PMA Market Outlook:
What Is The Impact Of Airline Economics?

Presented by Michael Howard
31 March 2011
San Diego, California
Gorham 2011 Annual Conference

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Agenda

High Fuel Costs & The New Airline Economics

Implications For The Air Transport PMA Market

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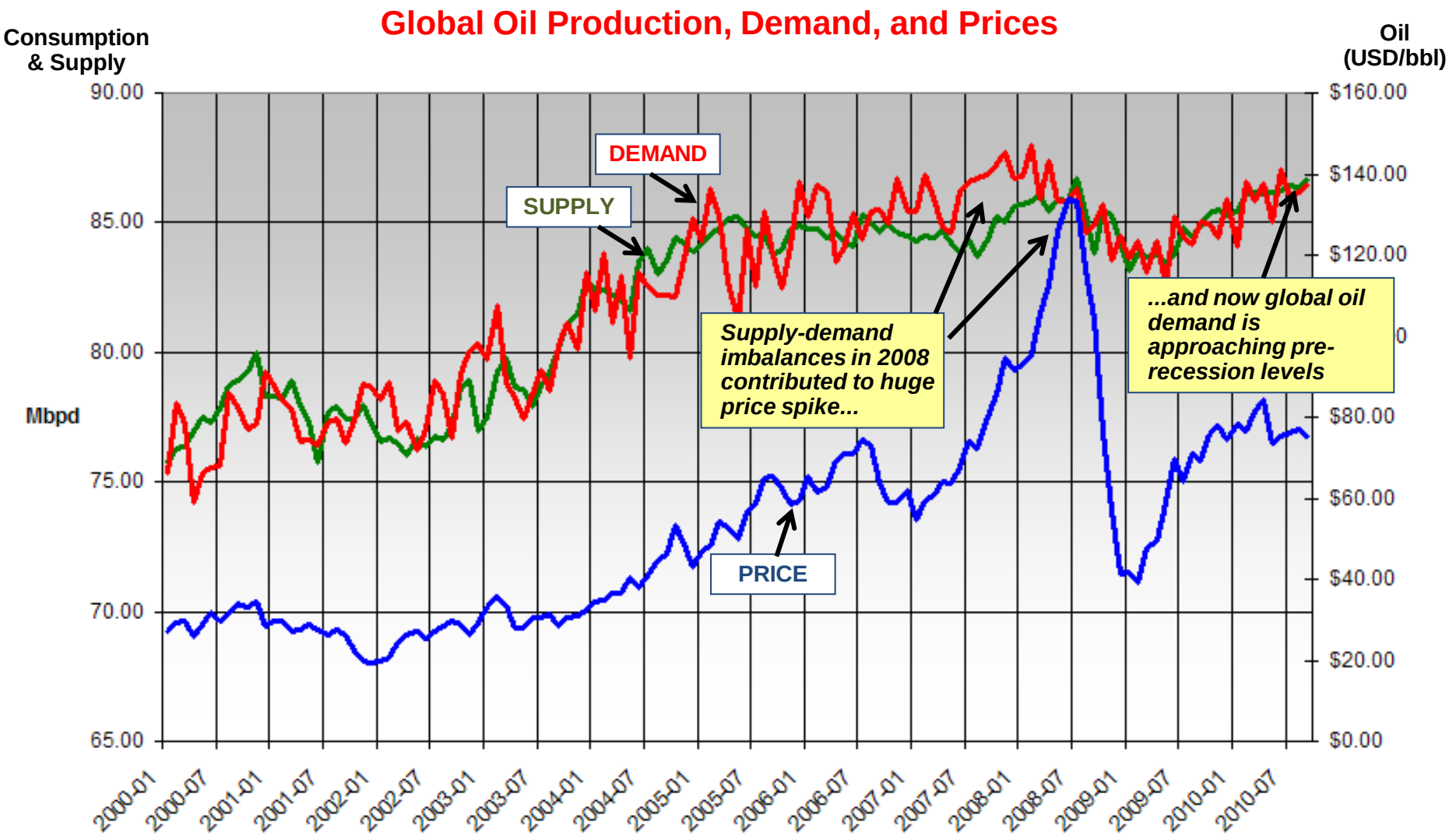
Global Oil Consumption Is Approaching Pre-Recession Levels, Exacerbating A Tight Supply-Demand Balance…



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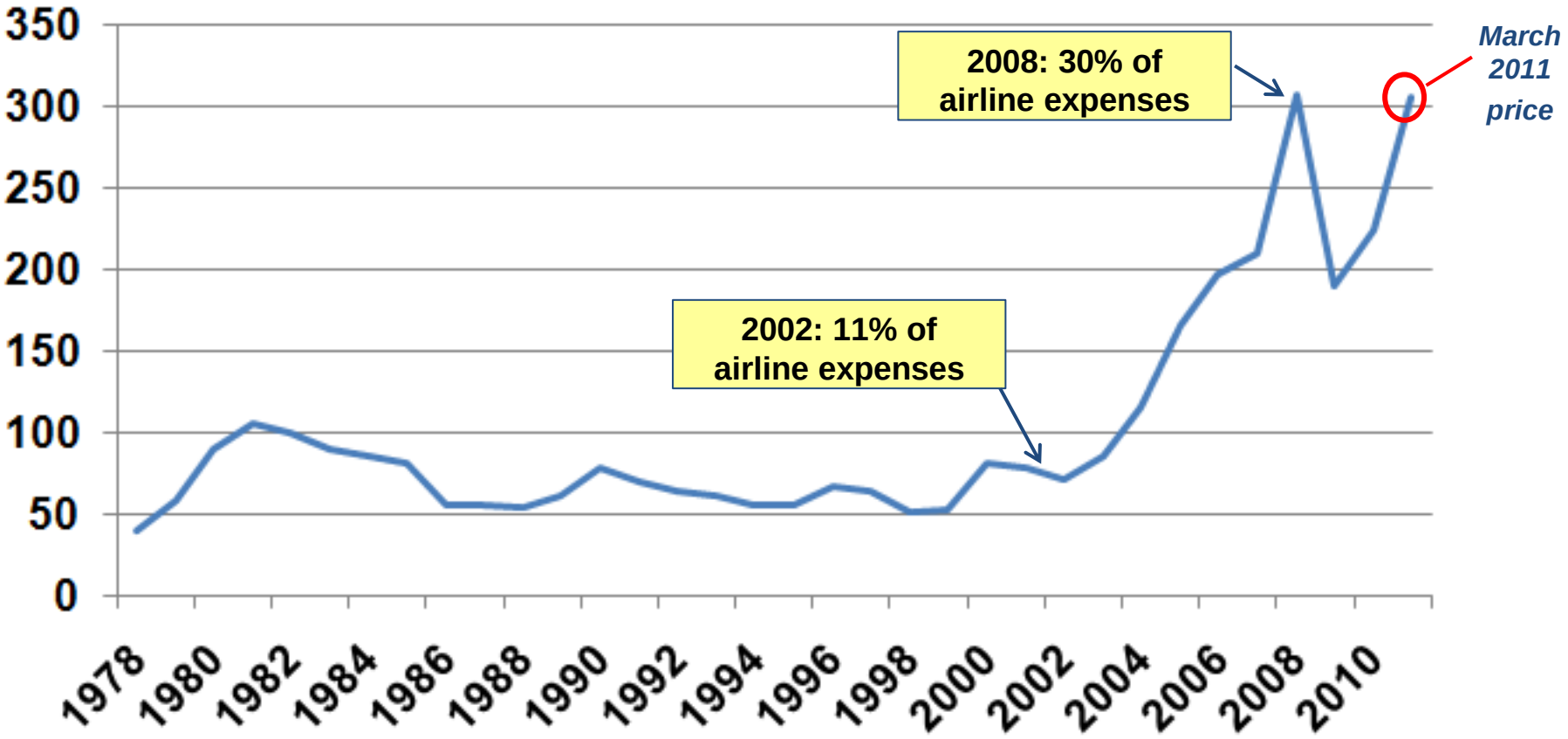
Source: EIA

…As A Result, Oil Prices Are Approaching The High Levels Of The 2008 Price Spike…

Annual Average Fuel Costs 1978 to present
(cents per gallon)



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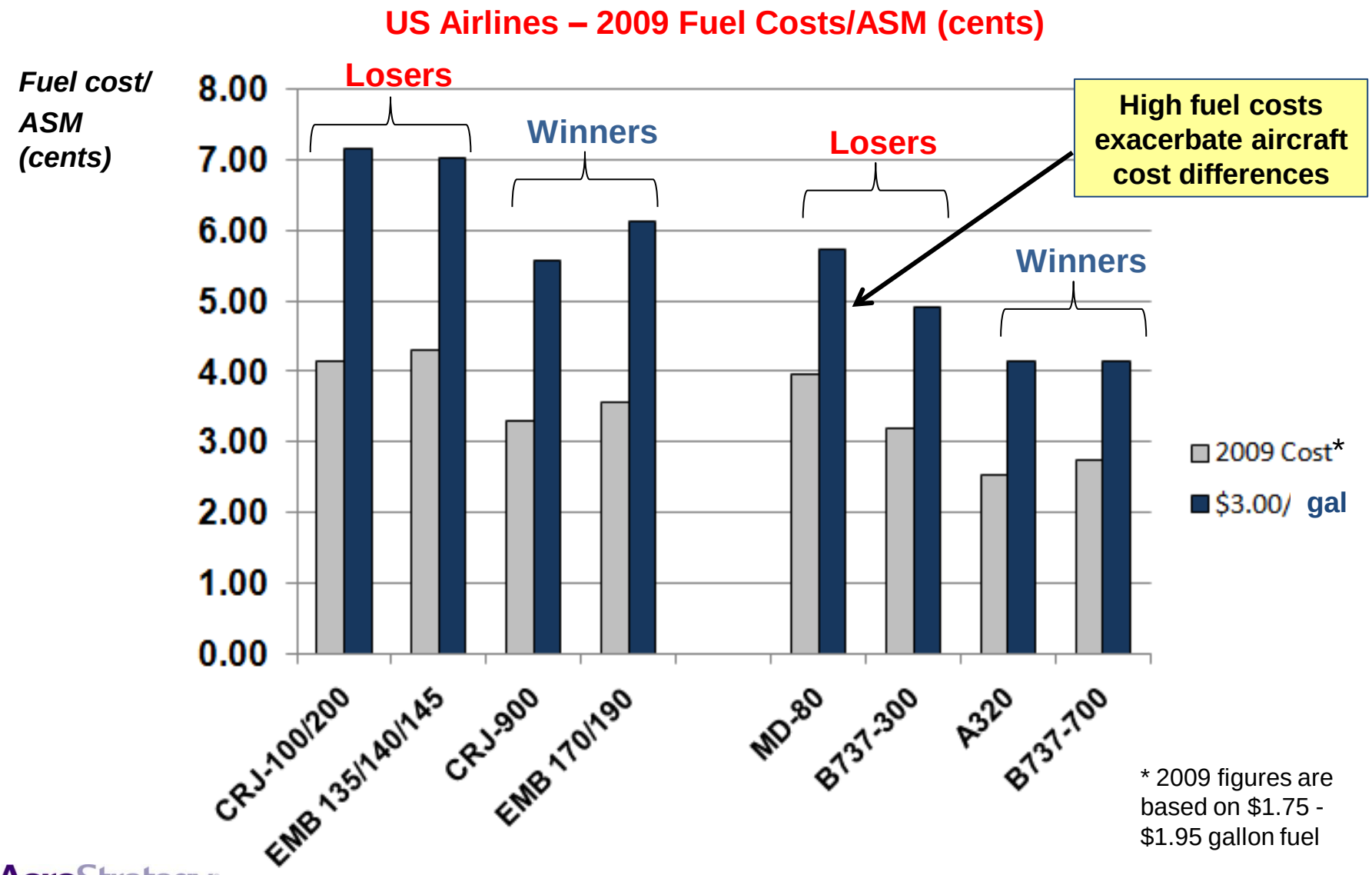
Source: Air Transport Association, IATA

…Which Is Changing The Economics Of Aircraft Operation…



* 2009 figures are based on $1.75 - $1.95 gallon fuel

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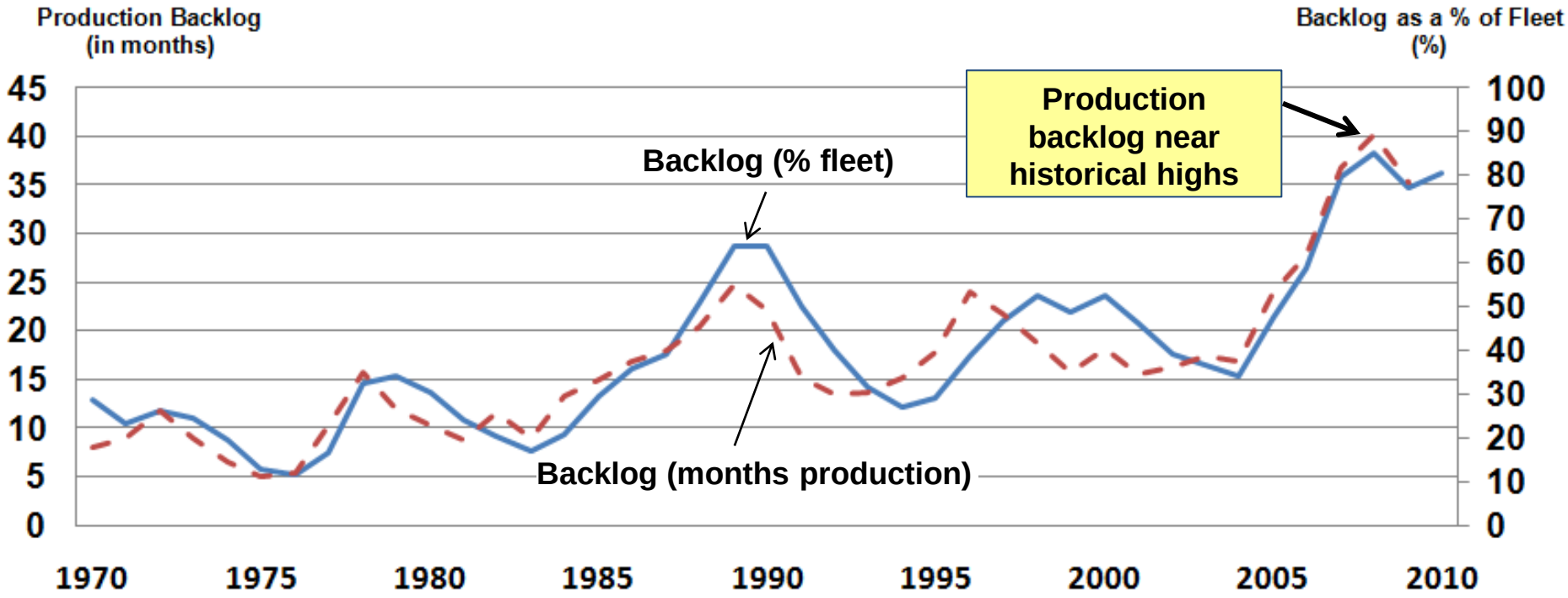
Source: US Air Transport Association

…And Contributes To A Near-Record Backlog…

Air Transport Production Backlog
1970 - 2010



High Fuel Costs Good News For Production…At Least In the Short Term!

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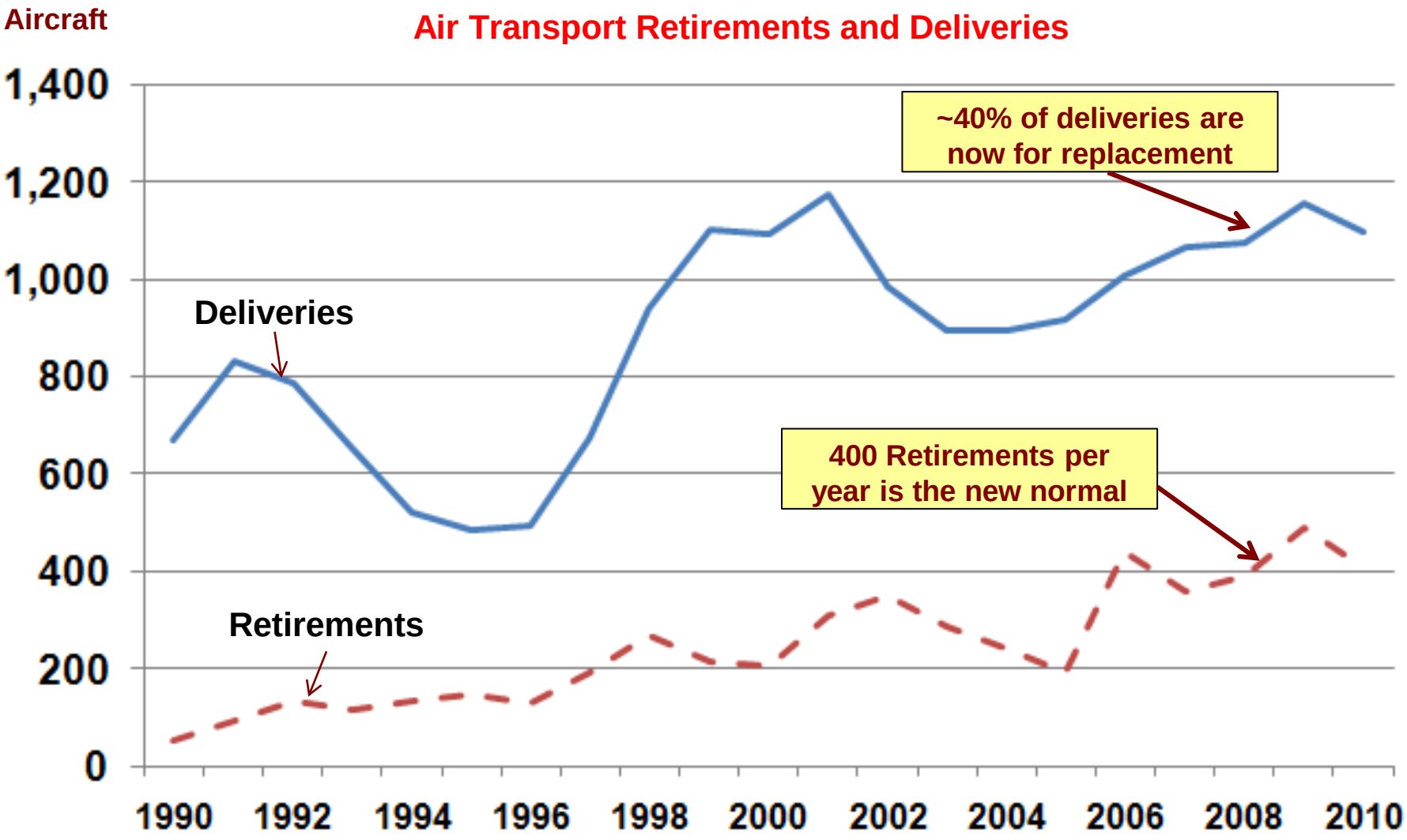
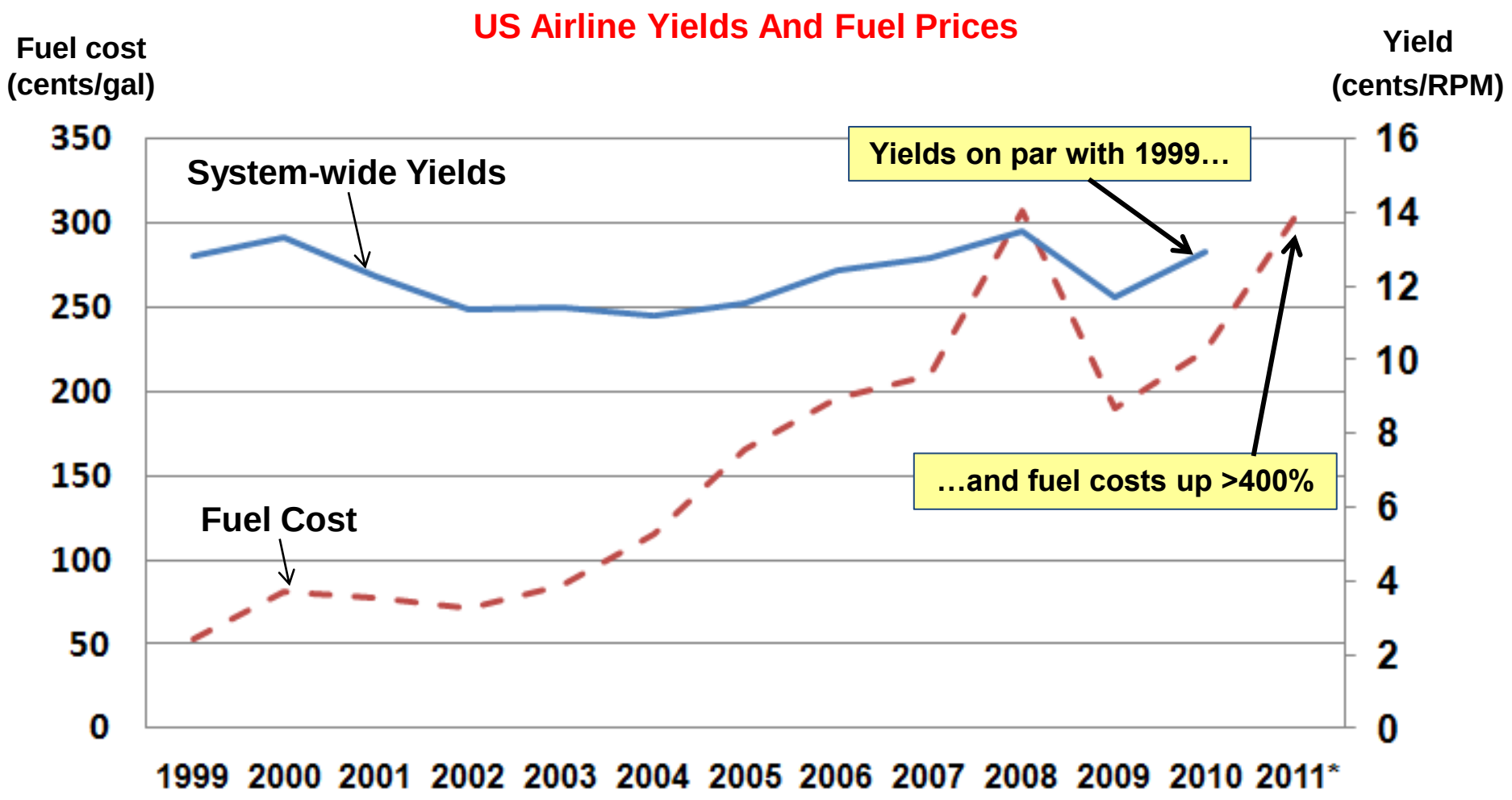
Source: Airline Monitor

...While Aircraft Retirements Are Surging...



…And Limited Pricing Power Is Squeezing Airlines



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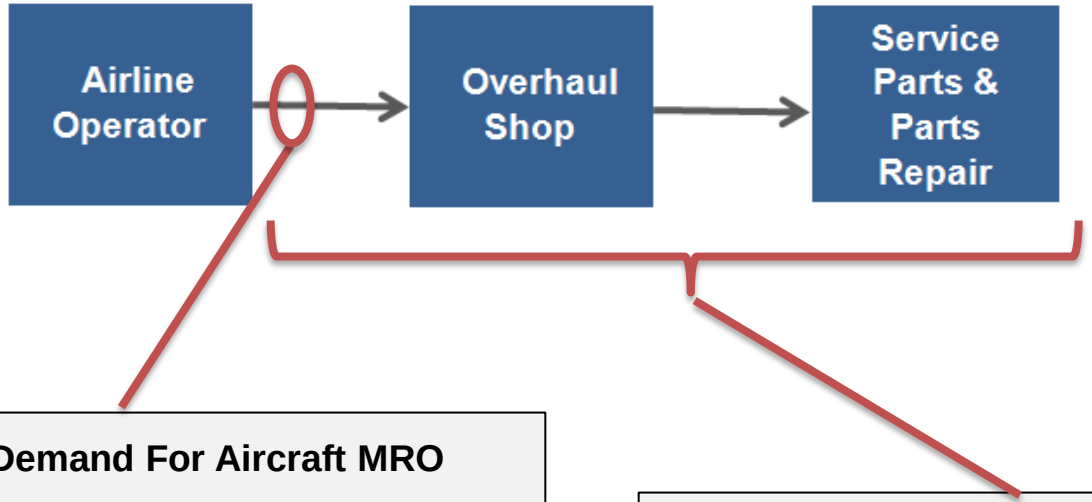
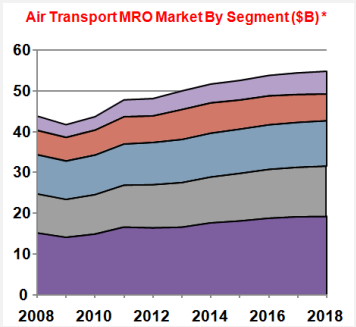
Source: Airline Monitor

Two Major Factors Influence Aircraft MRO Activity: Fundamental Demand And Supply Chain Practices…

Simplified MRO Supply Chain



1. Fundamental Demand For Aircraft MRO



- Predicted airline maintenance spending as a result of aircraft demographics, utilization, equipment reliability, maintenance programs and regulations
- A good predictor of supplier MRO and aftermarket activity in normal times

2. MRO Supply Chain Practices

- Inventory stocking & destocking, use of surplus components, deferred and reduced scope maintenance
- All of the above act as a buffer between fundamental demand and realized revenue by OEMs and MRO suppliers
- Important in times of crisis

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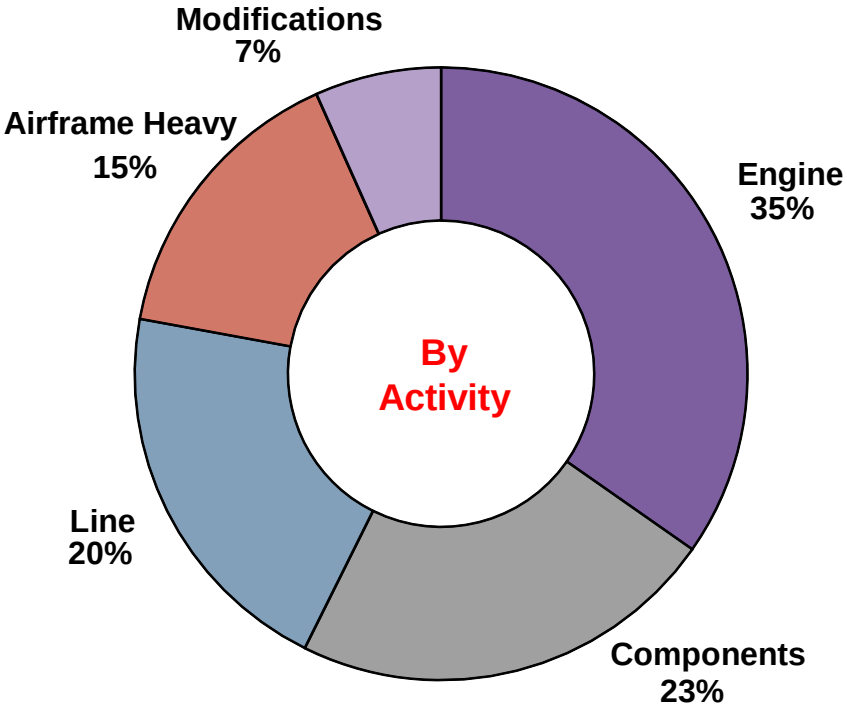
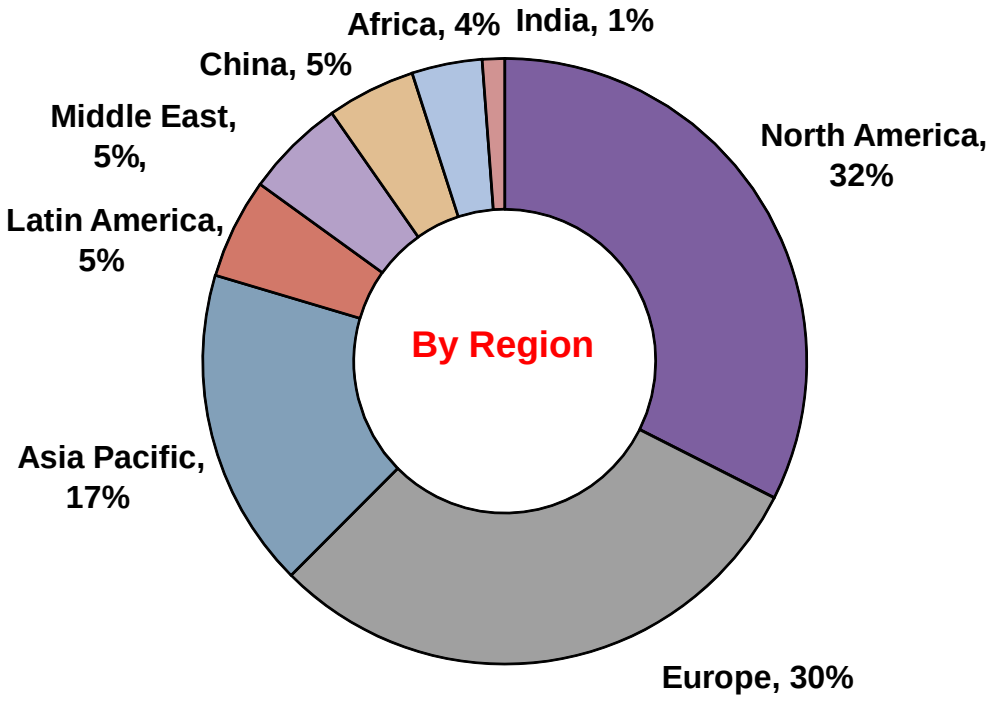
...And Fundamental Demand Indicates A Current Air Transport MRO Market Of $43.6 Billion...

2010 Air Transport MRO Market ($43.6B)





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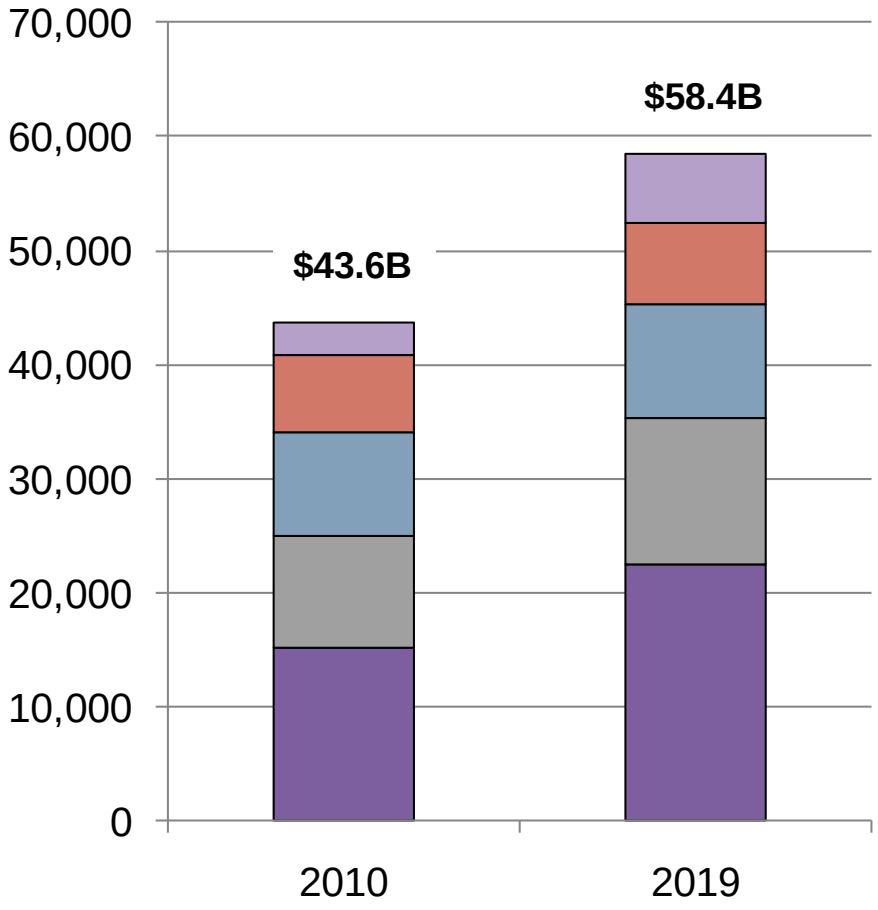
Source: AeroStrategy/OAG Aviation

...With A Long Term Growth Rate Of 3.3%....

Air Transport MRO Market Forecast ($M)*



CAGR

- Modifications, 8.4%
- Airframe Heavy, 0.5%
- Line, 1.3%
- Components, 2.9%
- Engine, 4.5%

Total = 3.3%

Slow growth in airframe MRO reflects better alloys and higher use of composites

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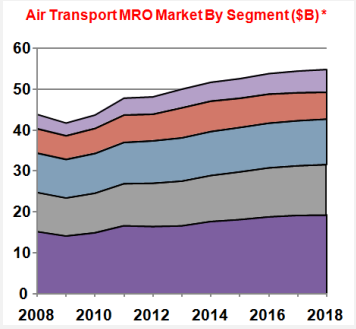
Source: AeroStrategy OAG Aviation
* Constant 2009 US$

MRO Supply Chain Practices Have Attenuated Fundamental MRO Demand Since 2009…

Simplified MRO Supply Chain

1. Fundamental Demand For Aircraft MRO



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- Inventory stocking & destocking, use of surplus components, deferred and reduced scope maintenance
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- Important in times of crisis

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Source: AeroStrategy

…And Airlines Have Utilized Several Key MRO Supply Chain Levers To Conserve Cash…

Engines

- Reduced scope of maintenance – more “repair” and less “replace”
- Defer replacement of expensive life limited parts until they reach absolute cycle limits(e.g. short-stub engines)
- Greater leverage of spare engines in lieu of overhauls
- Acquisition of surplus engines for mature aircraft
- Renegotiate MRO contracts

Components

- Burn down rotable inventory in lieu of component MRO repair
- Reduced scope maintenance – more “repair” and less “replace”
- Acquisition of surplus rotables for mature aircraft
- Renegotiate MRO contracts

Airframe Heavy

- Reduce utilization and rotate in-service aircraft to minimize heavy maintenance checks required by hour/cycle limits
- Park older aircraft approaching expensive heavy checks
- Reduce discretionary modifications (e.g. Interior upgrades, painting)

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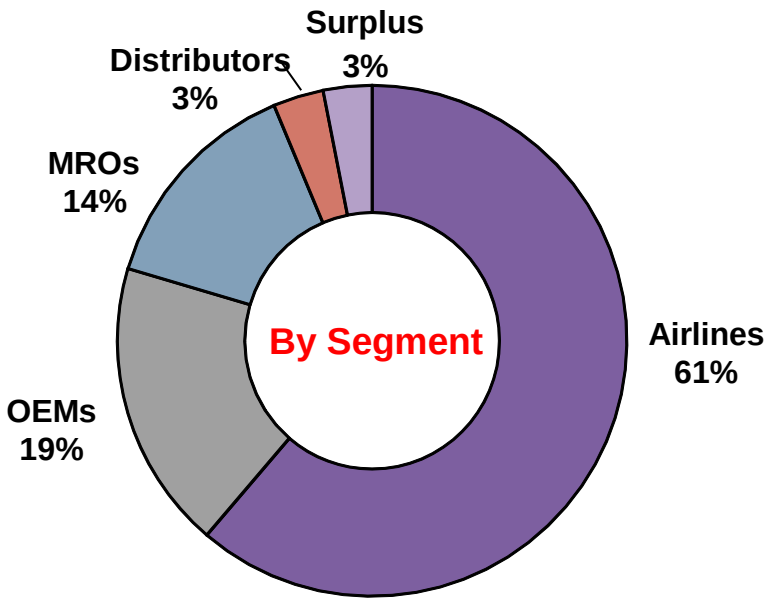
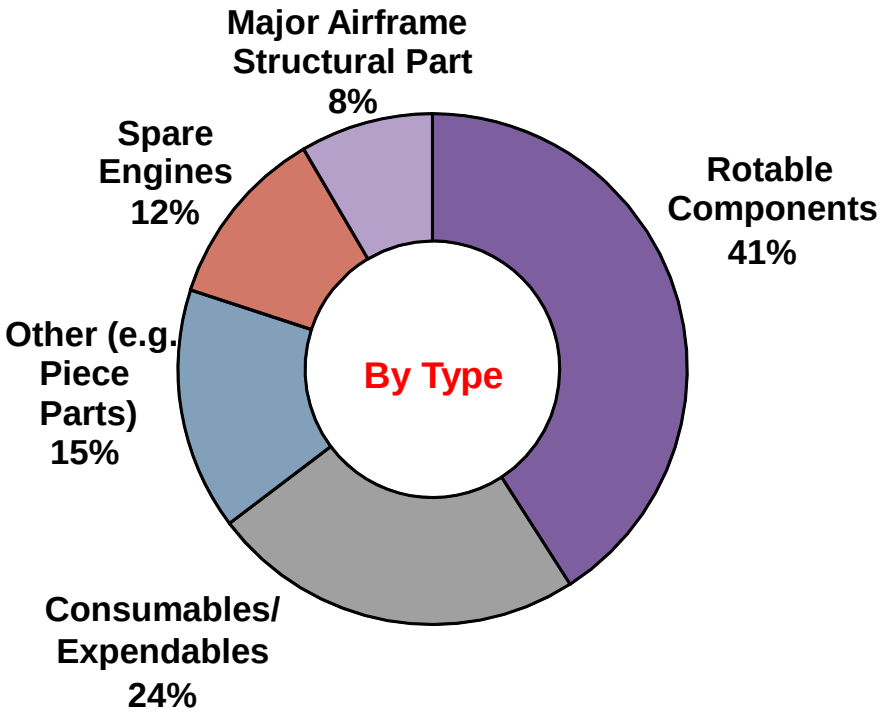
Source: AeroStrategy

…Particularly In Light Of $47 Billion Of Inventory In The MRO Supply Chain…

Air Transport MRO Supply Chain Inventory Holdings
2009 Total = $47B





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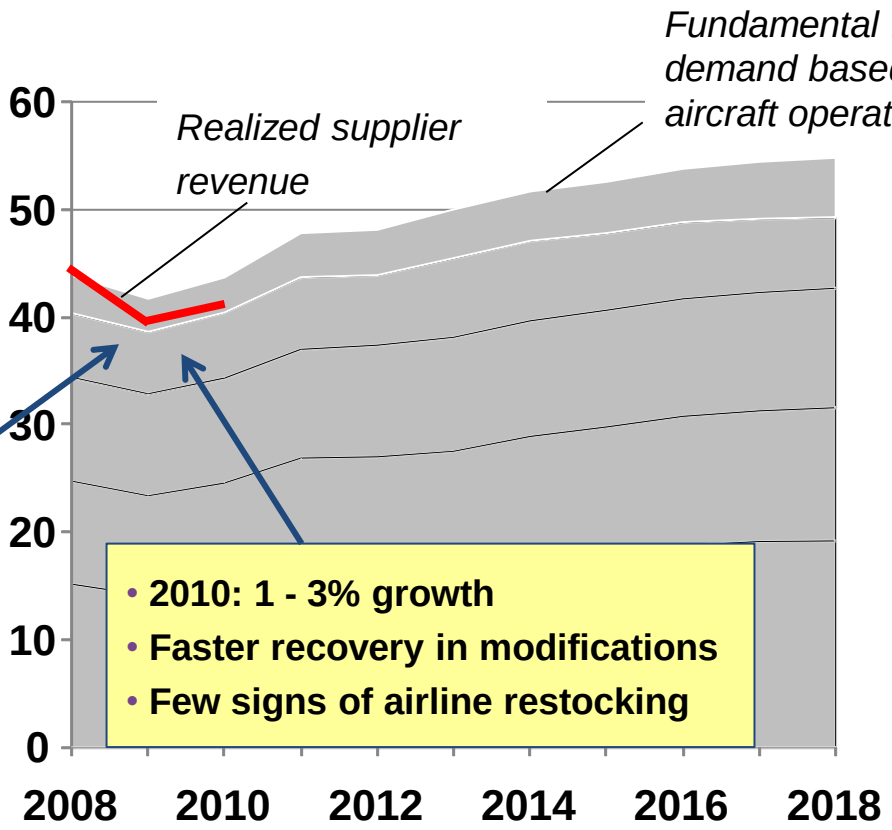
Source: AeroStrategy

…Which Resulted In An Unanticipated 15-20% Spending Reduction In 2009

Air Transport MRO Market – Realized Supplier Revenue($B) *



So much for the theory that aftermarket is steady while production is volatile!

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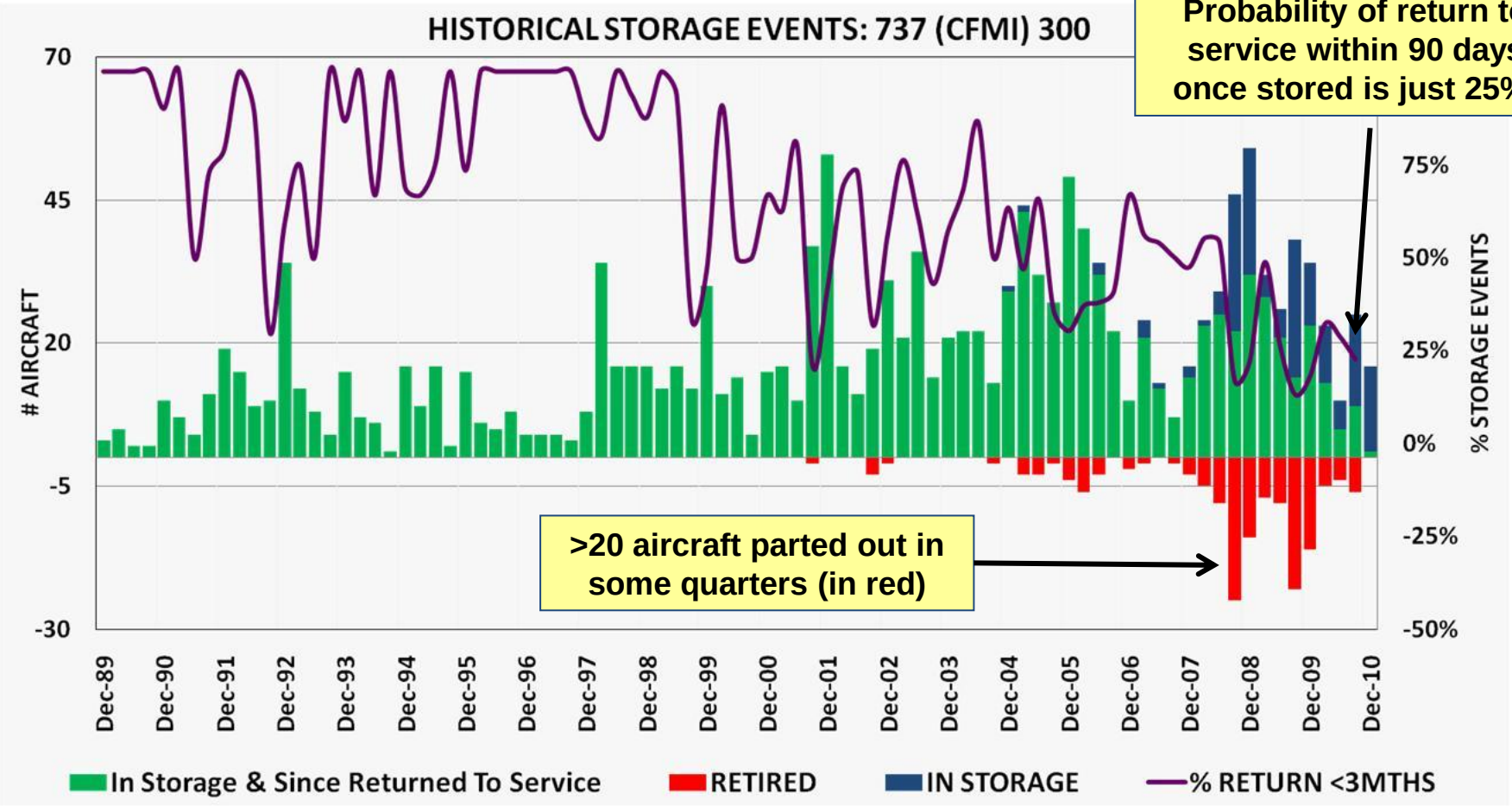
Source: AeroStrategy
* Constant 2009 US$

Now The Parting Out Of Retired Aircraft Is Gaining Momentum As Evidenced By The B737-300...

Historical Storage Events By Quarter 1990-2010: Passenger 737-300s



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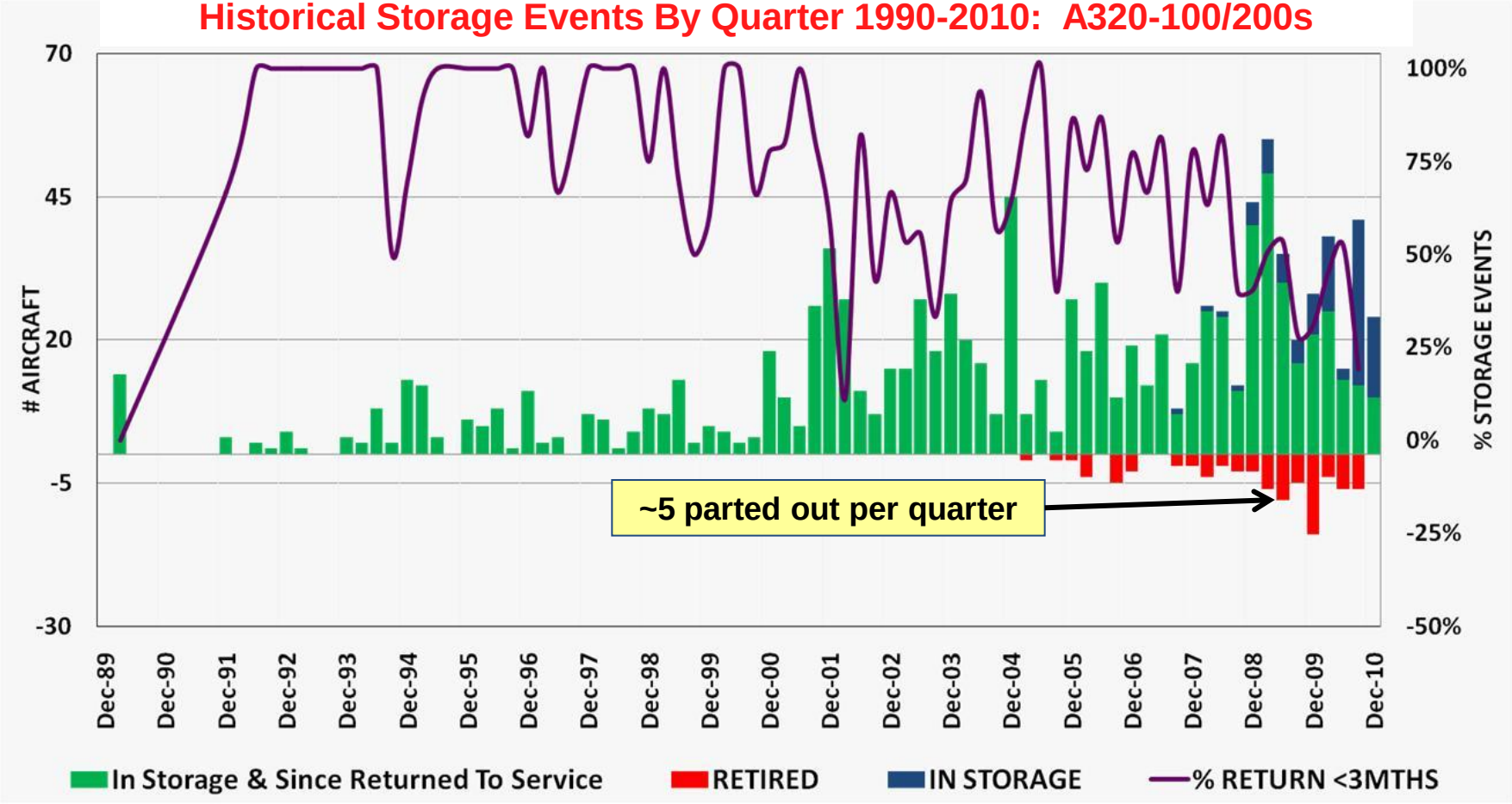
Source: AeroStrategy analysis; Airclaims

...And Parting Out Is Affecting Even Earlier Model A320s



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Source: AeroStrategy analysis; Aircraft

As Many As 15-20 Aircraft Are Now Being Parted Out Each Month…

- **Globally, 15-20 aircraft per month are being "parted out"**
- **Engines, avionics, and other aircraft components are re-circulated to the market, thereby suppressing MRO demand**
- **Facilitating this phenomenon is a new breed of surplus parts suppliers, with an impressive blend of financial skills, technical capability and market savvy**
- **"Parting out" is not limited to mature aircraft; new generation aircraft are also being cannibalized including A320, A340, and advanced B767 models**
- **"Hot" surplus parts markets include:**
  - **Aircraft: B737-3/4/500, B767, B747-400, CRJ**
  - **Engines: CFM56-3, CFM56-5, CF34, V2500A1, CF6-80C2**
  - **High value components: APUs, avionics, others**

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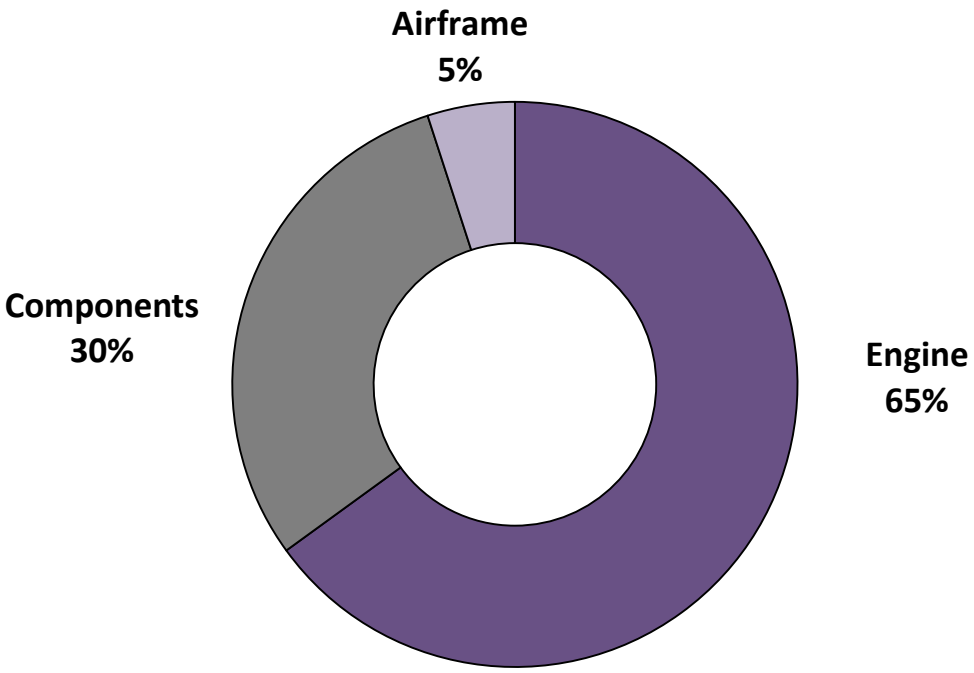
Source: AeroStrategy interviews

...And Consumption Of Surplus Parts Now Exceeds $2 Billion…

2010 Air Transport Surplus Parts Consumption ~ $2.3 Billion



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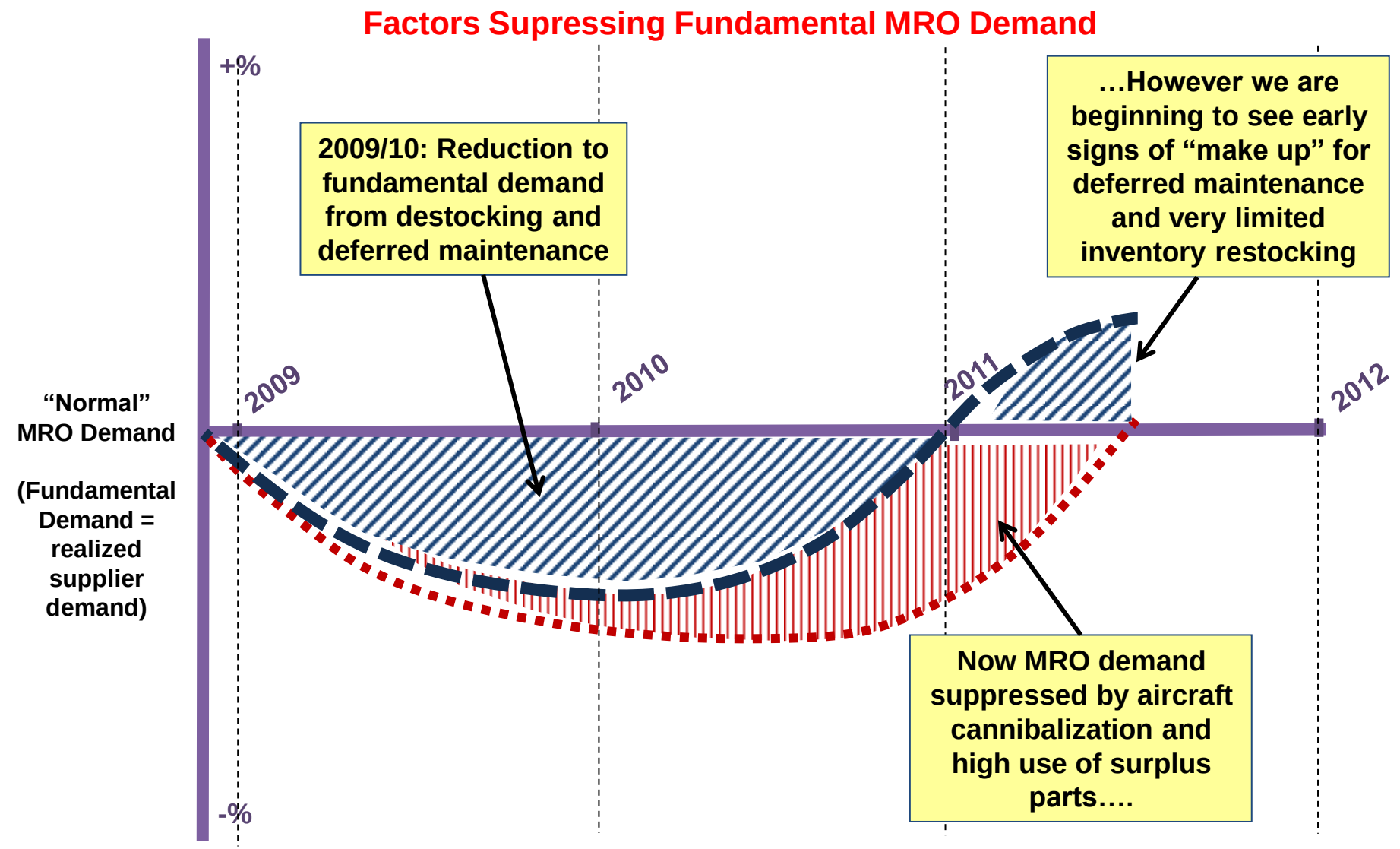
Source: AeroStrategy

…Which Is Suppressing Aftermarket Demand, Even As Inventory De-Stocking Runs Its Course



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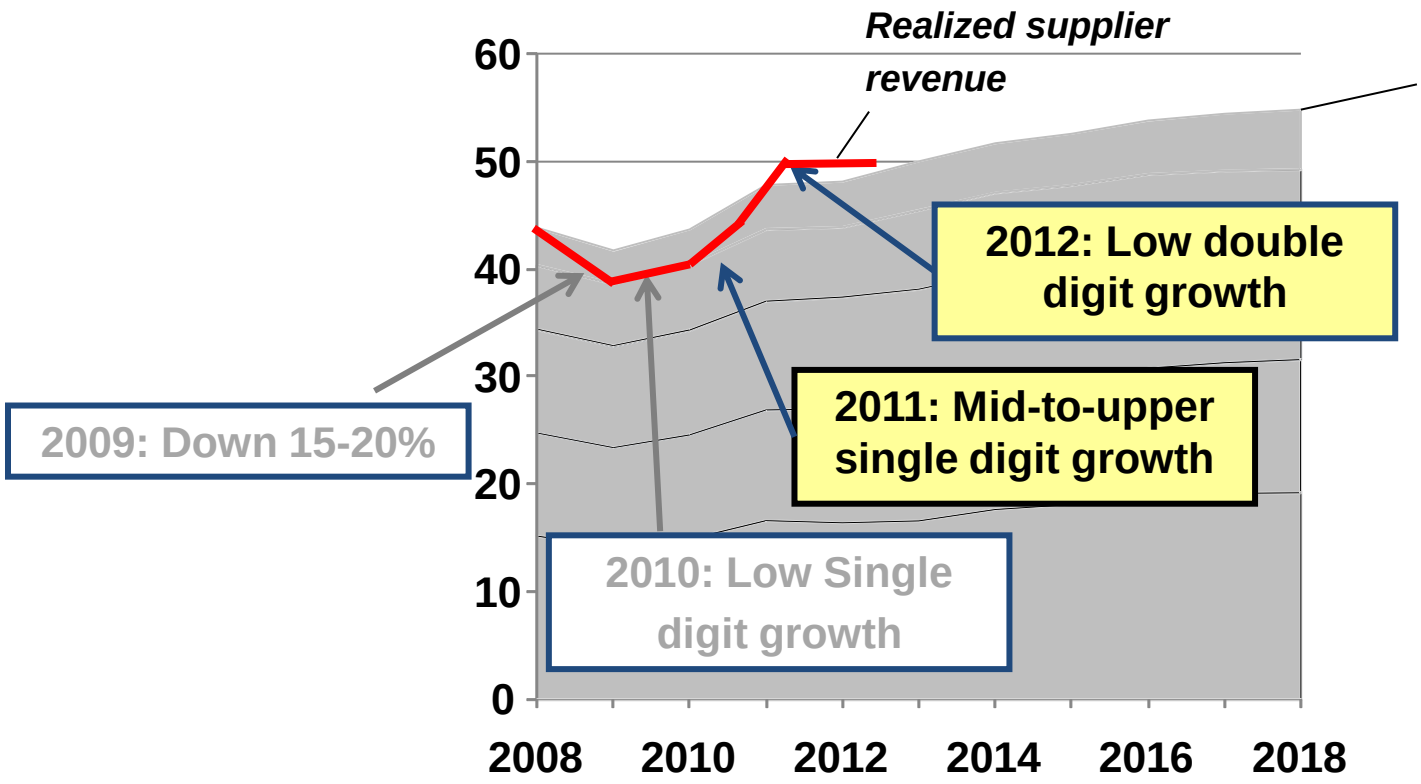
Source: AeroStrategy

AeroStrategy Anticipates Mid-To-Upper Single Digit MRO Growth In 2011…

Air Transport MRO Market – Realized Supplier Revenue($B) *



Key Assumptions

- Fuel costs in $80 – $110 /bbl range
- 2-3% global GDP growth and modest airline profitability
- Some make up for deferred maintenance and modest inventory restocking

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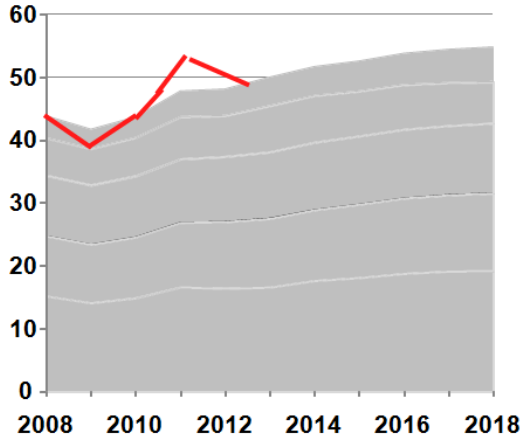
Source: AeroStrategy
* Constant 2010 US$

…However There Are Best And Worst Case Scenarios That Are Tightly Linked To Oil Prices

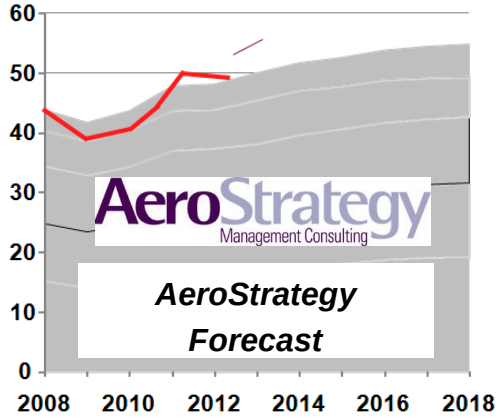
MRO Growth Scenarios Based On Fuel Costs

Best case
Oil < $80/bbl



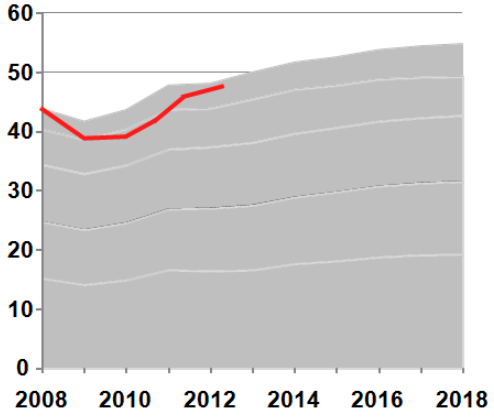
- **Fuel costs fall to less than $80/bbl**
- **Falling costs boost GDP, air travel growth, and airline profits**
- **Facilitates return of hundreds of aircraft from storage – which need MRO**

Nominal case
Oil $80 – 110/bbl



- **Fuel costs remain in $80-110/bbl range**
- **Modest (2-3%) global GDP growth…and airline profitability**
- **Fuel costs limit return to service of most stored aircraft**

Worst case
Oil > $110/bbl



- **Fuel costs escalate to >$110/bbl…or much higher**
- **A dramatic spike in fuel costs could lead to a "W" shaped recession and reduced air travel growth**
- **Airlines again in red, which results in further capacity reductions and cost cutting**
- **More aircraft to desert**

Source: AeroStrategy

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Agenda

High Fuel Costs & The New Airline Economics

Implications For The Air Transport PMA Market

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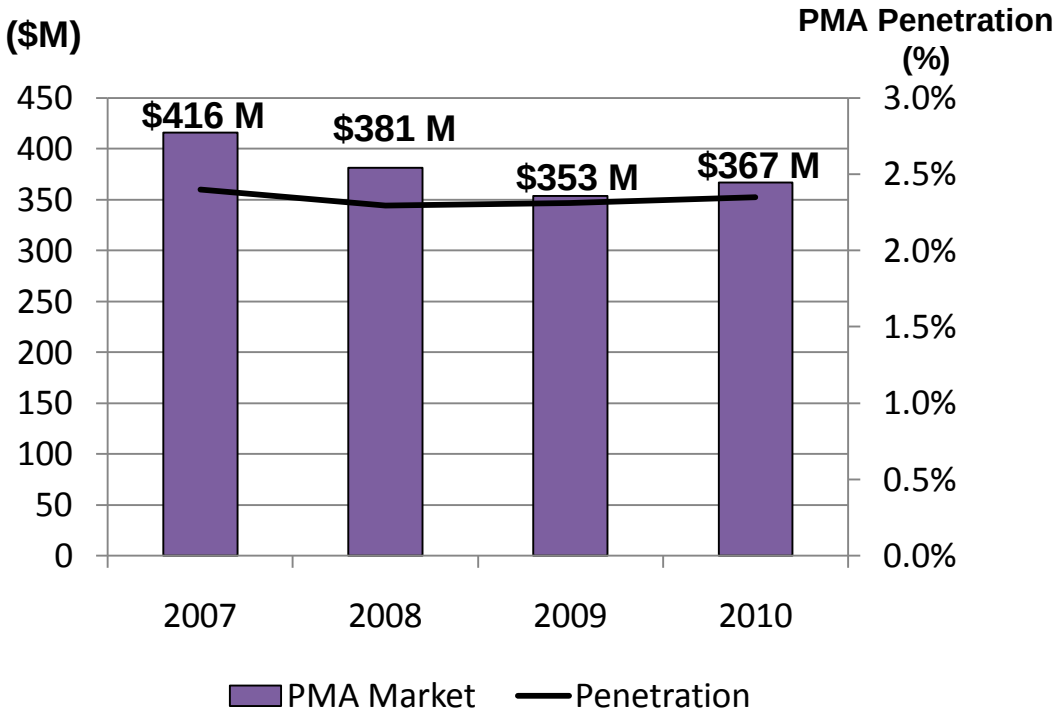
The PMA Market Grew By 4% In 2010 As The Air Transport Market Showed Signs Of Recovery …

Historical PMA Market (2007-2010)



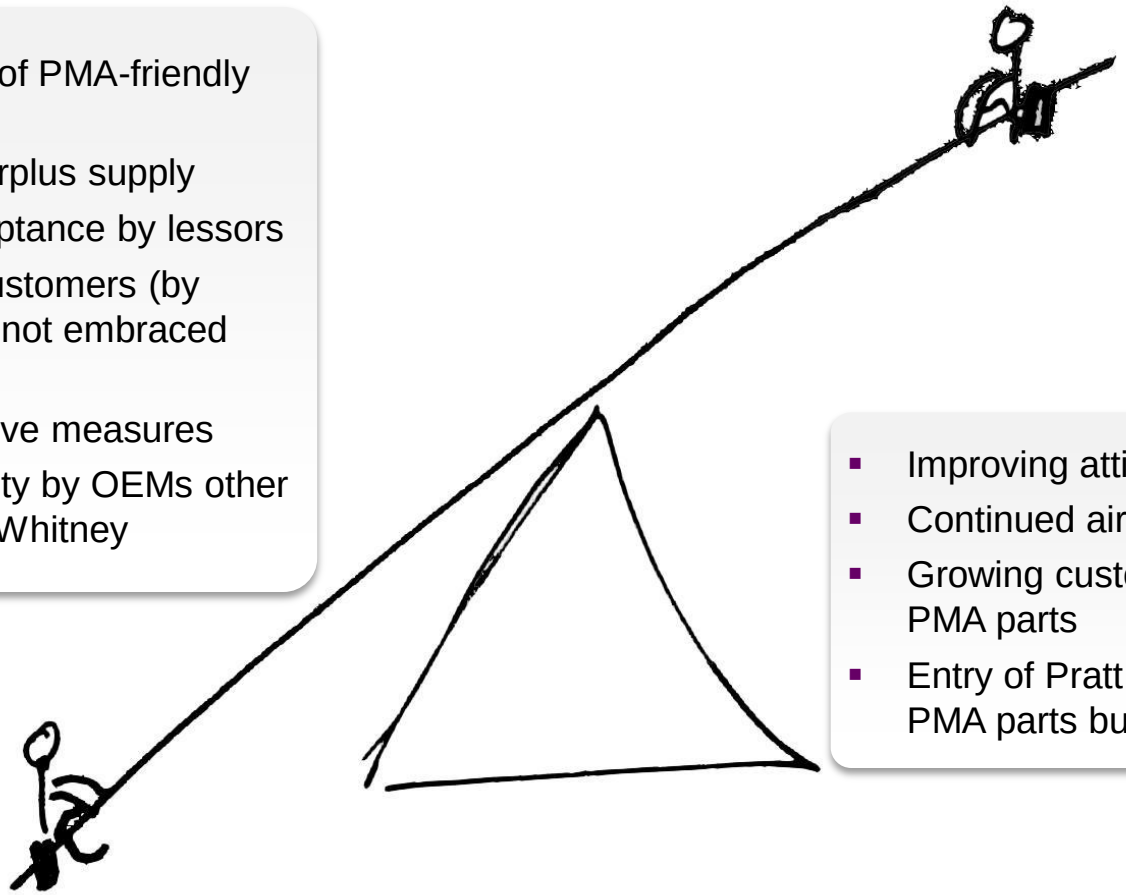
- 2010 PMA market was up 4% versus 2009, from $353M to $367M
- The PMA market is still below the 2007 peak of $416M
- Several factors drove the PMA market growth
  - Slight growth in the underlying MRO market
  - Greater penetration of PMA parts due to cost reduction actions at major airlines

Source: AeroStrategy/IATA 2009 Inventory & Logistics Survey, Aerostrategy / OAG MRO model

… And A Multitude Of Factors Will Impact PMA Growth In The Future …

PMA Parts – Not Yet At Tipping Point

- Retirements of PMA-friendly platforms
- Growth of surplus supply
- Limited acceptance by lessors
- 40-50% of customers (by spend) have not embraced PMA
- OEM defensive measures
- Limited activity by OEMs other than Pratt & Whitney

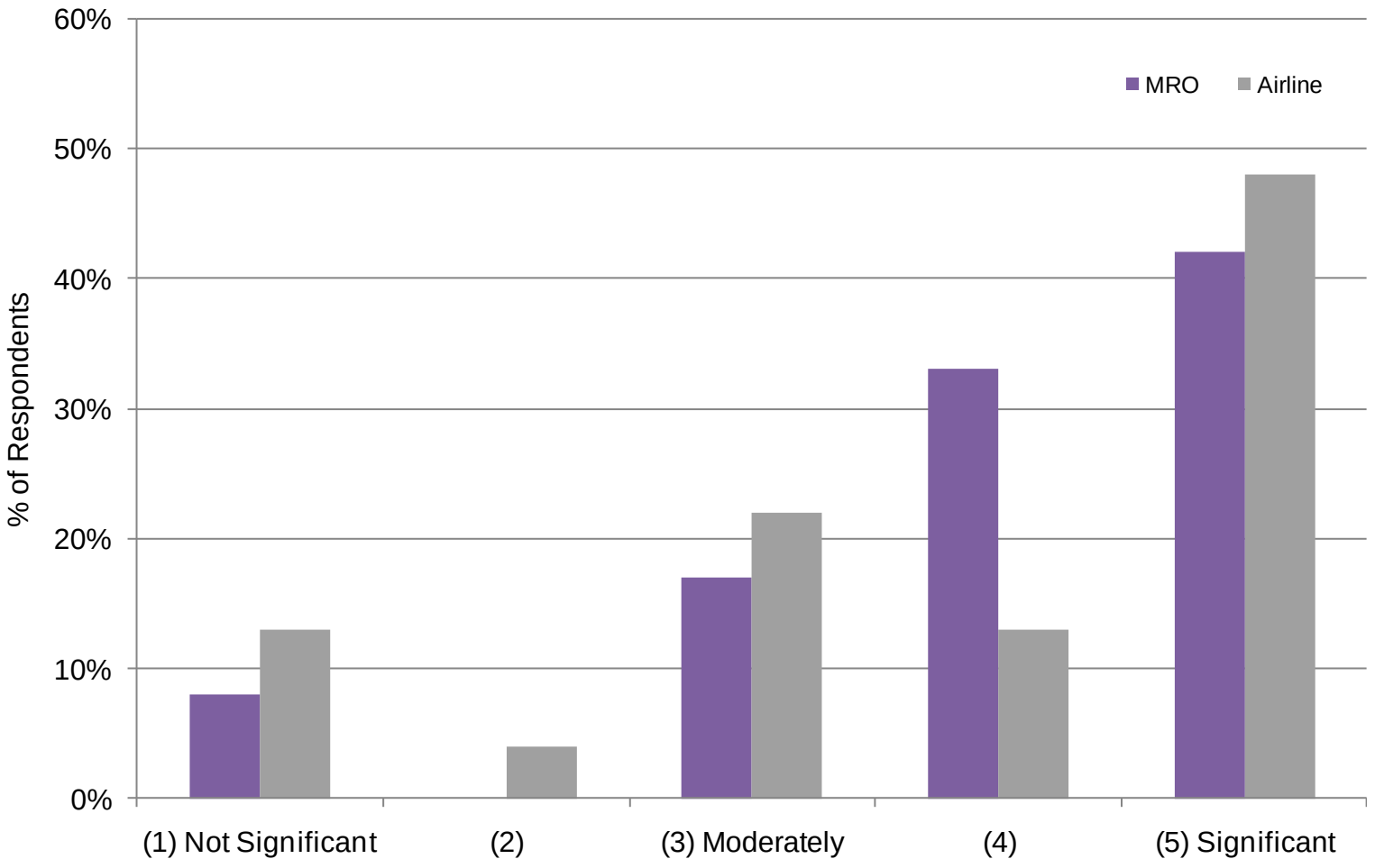


- Improving attitudes toward PMA
- Continued airline financial stress
- Growing customer acceptance of PMA parts
- Entry of Pratt & Whitney into PMA parts business

Tipping Point Definition: significant change In OEM pricing power and/or business models

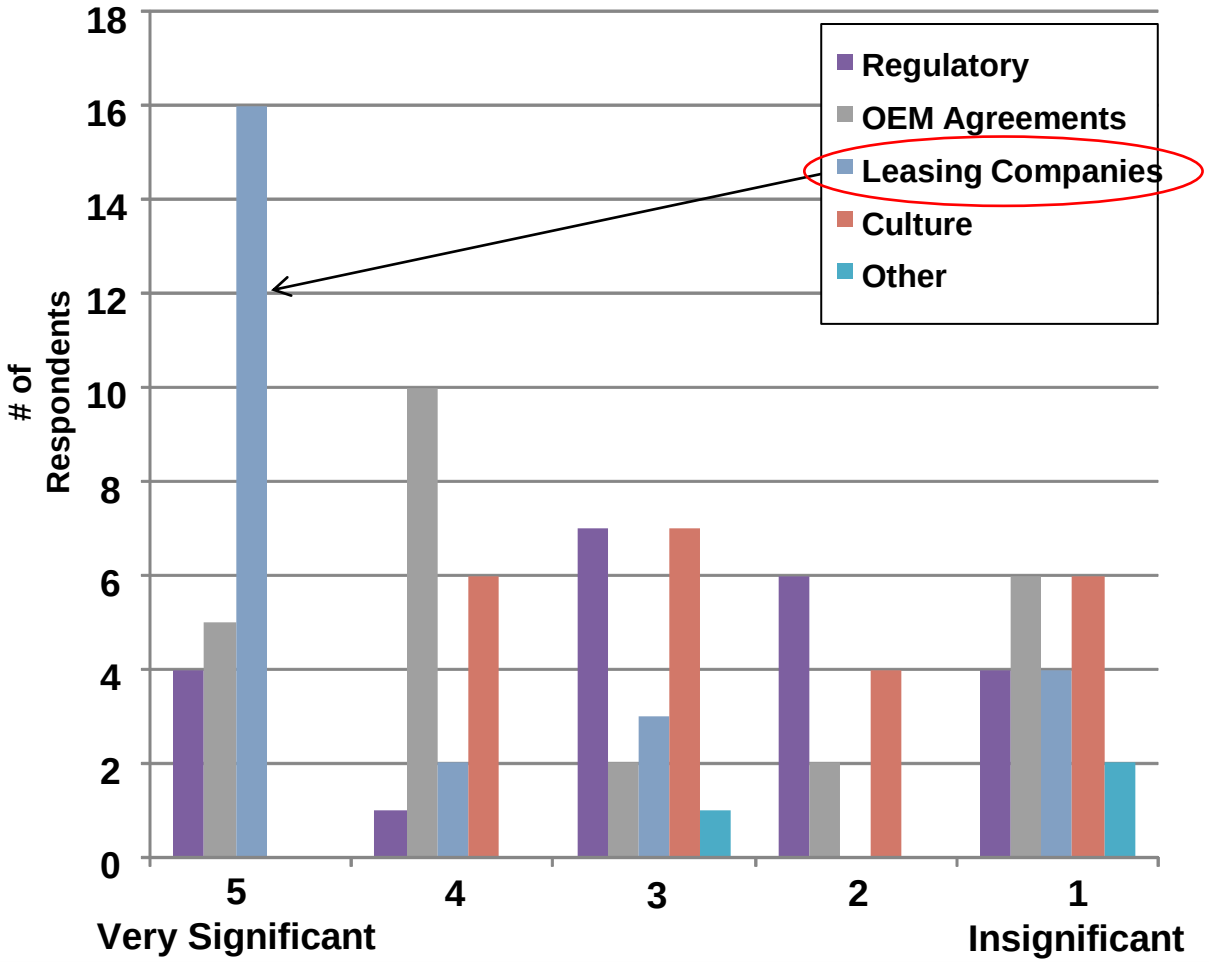
Most Airlines And MROs Feel That OEM Pricing Policy Significantly Drive The Usage Of PMA…

Extent Of Which OEM Pricing Policy Drive The Use Of PMA



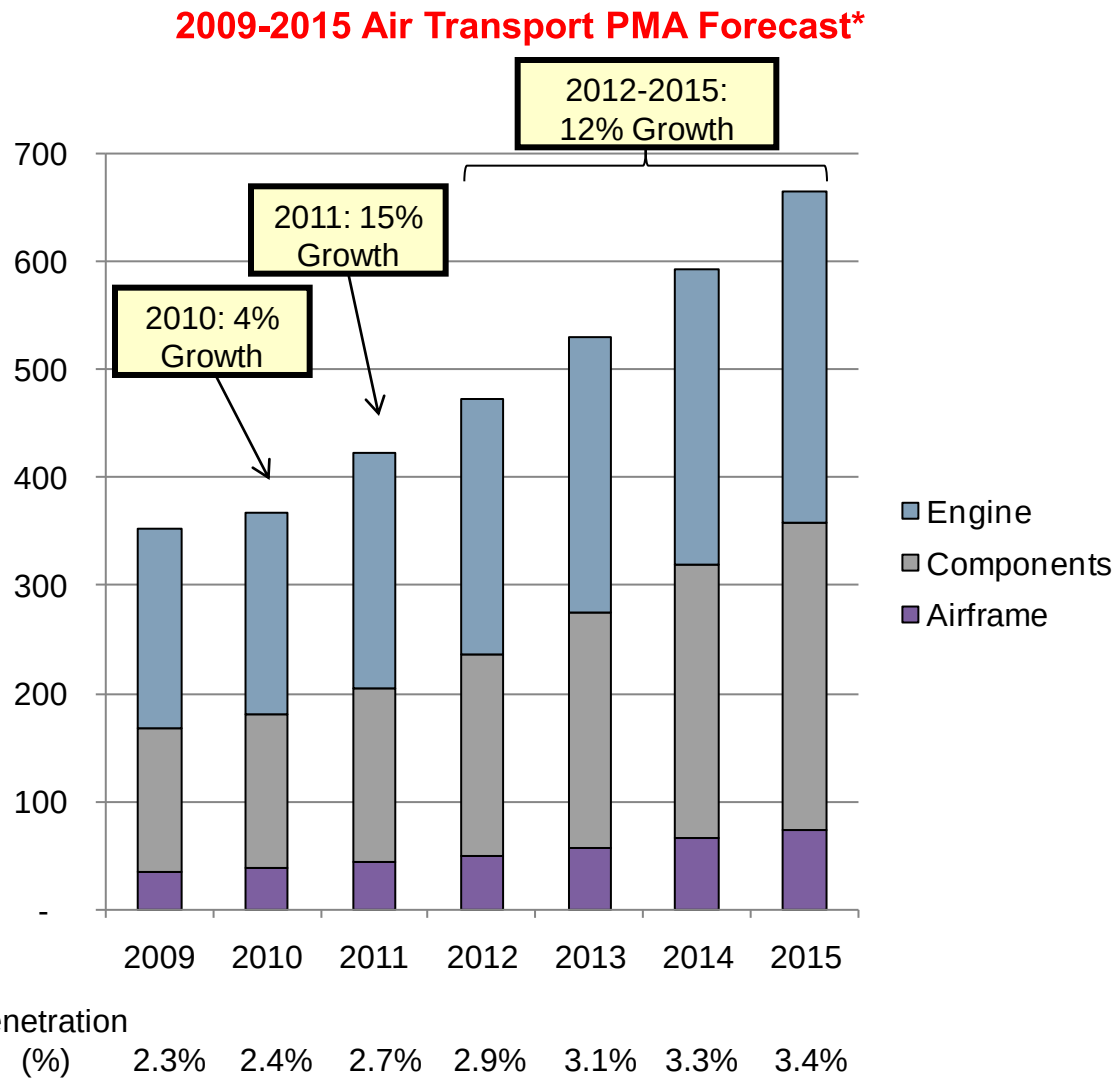
…But Airlines Believe That Leasing Companies Are The Largest Barrier To PMA Penetration

Barriers to PMA – Airline Perspective



"It is not even possible to arrive at a reasonable financial formula to allow a lessee to use substitute materials in return for a higher rent." – Chief Technical Officer of A Leasing Company

Current PMA Penetration Is 2.4% And Is Projected To Reach 3.4% By 2015…



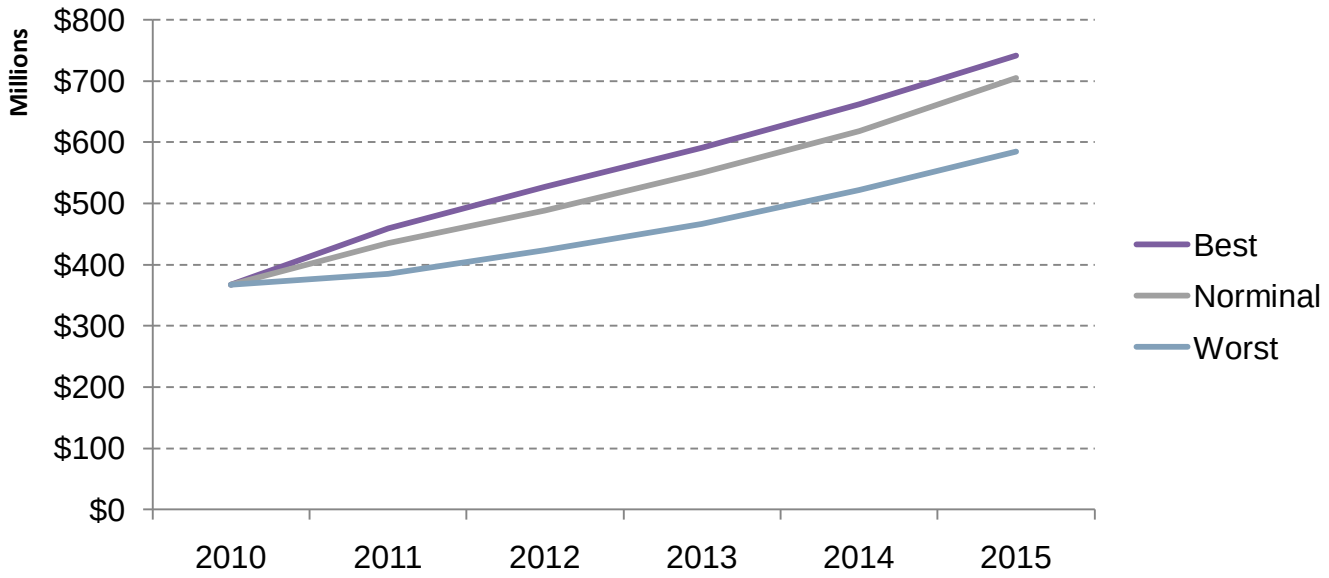
- The PMA market will begin to recover in 2010 with an estimated 4% growth rate
- In 2011, the PMA market is forecasted to spring-back with a robust growth rate of 15%
- Overall, the PMA market is estimated to grow from $367M in 2010 to $665M in 2015
- PMA penetration expected to reach 3.4% of total material consumption

* Constant 2009 US$

Source: AeroStrategy

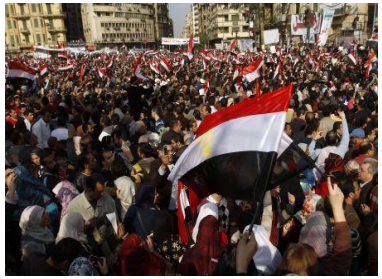
The PMA Market Outlook Is Strong, But Oil Prices Could Moderate Growth …

How Will Oil Prices Affect The PMA Market?



Best case *Oil < $80/bbl*	*Nominal case* *Oil $80 – 110/bbl*	*Worst case* *Oil > $110/bbl*
• Fuel costs fall to less than $80/bbl • Strong kick-back growth during 2011 and 2012 • 5 yr CAGR of 13%	• Fuel costs fall to less than $80/bbl • Strong kick-back growth during 2011 and 2012 • 5 yr CAGR of 12%	• Fuel costs fall to less than $80/bbl • Market exhibits slow growth due to flat airline travel • 5 yr CAGR of 9%

In Summary….



- **Global oil prices remain high which has lead to a shift in airline economics, leading to premature retirement of aircraft and increased supply of surplus parts**
- **The air transport MRO market is currently valued at $43 billion and fuel prices will impact the shape of the MRO market recovery**
- **The PMA parts market is valued at $367M in 2010 and is forecast to grow to $665M by 2015**
- **Airlines believe that OEM pricing policy significantly drives PMA parts growth while leasing companies remain the biggest barrier to PMA parts penetration**
- **The oil price impact on the MRO market will have implications for the PMA part market**

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Source: AeroStrategy

Thank you for your attention!

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