OLIVER WYMAN

AVIATION WEEK MRO EUROPE

TURBULENCE AHEAD
DISENGAGE THE AUTOPILOT

2015-2025 GLOBAL FLEET & MRO MARKET FORECAST

Tuesday, October 13th 2015

Christopher Doan
Vice President

MARSH & McLENNAN COMPANIES

Oliver Wyman acquired TeamSAI and integrated the business into CAVOK, its aviation technical consulting and services practice

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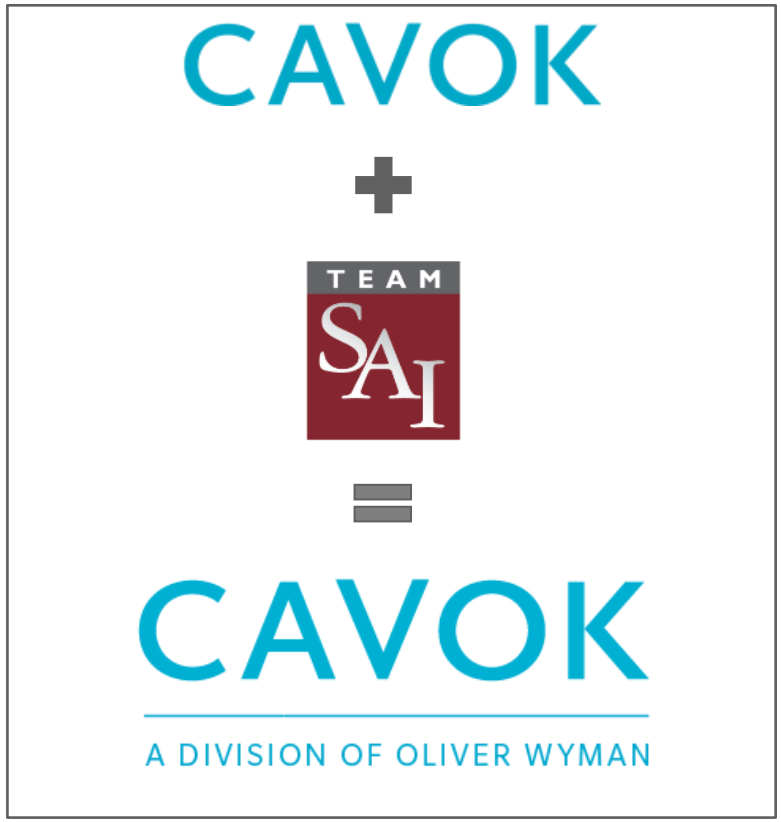


~150

Dedicated CAVOK employees located in DFW and ATL (Supported by +250 Oliver Wyman aviation consultants)

+2,300 years

of combined airline operations expertise

+70%

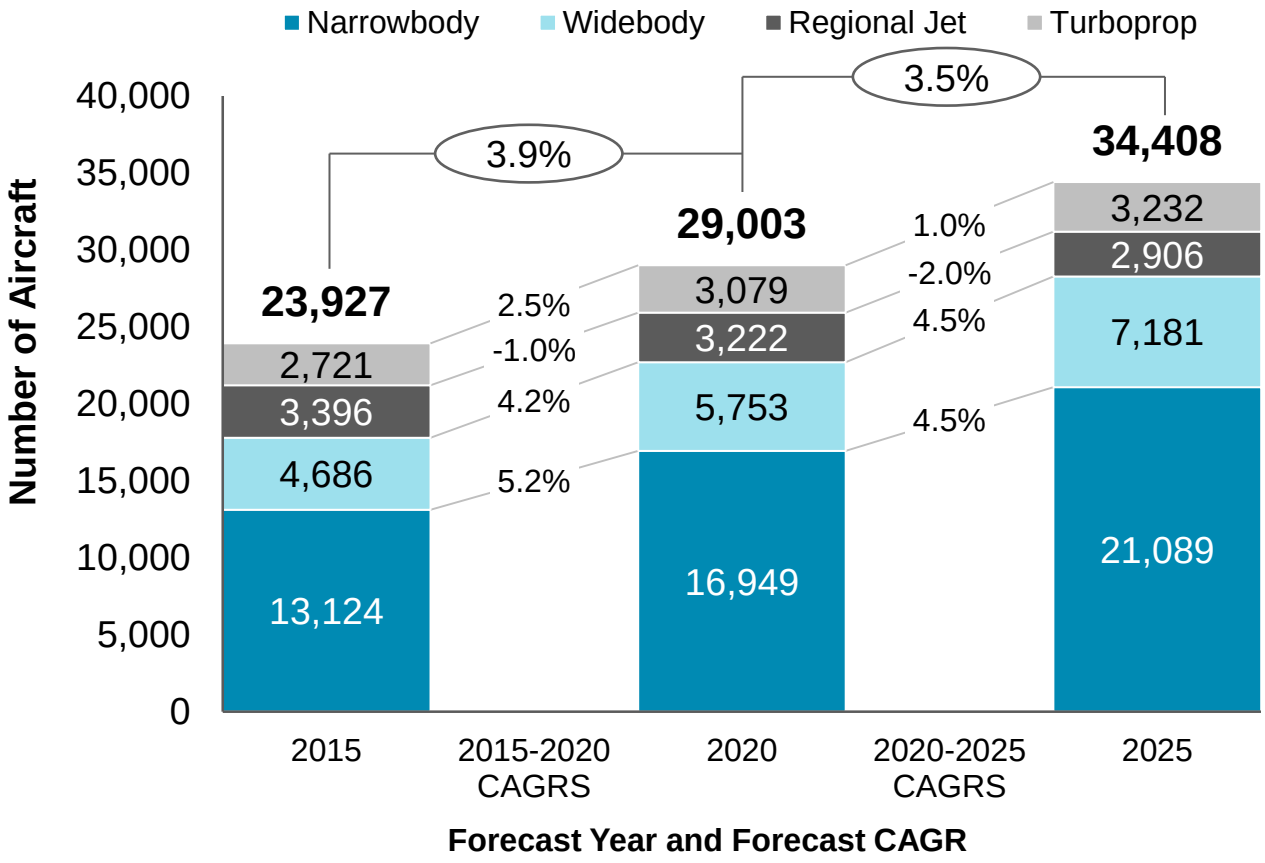
of CAVOK staff hold FAA certification/license

The respected TeamSAI Global Fleet & MRO Market Forecast, and related betterinsightTM market intelligence data, remains available at www.PlaneStats.com/betterinsight

Global Fleet &
MRO Market Outlook

The global air transport jet and turboprop fleet will grow by more than 10,000 net new aircraft by 2025

2015-2025 Global Fleet Forecast by Aircraft Class

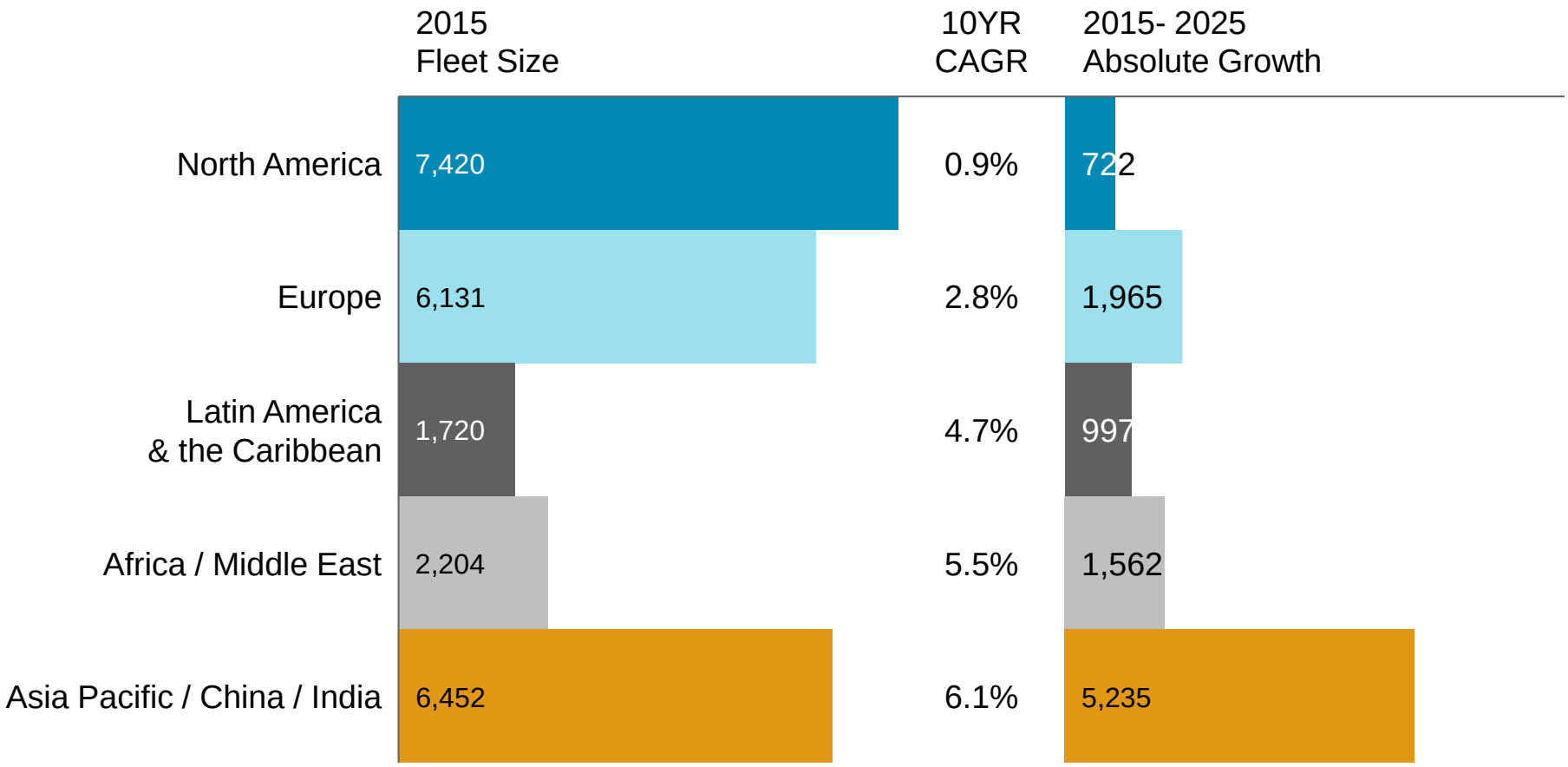


Key Fleet Forecast Growth Rates

- Global fleet will grow on average 3.7% annually over the full forecast period
- Passenger fleet expected to grow at 3.8% annually
- Cargo fleet forecast to grow by 2.3% annually
- Narrowbody aircraft will lead the growth
- Regional jets will actually decline in the mix

The growth outlook, however, varies widely from region to region

A 5 pt spread in regional growth rates leads to a significant share shift over the decade ahead



The mature North American and Western European markets will continue to undergo significant refleeting efforts during the next 10 years

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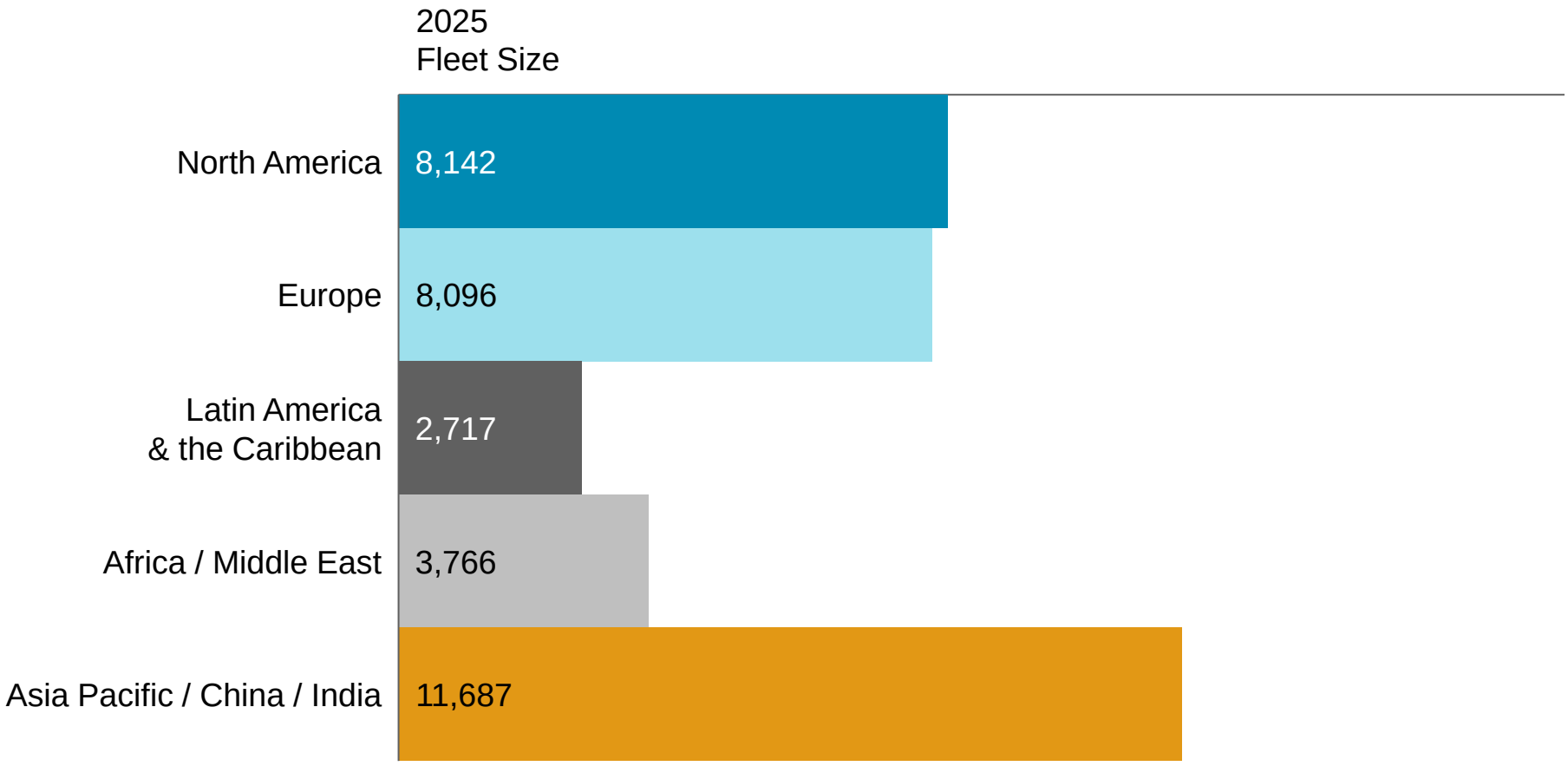

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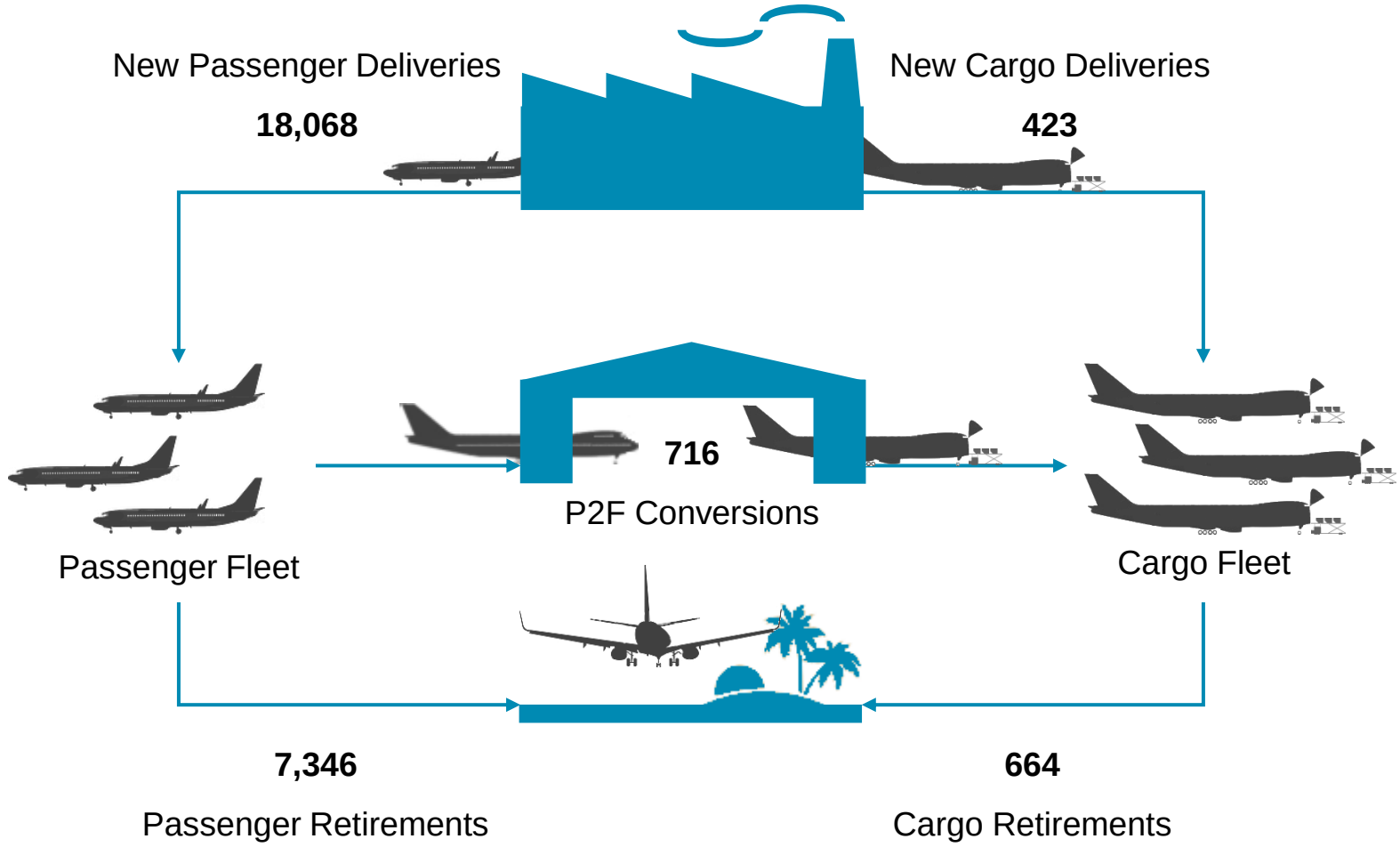
43% of all new aircraft deliveries will replace old technology aircraft over the forecast period



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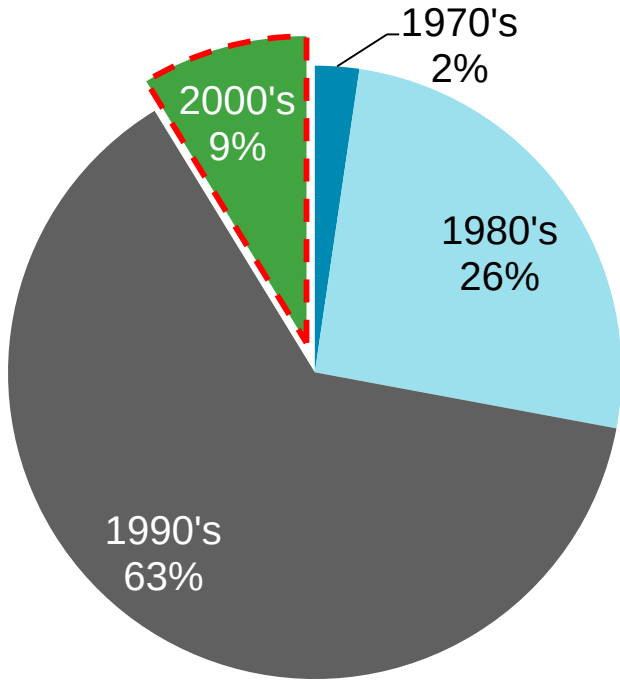
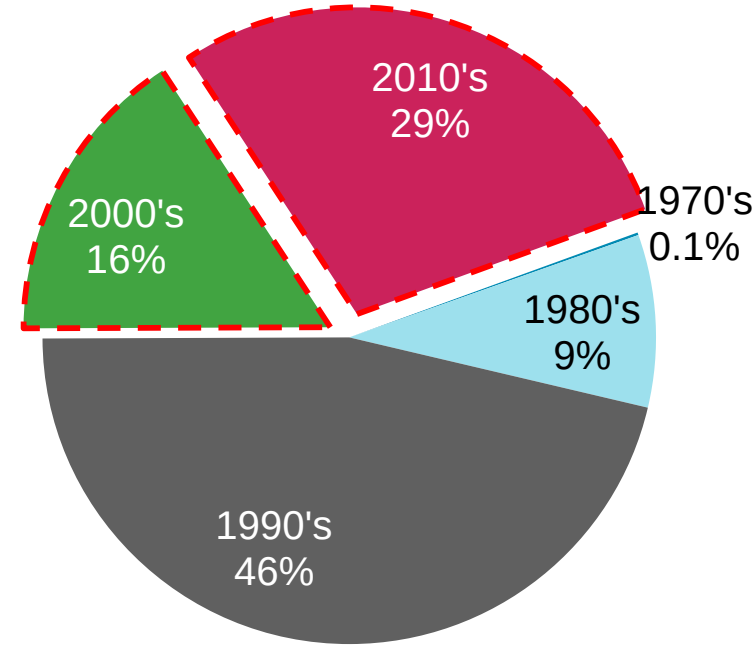
The result is a staggering change in fleet mix by 2025

2015 Global Air Transport Fleet by Vintage



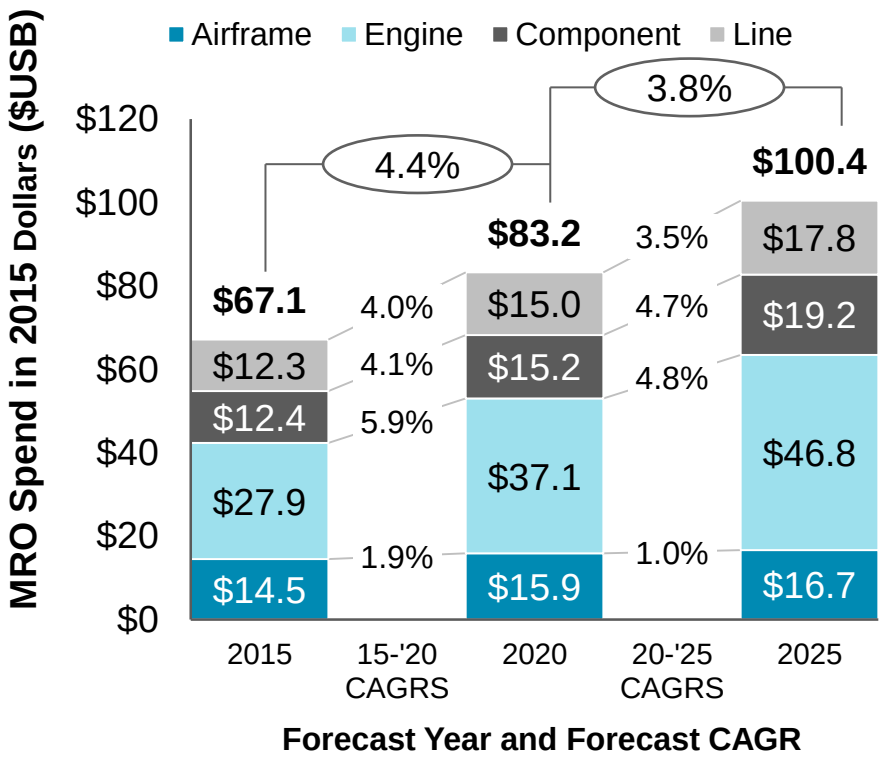
2025 Global Air Transport Fleet by Vintage



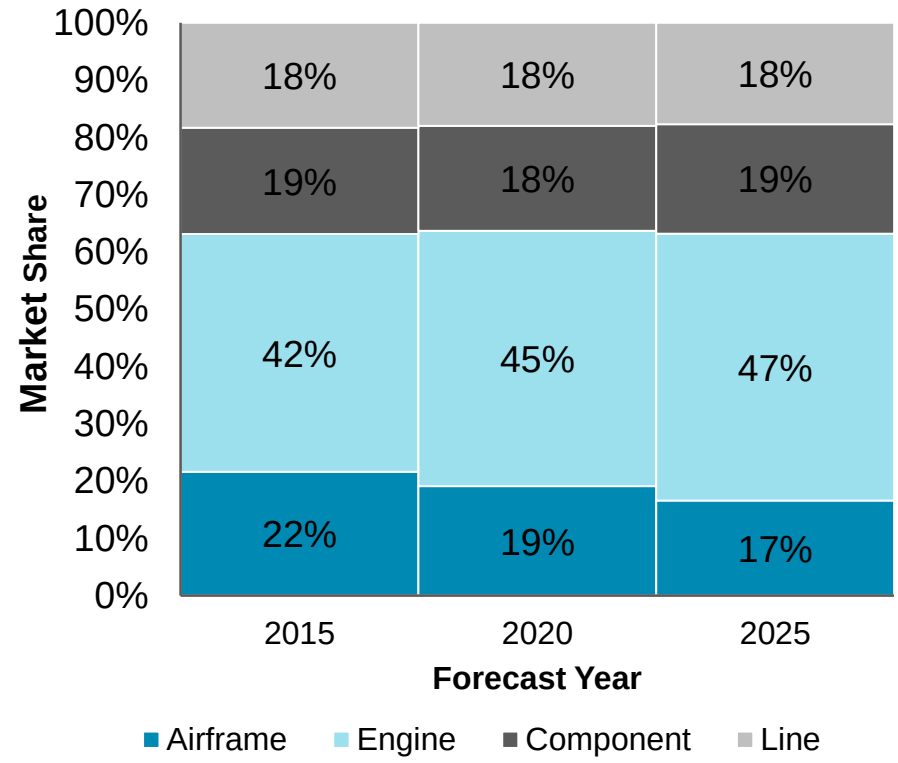
The significant move towards late generation aircraft, in addition to improving airline costs, will undoubtedly impact MRO dynamics

The fleet dynamics of the period result in a forecast that tops $100 billion by 2025, a 4.1% average annual growth rate

2015-2025 Global MRO Market Size Forecast by MRO Segment

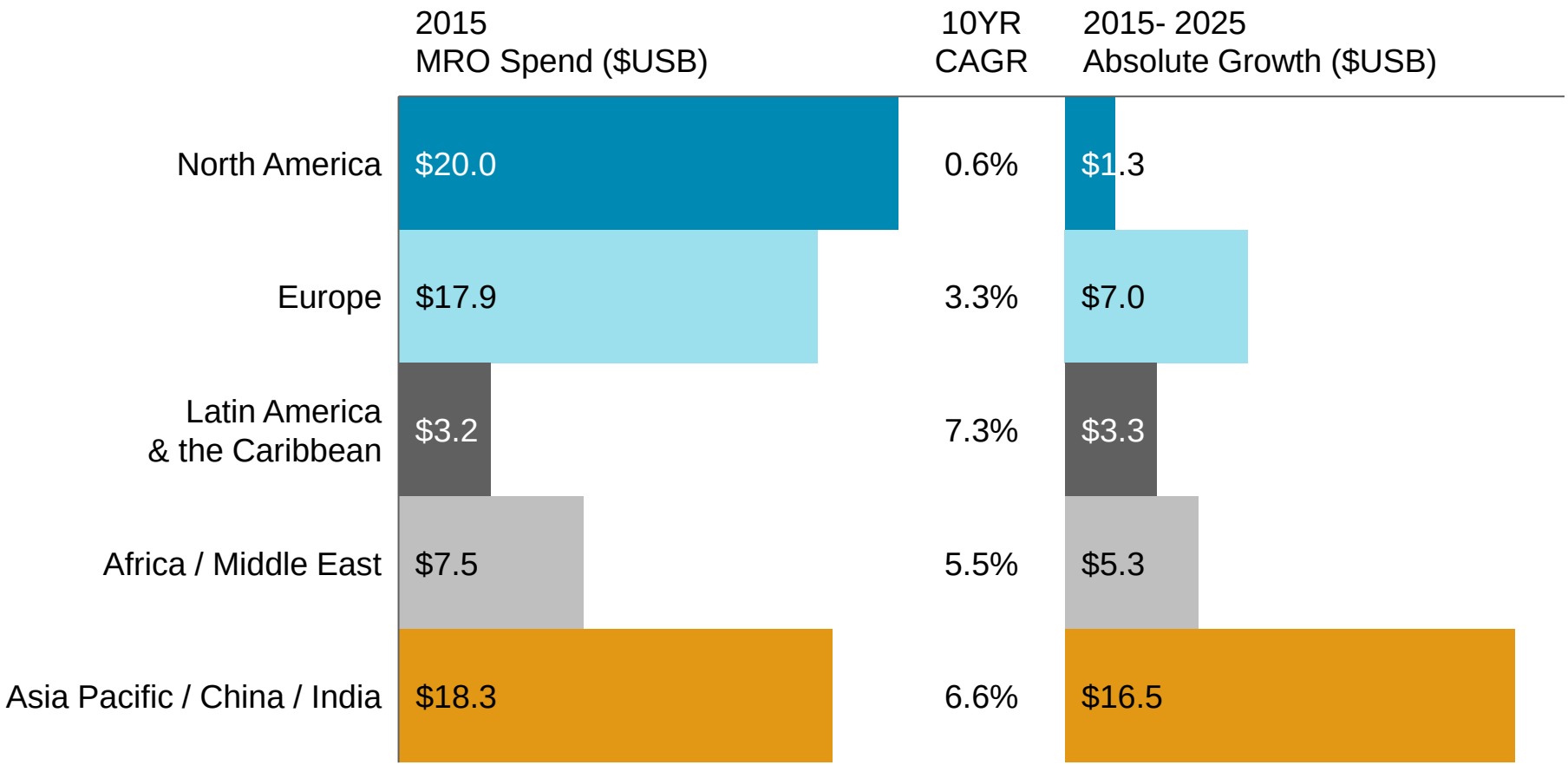


2015-2025 Global MRO Market Share Forecast by MRO Segment



Airframe Heavy Maintenance costs improve with the new technology while both Engine and Component sectors will take a larger share

Shadowing the fleet trends, large differences in regional growth rates will lead to a significant shift in MRO demand over the decade ahead



Asia Pacific / China / India will be challenged to build the necessary infrastructure capable of handling the volume of MRO the combined region will demand

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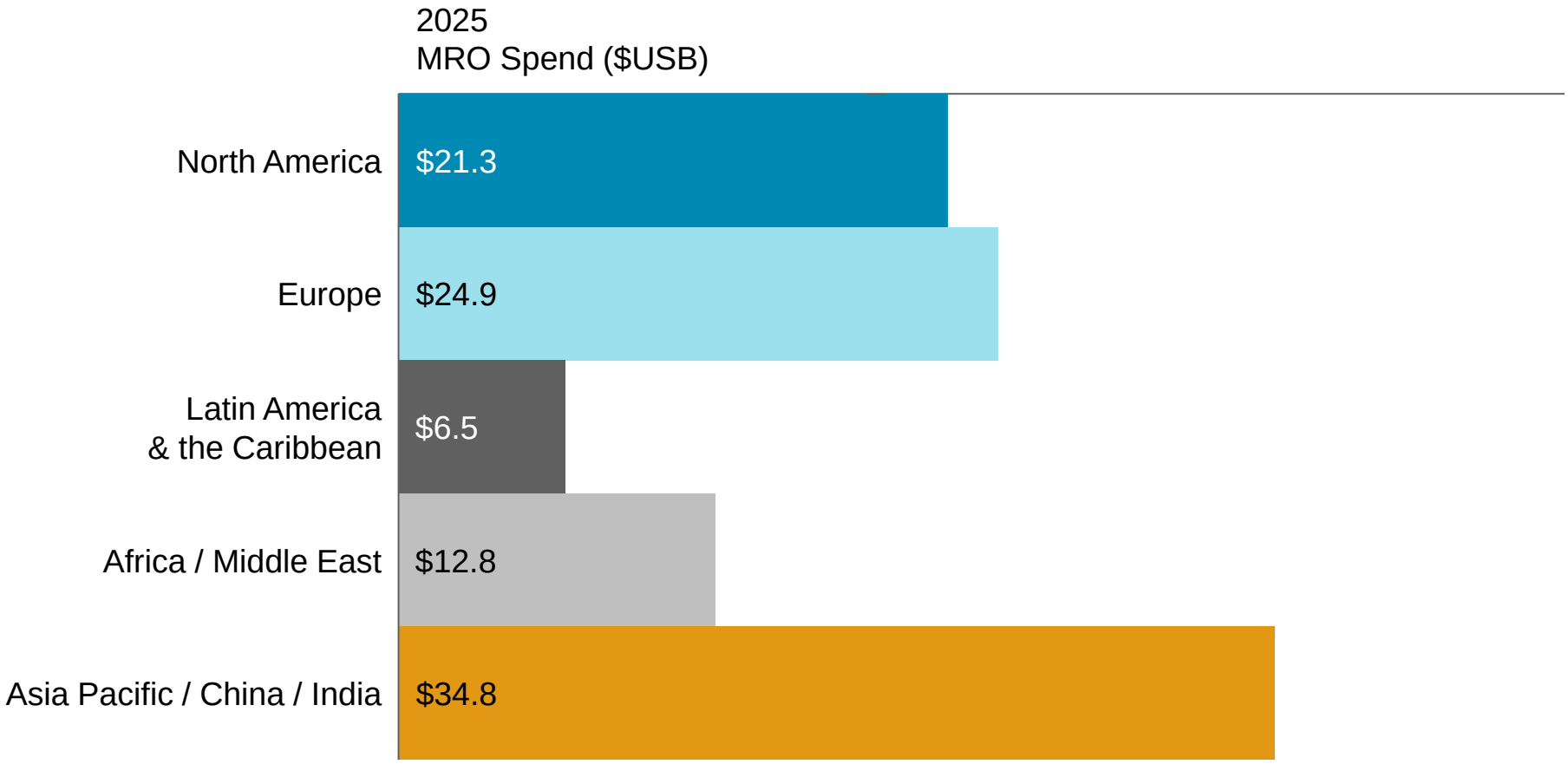


Asia Pacific / China / India will be challenged to build the necessary infrastructure capable of handling the volume of MRO the combined region will demand

European MRO Market Outlook

Passenger traffic is picking up; however, the fleet growth will be constrained over the next 10 years as half of all the new aircraft deliveries are slated to replace aging aircraft

2015 PASSENGER TRAFFIC (RPK) GROWTH

6.8%

2015 CURRENT FLEET

6,131

+2.8%

2015-2025
FLEET CAGR

4,100+

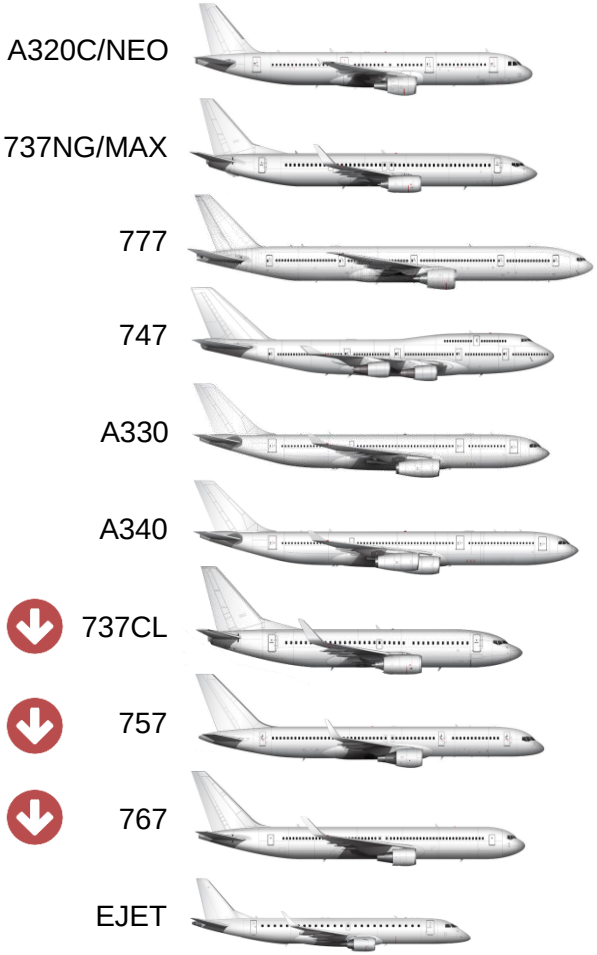
2015-2025 AIRCRAFT DELIVERIES

2,100+

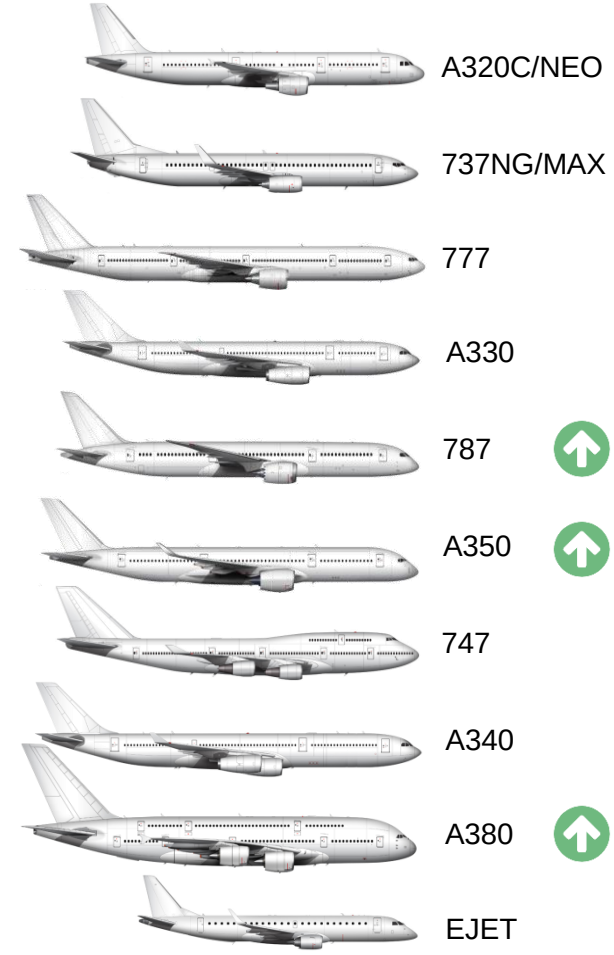
2015-2025 AIRCRAFT RETIREMENTS

$2.9B in MRO from ’70s and ’80s vintage aircraft will be lost over the next 10 years; however, ’90s, ’00s and ’10s vintage aircraft will see a $9.9B increase

Top 10 European Aircraft Families in 2015

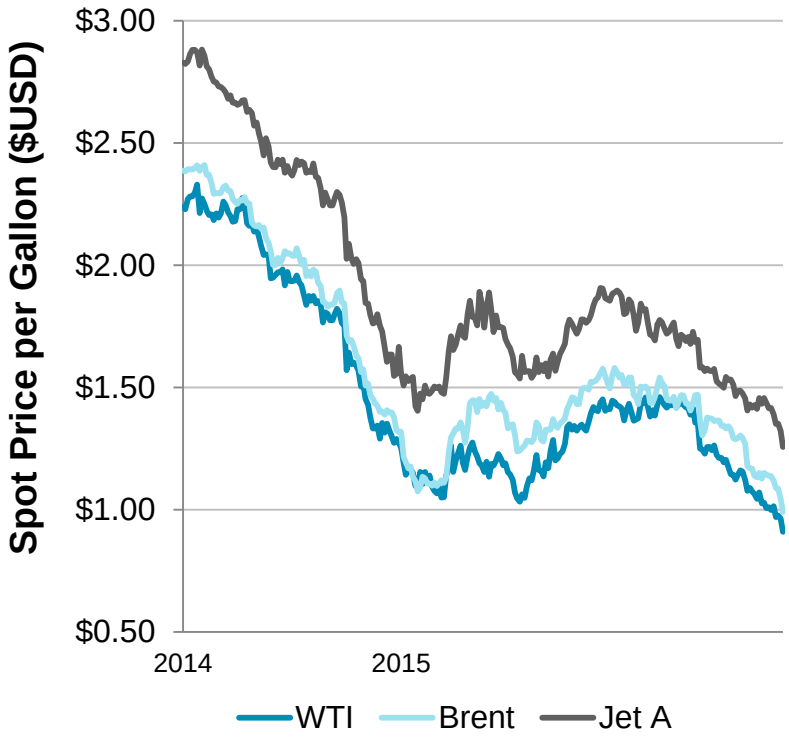


Top 10 European Aircraft Families in 2025

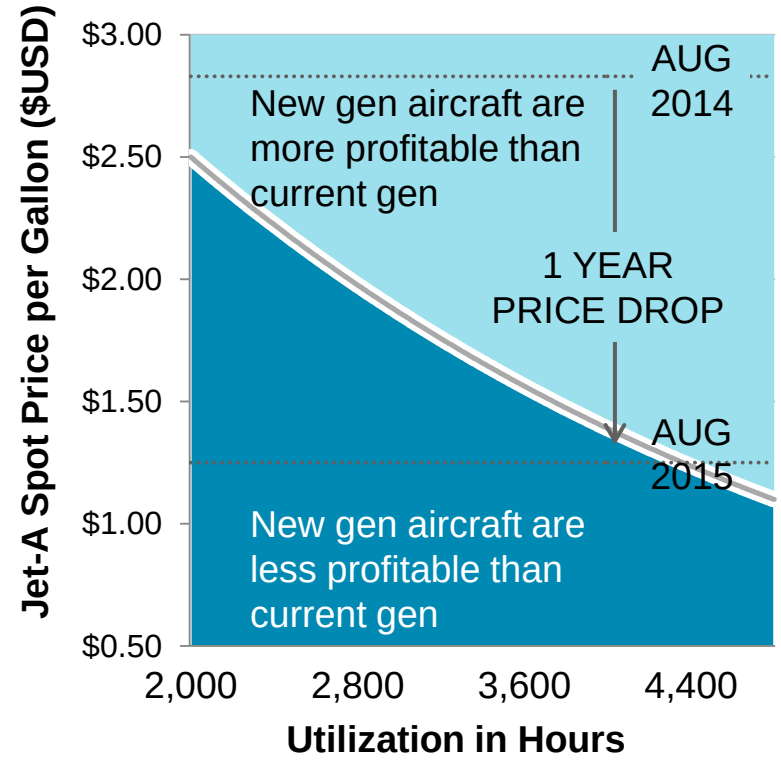


Oil prices have plummeted over the past year and could remain low over the short term. Many are concluding that this will cause airlines to alter fleet plans and drive an increase in MRO.

Crude Oil Spot Price per Gallon



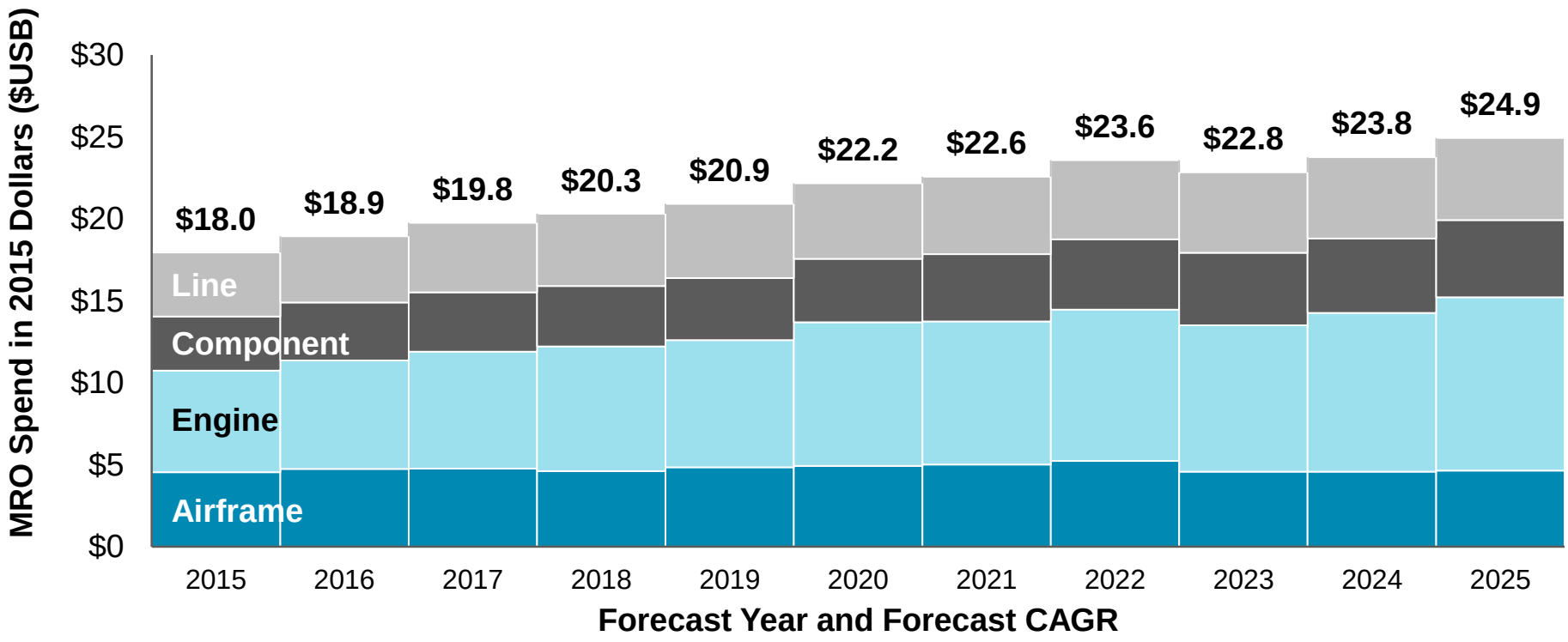
Aircraft Profitability Curve
Current Generation vs New Generation



Our view: Long term, oil prices will likely recover, OEM order books will remain largely unaffected, and net fleet growth will progress as forecasted

With just over half of the new deliveries forecast to replace older aircraft, the MRO forecast is constrained; however, a 3.3% growth rate is very healthy for what is largely a mature region

2015-2025 European MRO Market Forecast by MRO Segment



Despite the solid growth, aftermarket participants will likely still need to have an aggressive and innovative plan to maintain market share.

Fleet changes and technological advances will create turbulence for the MRO business

OEM's increased aftermarket presence

- Increased aftermarket market share for the newest generation of aircraft

New repair capabilities required

- Decisions necessary enter new markets for each of airframe, engine and component repairs

Less maintenance

- Health monitoring and predictive maintenance will reduce overall time-on-tool requirements for individual checks with fewer repairs

Increased use of data analytics

- Critical new source of value to the aftermarket driven by those who design the best algorithms and most rigorous data management

Market participants will need aggressive and innovative plans for growth

MRO Survey Results

Oliver Wyman's 2015 MRO Survey identified a slew of new technologies that are poised to come to market

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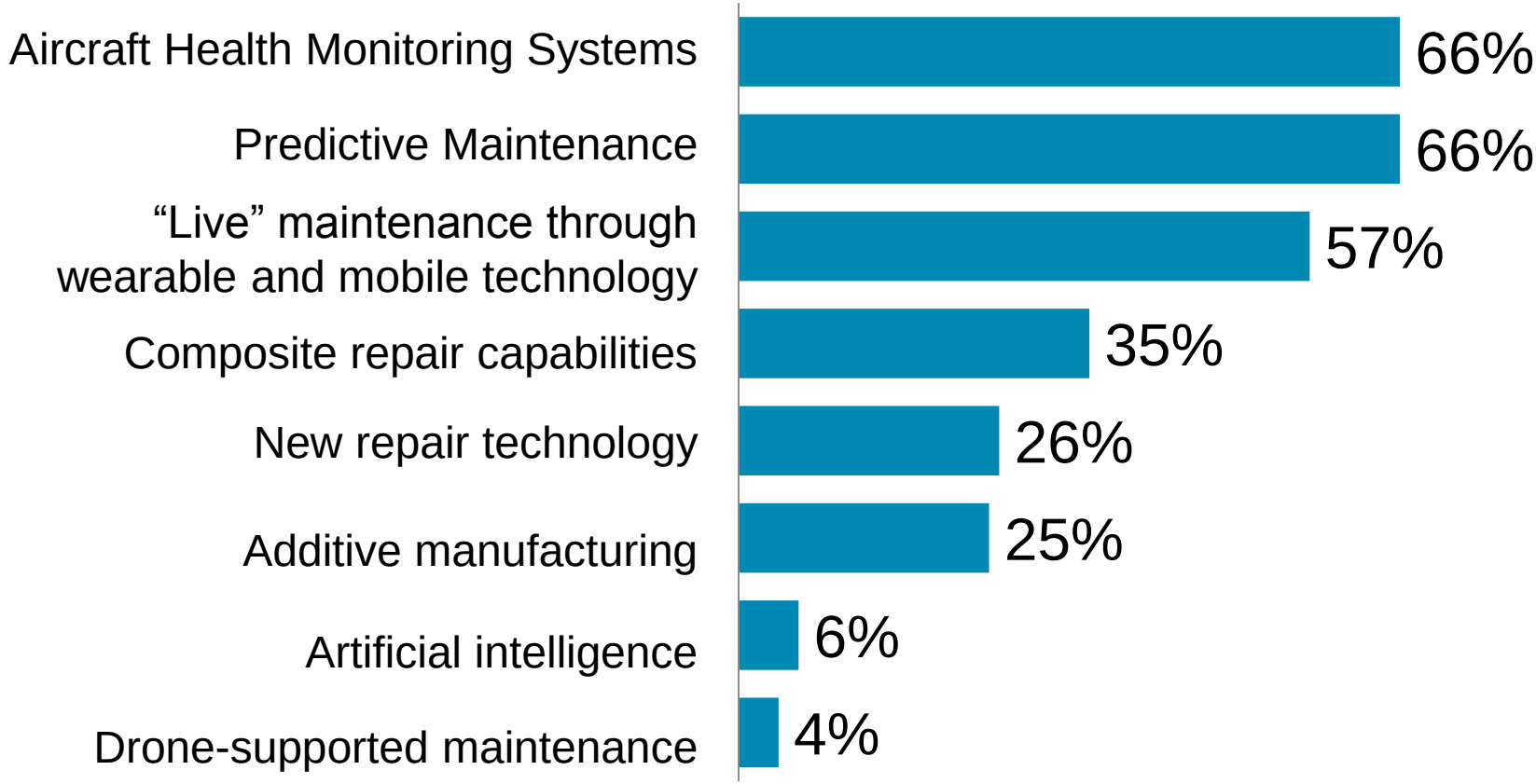
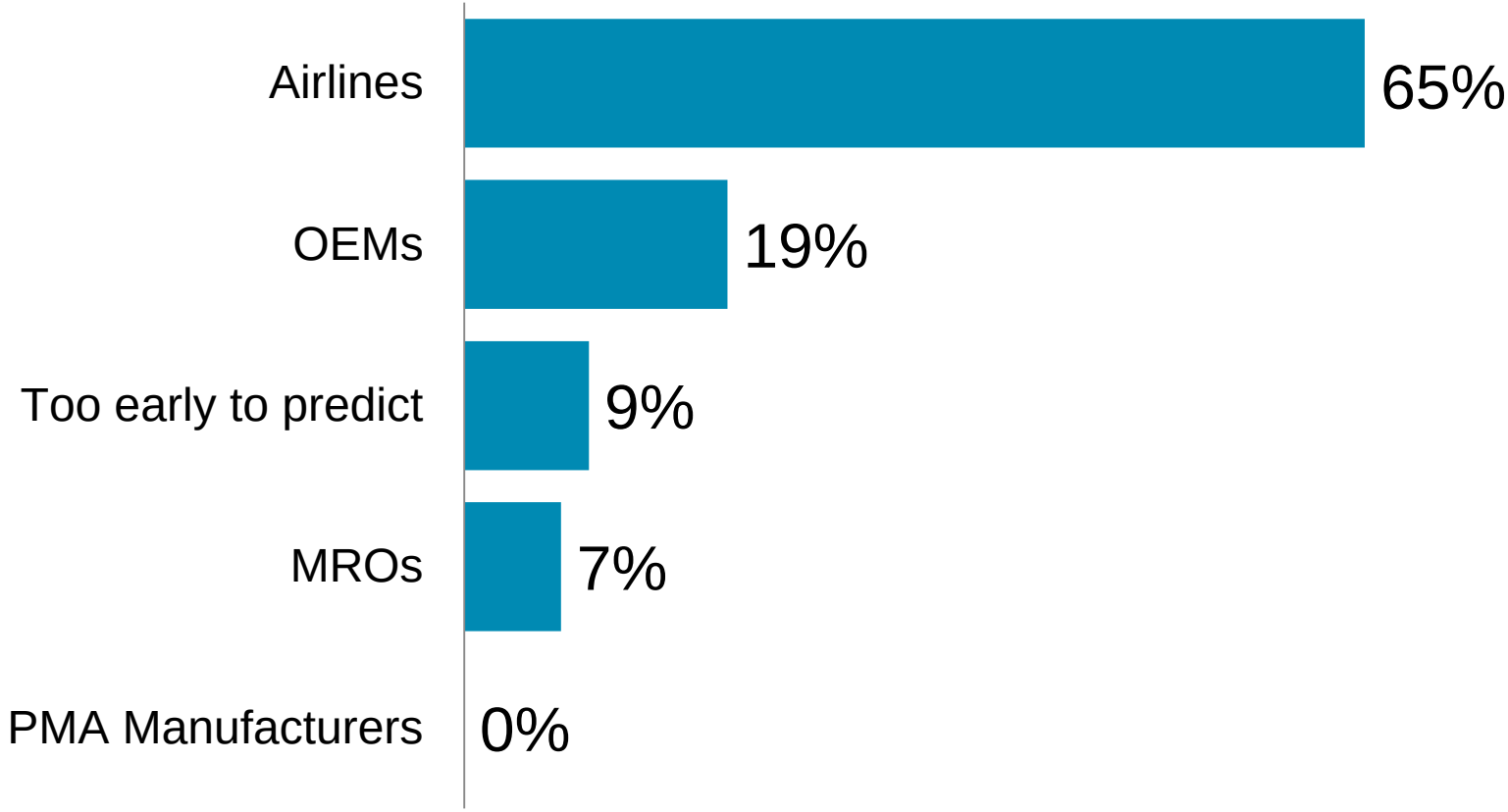
Most prominent new technologies by 2020 (All respondents)



Source: Oliver Wyman's 2015 MRO Survey

The collection, storage, aggregation and analysis of data will be key factors in aircraft health monitoring and predicative maintenance

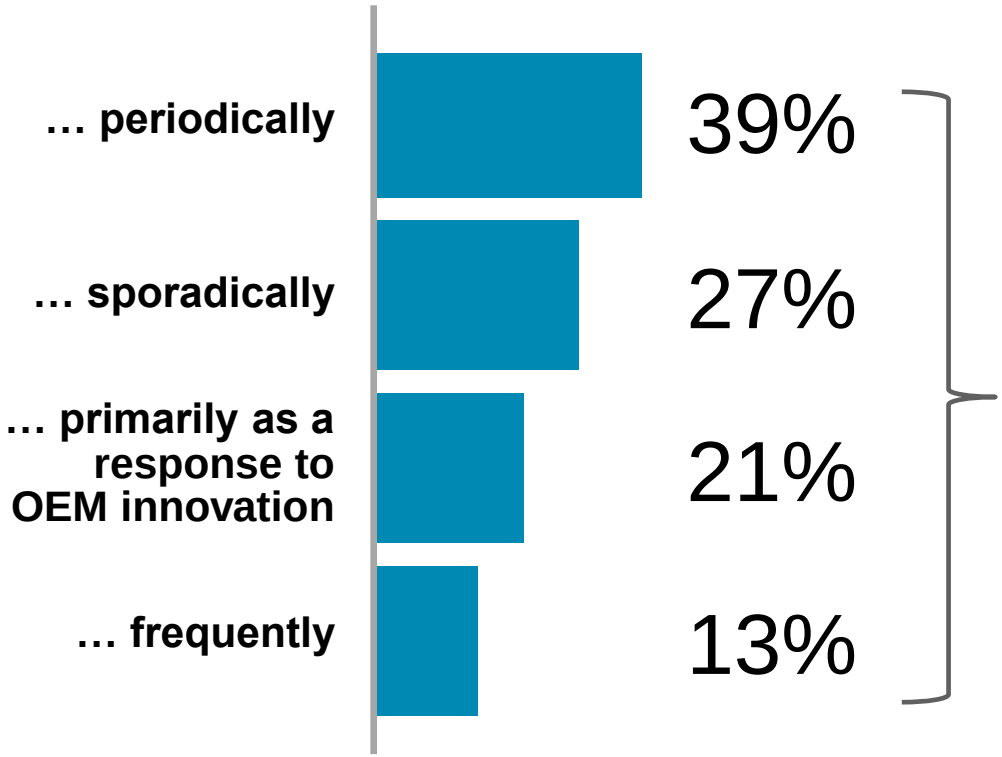
Who is best positioned within the industry to benefit from predictive maintenance?



Source: Oliver Wyman's 2015 MRO Survey

However, digesting innovative change is not standard fare for the MRO industry…

Survey respondents completed this sentence: "The MRO industry innovates..."

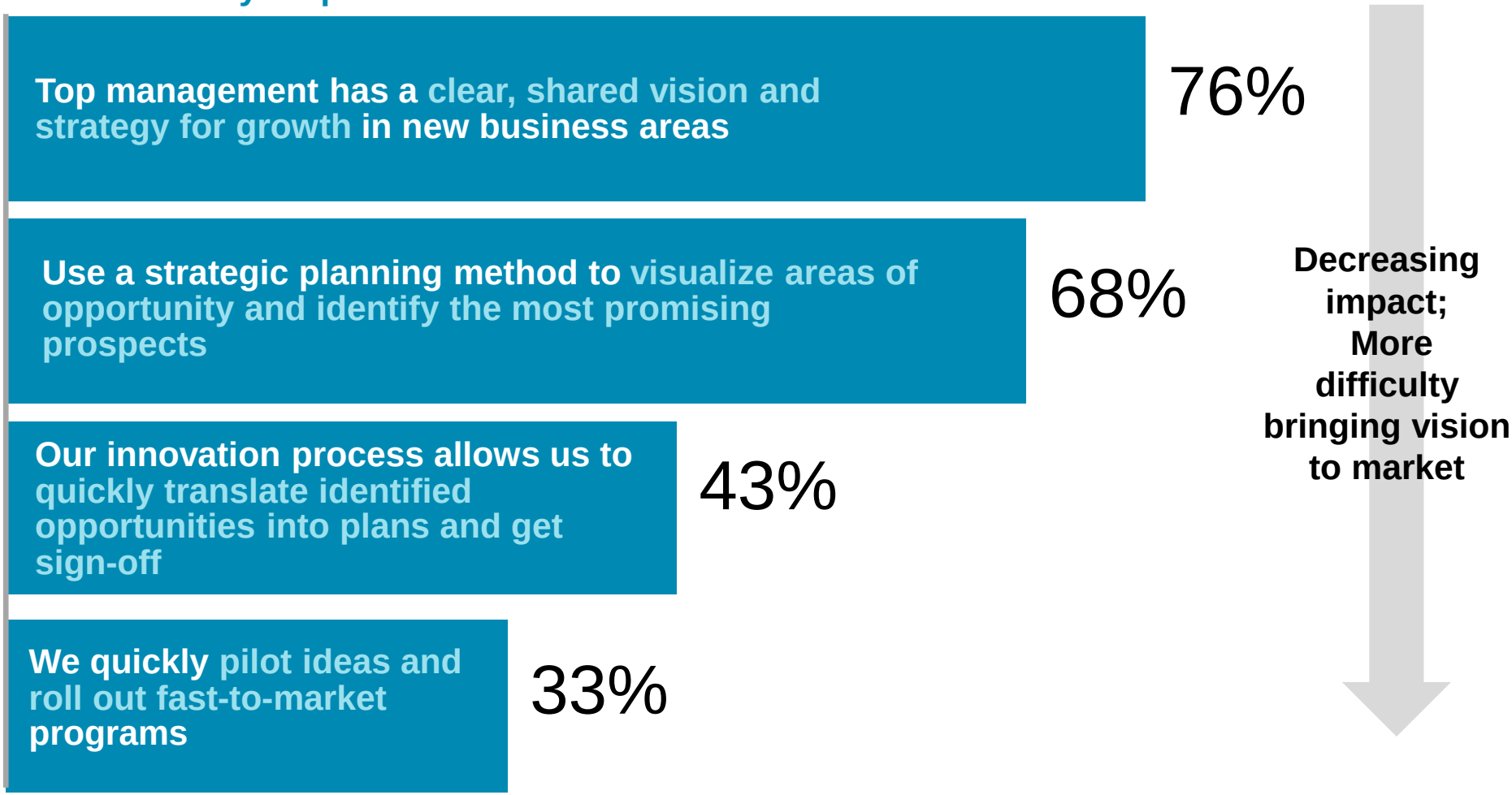


- Historically, little need to build internal organizations devoted to R&D, corporate strategy and product development
- Lack of regular disruptions decrease relative:
  - Devoted resources
  - Tried and tested review processes
  - Time and attention of executives
  - Clarity of ownership / leadership
  - Assessment infrastructure
- Internal ability to recognize, assess and prepare for change is not a core capability for the industry

Source: Oliver Wyman's 2015 MRO Survey

…and though they have a vision, many organizations struggle with how to rapidly evaluate and bring innovative ideas to market

Positive survey responses



Source: Oliver Wyman's 2015 MRO Survey

So what's really inhibiting change in MROs?

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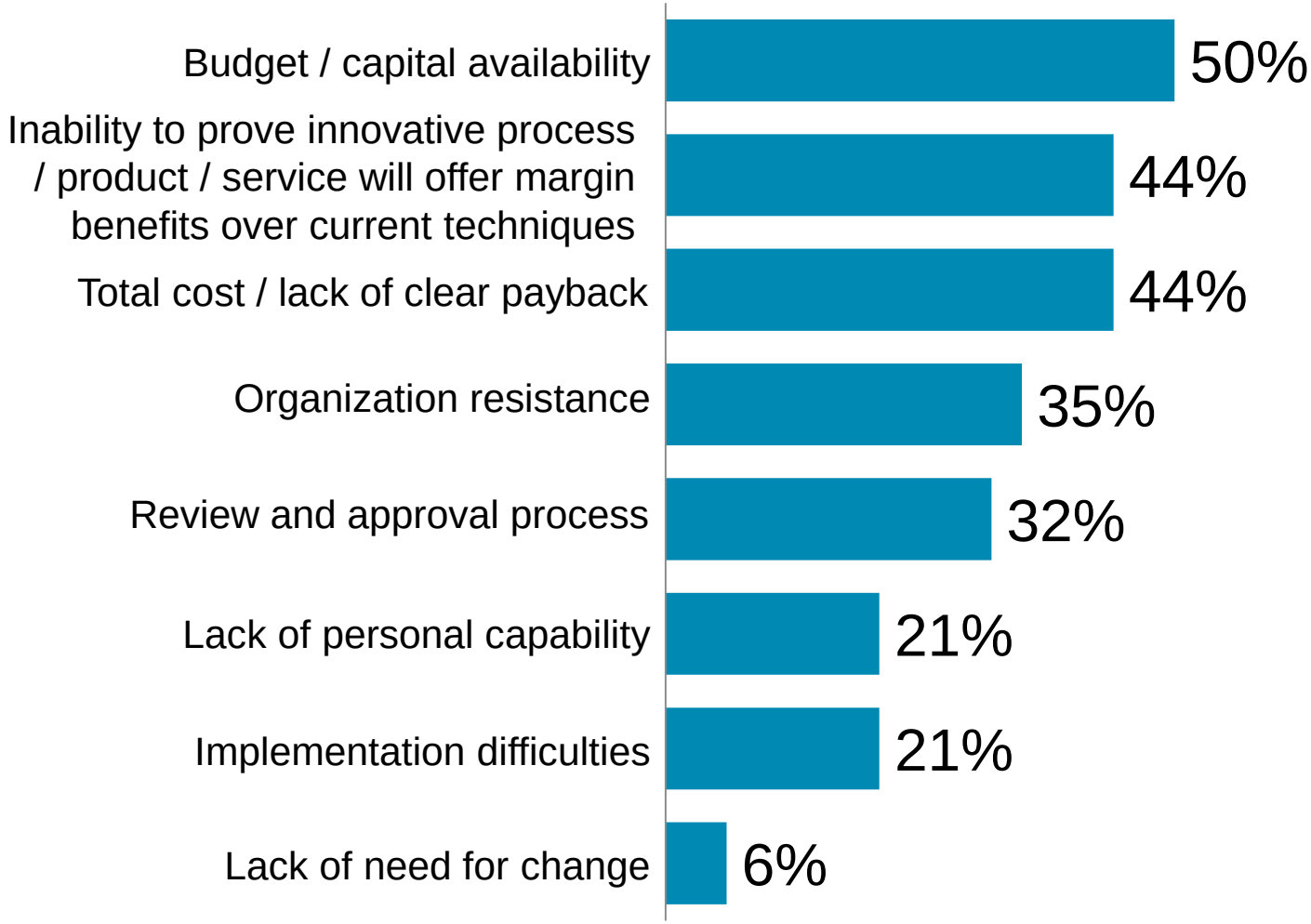
The primary inhibitors of innovation at my organization are:



How can you eradicate these barriers within your own organization?

Note: Responses to the question: "The primary inhibitors of innovation at my organization are:", Percent of MRO responses per inhibitor (multiple selections possible per category). Not shown "Other" responses from a total of 9% of respondents; Source: Oliver Wyman's 2015 MRO Survey

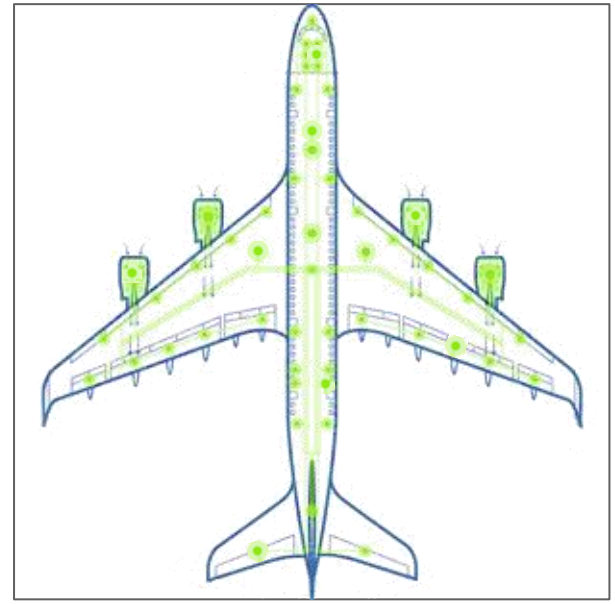
New technologies will reshape our perception of MRO aftermarket commercial offers.

Advances could cut or redistribute 15 to 20 percent of MRO spend, but also spawn new business models and revenue streams.

Take the controls and make strategic investments now: Technologies will likely come online faster than anticipated

Additive Manufacturing (3D Printing)

- Quickly gaining traction
  - A350 will feature 3D-printed plastic and metal brackets
  - GE will introduce 3D-printed fuel nozzles in its CFP LEAP engine
  - Out-of-production parts can be printed “on-demand”



Aircraft Health Monitoring (AHM) and Big Data

- Expected to be a significant driver of innovation over the next five years
- Boeing recently invested $100M into expanding AHM
- A 787 flight can generate 500GB of data

Augmented Reality and Automated Inspection Tech

- Augment reality allows for live audio and visual communication with OCC
- Robots used for visual inspections and non-destructive testing
  - Highly efficient
  - Highly accurate

Time to disengage the Autopilot

Is your corporate Auto Pilot engaged?

- Focusing solely on business as usual is a risky strategy in the coming years
- Relying on current commercial offers, sales practices, resources, will challenge an MRO's future business
- Advances could cut 15-20% of MRO spending from the aftermarket
- But also spawn new business models and revenue streams
- Amounts to a reduction or redistribution of $10-15B among current industry players & new competitors
- MROs and operators must actively choose technologies to develop and exploit
- Those that fail will end up as innovation takers, ceding further aftermarket control to competitors

The future is now

In closing …

- Our survey insights come directly from the industry and we value your insights as they help shape the future
- If you're interested in shaping our 2016 Survey in January, send us an email to MROsurvey@oliverwyman.com
- Just include a subject line with the phrase "count me in" and you'll receive the survey upon its release

Thank You !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