2016 Annual Conference
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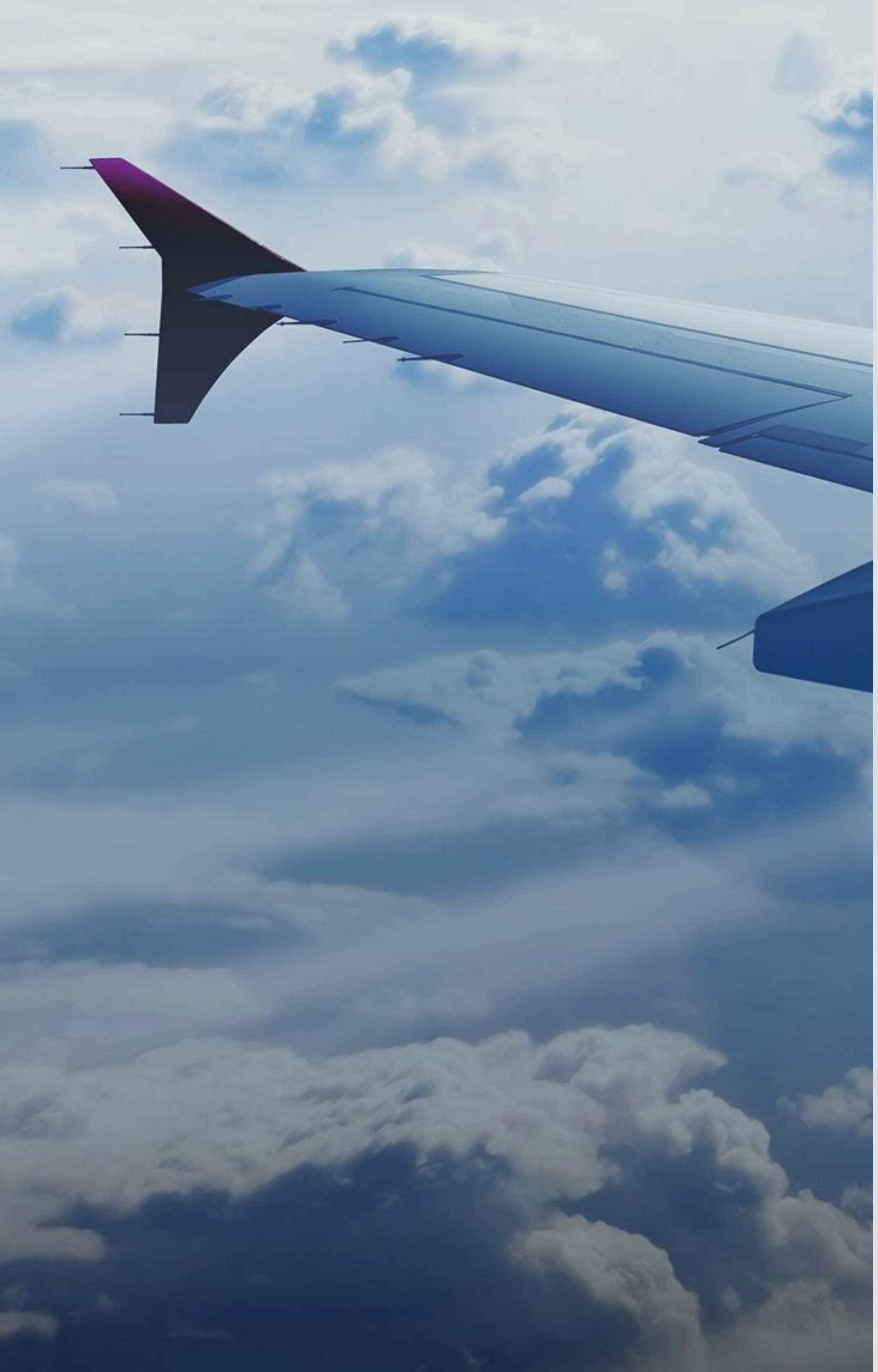
Orlando, Florida

Presented by:

Jonathan M. Berger
Vice President • Aerospace & MRO Advisory
jberger@icf.com

MRO Market Update & Industry Trends



Today's Agenda

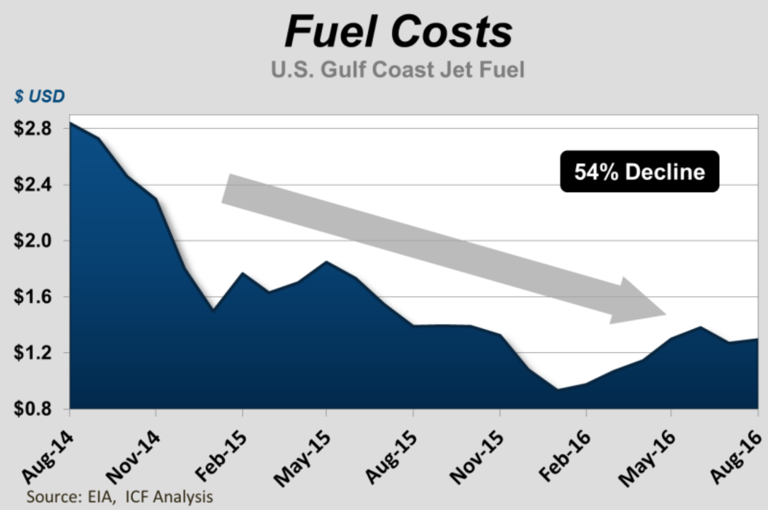
Bizarro Aviation

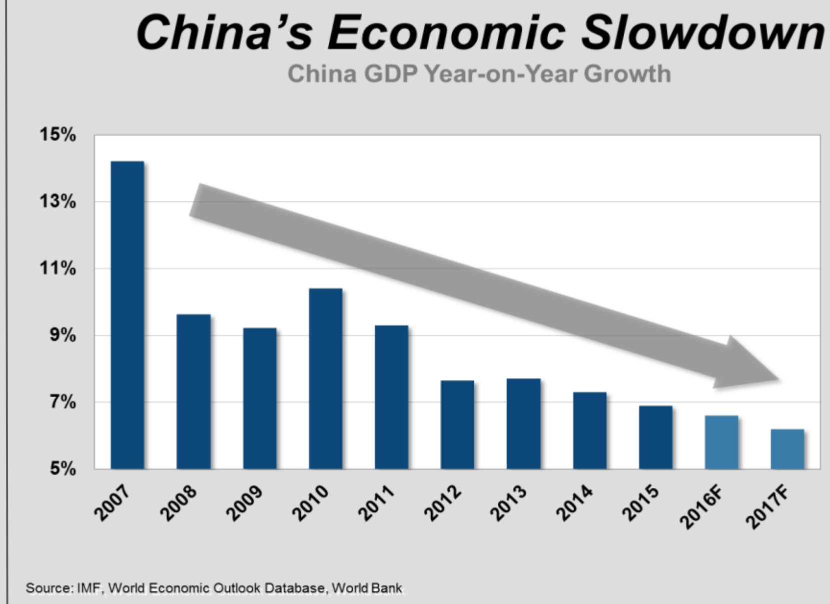
- *The "CRABS"*
- *Meet the Frackers*
- *These are the Good Old Days*
- *Follow the Money*
- *Amazon the Air Cargo Disruptor*
- *March of the Middle East Titans*
- *A New Golden Age of Aircraft Cabin Interiors*

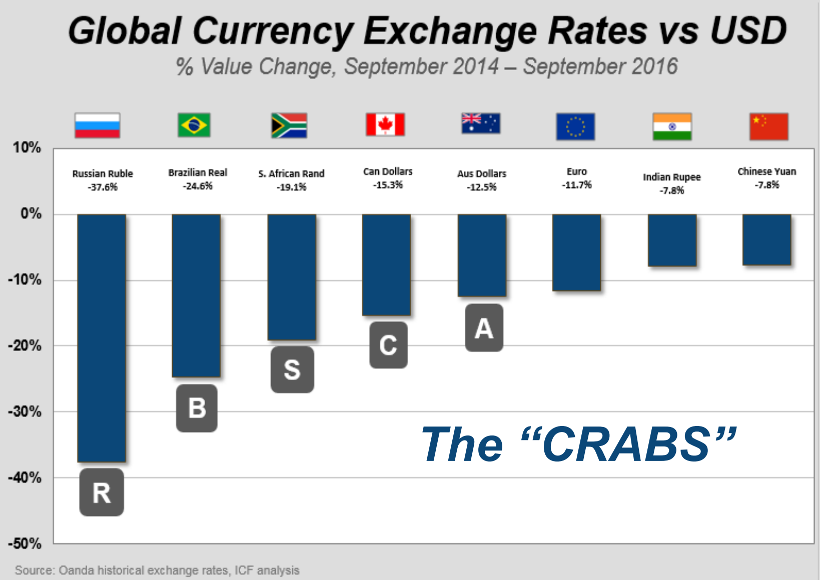
MRO & OEM Alternative Material Forecast

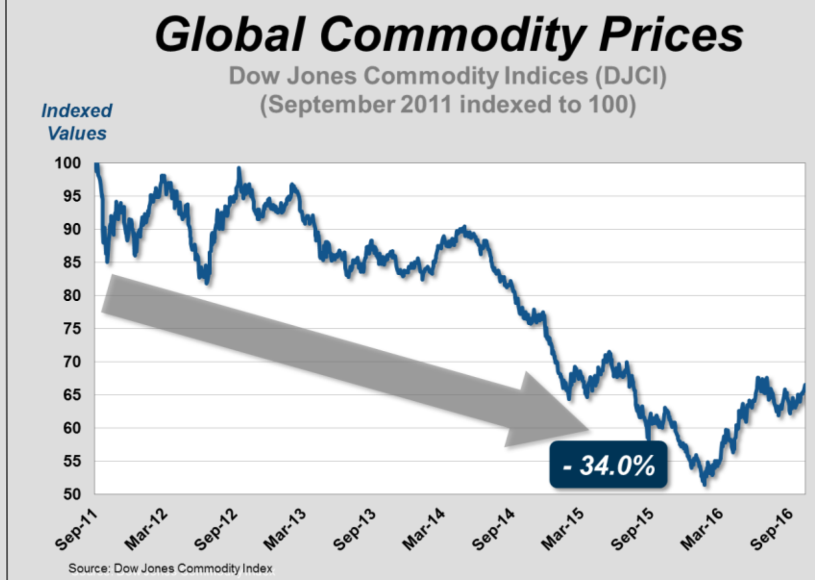

“Bizarro Aviation”

Four external macro-economic forces are having a significant impact on the aviation industry and the MRO supply chain









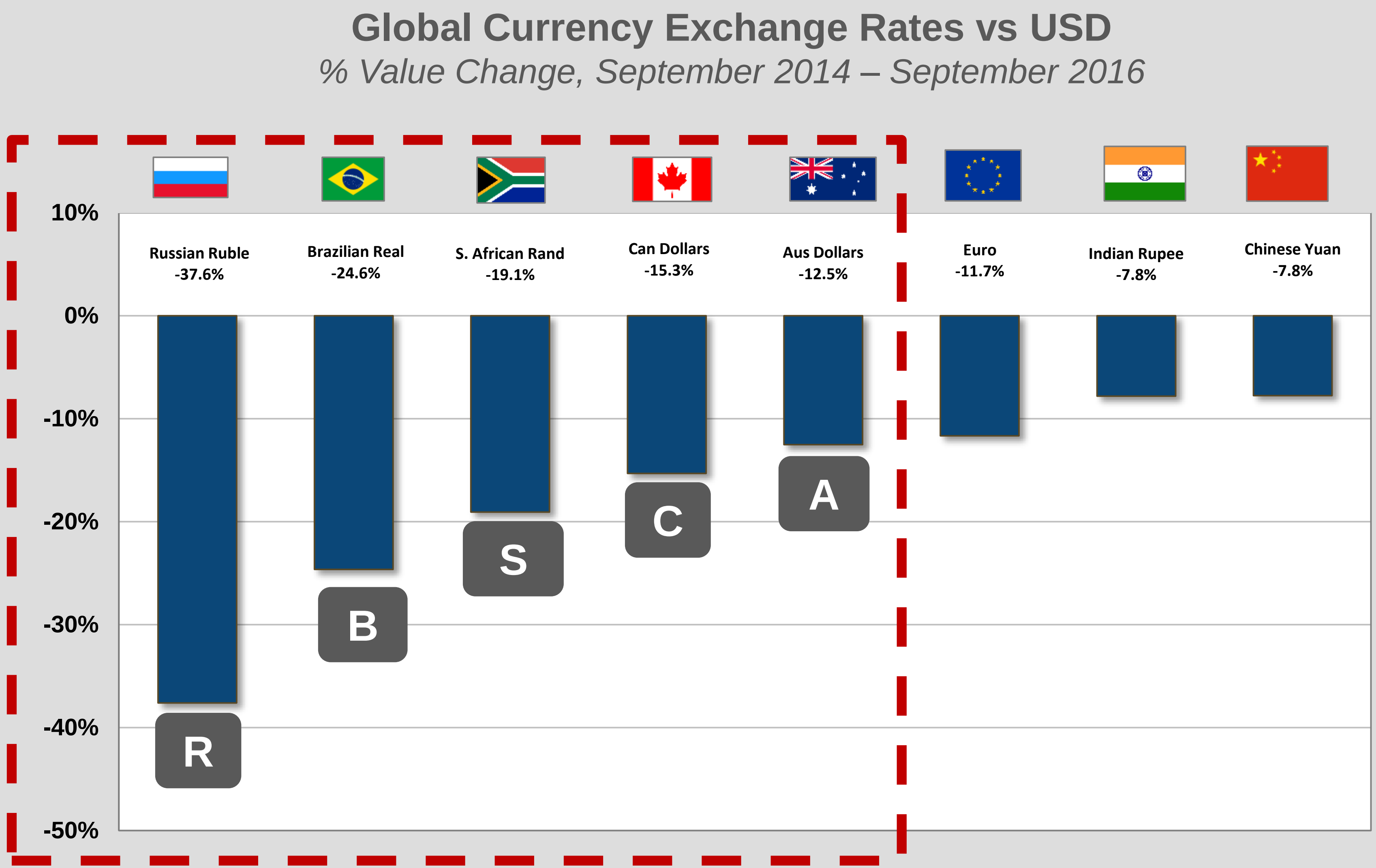
Source: ICF analysis

The dramatic increase in oil & gas market supply and reduced demand for commodities has led to a strong US Dollar

FOREX Impact

- Partially offsets the positive impact of low fuel costs for operators
- Increases the cost of dollar based flight hour agreements (and parts/material in general)
- Cost of labor for in-country MROs is cheaper driving up margins for US dollar based contracts
- Buying/leasing aircraft becomes more expensive

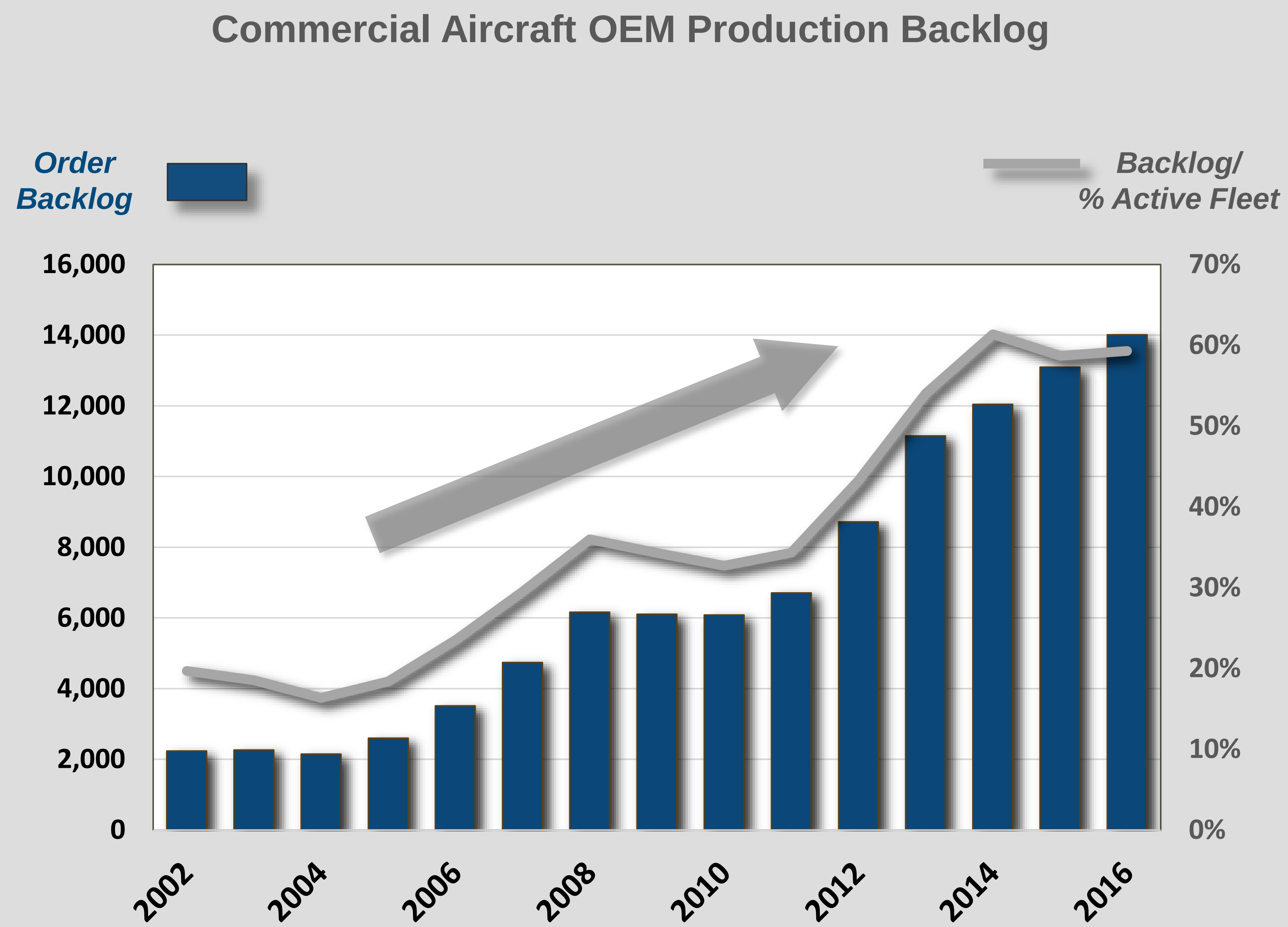
The "CRABS": Countries with economies that are heavily dependent on commodity exports



Source: USForex, ICF analysis

Commercial aircraft OEM production backlog remains at historical record levels driven by:

- **Emerging market growth**
- **Low interest rates**
- **Previously high oil and commodity prices**
- **Introduction of new technology aircraft/engines**



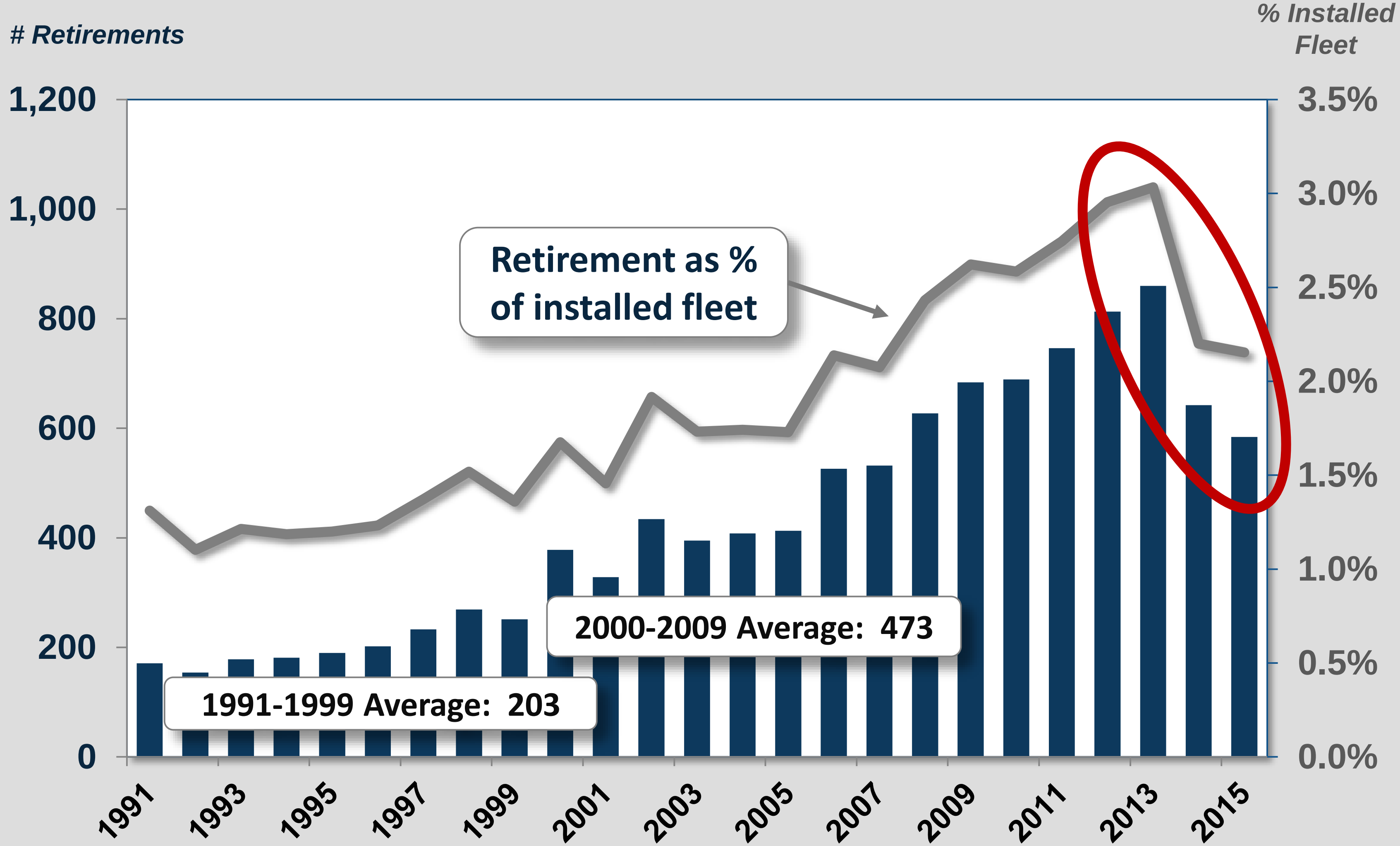
Source: CAPA, ICF Analysis

Low fuel costs appear to be reversing aircraft retirements trends

Industry Impact:

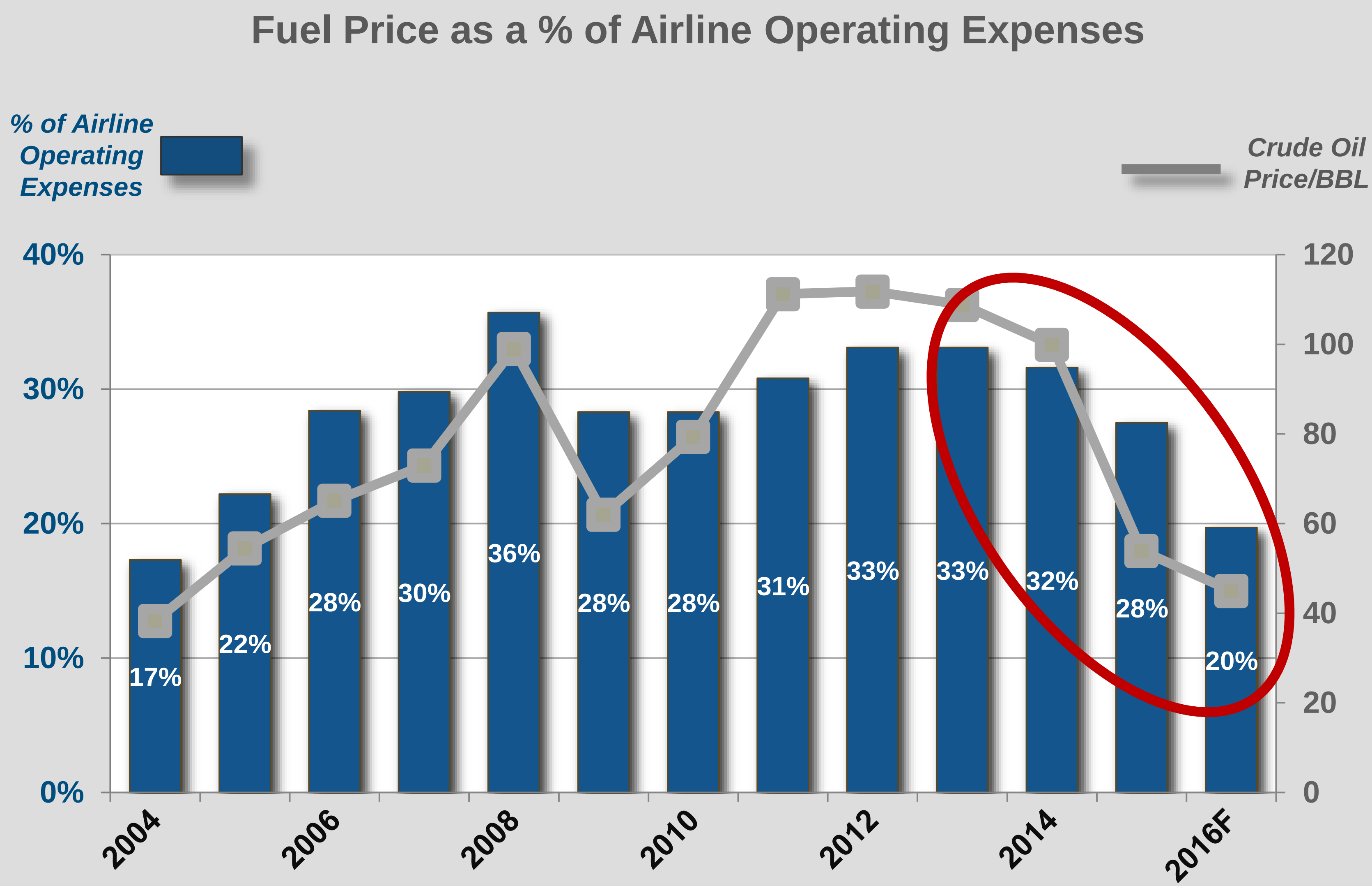
- **MRO Suppliers - Positive: Increased spend on older airframes & engines**
- **Surplus Market - Negative: Reduced part-out “feed stock”**
  - **OEMs: Improved new part sales**
  - **Distributors: Improved used part values / pricing**
  - **Operators: Increased material costs**

Commercial Air Transport Annual Aircraft Retirements



Source: CAPA, Airline Monitor, ICF analysis

Airline return on invested capital (ROIC) is clearly correlated with the drop in fuel costs



Source: IATA, ICF Analysis

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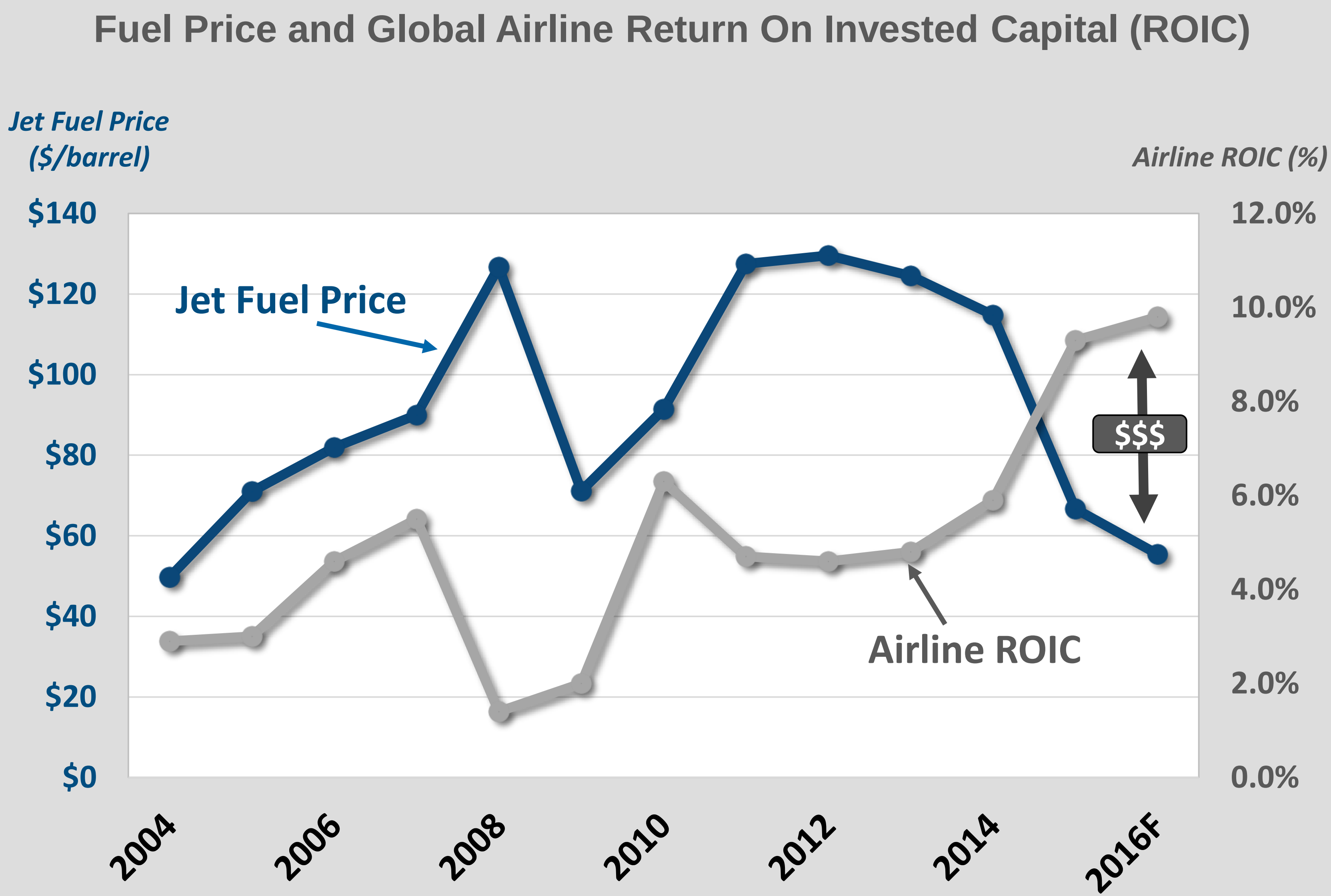
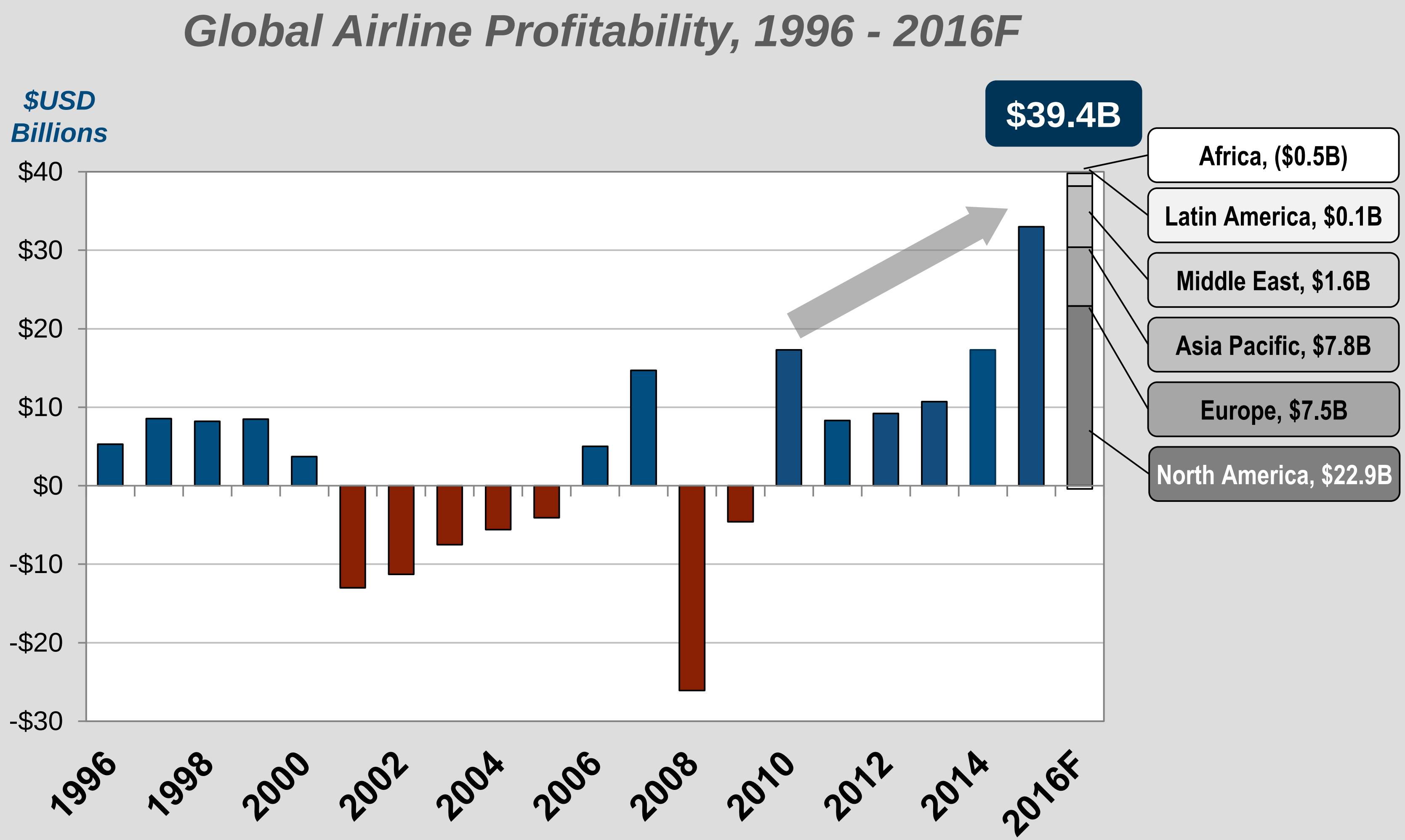


Source: IATA, ICF Analysis

Driven by low fuel costs and consolidation, airline the industry is on target to achieve record profitability in 2016 of almost $40B USD

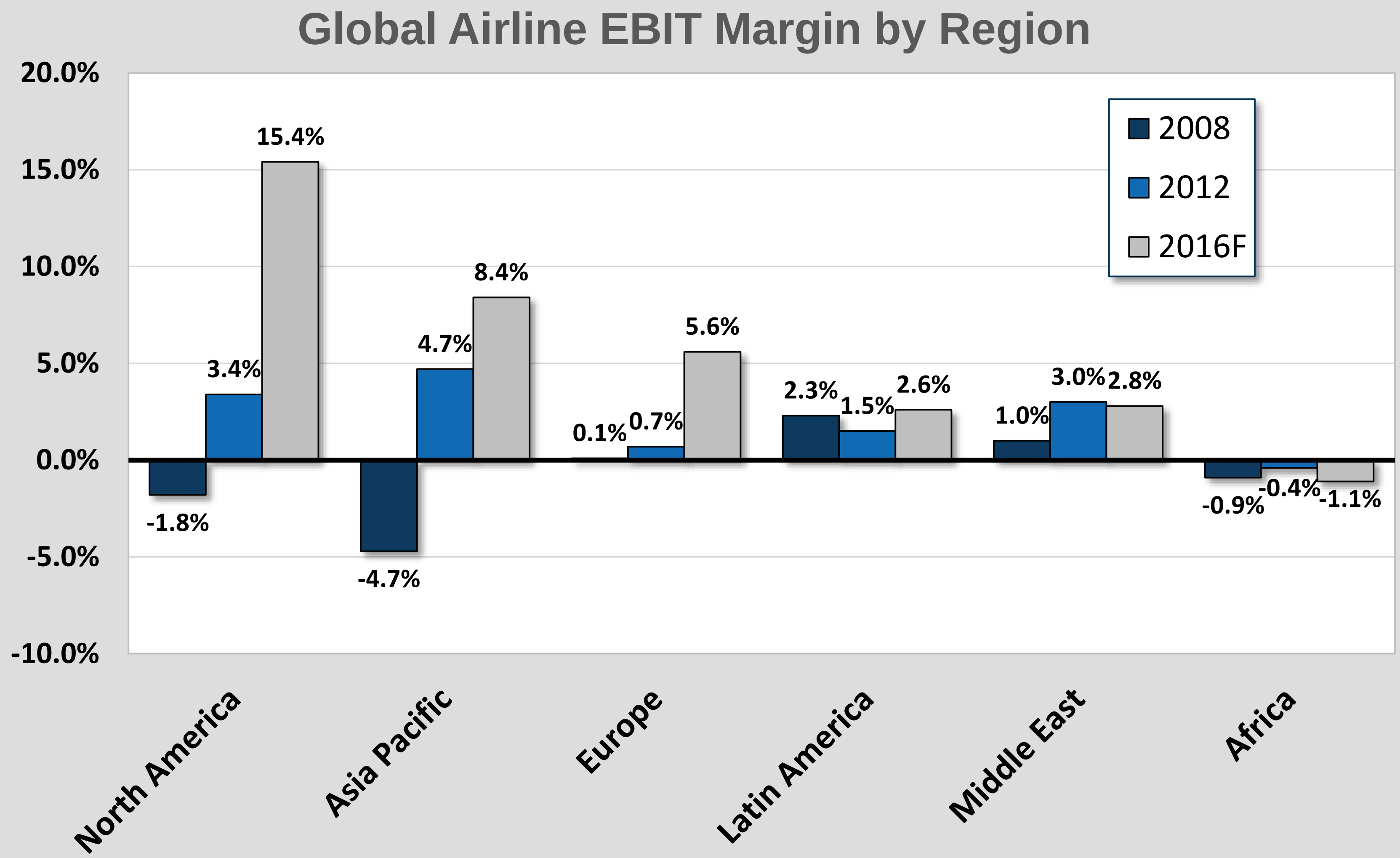
These are the "good old days: - for some airlines…



Source: IATA, ICF analysis

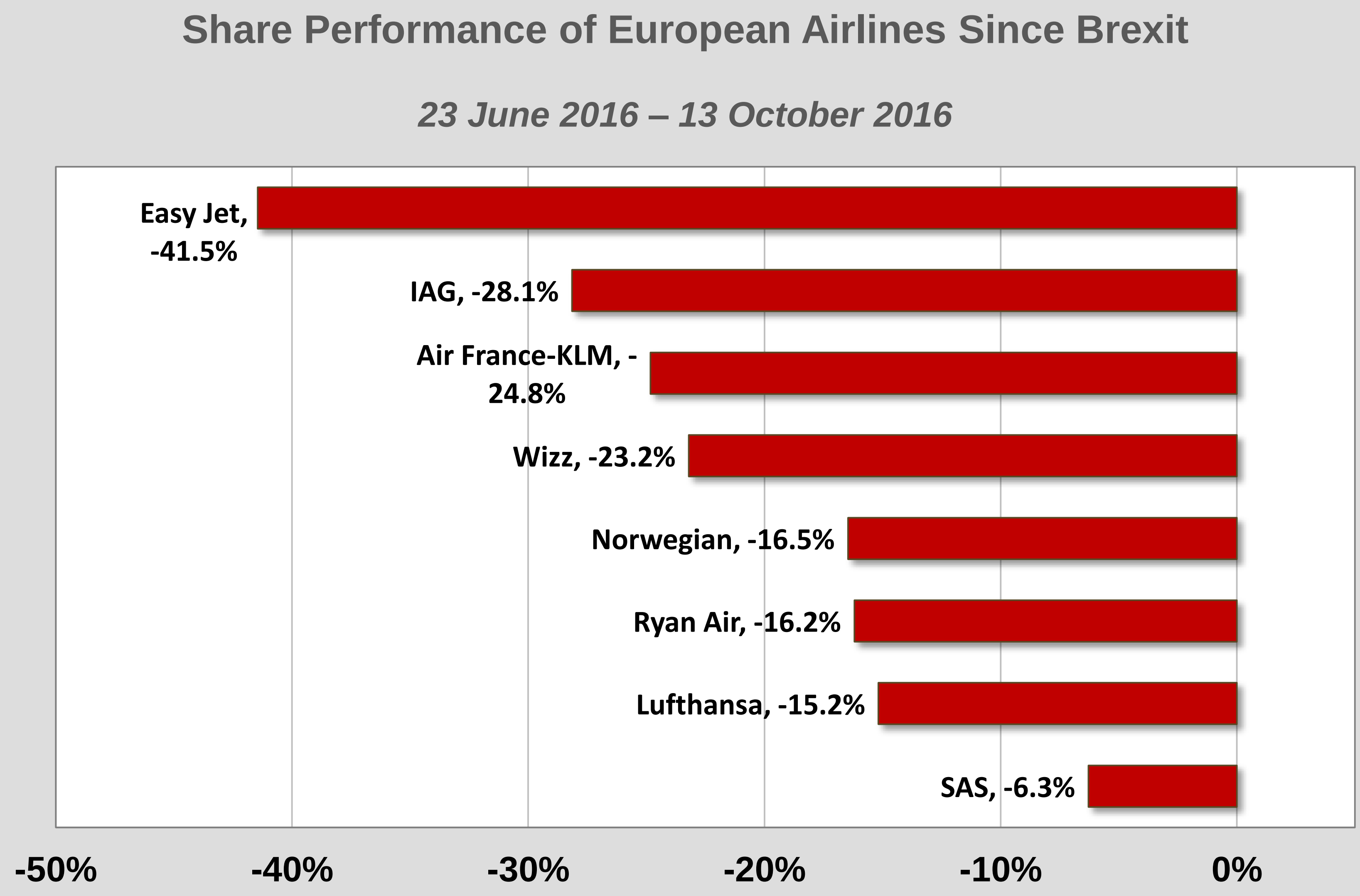
However, profit margin improvement has been largely limited to carriers in North America

…but not all – many airlines continue to struggle



Source: IATA, ICF Analysis

Brexit has clearly had an impact on European airline stock performance; specifically UK based carriers



Source: Company websites

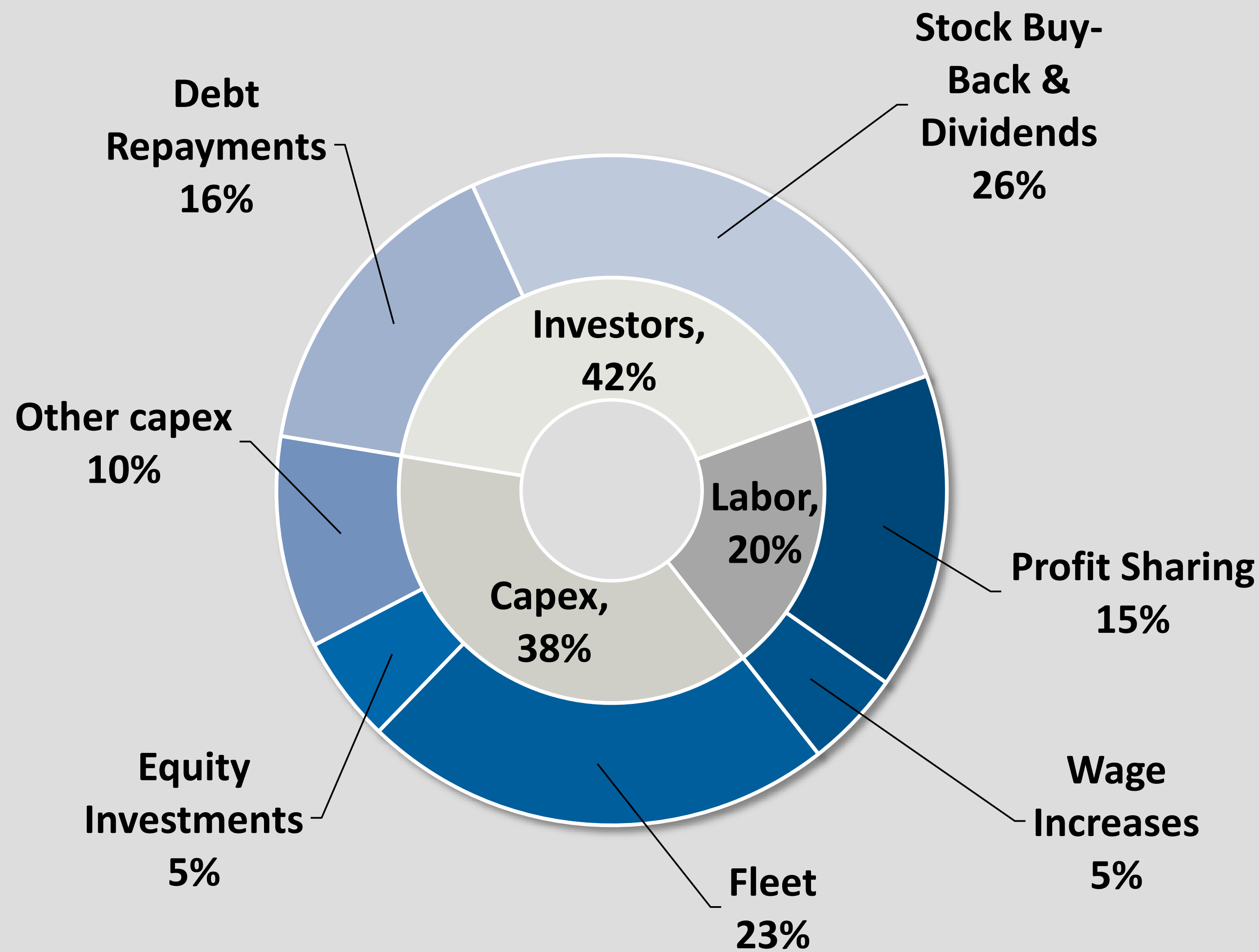
Follow the Money: Airlines are spending their hard earned profits in three primary areas

1. Labor ~ 20%:
- Profit sharing
- Wage increases

2. Capex ~ 38%:
- Fleet renewal & cabin upgrades
- Facilities, offices, lounges
- Equity partner investments

3. Investors ~ 42%:
- Stock buy-backs
- Dividends
- Debt repayment

Airline Profit Spend Analysis

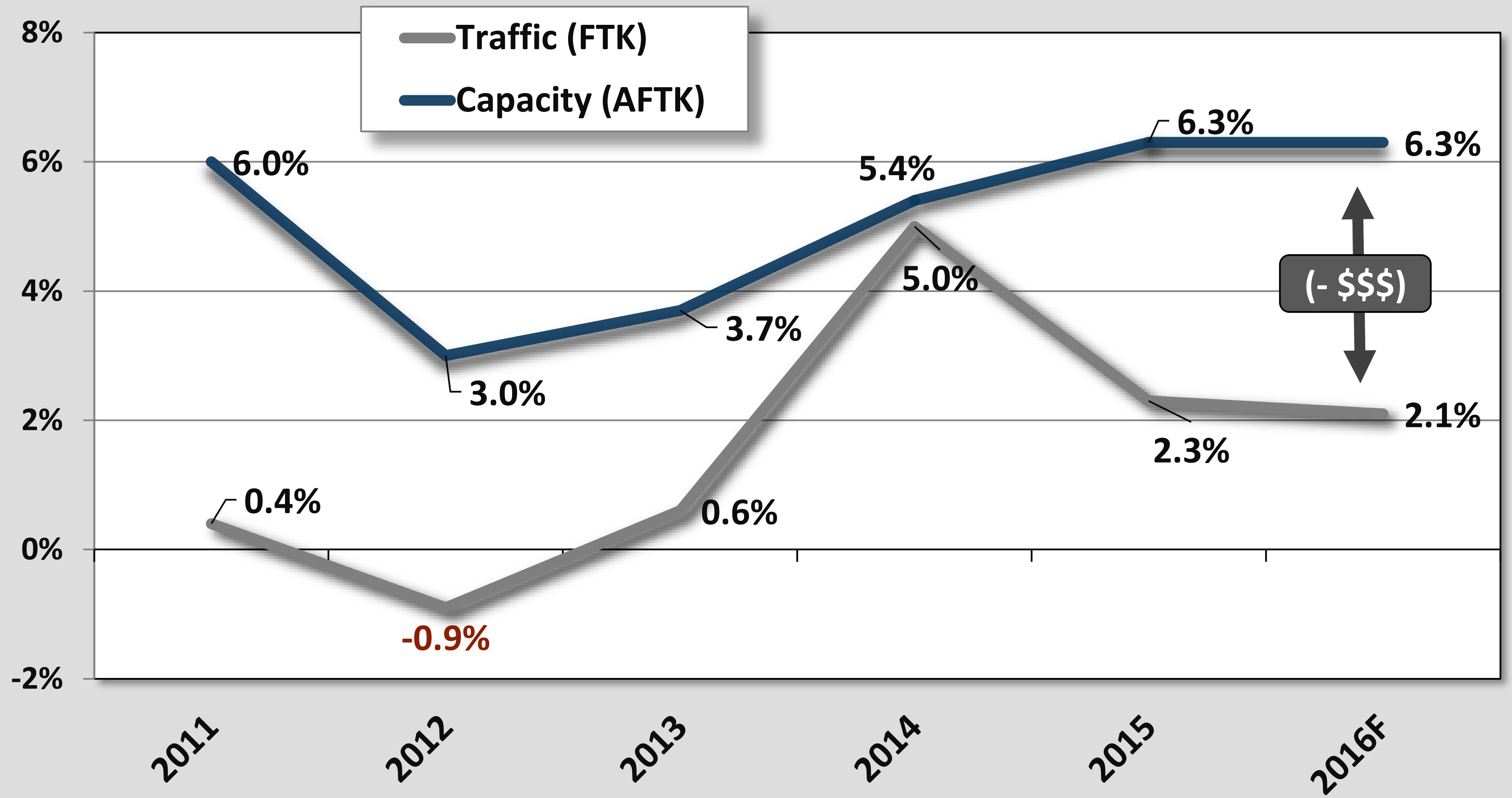


Source: Company Reports, ICF Analysis

After positive signs in 2014, air cargo supply continues to exceed demand

Global Freight Traffic (FTK) and Capacity Growth (AFTK)

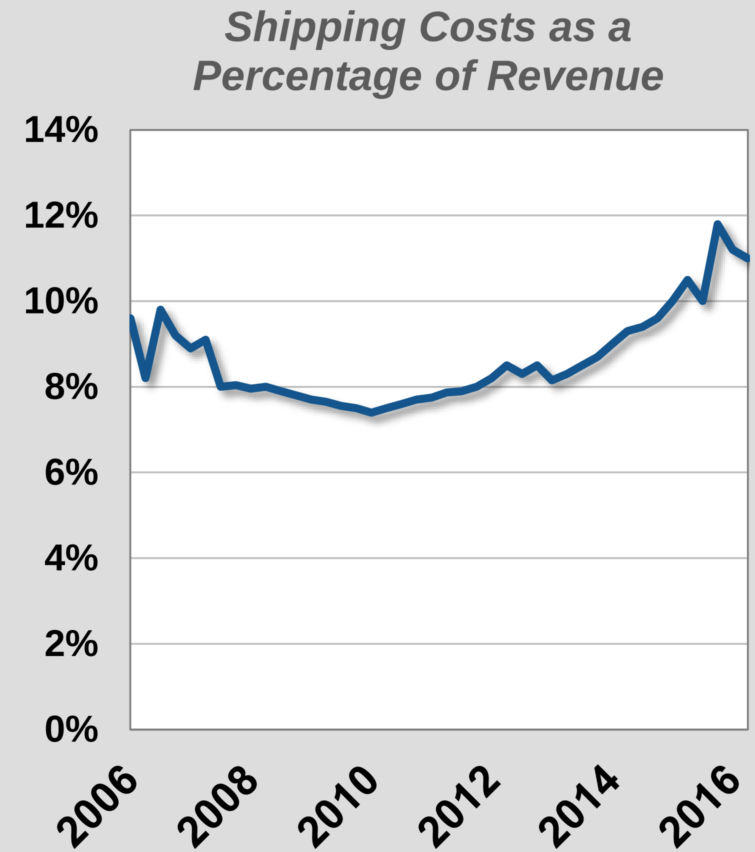
Year-Over-Year Percent Change



Source: IATA, ICF Analysis

Amazon is very well positioned to lead a major disruption of the air cargo industry

Amazon's Growing Revenue & Shipping Costs



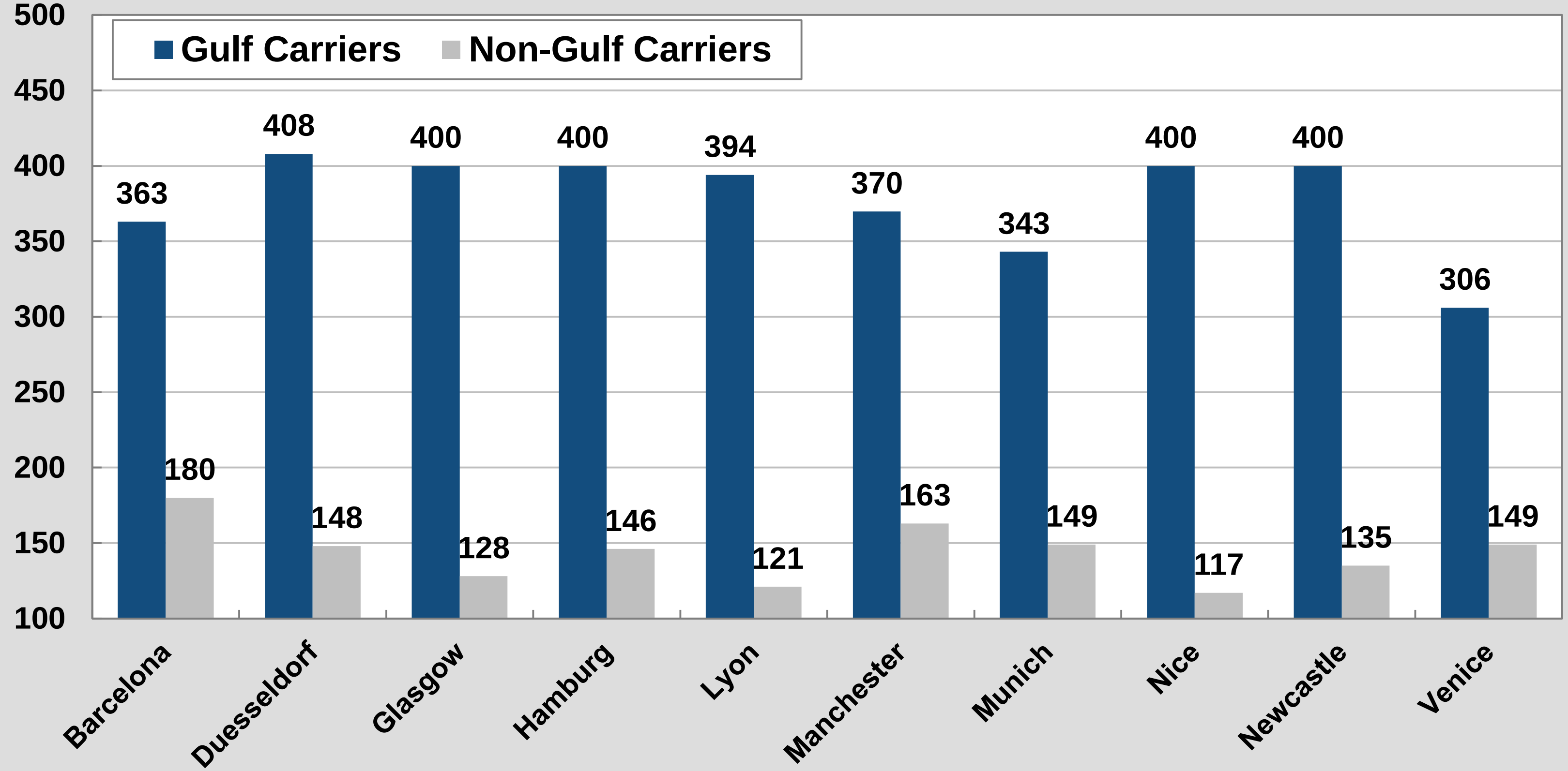
Source: Amazon SEC Filings

March of the Middle East Titans:

Middle East carriers have been very effective in capturing valuable business passenger traffic from European secondary airports

European Secondary Airports

Average Number of Seats per Departure in 2016



***"…Lufthansa's Frankfurt hub has lost nearly a 3rd of its market share on routes between Europe and Asia since 2005, with more than three million people now flying annually via Gulf hubs"** – The Economist*

Source: OAG Data, ICF Analysis

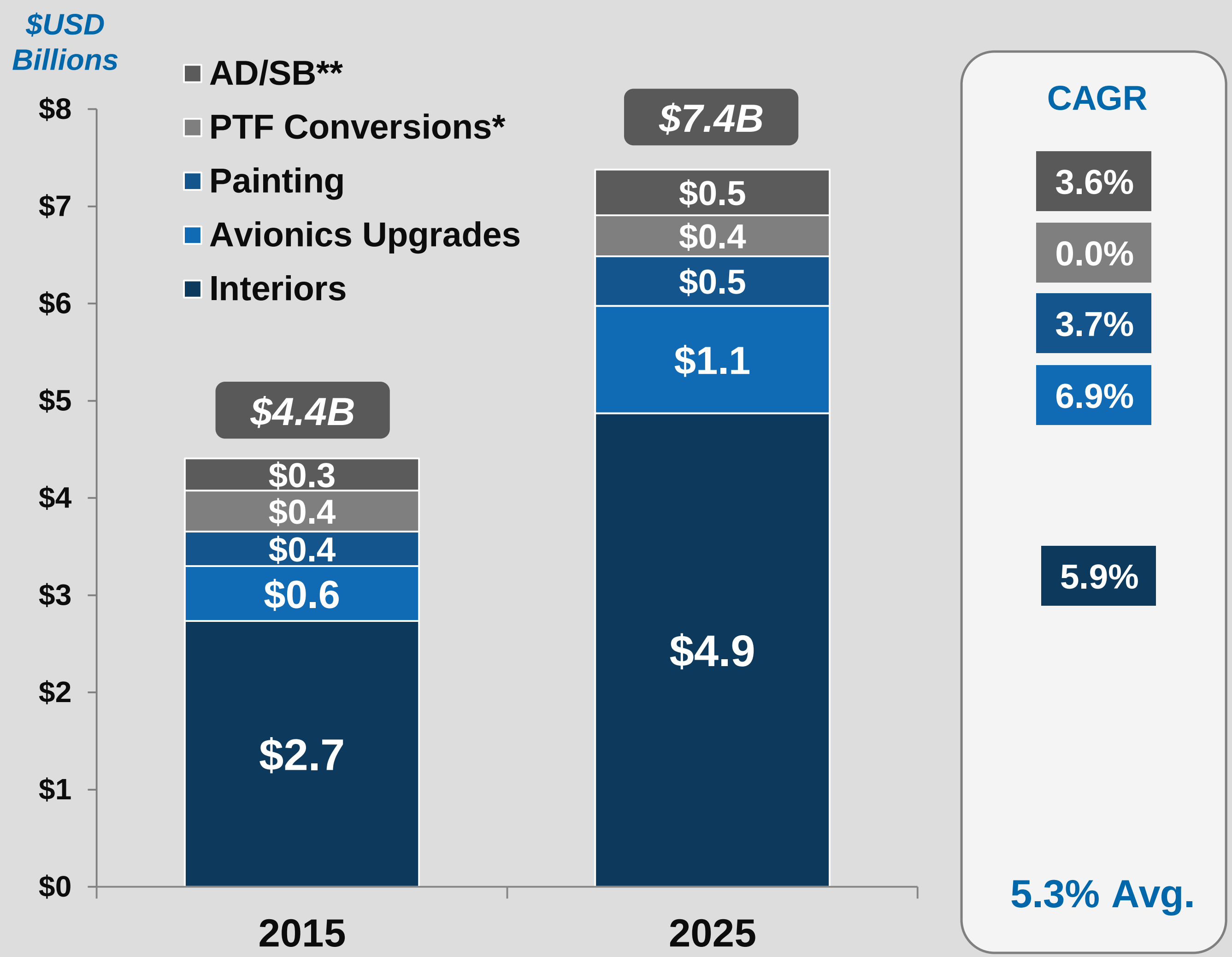
Trend Watch:
A New Golden Age of Aircraft Cabin Interiors

Modifications growth is driven by airlines seeking differentiation in the cabin and customer experience

MRO modification market growth drivers include:

- **Premium lie-flat seats are now the minimum standard**
- **Premium economy**
- **Wi-fi, on-board connectivity**
- **Coming soon: ADS-B Mod program**
- **Capacity (ASM/K) increase**

Commercial Air Transport Modifications Forecast



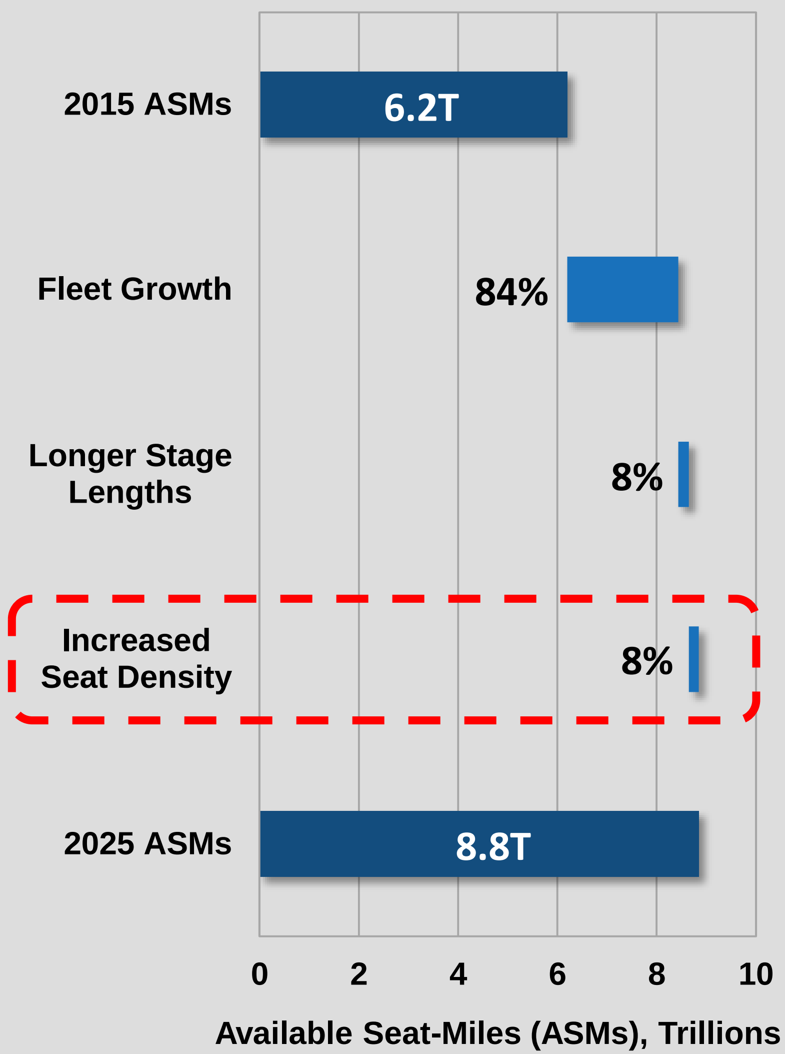
Modifications demand includes labor and material spend
*Passenger-To-Freighter Conversions
**Airworthiness Directives / Service Bulletins
Source: ICF analysis, constant 2015 US$

Cabin "*densification*" has emerged as cost effective strategy for airlines to increase capacity and drive bottom line growth

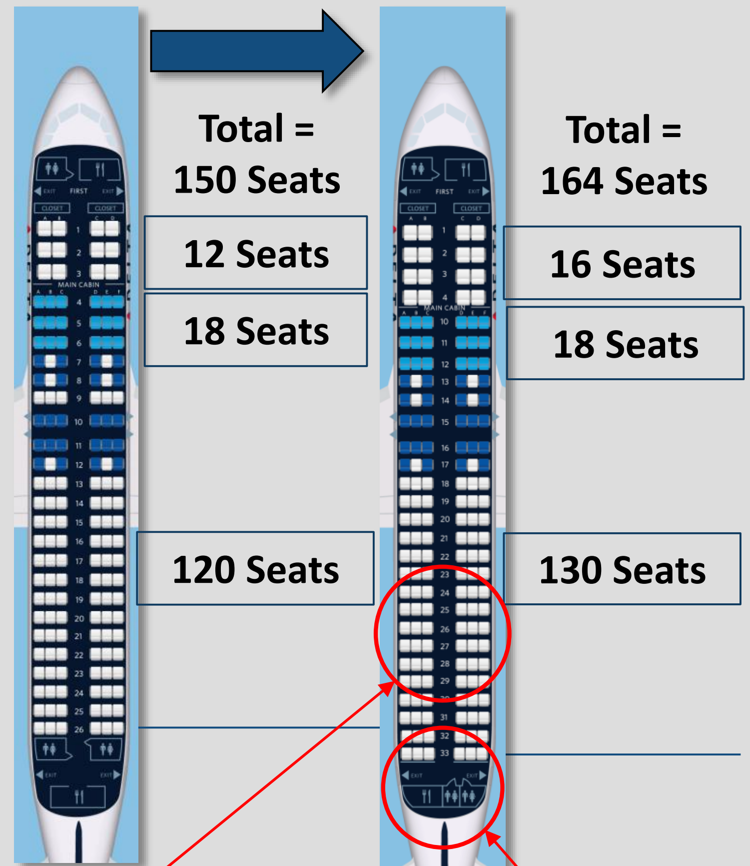
Cabin Upgrades:

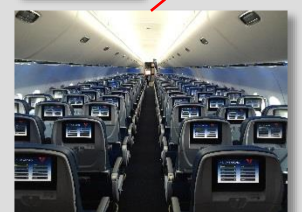
- Slim seats
- Slim lavatories
- Slim galleys
- Slim coat closets

2015 - 2025 Capacity Bridge



Example: Delta A320 Interior Modification Program





New seats, outlets, IFE, overhead bins

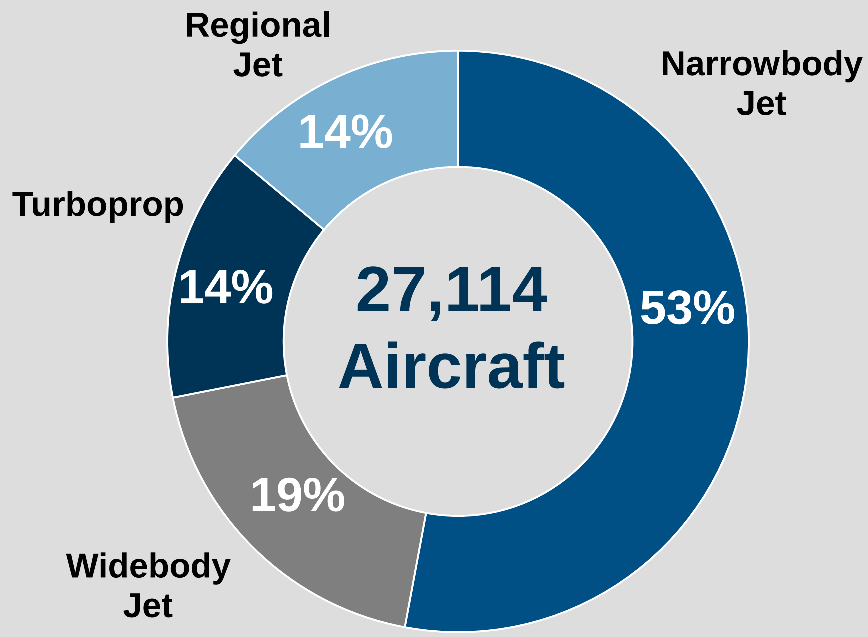
Space-saving galleys to add a row of seats

Source: ICF analysis, delta.com

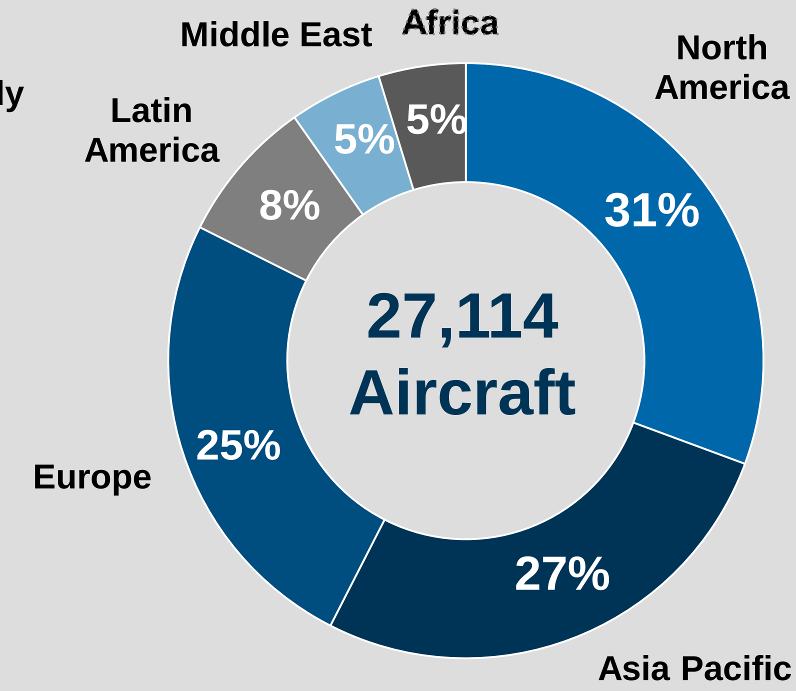
MRO Forecast

The current commercial air transport fleet consists of over 27K aircraft; over half are narrowbody aircraft

2015 Global Commercial Air Transport Fleet



By Aircraft Type

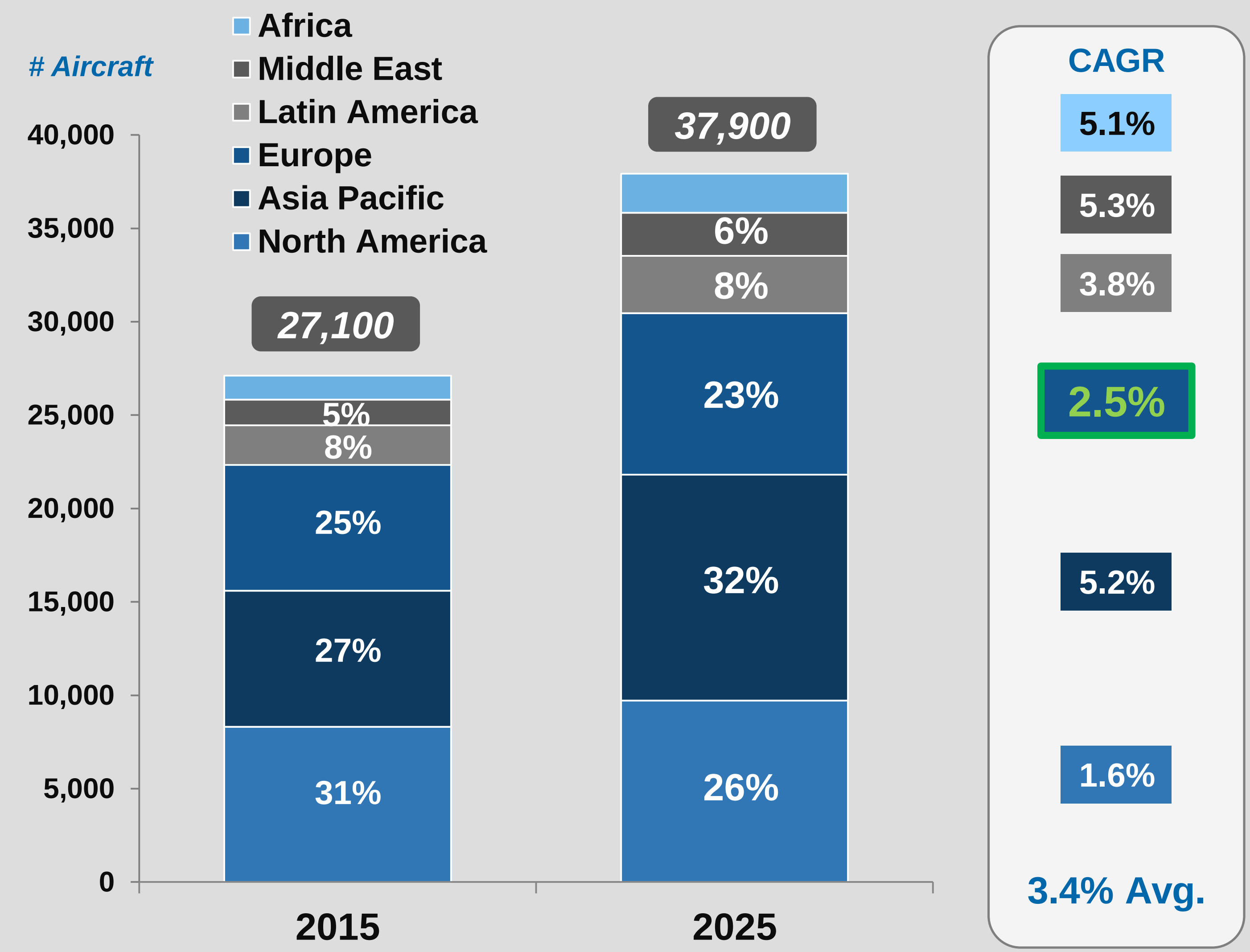


By Global Region

Source: CAPA 2015

The combination of strong air travel demand and the need to replace ageing aircraft will drive fleet growth at a healthy 3.4% annually

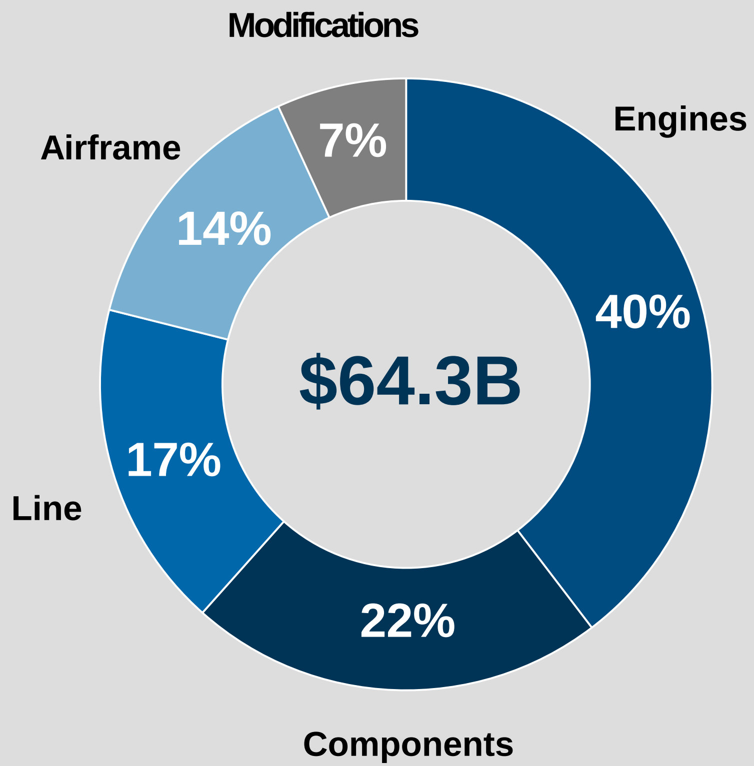
10 Year Global Air Transport Fleet Growth



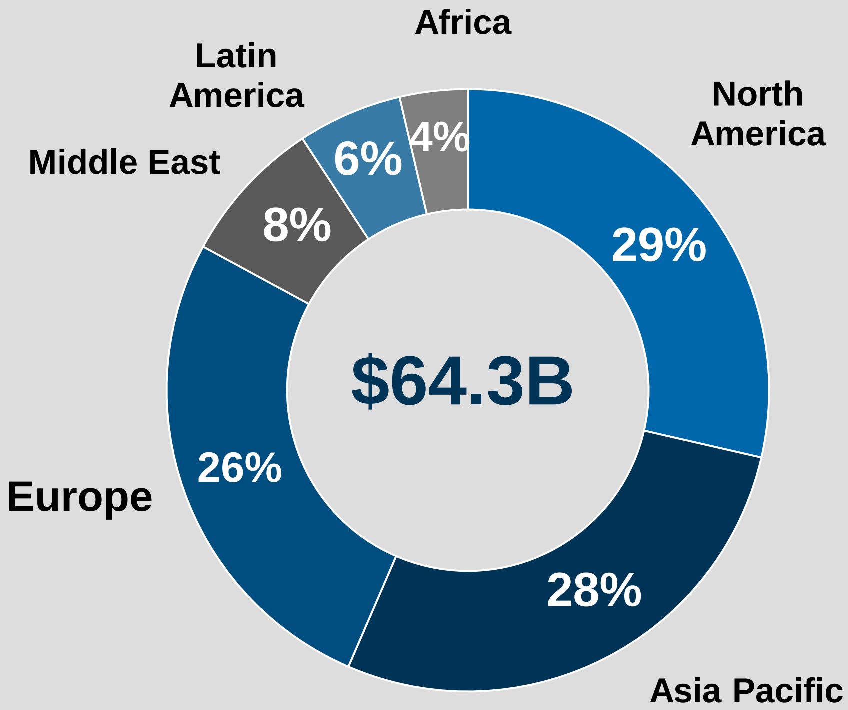
Source: ICF analysis: CAPA 2015

Current commercial air transport MRO demand is $64.3B; with Asia equivalent to North America and Europe in market size

2015 Commercial Air Transport Global MRO Demand



By MRO Segment



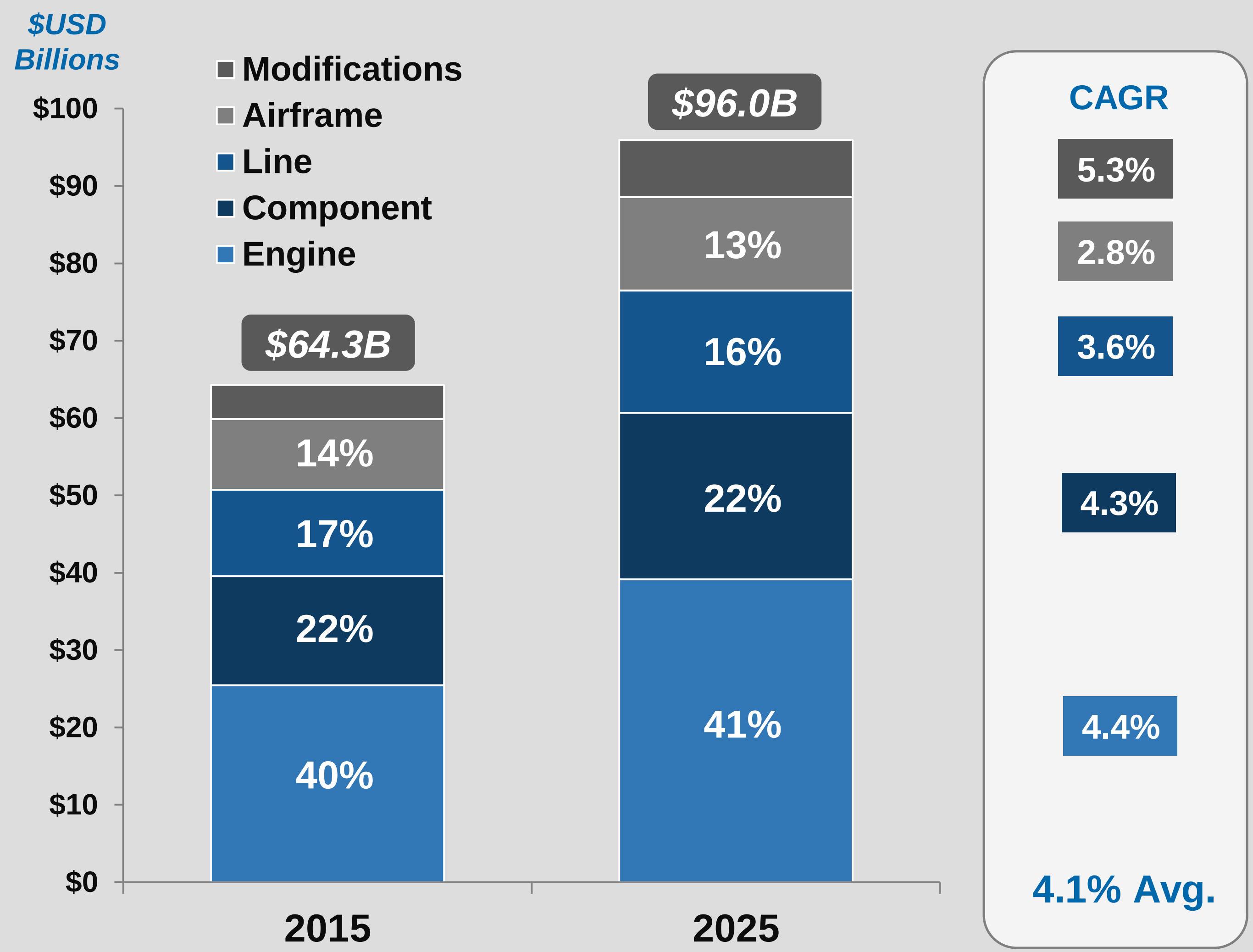
By Global Region

Source: ICF analysis; Forecast in 2015 $USD, exclusive of inflation

The global MRO market is expected to grow by 4.1% per annum to $96B by 2025

- Engine and component MRO markets remain the largest segments
- Modifications market will see the strongest growth (e.g. interiors, connectivity)
- Airframe market slows due to reduced man-hour intensity and increased check intervals as new fleets are introduced

10 Year Global Commercial Air Transport MRO Demand Growth



Source: ICF analysis; Forecast in 2015 $USD, exclusive of inflation

There two primary reasons operators are aggressively seeking non-OEM supplied parts;

1. Cost savings
2. Part availability

Three alternatives to purchasing OEM-supplied parts:

Surplus

Three types of surplus material:

1. Used Serviceable Material (USM)
2. New Material
3. Used, unserviceable material

DER Repair

- DER (Designated Engineering Representatives), FAA approved engineers who can approve technical data for repairs and modifications outside the CMM
- Design Organization Approval (DOA), a blanket approval for an MRO organization to develop internal repairs

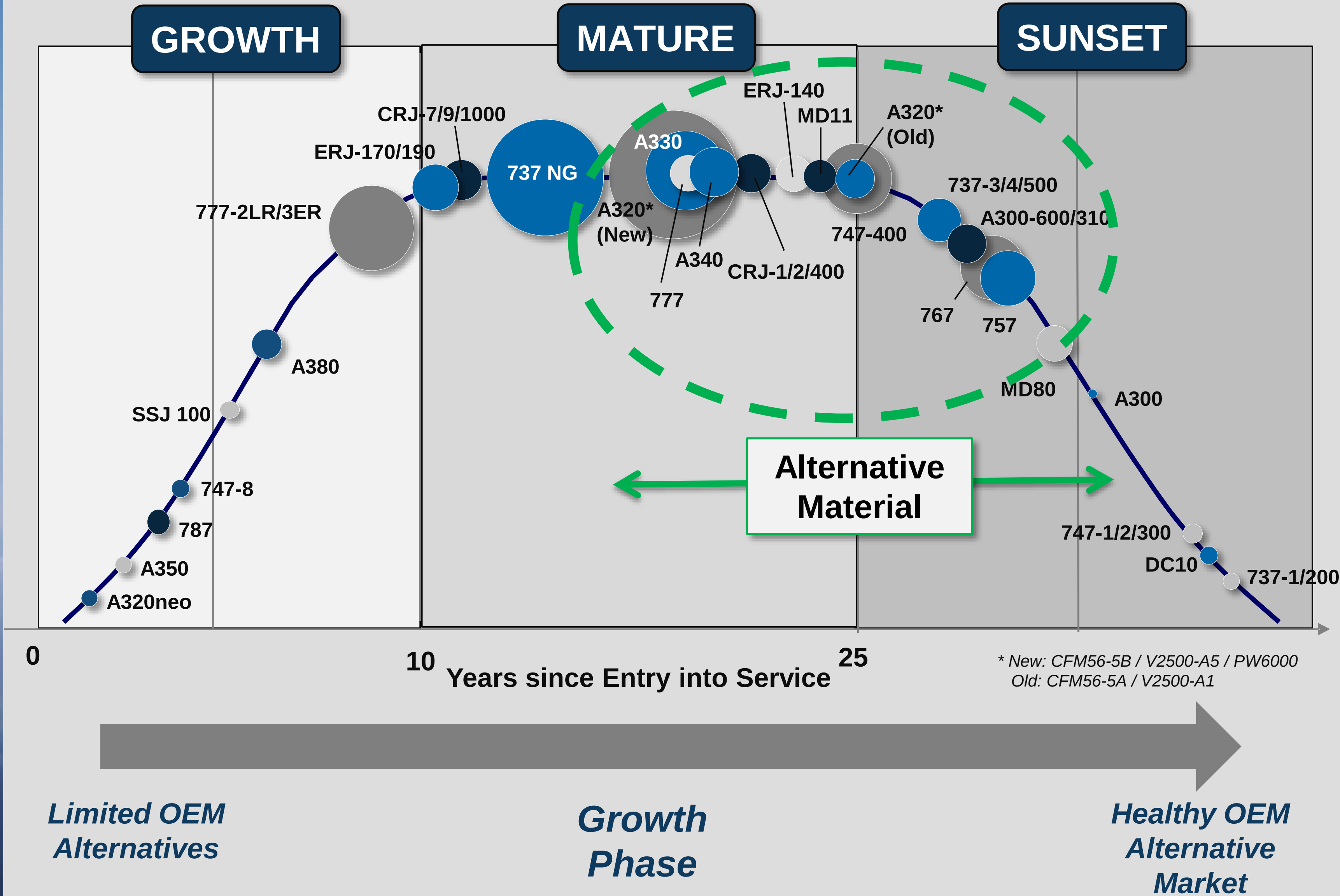
PMA

- PMA (Parts Manufacturer Approval) is approval granted by the FAA to a non-OEM manufacturer of aircraft parts
- Two types of PMA:
    1. Licensed
    2. Competitive

Lower — *Perceived Risk* — *Higher*

Source: ICF analysis

The alternative material market is concentrated on the back half of mature aircraft lifecycle (17-25 years old aircraft) and early sunset aircraft



Bubble size proportional to MRO spend

Source: ICF analysis

In 2015, operators spent over $32B on OEM new parts and an additional $13B on alternatives

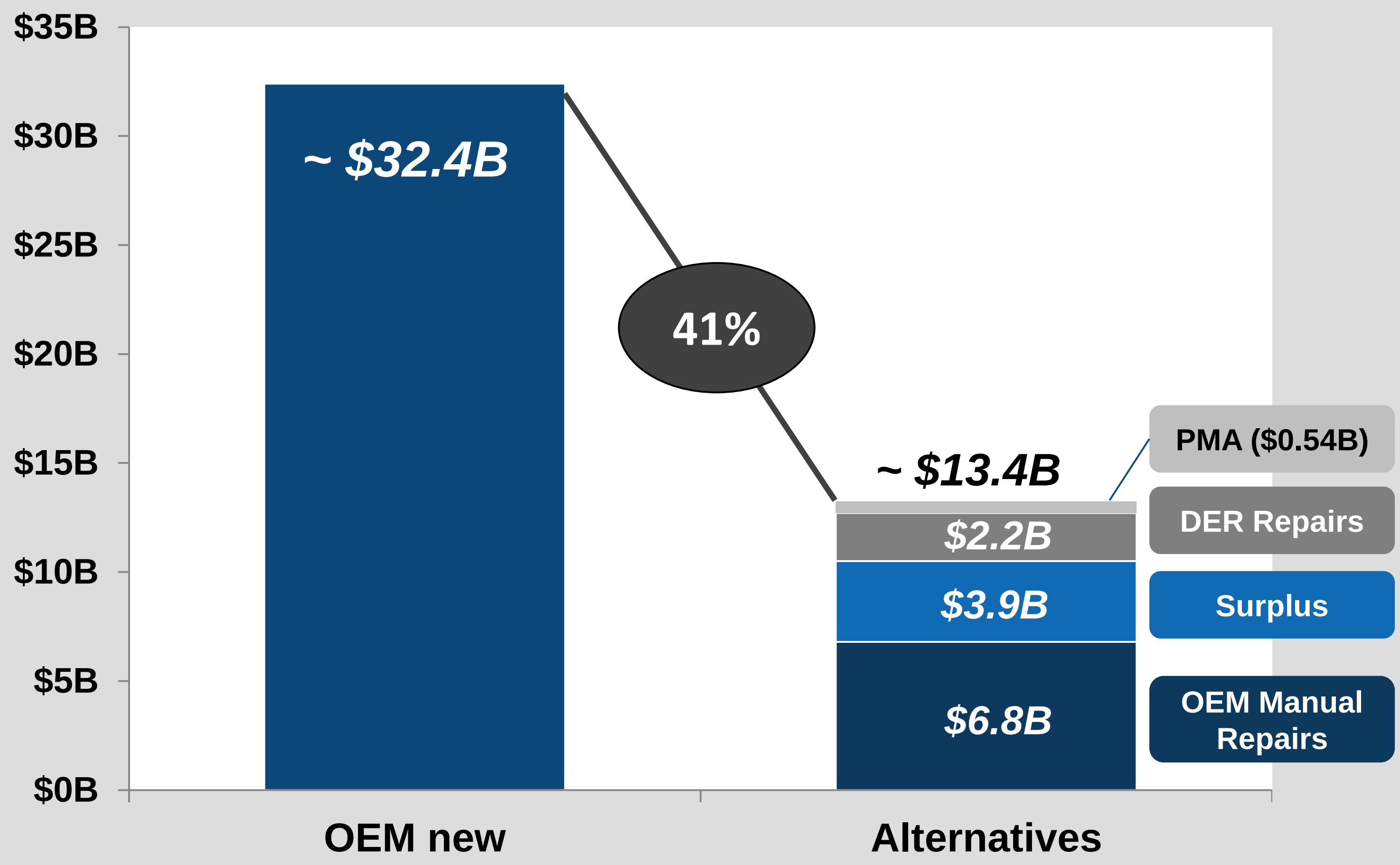
"…the OEM's increasingly tight grip on the aftermarket means Delta's spares costs <u>double about every seven years</u>."

"Without TechOps parting-out engines to bolster spares and coming up with other alternatives to OEM-supplied support, that increase could be even steeper…"

…"We're pretty good at sourcing outside the OEMs…and we're always working to develop those alternatives."

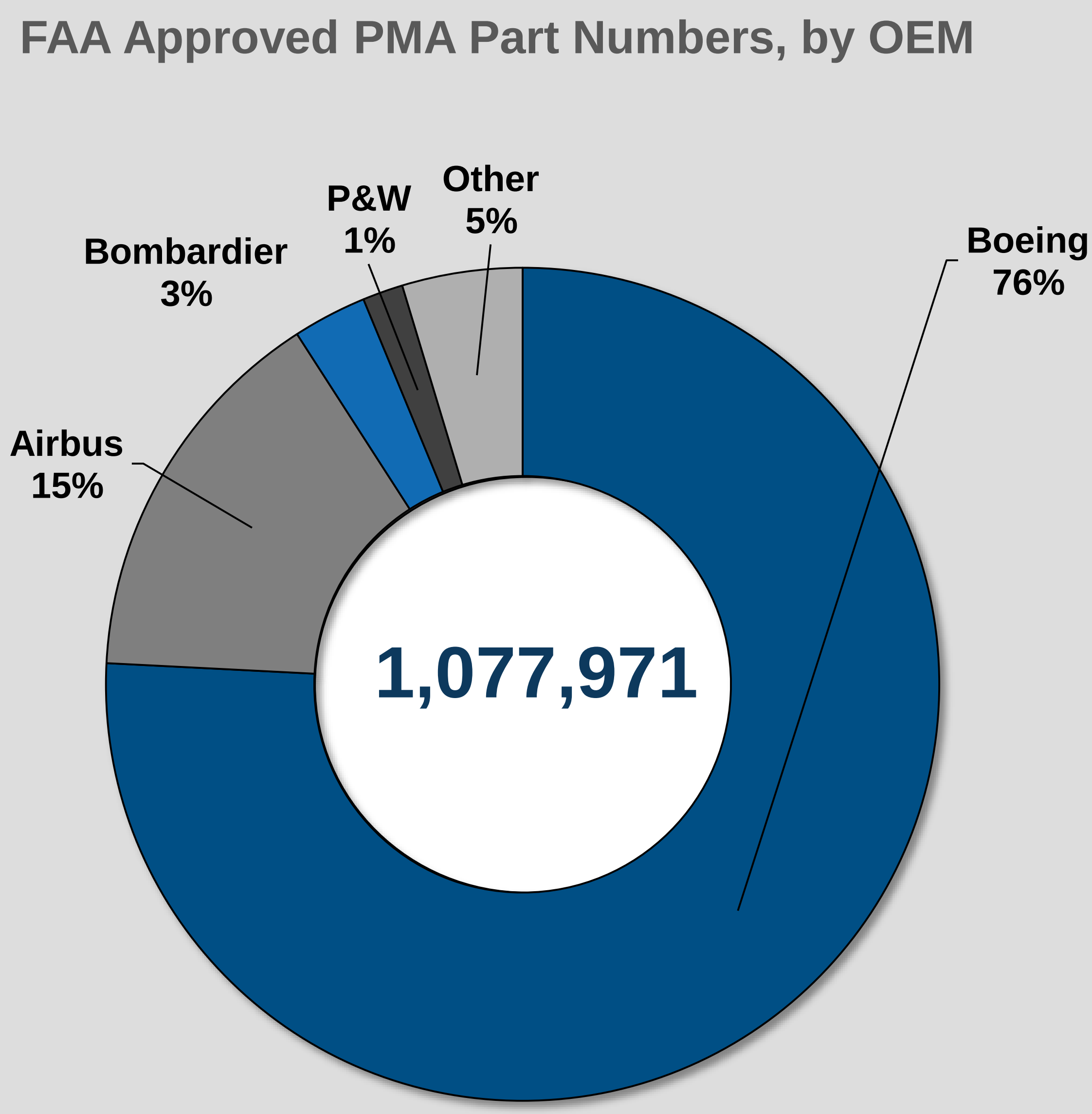
- Richard Anderson
CEO Delta Air Lines
Keynote Speech, MRO Americas
April 2013

2015 OEM New Material Demand vs. Alternatives



Source: ICF analysis

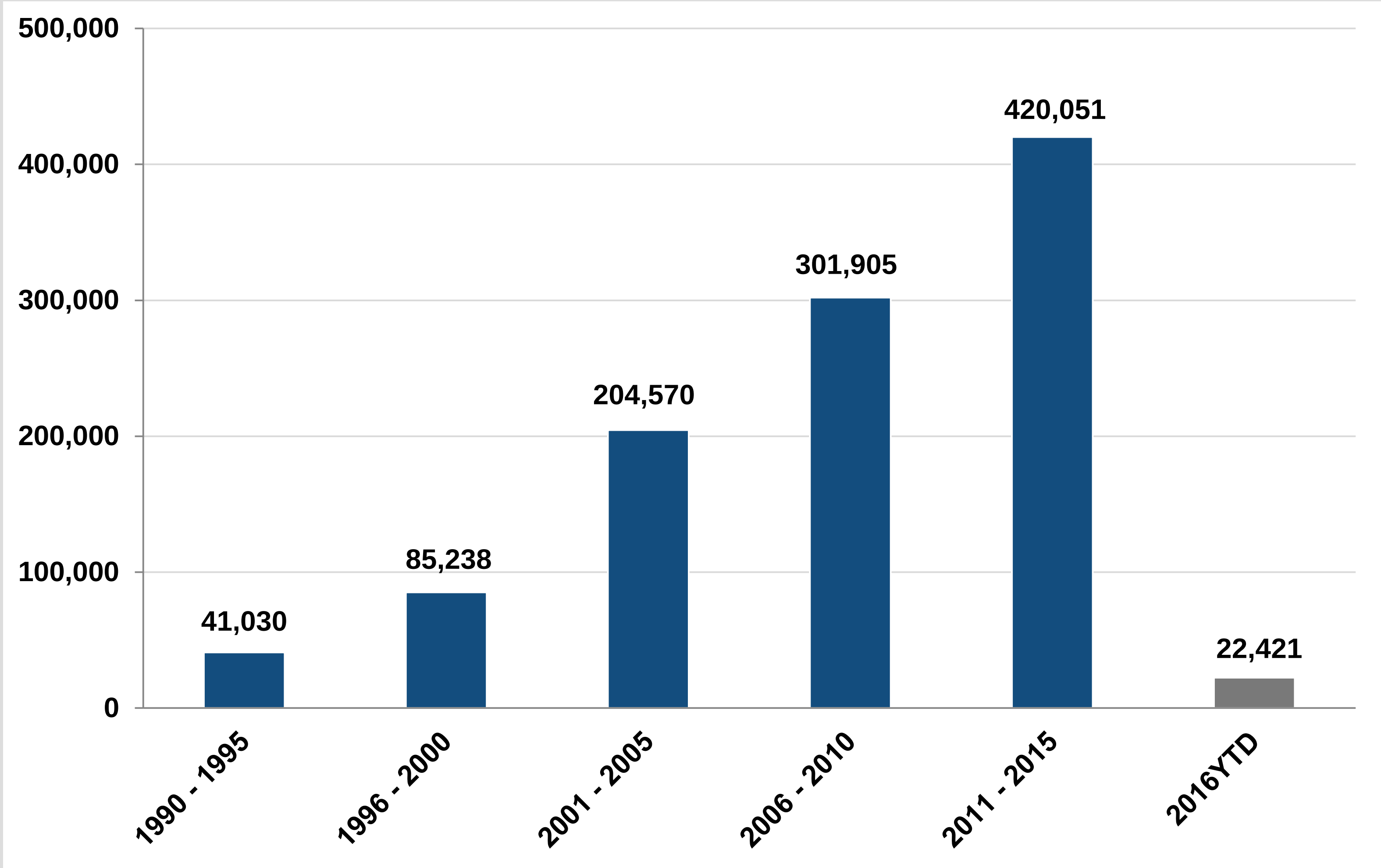
There are nearly 1.1 million total PMA parts that are FAA approved, of which over 75% are for Boeing aircraft



Source: Federal Aviation Administration

The volume of PMA approvals has been steadily growing since 1990, with over about 440,000 new approvals granted since 2011

FAA Approved PMA Part Numbers, by Year Approved

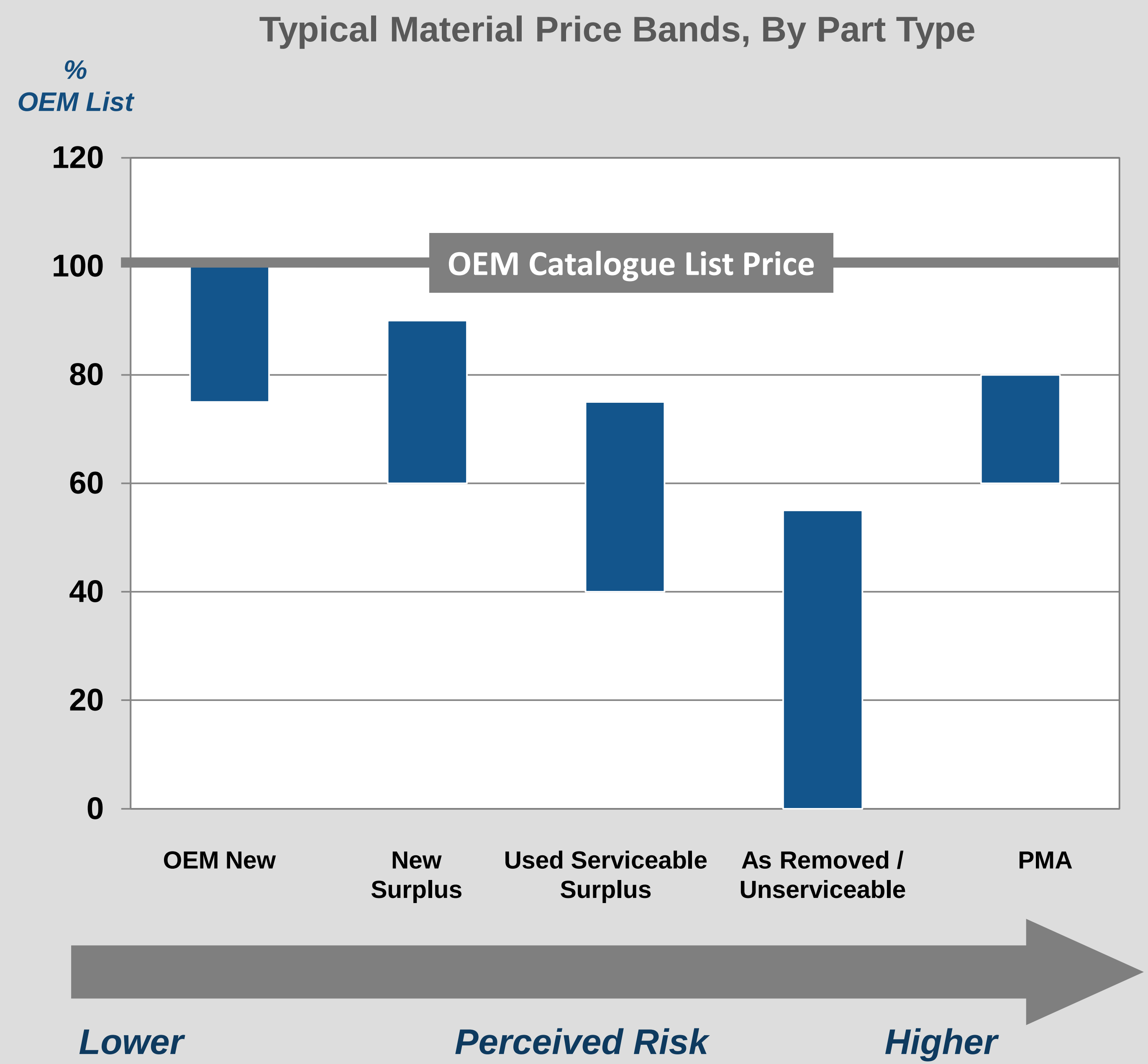


Source: Federal Aviation Administration

Surplus material usage has risen sharply over the past few years, driven by tangible cost savings and minimal perceived risk

"Surplus parts have increased the demand for component DER… because the unserviceable surplus parts must repaired. The biggest customer for DER is ourselves."

- Major PMA / DER Supplier



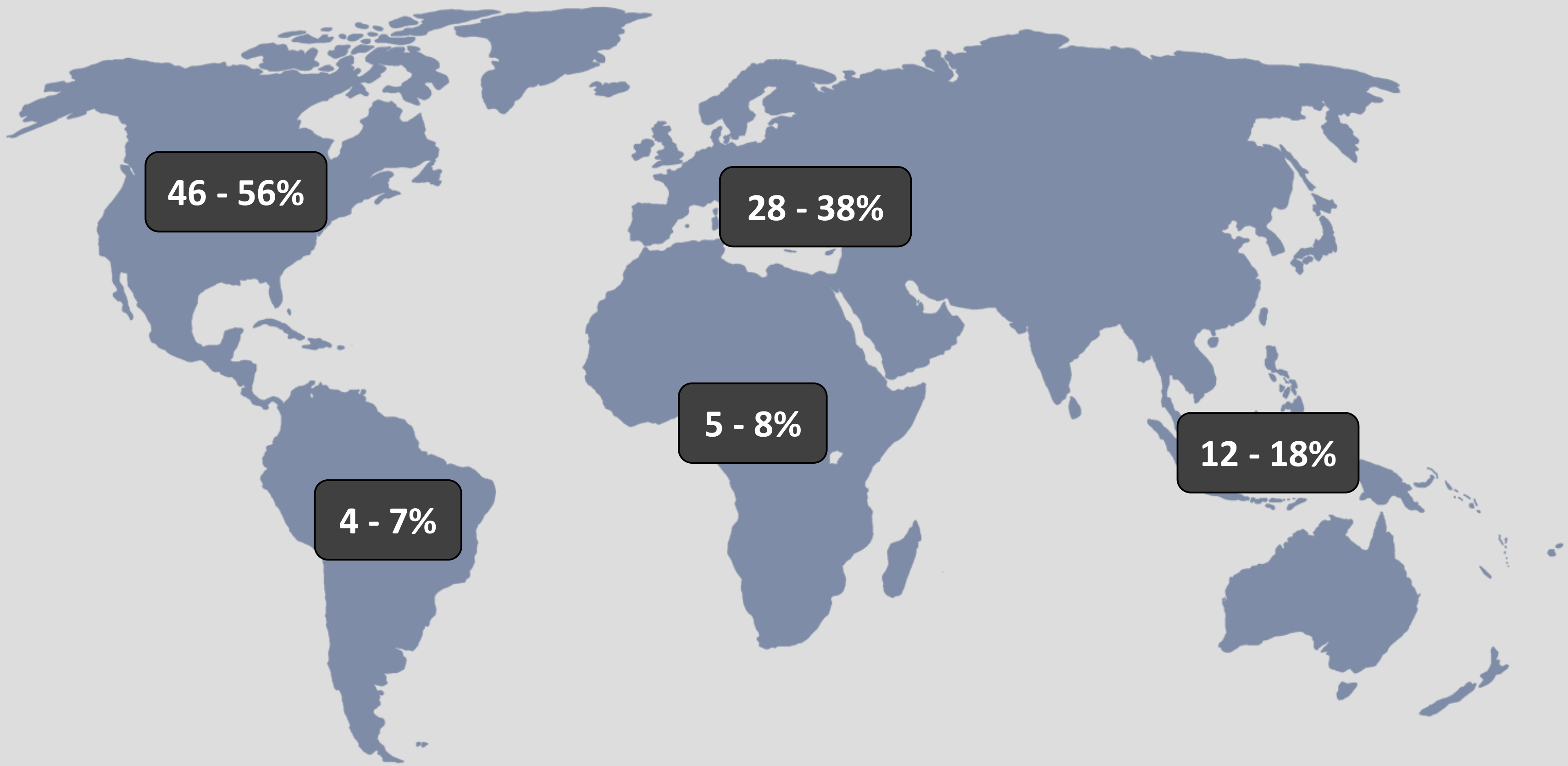
Source: ICF analysis

Numerous regional factors influence operator PMA consumption to include:

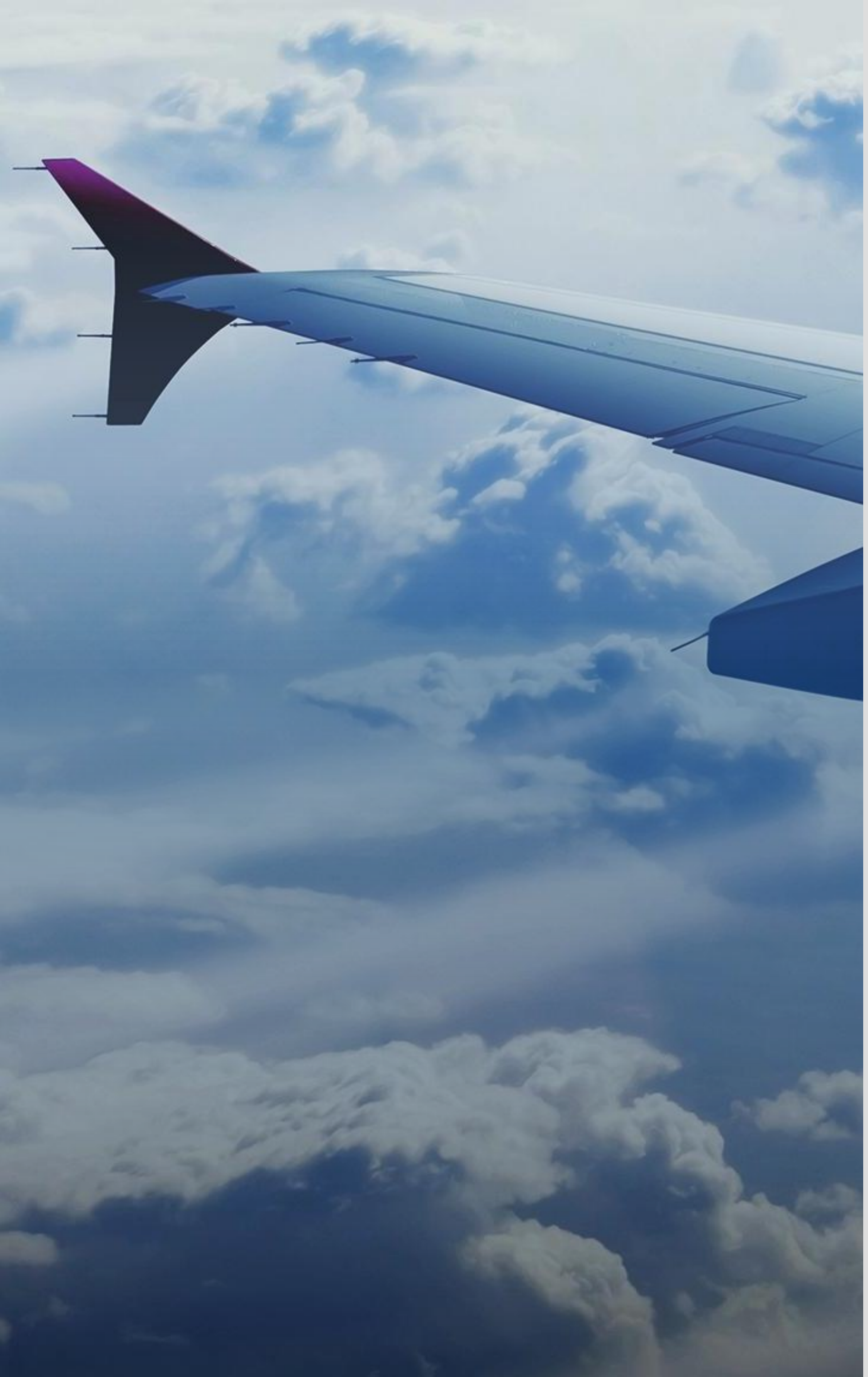
- Fleet age
- Mix of lease vs owned aircraft
- Technical capability & experience
- Airline procurement historical practices and culture

Virtually every major carrier leverages PMA parts as an OEM alternative

Estimated PMA Demand by Major Region



Source: ICF analysis



In Summary…

- In order to control and reduce material spend, airlines must have a comprehensive OEM alternative strategy
- PMA parts, DER repairs, and surplus material are valuable material sourcing solutions that drive tangible cost savings and improve part availability
- Safety concerns with regards to OEM alternative material usage have demonstrated to be meritless; yet clearly perceptions of risk remain
- As long as certain airlines continue to have restrictive PMA policies, Lessors will continue to include conservative language in their lease agreements
- Continued education is the only solution

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THANK YOU!

For questions regarding this presentation, please contact:

Jonathan M. Berger
Vice President • Aerospace & MRO Advisory
jberger@icf.com • +1 404.819.7669

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