Air Transport MRO & PMA
Market Forecast and Key Trends

Presented by:

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Gorham PMA Parts & DER Repairs

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ICF SH&E
an ICF International Company

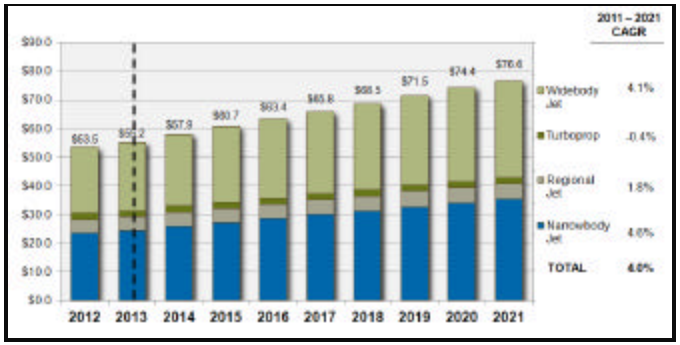
Today's Agenda

- **MRO Forecast**
- **Three Critical Issues For 2013**
- **PMA Market Insights**

ICF SH&E recently updated the air transport MRO forecast

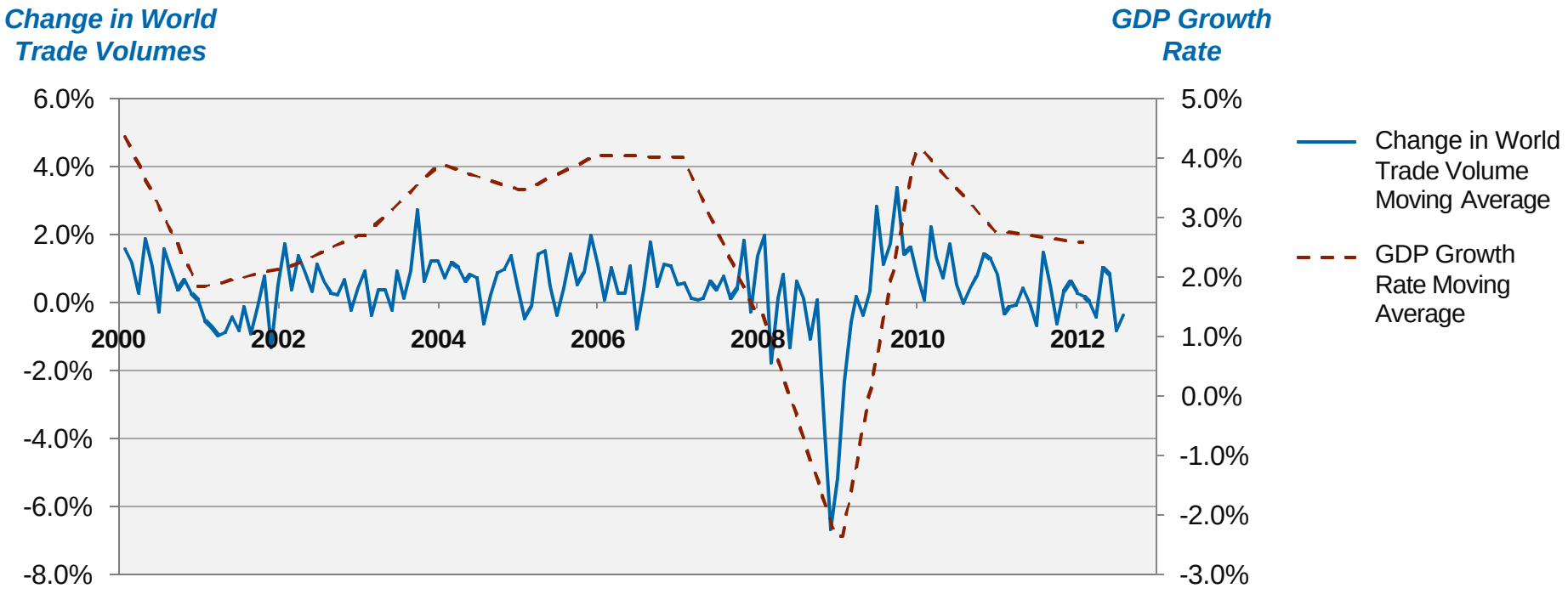
ICF SH&E 2013 MRO Forecast

Improved fleet forecast methodology	**More granular RPK/ASK forecast by airline domicile - better regional insights**
ICF SH&E perspectives on production rate realities	**Impact of new aircraft introductions and independent view on production ramp up**
Enhanced aircraft maturity and retirement survivor curves	**Customized survivor curves based on aircraft economic life analysis**



Since 2010, global trade and GDP has slowed overall

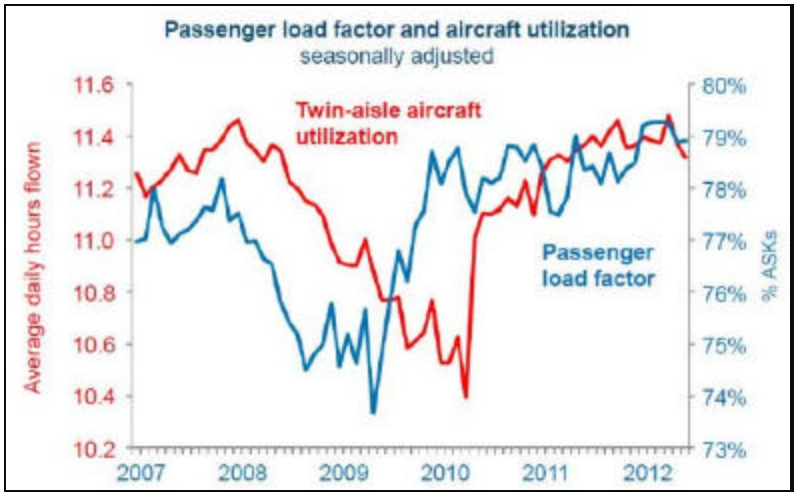
Change in World Trade Volumes and GDP Growth

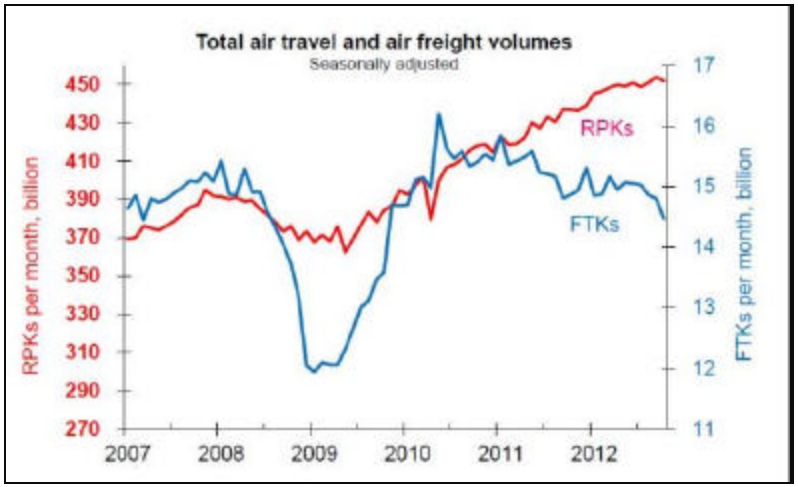


- Exacerbated by economic uncertainty in Europe, high fuel prices and turmoil in the financial markets

Source: ICF SH&E analysis of CPB and World Bank data / World Economic Outlook October 2012

Despite this difficult environment, airlines generally have managed to improve performance and traffic has grown





- Since 2010, airlines have improved capacity management and increased load factors and aircraft utilization (without necessarily lowering yield)
- Passenger air travel has seen continued growth since 2010
- While freight traffic has struggled
- Significantly, airline losses overall have been lower than in previous recessionary dips

Source: IATA Industry Financial Forecast Dec 2012

Source: IATA Financial Forecast Dec 2012

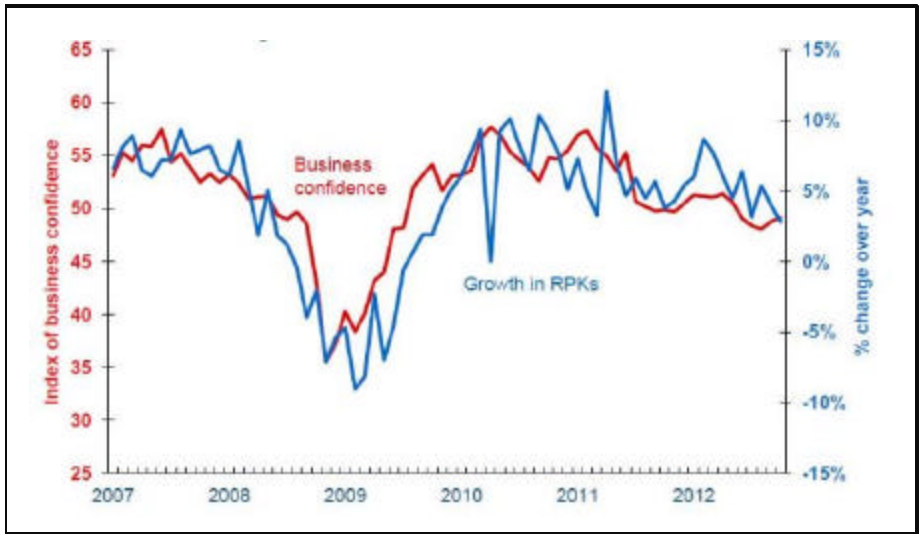
Despite an encouraging Q3 2012 * for some, overall business confidence remains low

Y-o-Y Profit Comparison, Q3 2012, IATA Reporting Carriers

In US $ Million

# Airlines	Region	Q3 2011		Q3 2012	
		Operating profit	Net post-tax profit	Operating profit	Net post-tax profit
13	North America	3164	1073	3708	1905
20	Asia-Pacific	3526	1962	3874	2638
14	Europe	4069	2567	4375	3487
5	Latin America	439	-31	291	-16
7	Others	329	295	692	622
59	Sample total	11527	5866	12940	8636

Worldwide Growth in Air Travel and Business Confidence



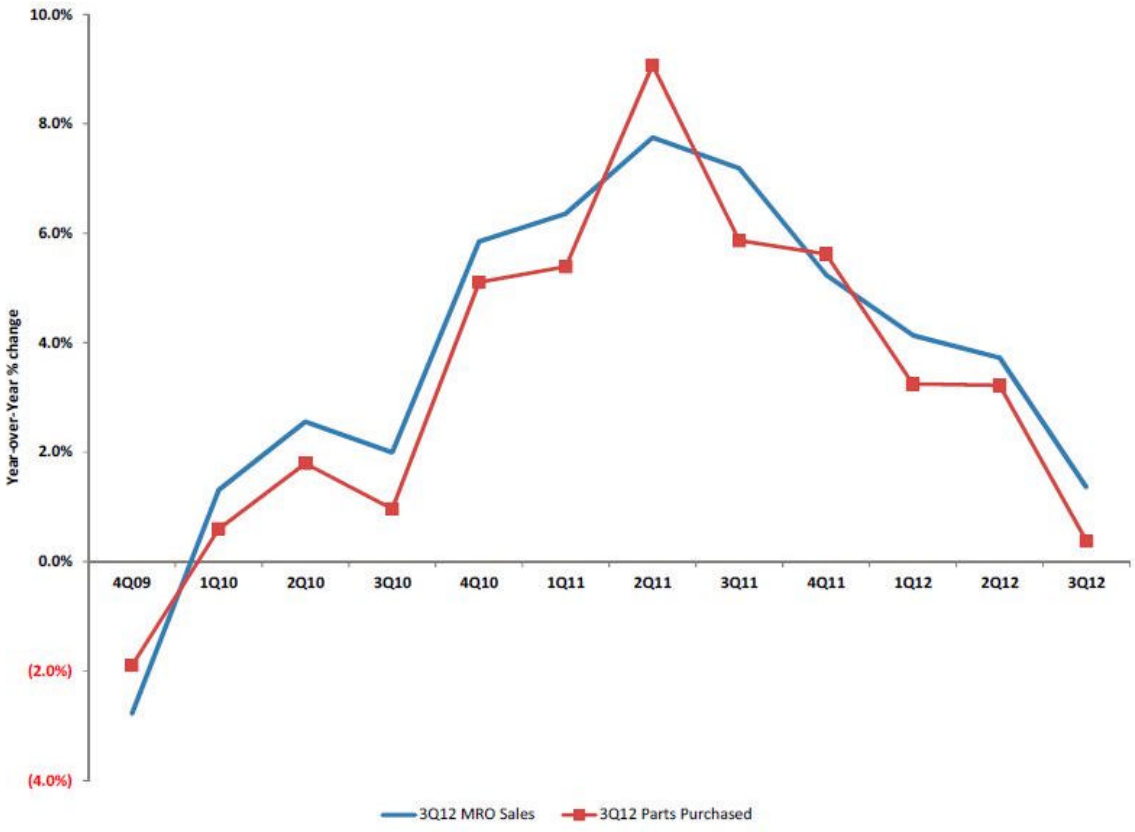
- Q3 2012 showed a year-on-year growth in operating profits across all regions and 12% overall*
- However, IATA research shows business confidence in 2012 continuing to be lower than any period since mid-2009…
- …in the light of uncertainty in Europe and North America

Source: IATA Airlines Financial Monitor Nov-Dec 2012, and IATA Forecast Dec 2012

* Based on IATA survey of 60 airlines

This lower confidence is also reflected by business expectations in the aftermarket

Current Quarter MRO Sales and Parts Purchasing *4Q 2009 – 3Q 2012*

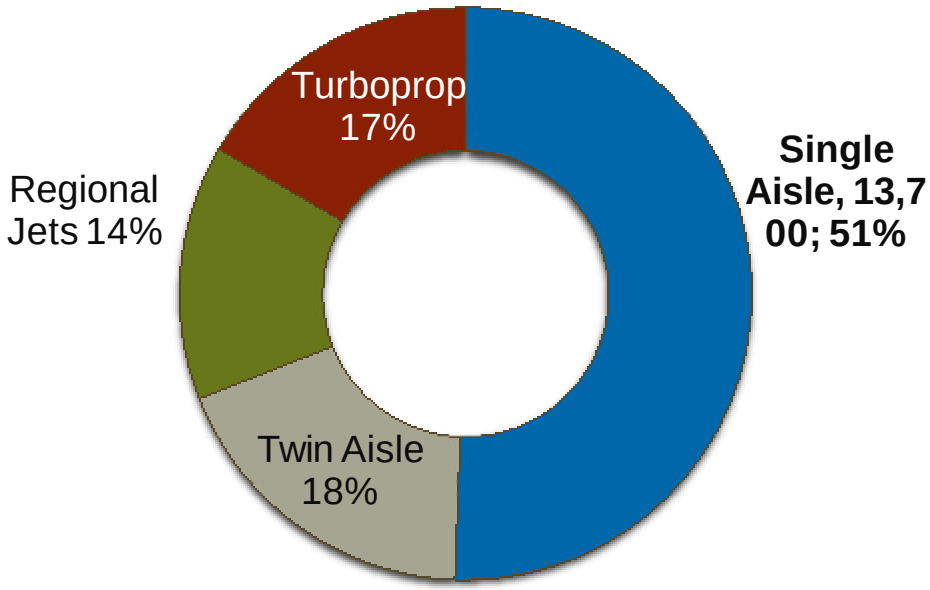


- The October Imperial Capital survey of 50 MROs shows that expected growth in MRO sales and parts buying lower than at any time since 3Q 2010
- Parts purchases is being impacted by availability of surplus materials on mature aircraft

Source: Imperial Capital Survey, Oct 2012

Today's active fleet is about 27,000 aircraft with 57,700 engines

2013 Global Aircraft Fleet
(total = 27,050)

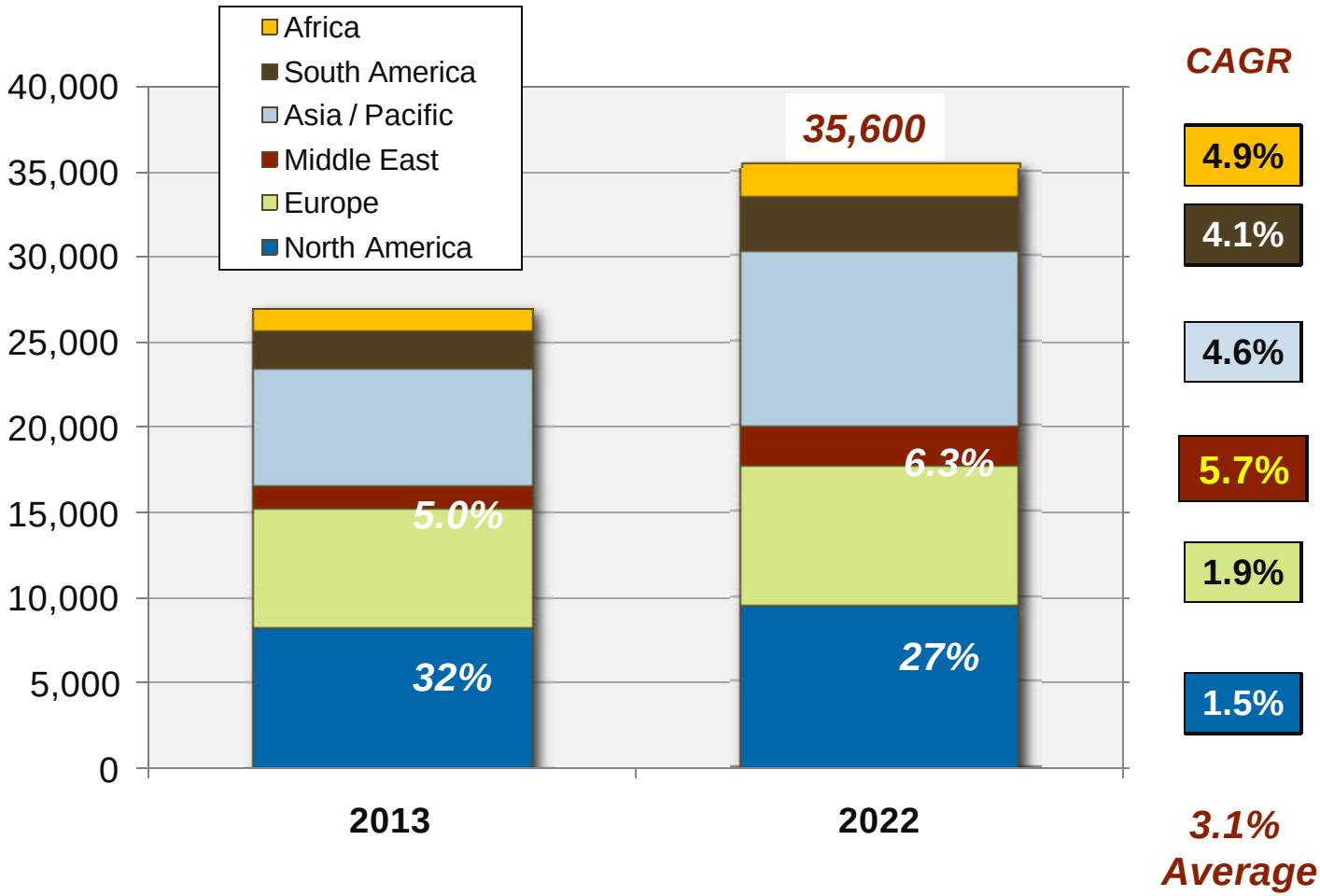


- Today's single aisle fleet of 13,700 aircraft accounts for 51% of the fleet
- The twin aisle and turboprop fleets are roughly the same size – between 4,500-5,000 aircraft each
- The smallest fleet is regional jets with about 3,900 in total
- These aircraft carry ~57,700 engines i.e., the average engines per aircraft is 2.13

Source: ICF SH&E analysis
excludes all Russian built aircraft

The global fleet is expected to grow by 950 aircraft a year – *the Middle East and Asia grow the fastest*

Fleet Growth 2013-2022

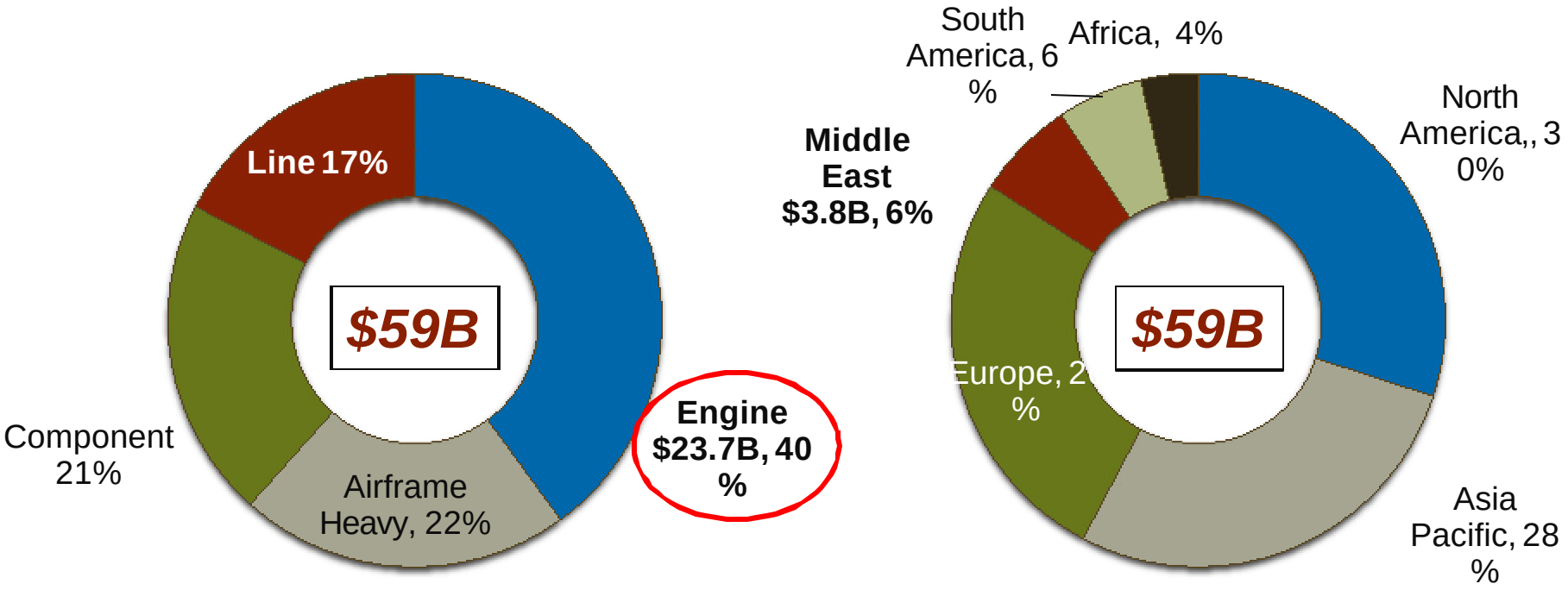


Source: ICF SH&E analysis

The 27,000 aircraft generate an MRO market of $59B with engine MRO accounting for almost 40%

Global MRO Spend

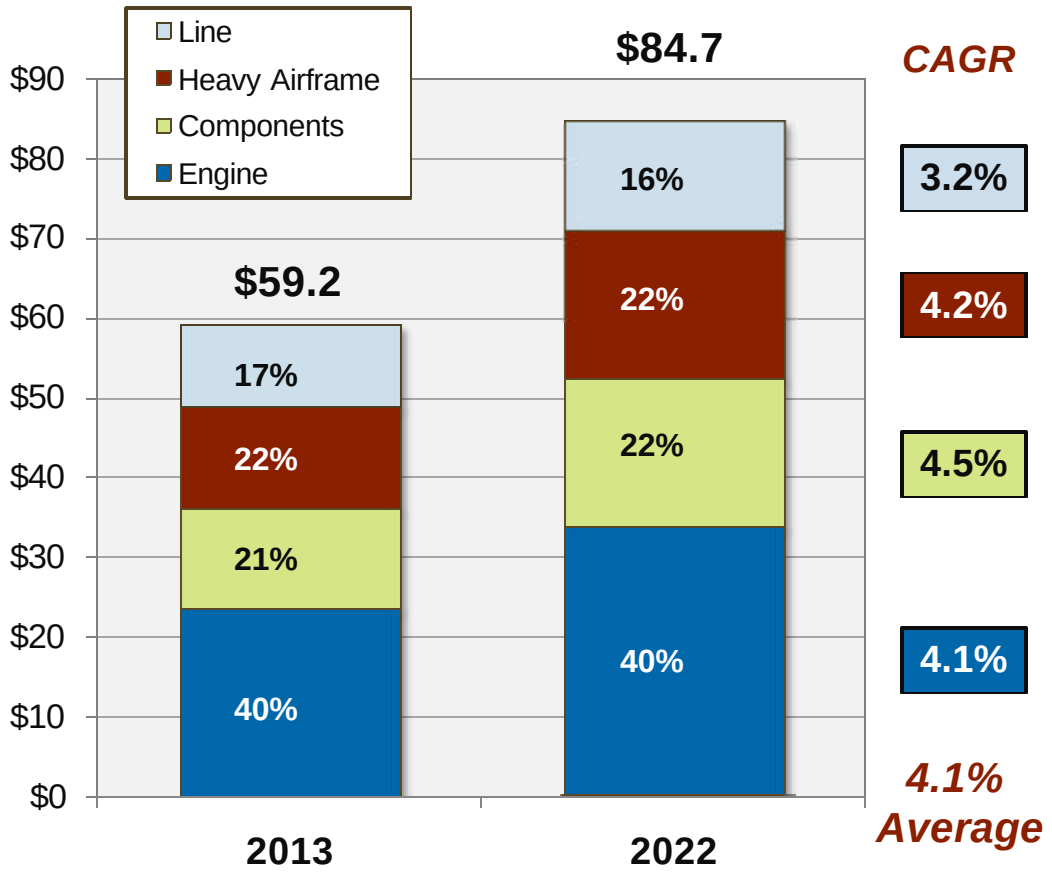
(2013 USD Billions)



Source: ICF SH&E

The global MRO market is expected to grow to $85B by 2022, at 4.1% per annum

Global MRO Spend
(2013 USD Billions)



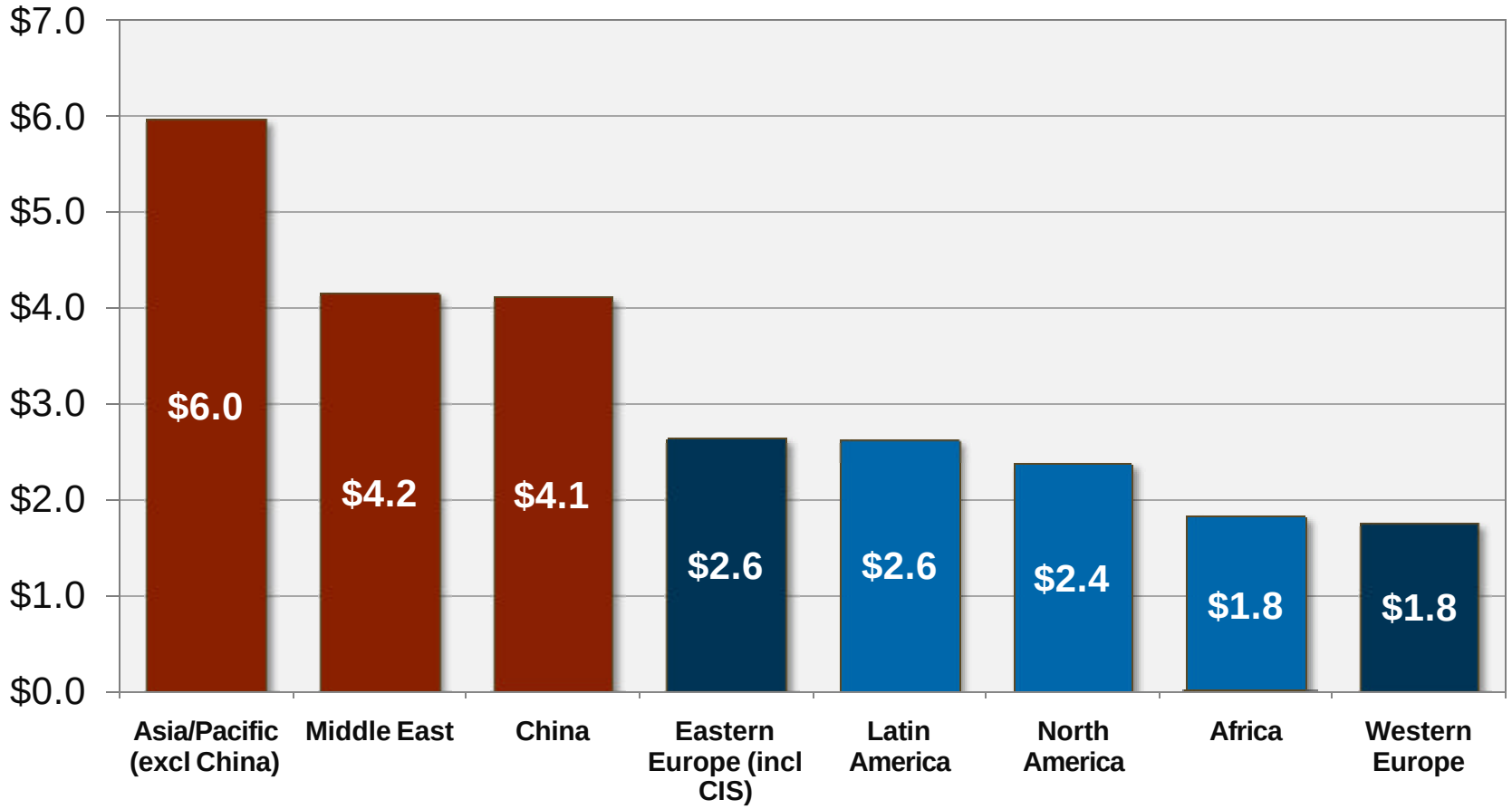
- Average growth is forecast to be 4.1% CAGR to $85B in 2022
- Growth outlook reflects the blended impact of:
  - Fleet and utilisation growth
  - Typically higher cost/event
  - Improvements in reliability
  - Fleet age demographics
- The strongest driver of growth are expected to be the engine market
- Despite reducing manhour intensity of airframe heavy checks as the fleet renews, upgrade and modification demand means airframe heavy MRO grows at 4.2% CAGR

Source: ICF SH&E analysis
Forecast in 2012 $USD, exclusive of inflation. Includes turboprops

Absolute MRO growth in $ terms is emphatically in Asia and the Middle East

Difference in $ MRO Spend, 2022 vs. 2013, By Region

(USD Billions)



Source: ICF SH&E analysis
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Today's Agenda

- **MRO Forecast**
- **Three Critical Issues for 2013**
- **PMA Market Insight**

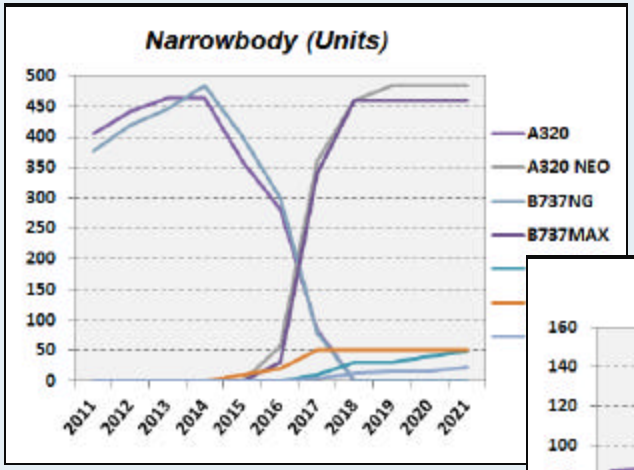
2013 will likely provide early insights to three critical and current market issues (#1)

#1

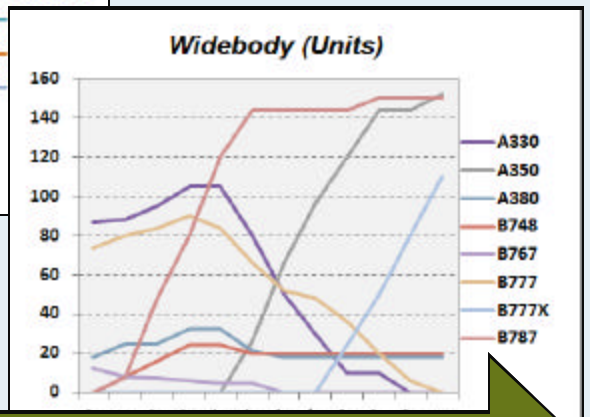
How will relations between airframe OEMs, component OEMs, airline MROs and independent MROs evolve?

- **The next decade sees a significant build up of new aircraft platforms in the fleet**

ICF SH&E Air Transport Production Forecast



- *Introduction and rapid build up of A320neo, 737 MAX*
- *New CSeries and MRJ*



- *Introduction and build up of A350XWB and 787*

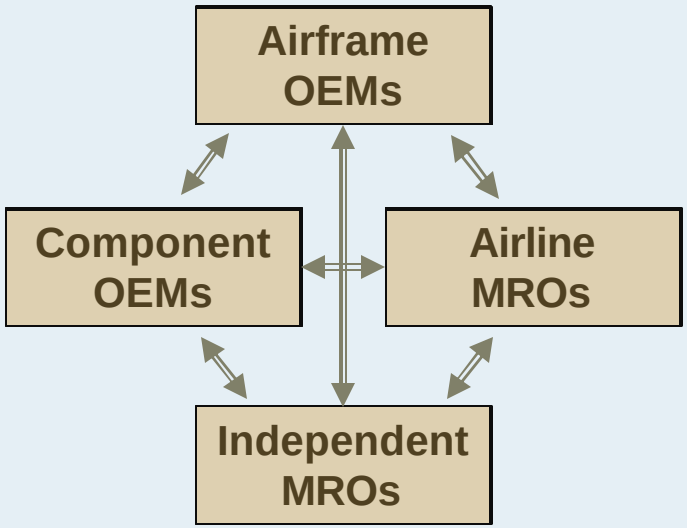
New aircraft introduction = Opportunity for new MRO supply chain model

2013 will likely provide early insights to three critical and current market issues (#1)

#1

How will relations between airframe OEMs, component OEMs, airline MROs and independent MROs evolve?

- **Focus of Airbus (FHS/TSP) and Boeing (GoldCare) on services is strategic**
- **Focus of component OEMs on aftermarket is an economic imperative**
- **Component management is a driver of portfolio profitability for airline/broad based MROs**



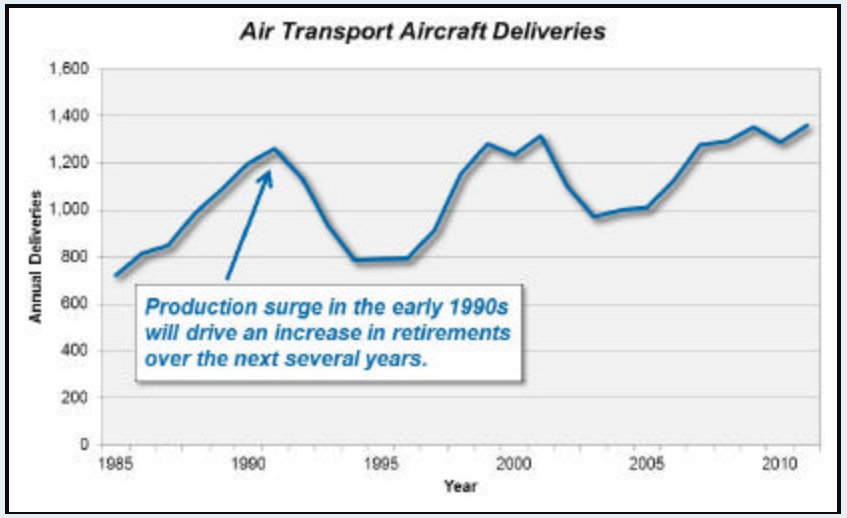
- ***New relations and partnerships should be based on:***
  - ***The value add for airlines***
  - ***Sustainability***

2013 will likely provide early insights to three critical and current market issues (#2)

#2

How will the supply chain react and evolve to increasing retirement volumes and support mature/sunset platforms?

- **The next decade will see a structural shift to higher volumes of retirements…the "class of 1990" is arriving**



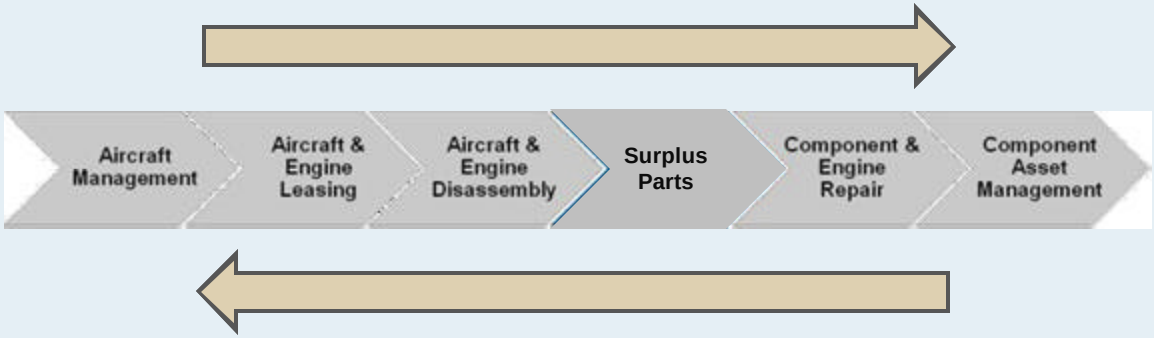
- **Increased part-out volumes**
- **Growth of the surplus market**
- **Impact on component OEM parts revenues**
- **Suppressed PMA**

2013 will likely provide early insights to three critical and current market issues (#2)

#2

How will the supply chain react and evolve to increasing retirement volumes and support mature/sunset platforms?

- **…resulting in changes in the supply chain; for example…**
  - ***ILFC and AeroTurbine***
  - ***GA Telesis into engine and parts repair management***
  - ***AJ Walter into component repair and asset management***



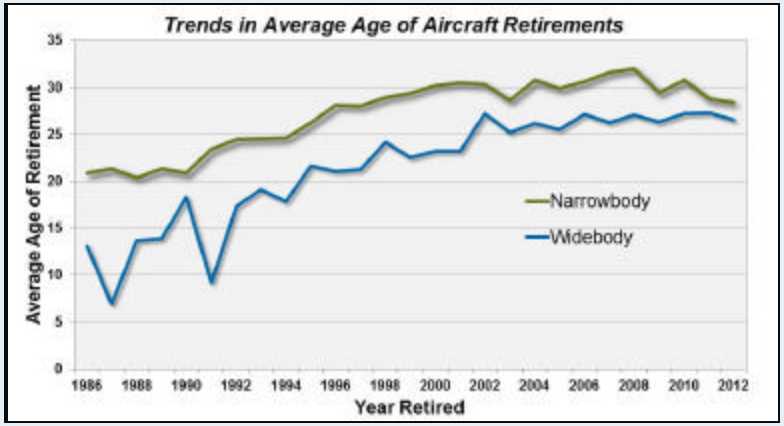
  - ***VAS and others into disassembly***
  - ***AAR and others into aircraft / engine leasing***

2013 will likely provide early insights to three critical and current market issues (#3)

#3

Is the economic life of aircraft undergoing structural change and shortening?

- **The average retirement age has reduced recently, after a long period of growth**



- **Is this structural or a short-term by product of high fuel prices, low cost of capital and high production rates?**
- **ICF SH&E analysis shows historic retirement curves along with current production plans => excess aircraft capacity – something has to give**

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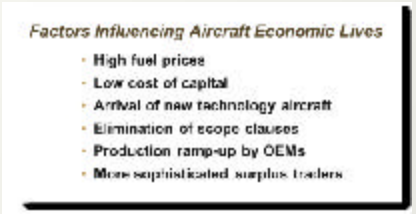
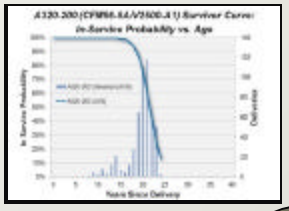
The next year will likely provide early insights to three critical and current market issues

Structural change and shortening of aircraft economic life

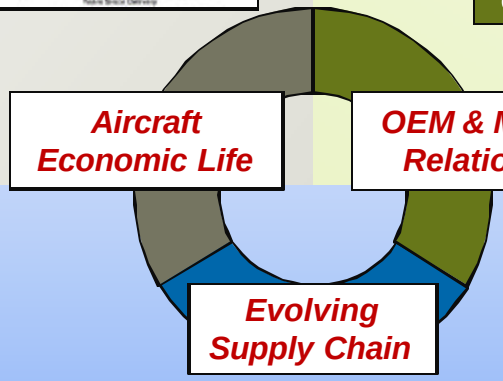


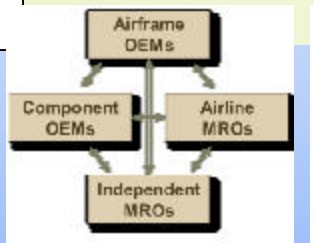


Introduction and rapid build up of A320neo, 737 MAX, A350XWB and 787 as well as CSeries and MRJ

New aircraft introduction = Opportunity for new MRO supply chain model

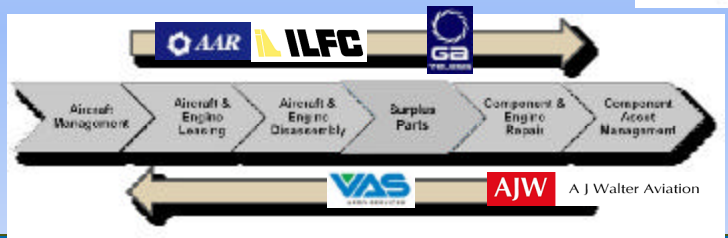
- The average retirement age of certain aircraft types are falling short of previous experience e.g., the old A320 fleet (22 yrs) and the CRJ100/200 (15 yrs)
- And examples exist of parting out of young A320s and 737NG
- However, the most ubiquitous airframes are likely to behave as expected





New relations and partnerships should be based on:

- ***The value add for airlines***
- ***Sustainability***
- ***E.g. Boeing Goldcare & Airbus FHS***

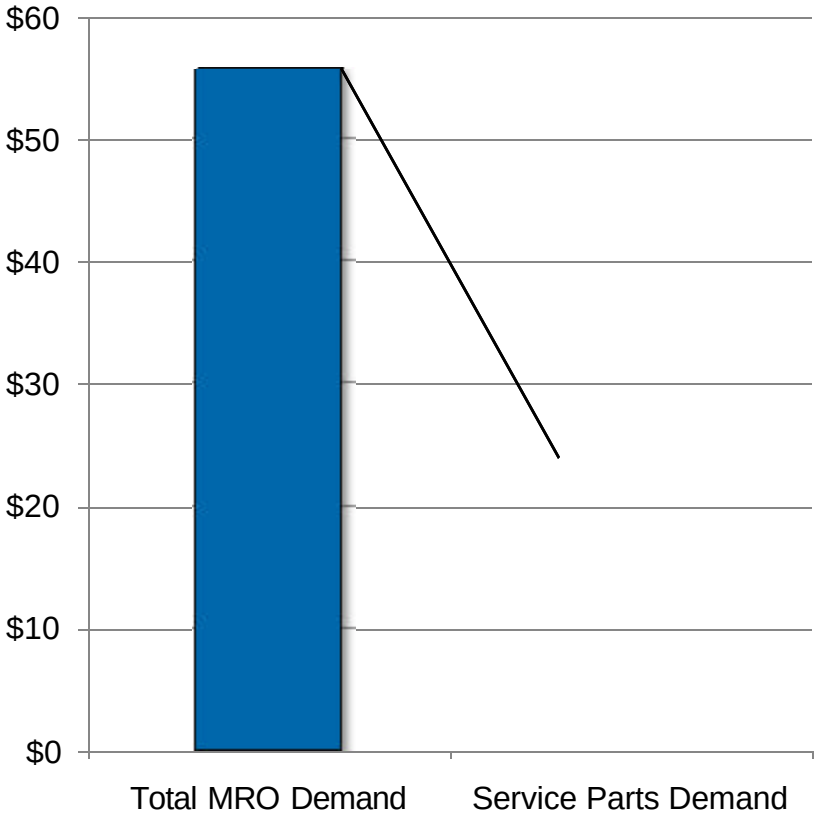


How will the supply chain react and evolve to increasing retirement volumes and support mature/sunset platforms?

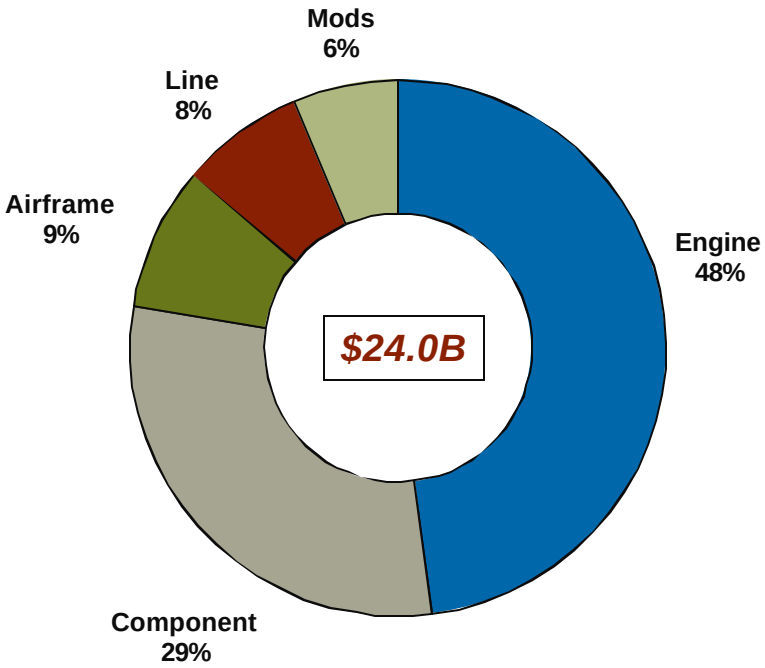
Source: ICF SH&E analysis

The air transport MRO market generates an estimated $24B in service parts demand

2012 Addressed Air Transport MRO Market ($B)



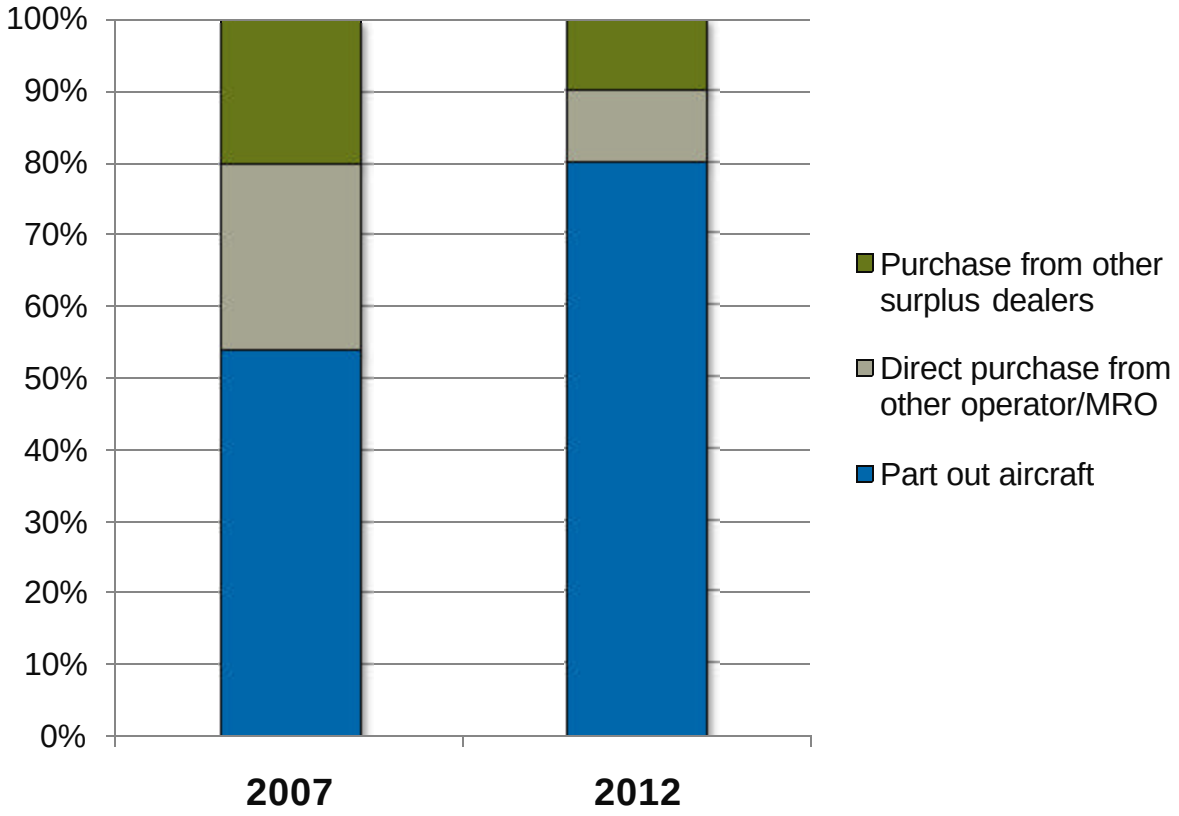
2012 Addressed Air Transport Service Parts Demand



Source: ICF SH&E

Part outs have significantly increased surplus supply

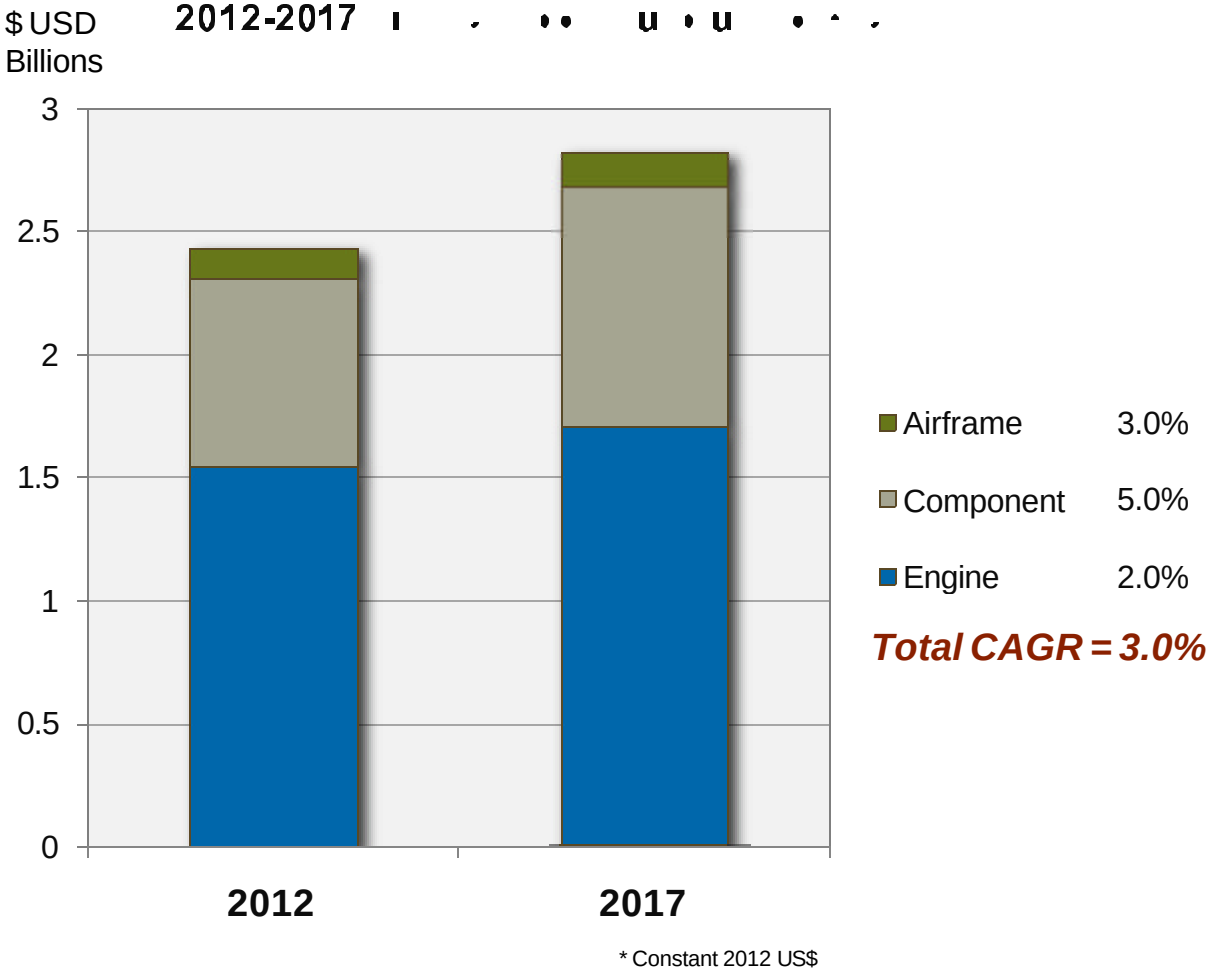
2007 & 2012 Supplier Channels for Acquisition of Surplus Materials



- Increases in the rate of aircraft retirements and the associated harvesting of spare parts has resulted in up to 80% of surplus parts originating from parted out aircraft
- Leaner airline and MRO inventories have resulted in less surplus parts coming from excess inventories
- Companies that scrap aircraft have a direct advantage in access and control of surplus parts

Source: ICF SH&E

But as retirements flatten, surplus material supply will slow relative to the MRO market

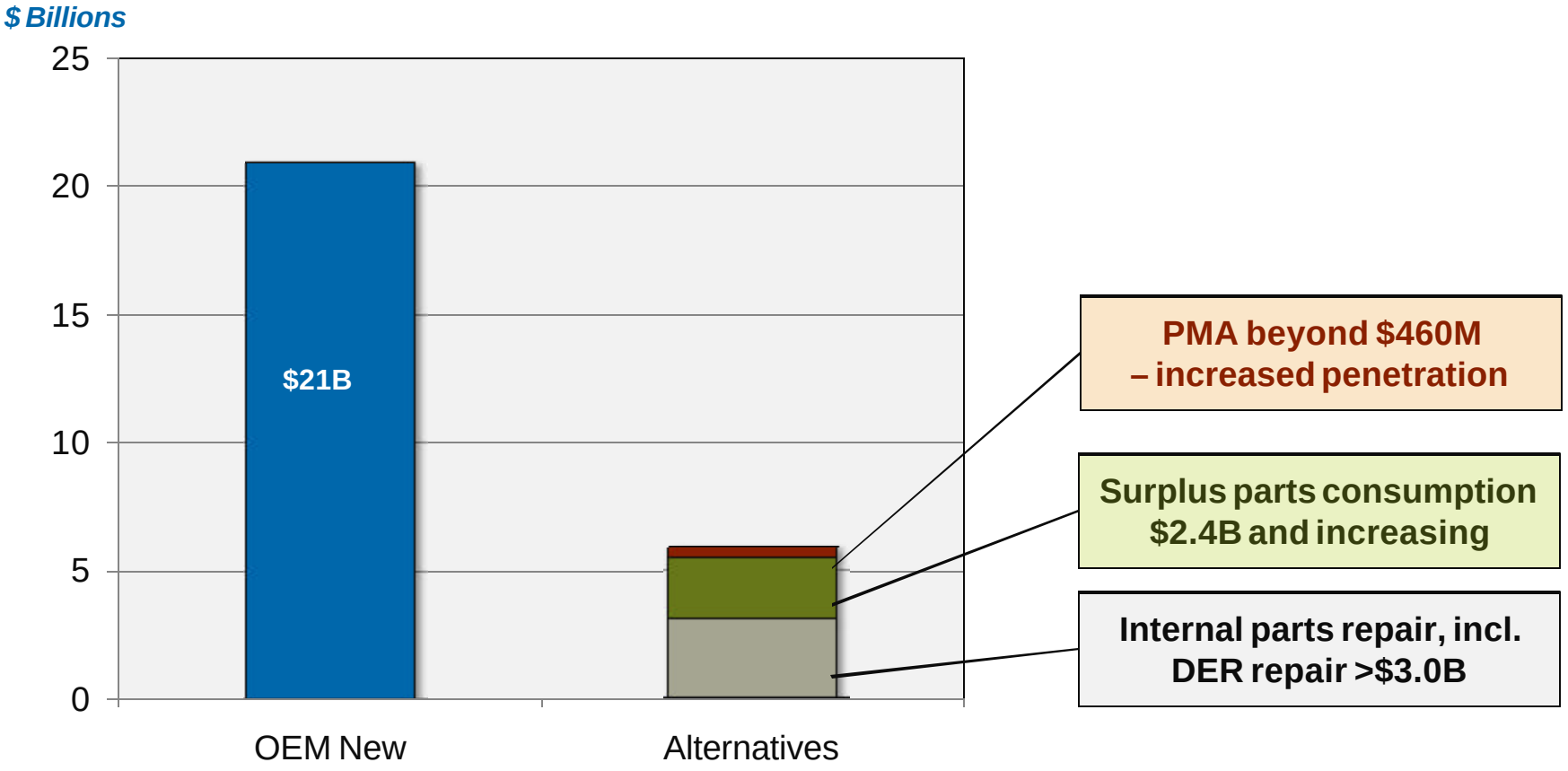


- The air transport surplus market will grow from $2.4B in 2012 to $2.8B in 2017, a 3.0% CAGR
- Engine surplus will grow slightly more slowly than the market average due to:
  - Greater usage of parts repair
  - Engine OEMs control of aftermarket through license service centers reduces alternative parts usage
- Component LRU surplus will grow slightly faster than the market average due to retirement / teardown of relatively new platforms (e.g. A320)

Source: ICF SH&E

Overall, the value of OEM new service parts is $21B

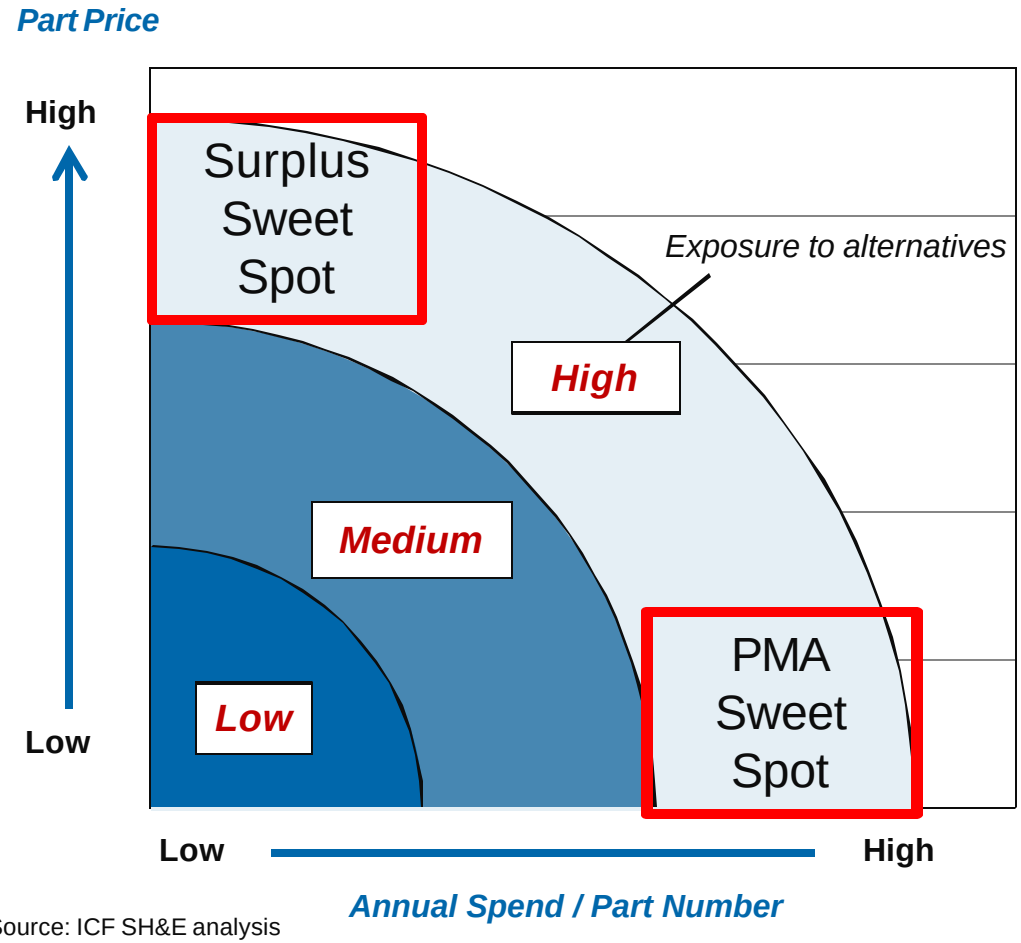
*2012 Air Transport Service Parts and Alternatives**



*Total parts demand of $24B USD is made up of OEM New + Surplus parts + PMA: Repair activity is outside this parts demand
Source: ICFI SH&E

PMA parts tend to focus on P/Ns with high annual spend and do not compete directly with some surplus parts

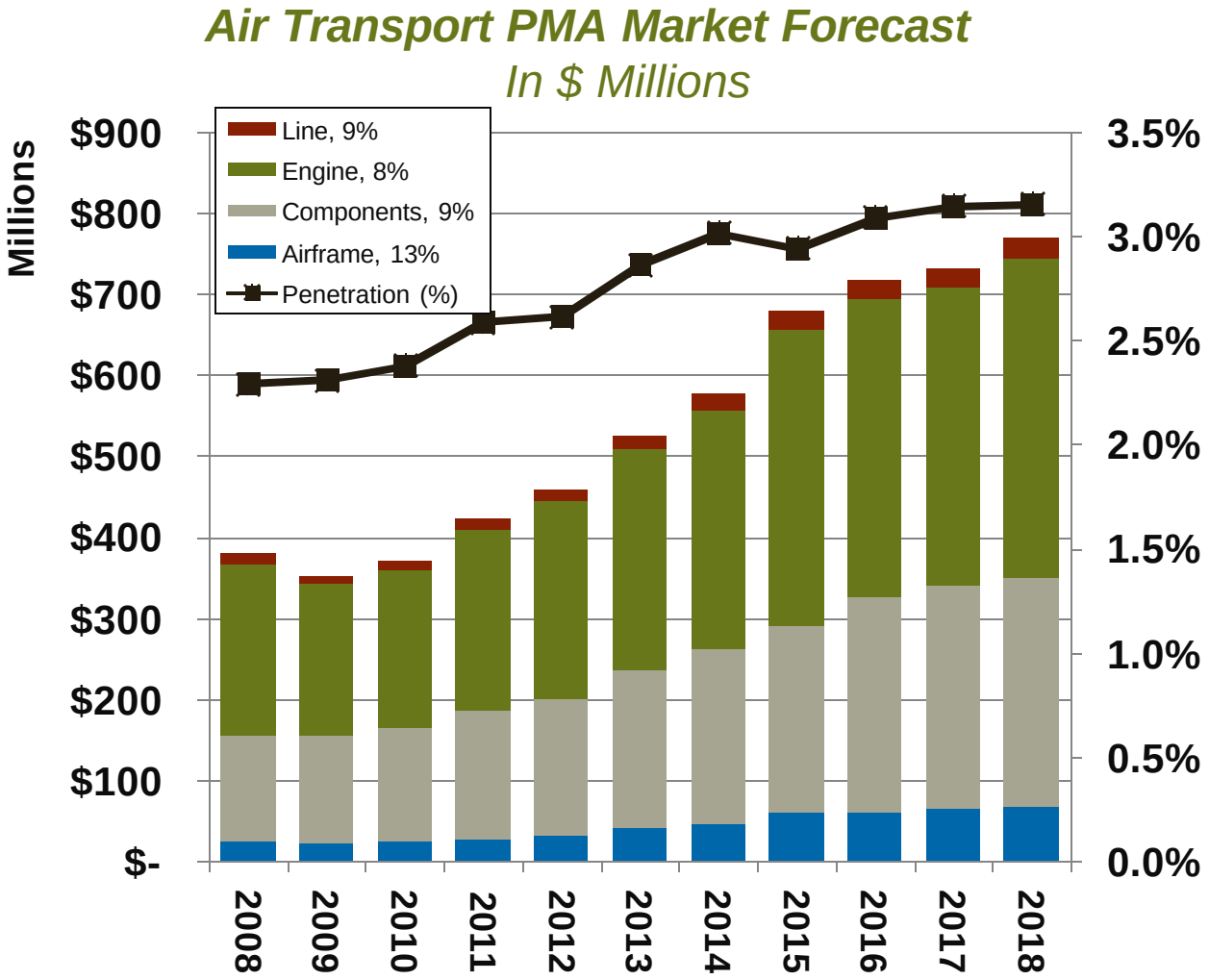
Alternative Parts Exposure vs. Part Type



Source: ICF SH&E analysis

- Majority of PMA parts are piece parts and consumables, which are relatively lower priced compared to rotables and LRUs
- Surplus parts are most attracted to high price and high annual spend parts such as rotables and LRUs
- PMA parts, while focused on piece parts and consumables, are focused on parts with high annual spend
- This decreases PMA's competition with surplus material

Current PMA penetration is 2.6% and is projected to grow to over 3% by 2018



- The PMA market is estimated to grow from $460M in 2012 to $770M by 2018 (~ 9% CAGR)
- Engine PMA parts remain the largest category (but slowest growth)
- PMA penetration expected to grow to over 3% of total material consumption

Source: ICF SH&E analysis

In summary, there are questions, opportunities and challenges for PMA companies to address

Retirements are constraining PMA growth

- Retirements have two impacts on the PMA market – increase the supply of surplus material and decrease the fleet of PMA-friendly aircraft

Leasing companies still cold to PMA

- Not only do leasing companies believe that PMA parts lower residual values, but they also have a stake in the growth of the surplus market

OEMs are more aggressive about PMA

- OEMs, particularly engine OEMs, have been aggressive in developing authorized service networks to control aftermarket service parts

PMA critical component of the market

- Airlines and MROs no longer debate whether PMA is safe, but whether is makes the most sense to use economically

Thanks and Questions

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