Safety (EH&S), Product Life-cycle Management (PLM), Customer Relationship Management (CRM), and Manufacturing Operations Management (MOM). Solutions are designed to easily integrate with such existing enterprise IT systems, as well as the broader enterprise IT backbone in nearly all organizations, ERP.

While EQMS can be delivered as a stand-alone solution, specific functionalities or entire suites of functionality can also be delivered via several of the solutions listed in this graphic, including ERP, PLM, and MOM. The ideal delivery model is

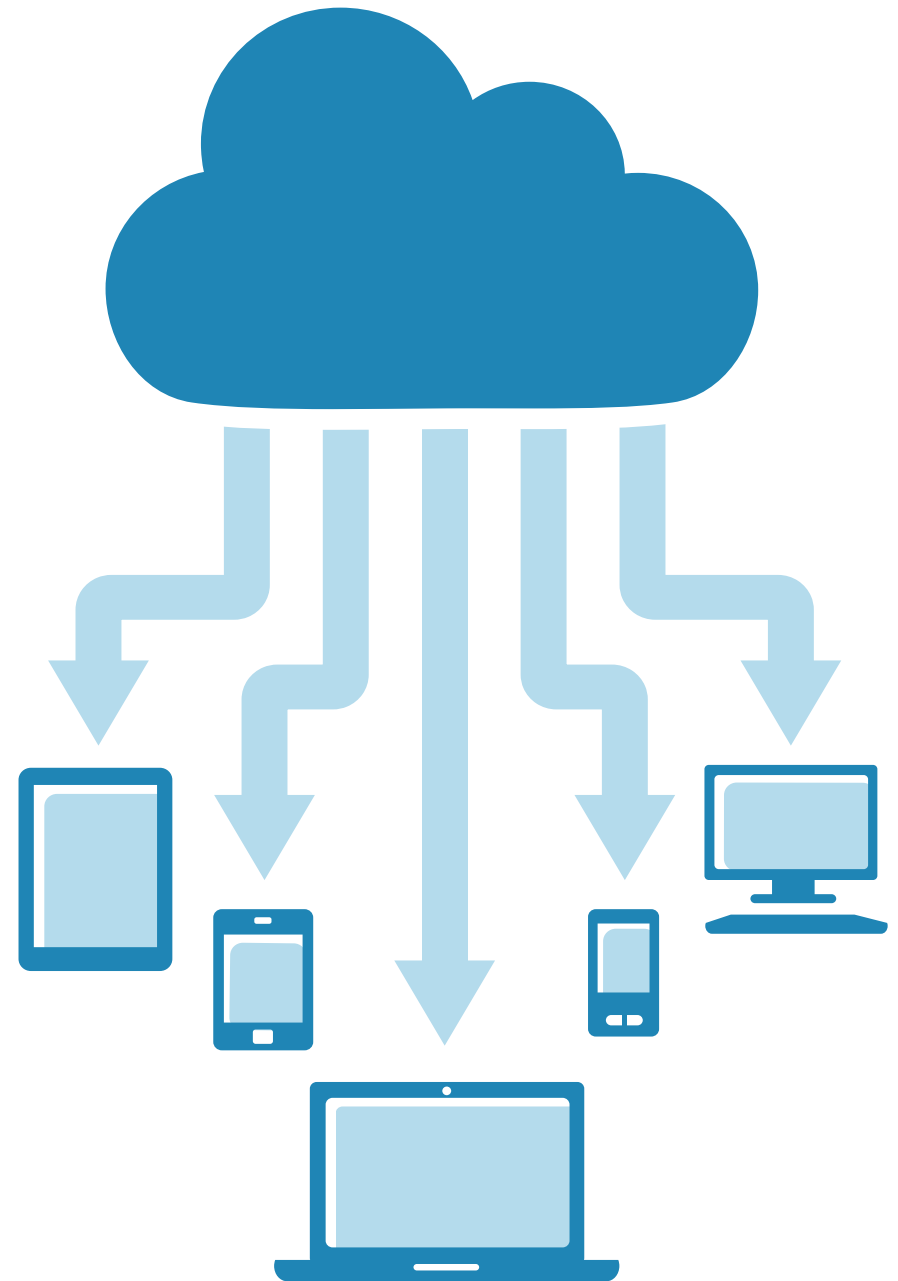
dependent on the existing IT footprint. Because many smaller organizations tend to have an ERP solution deployed across the enterprise, this may be an optimal mode of EQMS deployment. But, again, that decision should be made on a case-by-case basis.



Quality and Compliance in the Cloud

Although cloud-computing is commonplace in many solutions categories—sales tracking, marketing automation, and so on—cloud-based EQMS solutions are relatively new. Often accompanied by Software as a Service (SaaS) pricing and delivery models, these types of solutions are opening many new doors for organizations requiring next-generation quality and compliance capabilities. They are often more cost-effective—especially for companies with smaller IT budgets—and can tailor to a number of different user needs.

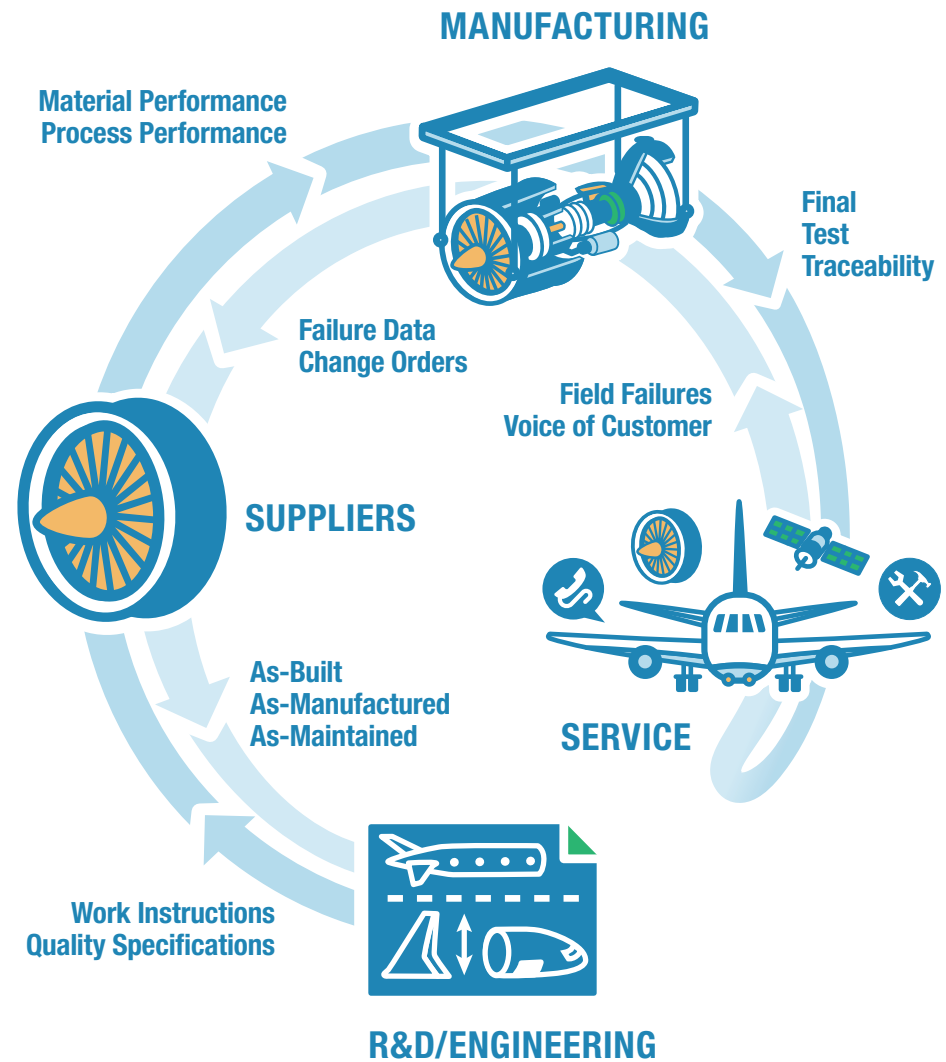
Because a good number of A&D suppliers do not have access to the same size budgets as their downstream counterparts, cloud-based EQMS is emerging as an optimal option for many. As information and collaboration requirements are only poised to increase in the coming years, LNS Research expects to see a rise in the number of cloud-based EQMS adoptions.



Developing Closed-Loop Processes with EQMS

Today's leading organizations—regardless of their positioning in the supply chain—are taking advantage of the connections EQMS facilitates between functional areas to create closed-loop quality processes. These types of process are created to essentially streamline quality process data and content from one area of the value chain to another, connecting resources in ways that were previously impossible without incredible IT undertakings.

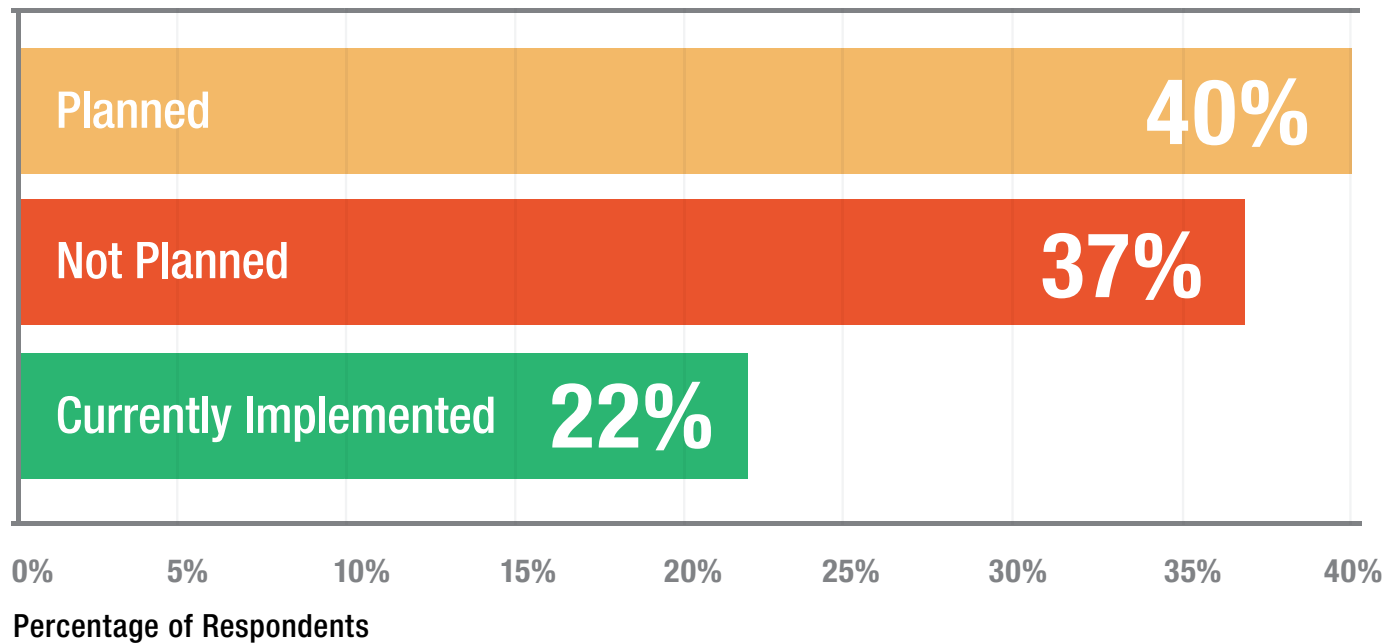
As shown to the right, critical information is generated in each area of the value chain, but often ends up residing in that area. Closed-loop quality enabled by EQMS, however, ensures that it is routed (streamlined rather than manually delivered) in the right context and in a timely manner. For instance, a process may be set up so that as-built data along with in-line testing data is automatically sent back to engineering so professionals can make adjustments to work instructions as needed. This is vital for correcting quality issues earlier, driving costs down and compliance up.



Closed-Loop Quality Data

From the chart, it is clear that closed-loop quality management processes are important to manufacturing organizations. 22% of participants reported currently having closed-loop processes established, while two out of five reported being in the planning stages of deploying such processes. As is the case with the rising EQMS adoption rates, it is duly expected that the percentage of organizations with closed-loop quality processes established or plans for establishing them only follows suit.

Closed-Loop Quality Processes Established





SECTION 4

Highlighting the Benefits of Quality and Compliance Technology

By looking at the adoption of closed-loop quality processes and other more specific technologies along with year-over-year performance improvements, the benefits of such approaches can be quantified. This section does just that. As shown below, several high-level, encompassing business metrics—Overall Equipment Effectiveness (OEE), On-Time and Complete Shipments, and Successful New Product Introductions (NPI)—are highlighted.

Across the board, organizations that had closed-loop quality processes established outperformed all others. Particularly, companies with closed-loop quality processes established had a considerably higher successful NPI rate. This stands out not just because of the disparity in performance, but for the importance of such a metric for A&D suppliers fighting to stand out among competition.

	CLOSED-LOOP QUALITY PROCESSES IN PLACE	ALL OTHERS
Median Overall Equipment Effectiveness	87%	83%
Median On-Time and Complete Shipments	94%	91%
Median Successful New Product Introductions	95%	80%

Benefits in Engineering

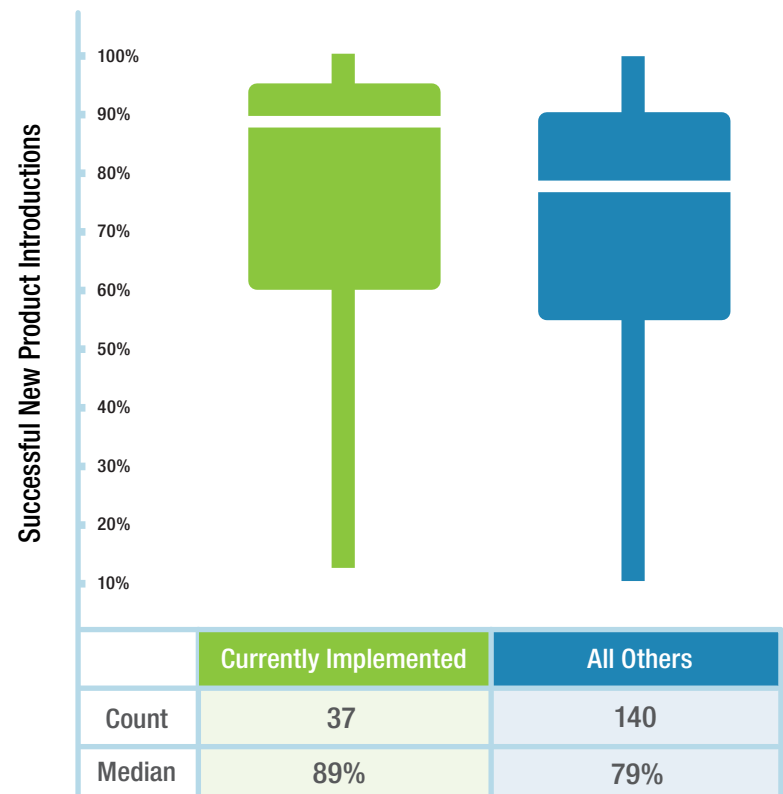
Diving deeper into NPI, data from the quality management survey shows that companies with capabilities for delivering real-time visibility of quality metrics in engineering have a much greater success rate. Performing at 89% versus 79% in the holistic metric, this type of visibility clearly has benefits for other areas of the value chain as well. Again, EQMS may open this portal that facilitates connection with the broader value chain. For A&D suppliers, it is critical that product compliance is built into engineering quality specifications, and that the development and testing information behind it is readily available.

Real-time visibility into engineering quality performance translates into a

13%

higher rate of successful new product introductions

Real-Time Visibility of Quality Metrics in Engineering

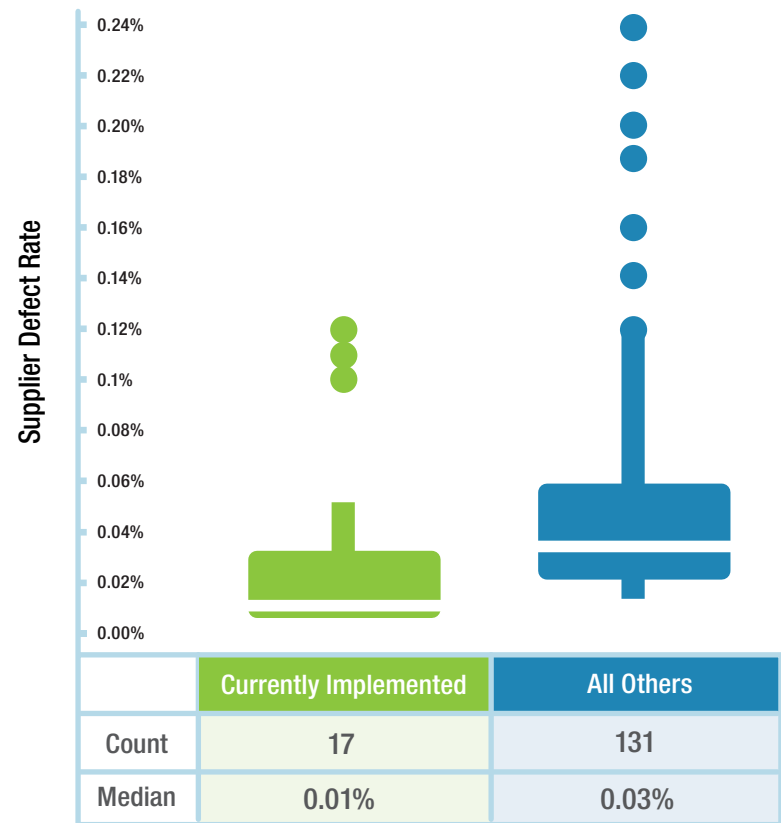


Benefits in Supplier

Many organizations are leveraging EQMS to connect with suppliers via Web-based portals. With these portals, both historical and real-time supplier quality data can be collected and inspected by continuous improvement professionals downstream. With the use of analytical tools to identify correlations, such supplier quality data can have a major impact on performance across the value chain. Additionally, as more quality, compliance, and traceability requirements are being pushed upstream in A&D, visibility into supplier performance is on pace to become more common than ever seen in the past.

A **67% LOWER** median supplier defect rate could very well attribute to **AVOIDING A MAJOR PRODUCT RECALL**

Supplier Quality Data Collected Automatically Through Web-Based Portal



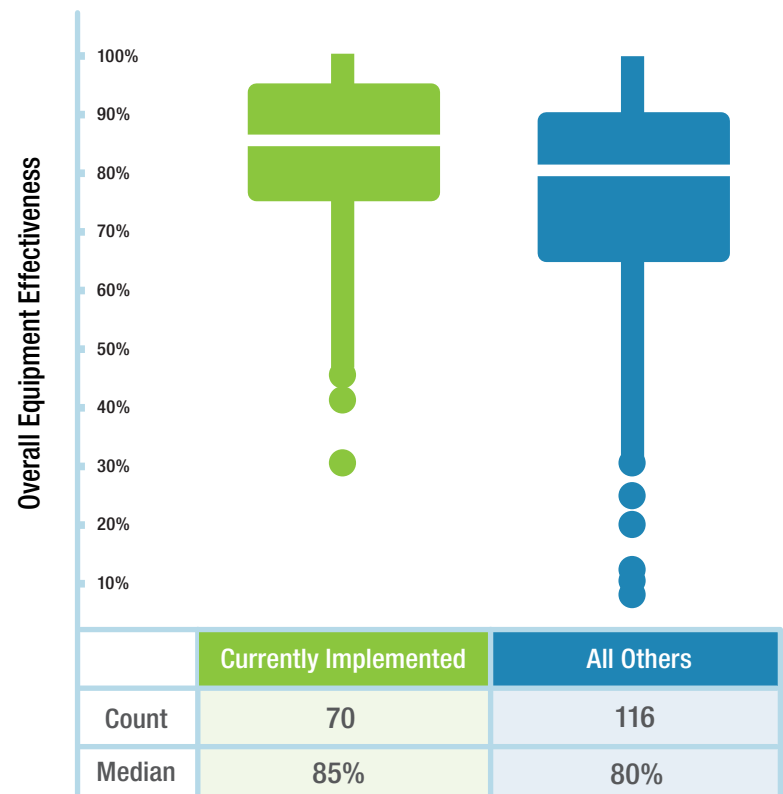
Benefits in Manufacturing

OEE encompasses availability, performance, and efficiency, and as shown to the right, those companies with real-time visibility of quality metrics in manufacturing have a 6.25% greater OEE. The holistic nature of this metric and the performance differences are indicative of the importance of technologies like Statistical Process Control (SPC), and how those types of data can be leveraged by other functional areas in the value chain. Many A&D suppliers have solutions like SPC. However, in many cases it is a matter of using a solution such as EQMS to compound its effectiveness

The establishment of real-time visibility of quality metrics in manufacturing drives a higher OEE by

6.25%

Real-Time Visibility of Quality Metrics in Manufacturing



Benefits in Service

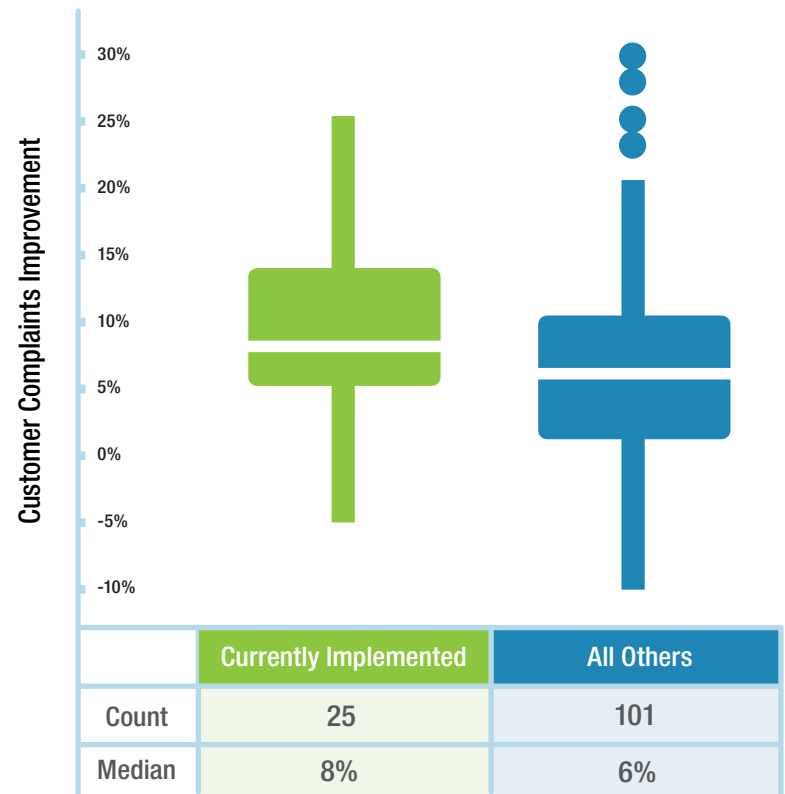
Companies with real-time visibility of quality metrics in customer service outperformed those without the capability. Again, it's important to think of this type of technology in the broader context of the value chain. For A&D suppliers with many customers and products, customer complaint data made consumable with quality and compliance analytics found within EQMS solutions can deliver eye-opening correlations with downstream performance. For A&D suppliers in particular, where customers may be OEMs, customer complaints require a great deal of attention.

Real-time visibility of quality metrics in customer service helped drive a

33% HIGHER IMPROVEMENT

in customer complaints

Real-Time Visibility of Quality Metrics in Customer Service





SECTION 5

Conclusion

Actionable Recommendations

The A&D industry is facing one of its most interesting times right now. While Aerospace is in a rapid growth period, much of the Defense sector is in a precarious situation. U.S. Congress' Bipartisan Budget Act of 2013 should help to alleviate some of the pressures in Defense, but what happens in two years is still up in the air. Regardless of spending, however, outsourcing and collaboration continue to remain top drivers in the industry as a whole. And those suppliers that can differentiate on engineering expertise, manufacturing visibility, and the ability to meet quality and compliance requirements will lead the way.

Based on the rising adoption rates of EQMS and the number of organizations with planned adoptions, A&D suppliers without an EQMS adoption should be one of the next in line. The benefits to cost, risk, and compliance are second to none, and solutions' functionality is only increasing. Organizations considering an investment should weigh the benefits of both SaaS and on-premise deployments, keep in mind the deployment's impact on existing IT resources, and think about the impact to personnel across the value chain. In the end, the goal with EQMS is to not simply automate traditionally manual processes, but to provide a more holistic view of quality and compliance by strategically closing the loop.

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