

MRO SURVEY 2017

# WHEN GROWTH OUTPACES CAPACITY

A LABOR SHORTAGE AND OUT-OF-DATE TECHNOLOGY MAY  
RAISE MRO COSTS FOR AN EXPANDING GLOBAL FLEET

By Brian Prentice, Derek Costanza, and John Smiley



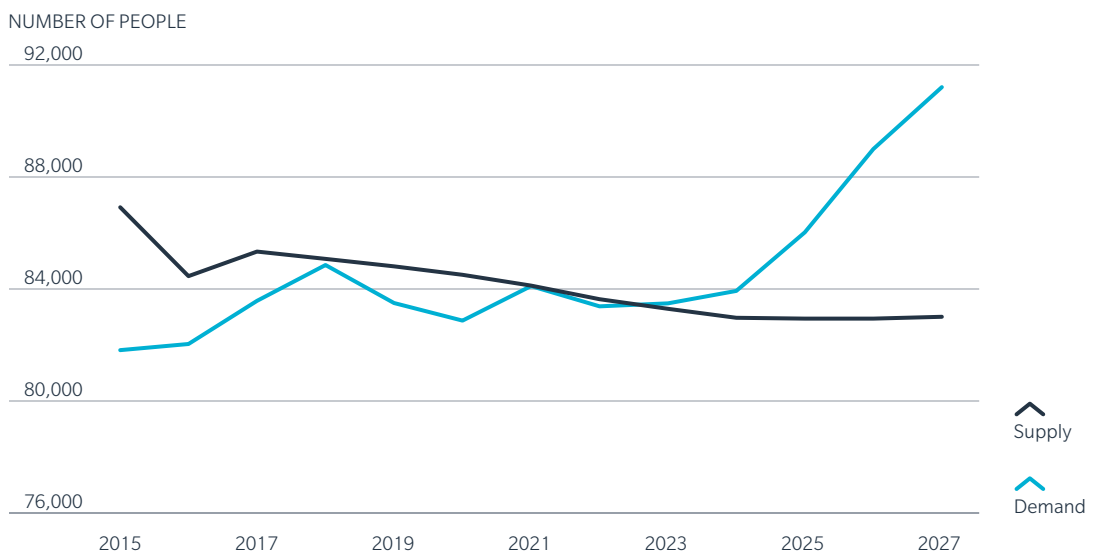
Executives from the maintenance, repair, and overhaul (MRO) industry are worried about an anticipated shortfall in the number of adequately trained mechanics at a time when the global airline fleet is expanding and modernizing, according to Oliver Wyman’s 2017 MRO survey.

Over the next decade, the record number of maintenance technicians eligible to retire will outpace the total of new mechanics entering the market. The shortfall is expected to create expertise gaps as the industry finds itself having to service a fleet that by 2027 will be almost equally divided between older and newer technology aircraft. Already, a majority of survey respondents (78%) report that it is getting

harder to hire mechanics and the tightening labor market is pushing them to rely on overtime and other stop-gap efforts to keep up with market demand.

Meanwhile, the promise of advanced analytics and game-changing technologies remains elusive for many in the aftermarket, with only 20 percent of respondents currently seeing a

**Exhibit 1: Forecasted US Commercial MRO Maintenance Technician Demand and Supply by Year**



Source: Oliver Wyman Commercial MRO Maintenance Technician Labor Model

material impact on business operations from these technologies. Participating executives describe their industry as constrained by old IT systems (62%) that lack functionality and flexibility and are too often not compliant with changing regulations.

Given the looming labor shortage and failure to upgrade technology, Oliver Wyman sees a prospect for rising maintenance costs and an increase in turnaround times (TAT) for scheduled maintenance. In response, airlines are likely

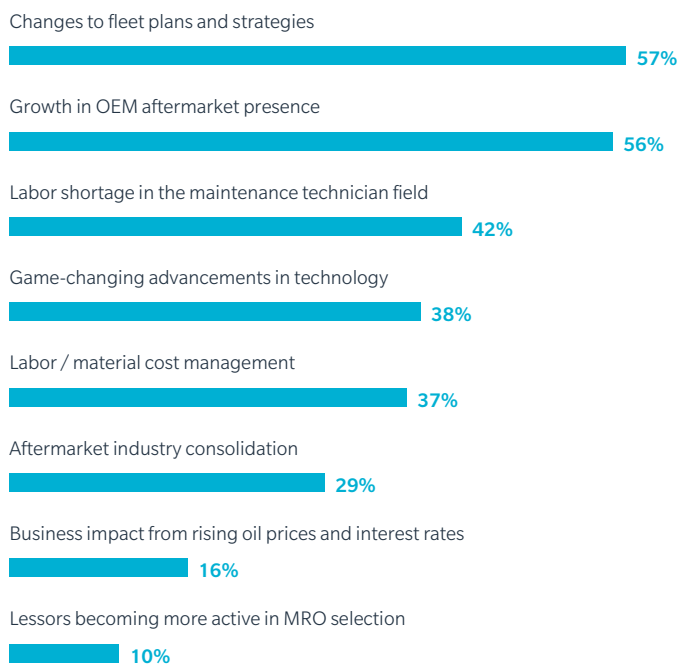
to retain more spare aircraft as a backup for potential servicing delays.

The other top industry disruptors identified by the survey include changes to fleet plans and strategies (57%) and growth in the aftermarket presence of original equipment manufacturers (OEMs) (56%). More on these topics can be found in our Global Fleet & MRO Forecast as well as in previous editions of the MRO Survey on [www.oliverwyman.com](http://www.oliverwyman.com).

### Exhibit 2: Potential Aviation Aftermarket Disruptors That Warrant Greatest Attention

Q: In reviewing the following list of potential disruptors in the aftermarket business, please select the three that will warrant the greatest attention and challenge for your company over the next three years

PERCENT OF RESPONDENTS



Source: Oliver Wyman MRO Survey 2017

# THE BIGGER AND YOUNGER GLOBAL FLEET

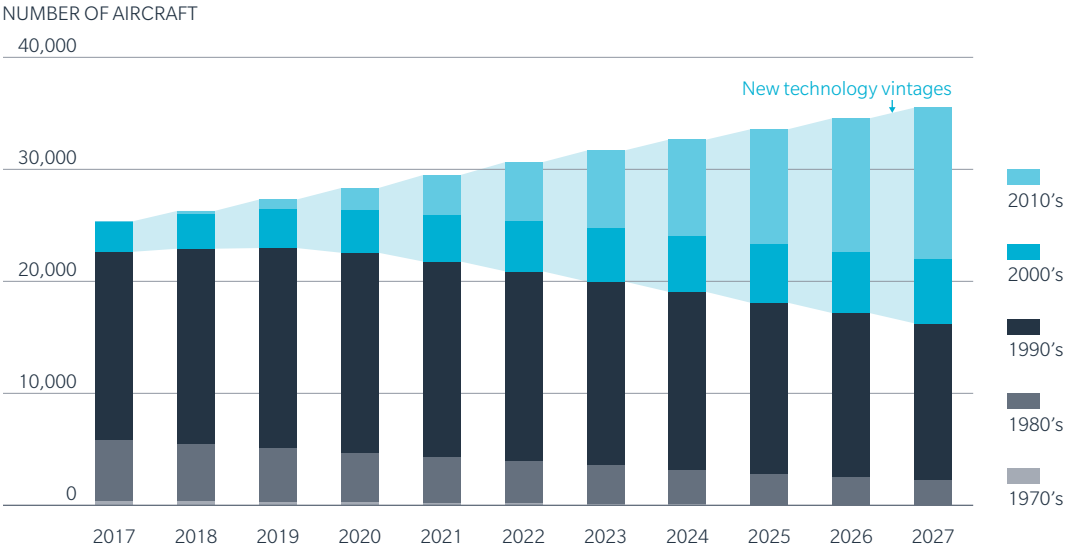
Over the next decade, the world’s major airlines are slated to add 20,444 planes, of which 17,390 are new technology aircraft, and retire 10,311 older planes, according to Oliver Wyman’s annual Fleet and MRO Forecast. This will enlarge the global fleet by a net 10,133. By 2027, 58 percent of in-service aircraft will be comprised of fuel-efficient planes designed and produced since 2000. During this period, the average age of the fleet will drop to 9.7 years old, from today’s 11.2 years.

The growth in the fleet is being pushed by continuing global economic expansion, particularly in China and India where many of the aircraft will be added. In its 2016 Pilot

and Technician Outlook, Boeing projected that aviation would need as many as 679,000 maintenance technicians by 2035 to service the larger fleet – a figure more than 11 percent higher than the company’s 2015 calculation. Similar upticks are being projected for pilots and cabin crews.

The projected fleet revitalization is expected to prove problematic for the MRO industry. Many providers continue to rely on systems designed for 20th century planes and depend on a shrinking workforce that often lacks the necessary training in systems and components of newer aircraft, such as composite materials and next-generation avionics.

**Exhibit 3: Global Commercial Air Transport Fleet Forecast by Aircraft Vintage by Decade of Platform Launch**



# LABOR SQUEEZE AHEAD

The aging of the mechanic workforce and rash of anticipated retirements could not come at a worse time for the industry, as it gears up to accommodate the larger and newer fleet. The problem stems from a simple combination of demographics and economics.

For example, the median age of aviation mechanics in the United States is 51 years old, nine years higher than the median age for the broader US workforce as calculated by the Bureau of Labor Statistics. That explains the anticipated increase in retirements.

But why are relatively few of the millennial generation looking to train as aviation mechanics? When asked why it was difficult to recruit, 51 percent of survey respondents identified wages and benefits as an obstacle. Wages are expected to rise because of the labor shortage, which presumably will attract more candidates.

Other factors making it difficult to hire mechanics include the lack of supply (72%), heavy competition (49%), and the cost of living near the maintenance facility location. Besides, many mechanics are tempted by career opportunities in other industries requiring a similar skill set. The Aviation Technician Education Council (ATEC) estimates 30 percent of those who finish an aviation maintenance training course end up accepting employment in another industry.

Bottom line: Seventy-two percent of those surveyed expect the search for qualified candidates to get much harder.

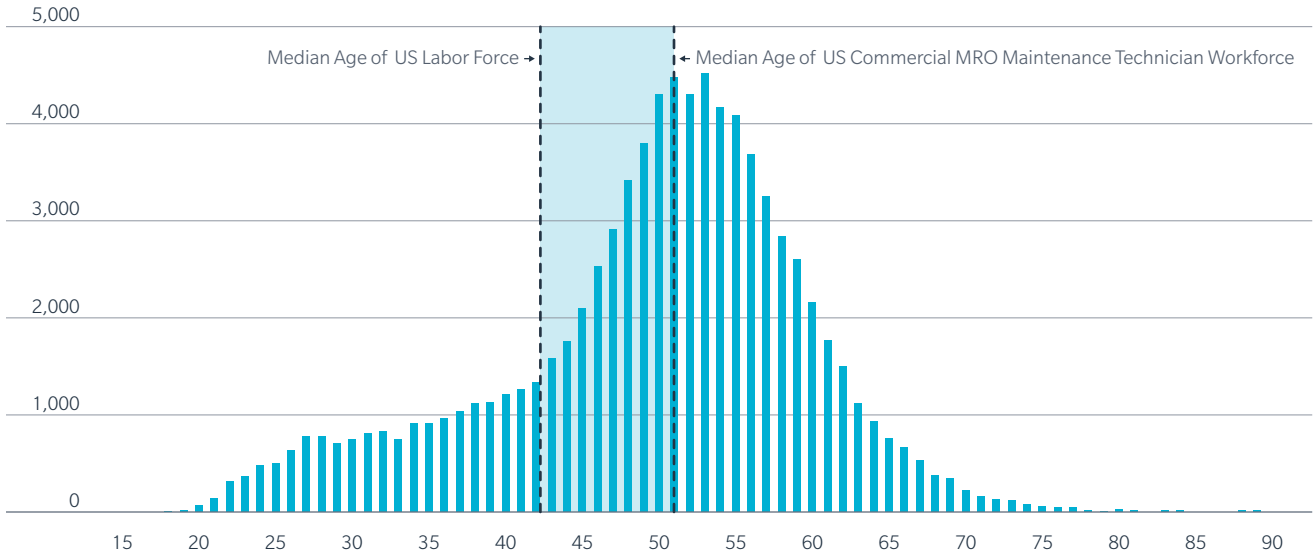
Sixty-four percent of the surveyed executives state their companies expect to hire mechanics over the next three years to expand the workforce; another 23 percent say they will hire simply to maintain their numbers. Thirteen percent are planning for their number of maintenance technicians to decline, either through attrition or layoffs.

This labor shortfall may be felt the soonest in Asia where the biggest portion of fleet expansion is taking place. In the United States, where minimal overall growth is expected, Oliver Wyman anticipates that the real labor crunch will hit five to seven years from now, when supply and



### Exhibit 4: 2017 US Commercial MRO Maintenance Technician Workforce by Age

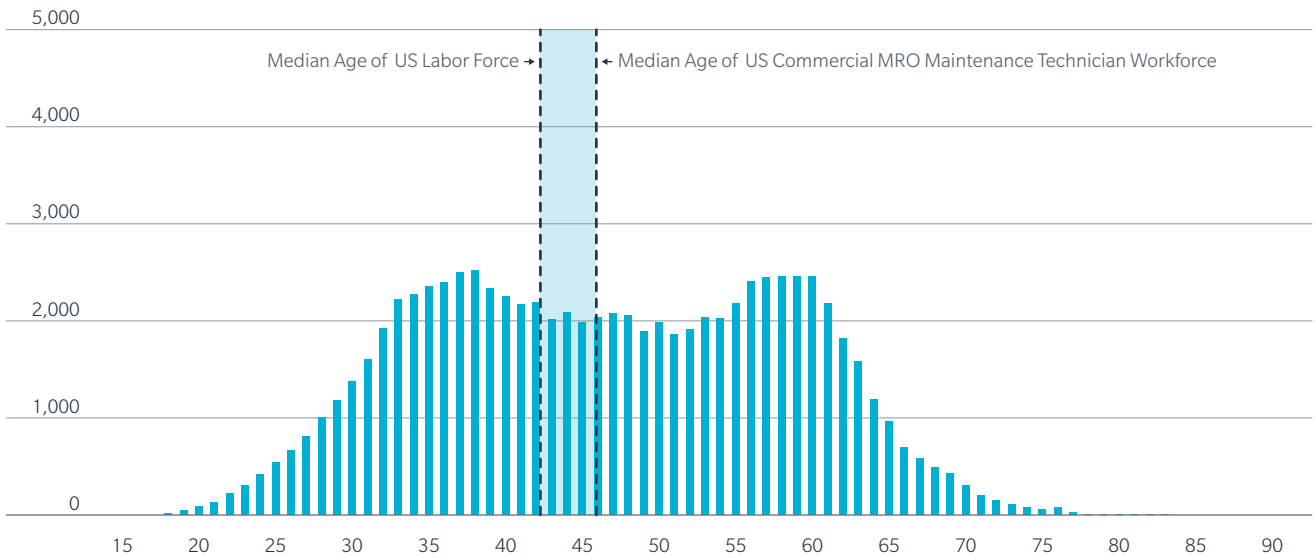
NUMBER OF PEOPLE



Source: Oliver Wyman Commercial MRO Maintenance Technician Labor Model

### Exhibit 5: Forecasted 2027 US Commercial MRO Maintenance Technician Workforce by Age

NUMBER OF PEOPLE



Source: Oliver Wyman Commercial MRO Maintenance Technician Labor Model

demand equalize; at that point, employers will have to hope that the right mechanics with the right skill sets are in the right place at the right time when they need them. The situation will continue to worsen through 2027, when the projection forecasts a discrepancy between supply and demand of 9 percent.

When hiring mechanics, MROs also face a challenge to get the right mix of skills. While the percentage of newer planes will grow

over the next few years, some airlines are finding the need to delay retirements of older aircraft to meet demand. Nearly half of airline respondents reported that they were deciding against mothballing planes. Reasons cited include capacity opportunities (30%), improved economics of older aircraft (13%) given lower fuel prices, and the lack of availability of new aircraft (3%). Twenty-nine percent report aircraft being pulled out of storage and pressed into service.

#### Exhibit 6: Demand for Maintenance Technicians in the Next Three Years

Q: Over the next three years, is your organization likely to

PERCENT OF RESPONDENTS

Hire to increase the current headcount of maintenance technicians



Hire to maintain the current headcount of maintenance technicians



Reduce headcount of maintenance technicians through attrition



Reduce headcount of maintenance technicians through layoffs



Source: Oliver Wyman MRO Survey 2017

# THE TRADITIONAL AND THE TECH-SAVVY

Mechanics moving forward will need the skill sets to work not only on the newest planes, but also on those that have been flying for 20 years — and these are not necessarily the same.

Tomorrow's maintenance technicians need to be tech-savvy diagnosticians — something that was not even imaginable a few decades ago. The survey identified three emerging technologies vital for the next generation of mechanics, including composite material repair and manufacture (62%); collection and reporting of data for advanced analytics, big data, and predictive maintenance (51%); and the newest avionics and electrical systems (51%).

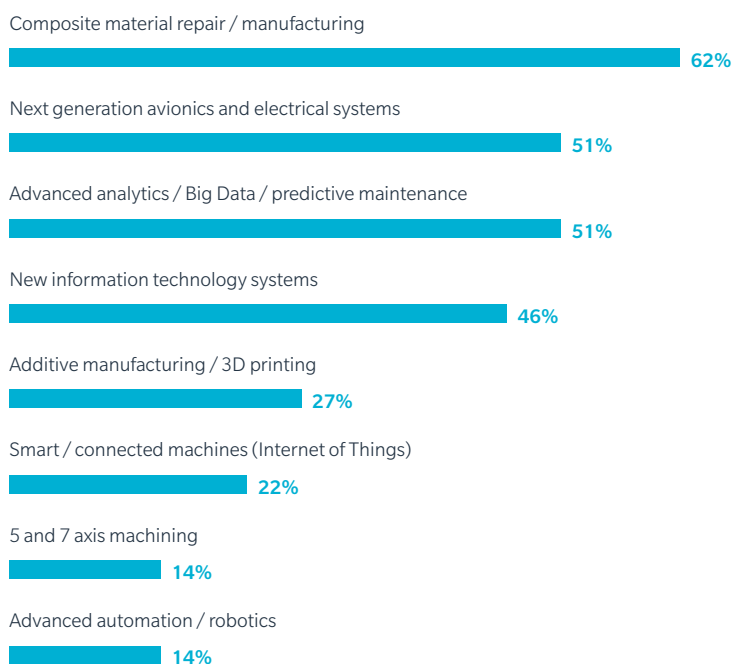
While the aftermarket needs new skills, it also will continue to require those who are familiar with older, less digitally sophisticated technology — planes that after 20 years in service are apt to require more maintenance, not less. Because of the probable retirements of so many baby boomer mechanics, seven out of 10 respondents told the survey they already fear the loss of critical skills with their departures.

If older aircraft can get phased out quickly, that could simplify training and make it easier for MROs to focus resources on the newer planes. There will also be fewer shops forced to run

## Exhibit 7: Training Needed on Emerging Technologies

Q: Please identify emerging technologies affecting the skill requirements of your maintenance technicians

PERCENT OF RESPONDENTS



Source: Oliver Wyman MRO Survey 2016, Oliver Wyman MRO Survey 2017



new-generation platforms — and the systems, programs, and training that go with them — alongside those for older aircraft.

To help mechanics develop necessary skills, 84 percent of survey respondents said their companies were offering classes and workshops; 61 percent said they had established partnerships with technical schools or colleges to assist their labor force. The training areas that they said should be prioritized are: proper documentation of work performed and next steps (81%); familiarization of inspection and repair techniques for composites (65%); and troubleshooting of avionics and test equipment (62%). Things like proper documentation provide the data feed and foundation for advanced analytics and predictive maintenance tools.

The survey identified community colleges and universities with FAA- and EASA-approved programs as the highest ranked sources of qualified candidates. The next highest ranked sources are either the military or business aviation, as well as Fixed Base Operators, the survey shows. But, since aviation competes with other industries to attract the sheer quantity of interested new hires, companies need to look well beyond the usual tactics of opening up additional training programs. Just as airlines and manufacturers are doing with other highly skilled positions like engineers and pilots, the MRO industry will have to tailor new incentives to expand and protect the technician pipeline, raise the desirability of working in aviation maintenance, and recruit across a broader demographic, especially given the competition for workers with other technologically intensive industries.



# TECHNOLOGY EPIPHANIES

The good news is that most companies recognize that they are operating behind the technology curve and say they are planning system upgrades over the next three years. More than half of the survey respondents reported a planned migration or major upgrade in their systems for engineering (68%), supply chain (55%), and engine maintenance, technical support, and planning (50%).

Seventy-seven percent report plans to implement predictive maintenance technologies in the next three years — an important protocol to have in place with a mechanics shortage as a means to make sure the maintenance work is being performed at an optimal time and efficiently.

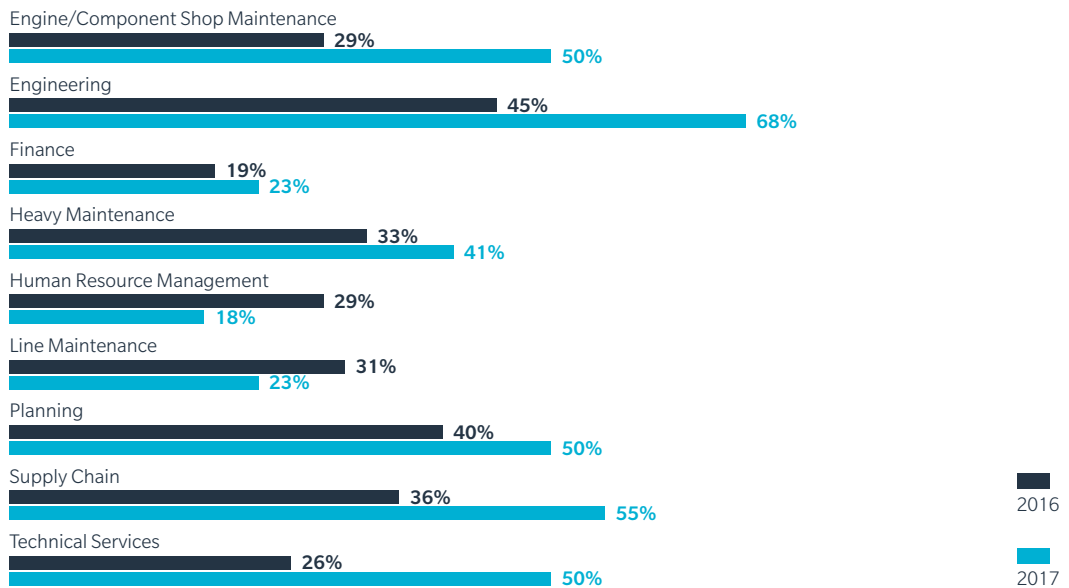
The survey also identified paperless shops and hangars as another technology being deployed that is likely to increase technician efficiency and productivity at a critical time.

That said, nearly half (48%) are concerned that not enough of the IT budget is devoted to upgrading old systems and implementing new ones to meet the challenges ahead. And when asked about new technologies being deployed at their companies, the survey identified radio-frequency identification (RFID) and wearable or hand-held devices as the two most commonly (68%) planned — both of which are already widely used in other industries.

## Exhibit 8: Planned Major IT Systems Migrations or Upgrades

Q: Indicate which IT systems have a migration or major upgrade planned within the next three years

PERCENT OF RESPONDENTS



Source: MRO 2017 Survey

# STILL DUBIOUS

As the MRO Survey noted in 2016, the industry remains skeptical about the positive impact predictive maintenance and big data will have over the short term. The majority of this year's survey respondents report they still have only anecdotal evidence of its effectiveness. That said, some larger providers have opened predictive maintenance departments and created executive positions responsible for oversight of advanced analytics work.

**“Regardless of the doubters, the industry is approaching an inflection point when it comes to data-driven programs.”**

For big data and predictive maintenance to be effective, data capture and collection needs to be more refined. Respondents are collecting large amounts of data, albeit in most cases not usable—often dirty, disconnected, and/or fragmented—requiring considerable additional preparation to be turned into useful information. Additionally, few companies seem to have the time, available resources, training, algorithms, and/or system interconnectivity needed to capitalize on the data in a meaningful and fully integrated way. Even where smart systems are producing quality output, they often still have to interact with “dumb” systems and often cannot yield the desired operational impact.

With a large number of survey respondents still in exploratory mode with predictive maintenance, there are many views on what it is, who will manage it, and how it should roll out more broadly. It is likely that the evolution of predictive maintenance will be driven by the OEM community working in close alignment with the airline technical staff, and the MRO providers executing the directives. Further test and learn experimentation in high value areas like inventory management, maintenance intervals, and large component renewal will occur before more ardent adoption.

In addition to predictive analytics and big data, survey respondents also seem skeptical about the efficacy of wearable or hand-held digital tools; 43 percent describe them as “gadgets that do not last,” despite their extensive adoption by other industries. Those who have deployed the tools; however, report efficiencies, including a 22 percent saving in the time it takes to perform a task, a 10 percent increase in the tasks a technician can perform, and a positive return-on-investment within 19 months.

Regardless of the doubters, the industry is approaching an inflection point when it comes to data-driven programs. Newer generation aircraft collect more and cleaner data. It is also more integrated. Here, we are seeing more adoption and trust in the data. Currently, less than 50% of the global fleet has these more advanced systems, so it will no doubt take years to equalize capabilities across airline networks.

# INDUSTRY IMPLICATIONS

With a shortage of skilled technical labor, airlines will likely seek to protect their daily operations by drawing existing skilled workers into their line maintenance programs to the detriment of third-party maintenance providers. In the near term, airlines will continue to focus on operational reliability, at the possible expense of turnaround times for scheduled maintenance and components. An increase in out-of-service time will potentially require a shift in asset management strategies. The industry may have to give back some of the efficiency gains made over recent years, which means airlines may decide to hold more spare planes and components in the system to maintain fleet utilization rates.

We anticipate updating IT will become an increasingly important strategy to help combat the impending talent shortage and help optimize operations and workforce productivity. Survey data shows that many companies are planning upgrades or migrations; in five of nine major

areas in the survey more than half conveyed such plans. Only in line maintenance and human resource management did the percentage planning an upgrade decline from last year.

Higher maintenance costs may prompt airlines to seek out more efficient MRO markets in different geographies or pursue joint ventures to lower the price tag. On the flip side, MROs, OEMs, and airlines prepared to meet this shortage challenge will be poised to win incremental business and grow over the next decade.

Oliver Wyman believes the current imbalance in labor supply and demand in the MRO industry eventually will be remedied by a combination of improved efficiencies, driven by new technology solutions and increased wages that will attract new technicians into the workforce. However, this may take up to a decade to achieve, and in the meantime, it will be challenging for both the airlines and the MRO industry.

## ABOUT THE SURVEY

In its second decade, the Oliver Wyman annual MRO survey samples a range of executives from across the aviation industry addressing key trends and emerging issues in the MRO sector. Sixty three percent of this year's respondents to the annual survey were senior executives — either in C-suite posts or vice president or above, and 85 percent were director level or above. The sample reflects views across major geographic markets, with North America representing 55 percent of inputs, Europe and Asia accounting for the 21 and 17 percent respectively. The balance came from Latin America, the Middle East and Africa.

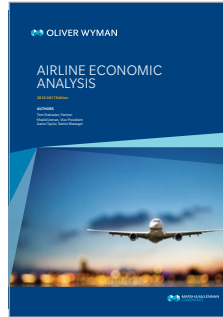
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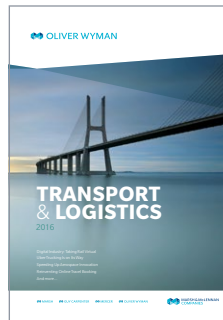
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## CONTACTS

### ROGER LEHMAN

Partner and Global Transportation Practice Leader  
[roger.lehman@oliverwyman.com](mailto:roger.lehman@oliverwyman.com)

### BRIAN PRENTICE

Transportation Partner  
[brian.prentice@oliverwyman.com](mailto:brian.prentice@oliverwyman.com)

### DAVE MARCONTELL

Vice President and GM, CAVOK  
[dmarcontell@cavokgroup.com](mailto:dmarcontell@cavokgroup.com)

[www.oliverwyman.com](http://www.oliverwyman.com)

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