



Air Transport MRO

Market Forecast and Key Trends

Presented by:

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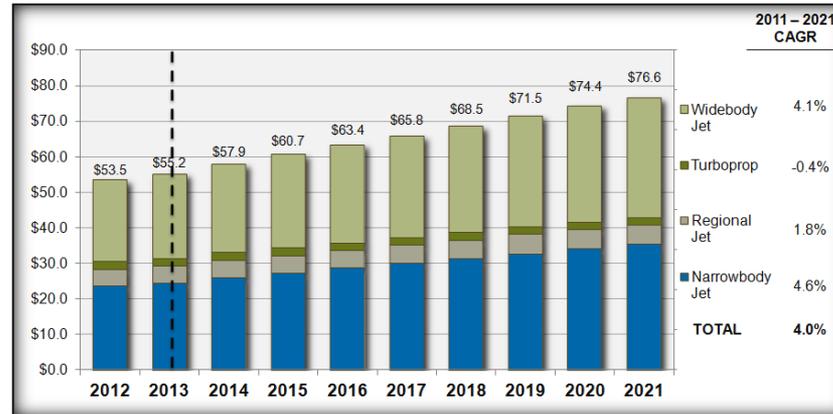


Today's Speech Will Highlight Output From ICF SH&E's New And Leading Ten-Year MRO Forecast

ICF SH&E MRO Model Key Features

Reflects economic growth and regional market maturity

ICF perspectives on impact of new aircraft introduction



Addition of turboprops

Aircraft migration between regions

O&R Maturity and Retirement Survivor Curves

Addition of Maintenance Management Spend

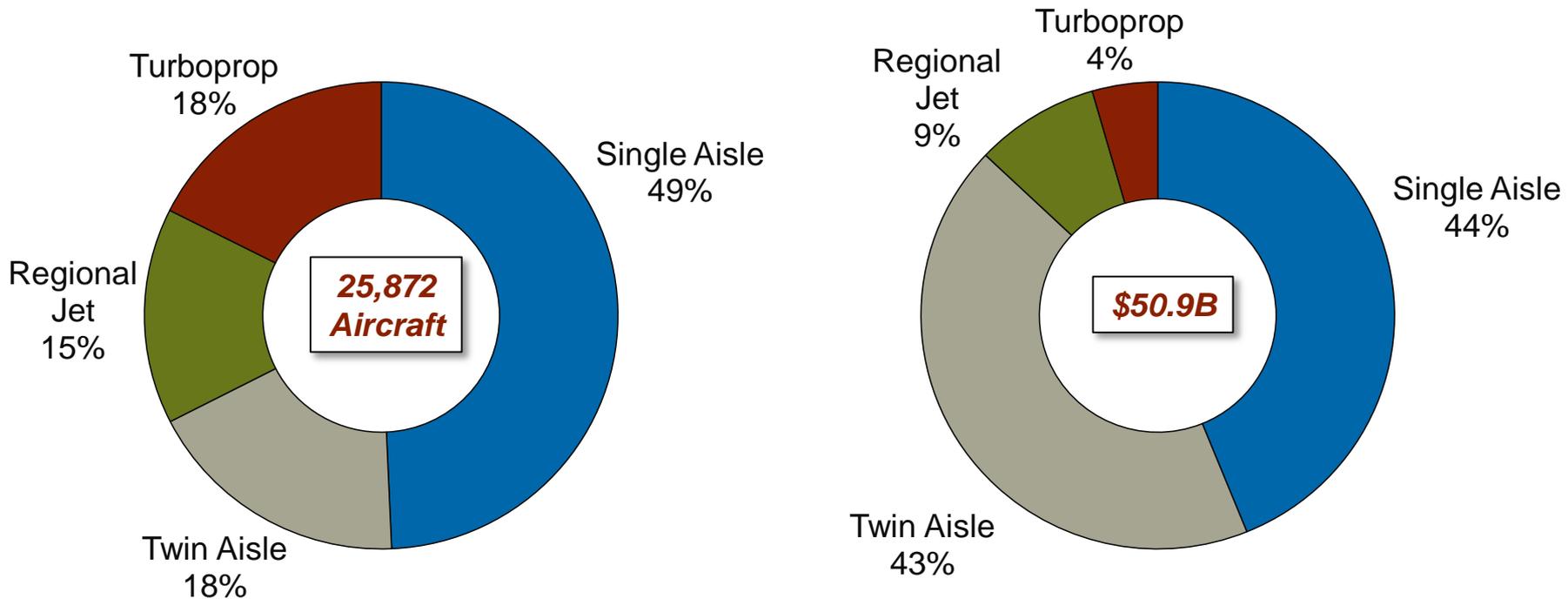
Addition of Rotable / Inventory Management Spend

Today's Agenda

- **Air Transport MRO Forecast**
 - **Seven Fearless MRO Market Predictions**

Today's Active Air Transport Fleet Is 25,871, Generating MRO Spend Of \$50.9B

2011 Air Transport Market*

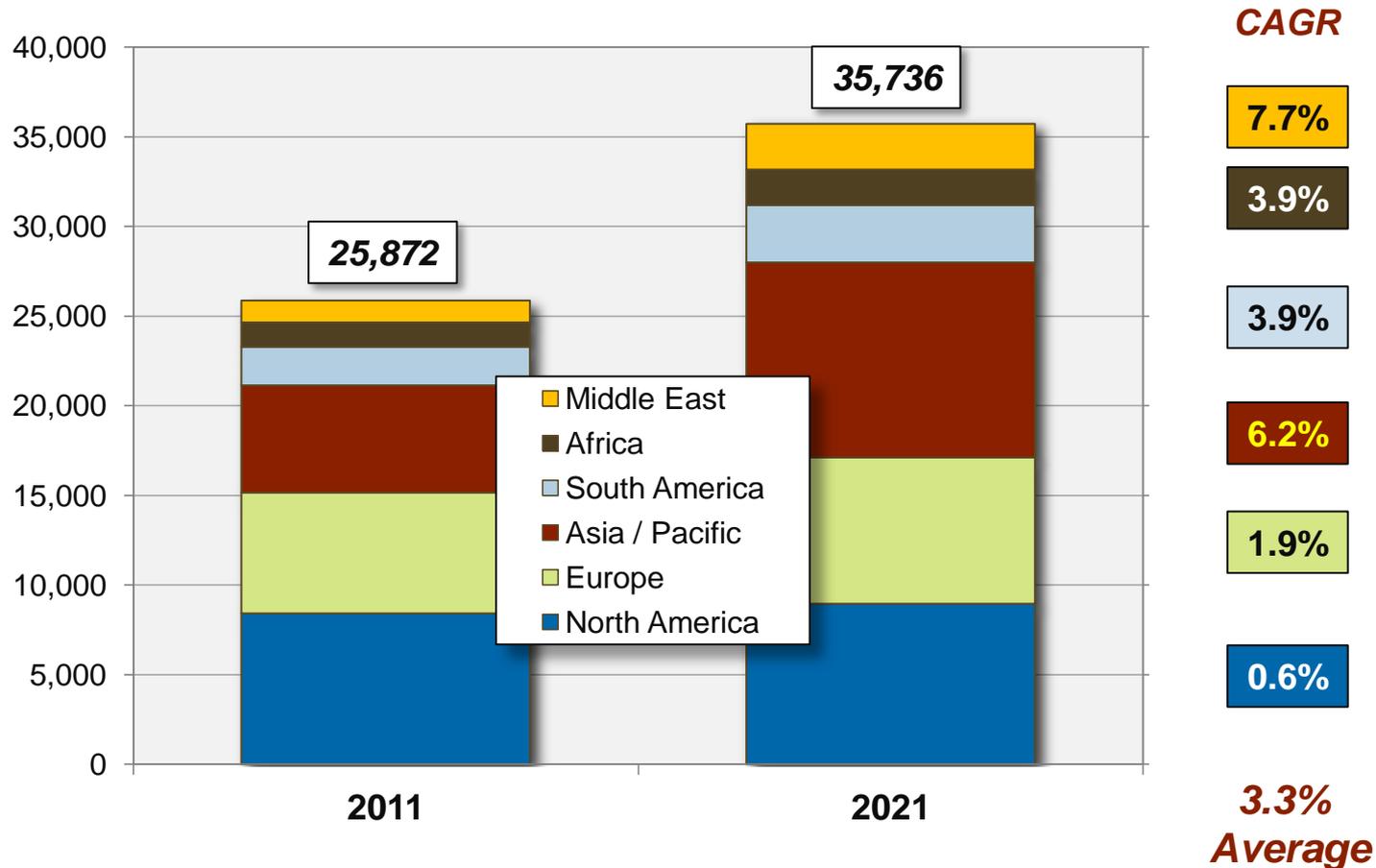


Source: ICF SH&E analysis
Forecast in 2012 \$USD, exclusive of inflation
excludes all Russian built aircraft

* Includes Turboprops

The Fleet Is Expected To Grow By Almost 1,000 Aircraft Per Annum, Led By The Middle East And Asia/Pacific

Air Transport Fleet Growth 2011-2021*

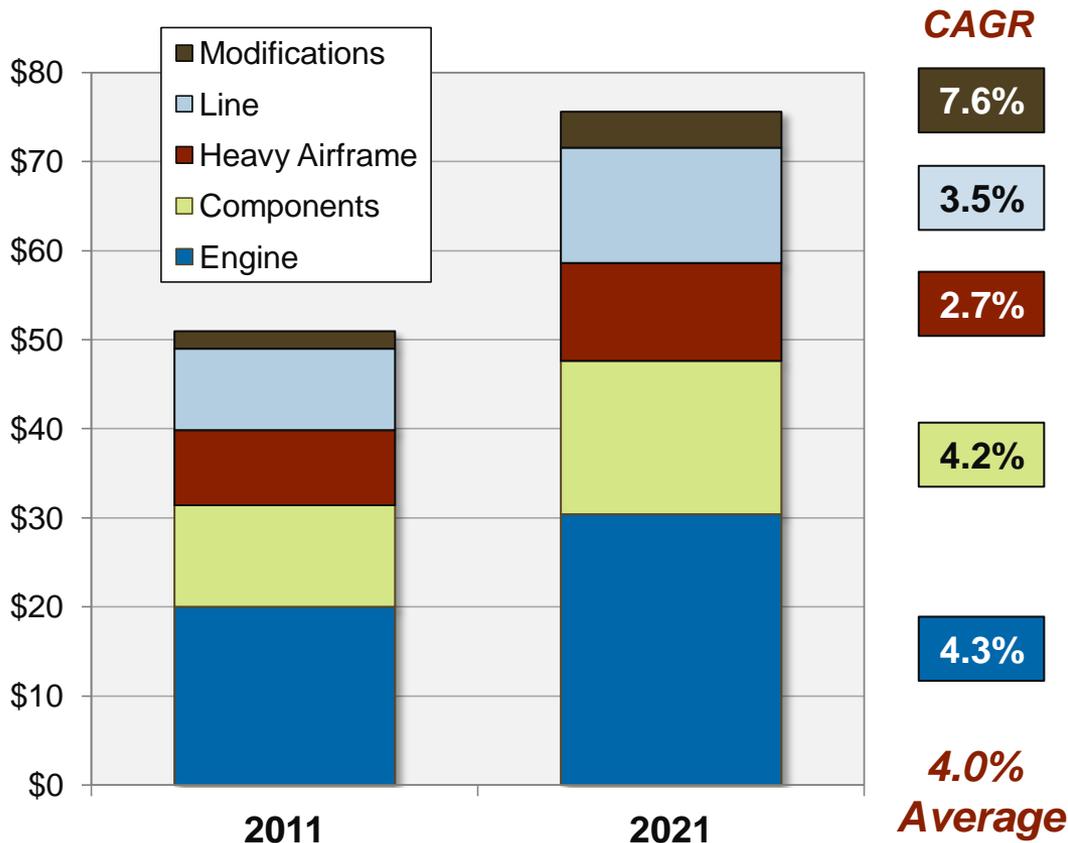


* Includes Turboprops

Source: ICF SH&E analysis

Currently Valued At \$51B, The Global MRO Market Is Expected To Grow To \$76B By 2021

Global MRO Spend (2011 USD Billions)

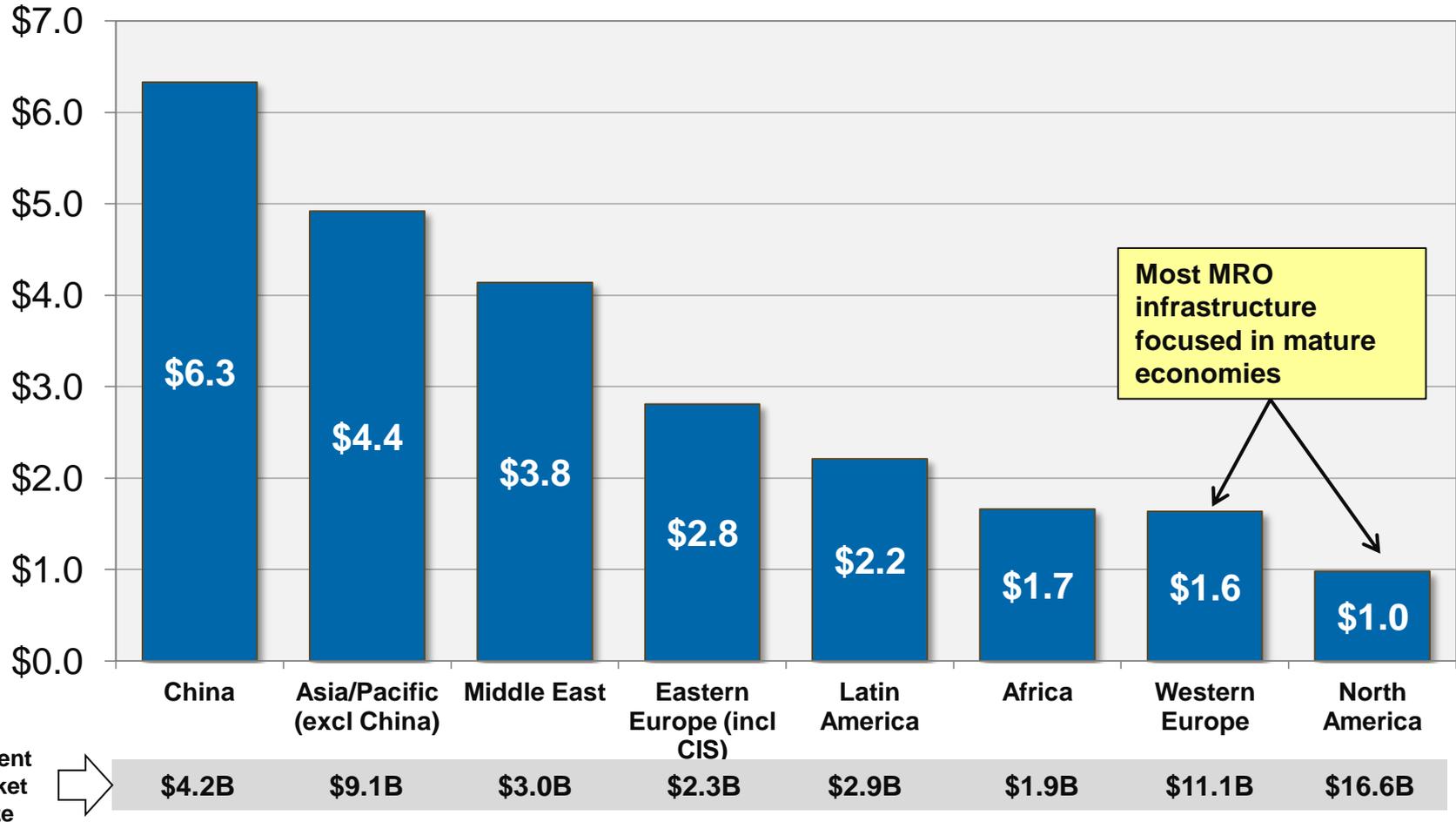


- Global MRO spend is \$50.9B, with the largest segment being engines at 39% of demand
- Average growth is forecast to be 4.0% CAGR to \$76B in 2021
- The strongest drivers of growth are expected to be the modifications, engine and component markets
- Despite reducing manhour intensity of airframe heavy checks as the fleet renews, upgrade and modification demand means airframe heavy MRO grows at 3.3% CAGR

Source: ICF SH&E analysis
Forecast in 2011 \$USD, exclusive of inflation. Includes turboprops

Nearly All MRO Growth Will Be Concentrated In Emerging Economies

Difference in MRO Spend, 2021 vs. 2011 (\$B)



Most MRO infrastructure focused in mature economies

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

Parts Sales Have Recovered Emphatically As A Result Of MRO Supply Chain Restocking

MRO YoY Revenue Results

Year-over-year % change	1Q 10	2Q 10	3Q 10	4Q 10	1Q 11	2Q 11	3Q 11
Pure Play Parts Sales							
GE Engine Spares	1%	(2%)	25%	23%	32%	18%	21%
Pratt & Whitney Engine Spares	(15%)	0%	25%	25%	33%	25%	10%
Global CFM56 Spares (Snecma)	(25%)	(25%)	(15%)	2%	8%	25%	5%
Hamilton Sundstrand Commercial Spares	3%	0%	5%	25%	23%	25%	30%
TransDigm Commercial	(2%)	12%	18%	20%	25%	25%	24%
Average	(8%)	(3%)	12%	19%	24%	24%	18%
Blended (Parts and MRO) Sales							
HEICO FSG	2%	7%	14%	24%	20%	23%	30%
Hamilton Sundstrand Aftermarket	3%	3%	0%	13%	23%	35%	15%
Rockwell Collins Aftermarket	(4%)	6%	18%	20%	15%	15%	3%
Goodrich Aftermarket	(10%)	(3%)	3%	12%	12%	16%	13%
Crane Aftermarket	(18%)	(1%)	(2%)	1%	20%	22%	29%
Triumph Group Aftermarket	(6%)	3%	20%	45%	35%	18%	3%
Average	(5%)	2%	9%	19%	21%	22%	16%
Pure Play MRO Sales							
AAR Commercial MRO	(9%)	(18%)	(3%)	39%	54%	36%	21%
MTU Commercial MRO	(19%)	(8%)	(1%)	2%	3%	(11%)	4%
ST Engineering Commercial MRO	(3%)	1%	3%	(1%)	2%	0%	(5%)
Lufthansa Technik Commercial MRO	(9%)	(1%)	8%	8%	3%	5%	(1%)
Average	(10%)	(6%)	2%	12%	15%	8%	5%

Parts recovering faster than MRO services

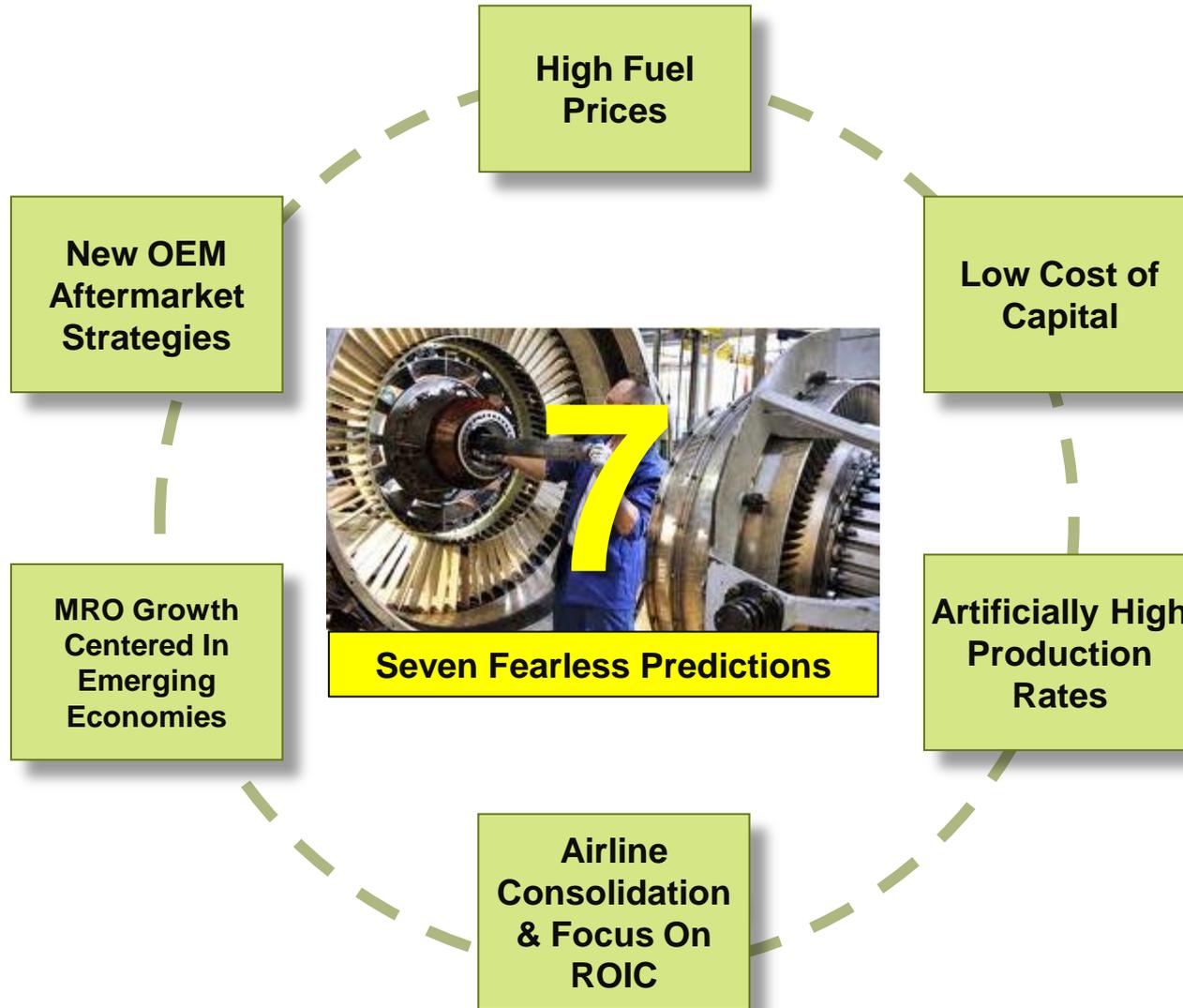
Source: Wedbush Securities

Today's Agenda

- **Air Transport MRO Forecast**

- **Seven Fearless Predictions**

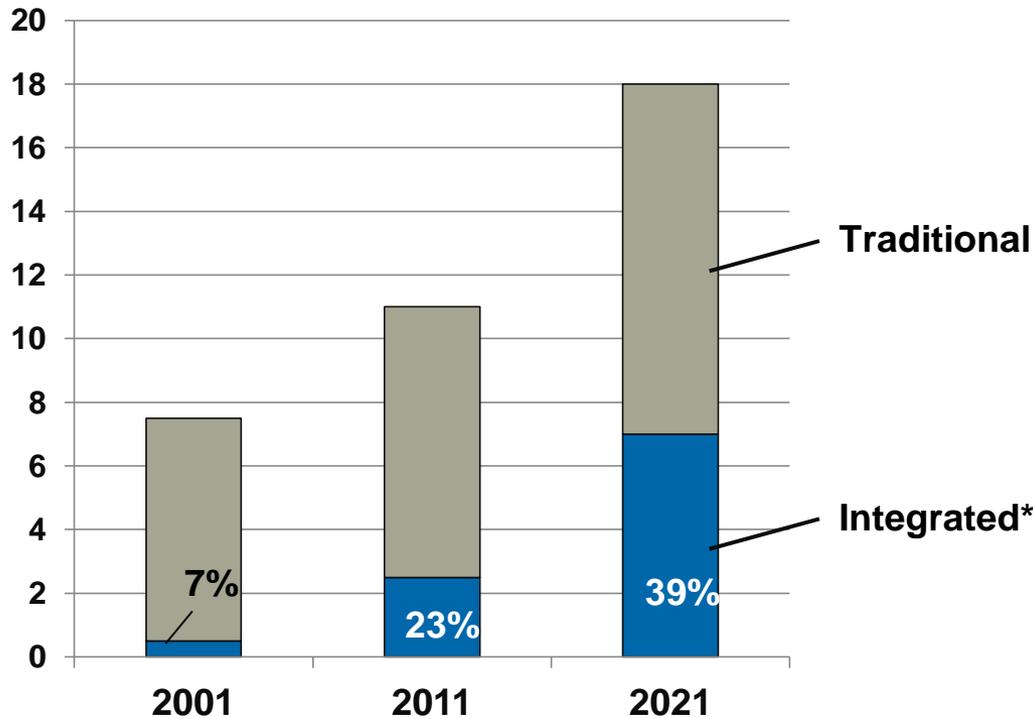
Shifts In The Global Economy And The Aviation Sector Will Lead To A Fundamental Restructuring Of The MRO Market



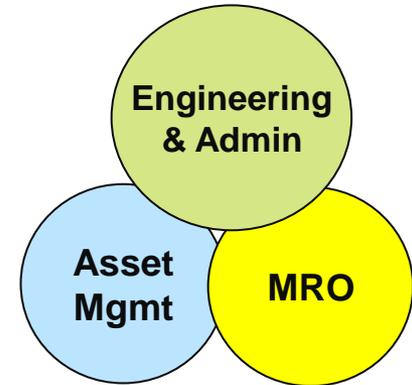
#1: Integrated Component MRO Penetration Reaches 40% By 2021

Integrated MRO - 40% Penetration

Air Transport Component MRO Market (\$B)



*Integrated MRO Elements



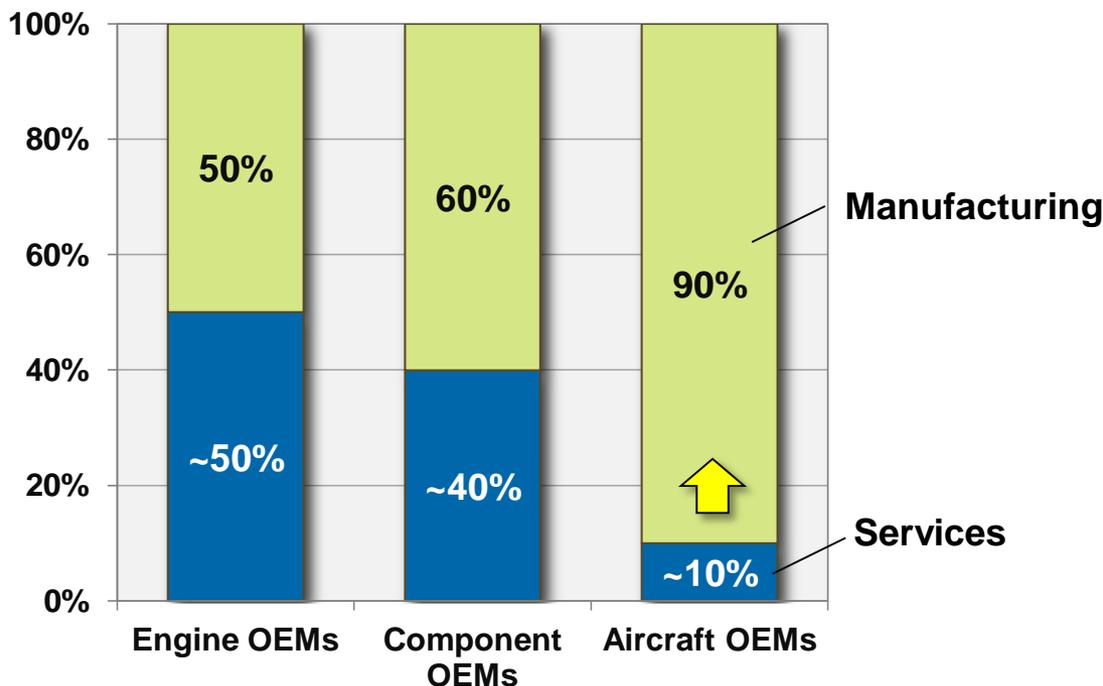
DRIVERS

- *Fleet size <25*
- *New Aircraft Programs*
- *Improved ROIC*
- *Maintenance non-core activity*
- *Cash preservation*
- *Attractive value propositions*

Source: ICFI SH&E analysis and estimates

#2: Aircraft OEMs Will Become Major MRO Players By Mid-Decade...

Typical OEM Revenue Mix



- The EADS Vision 2020 goal is 25% services revenue by 2020
- Two major acquisitions in 2011: Satair and Vector Aerospace

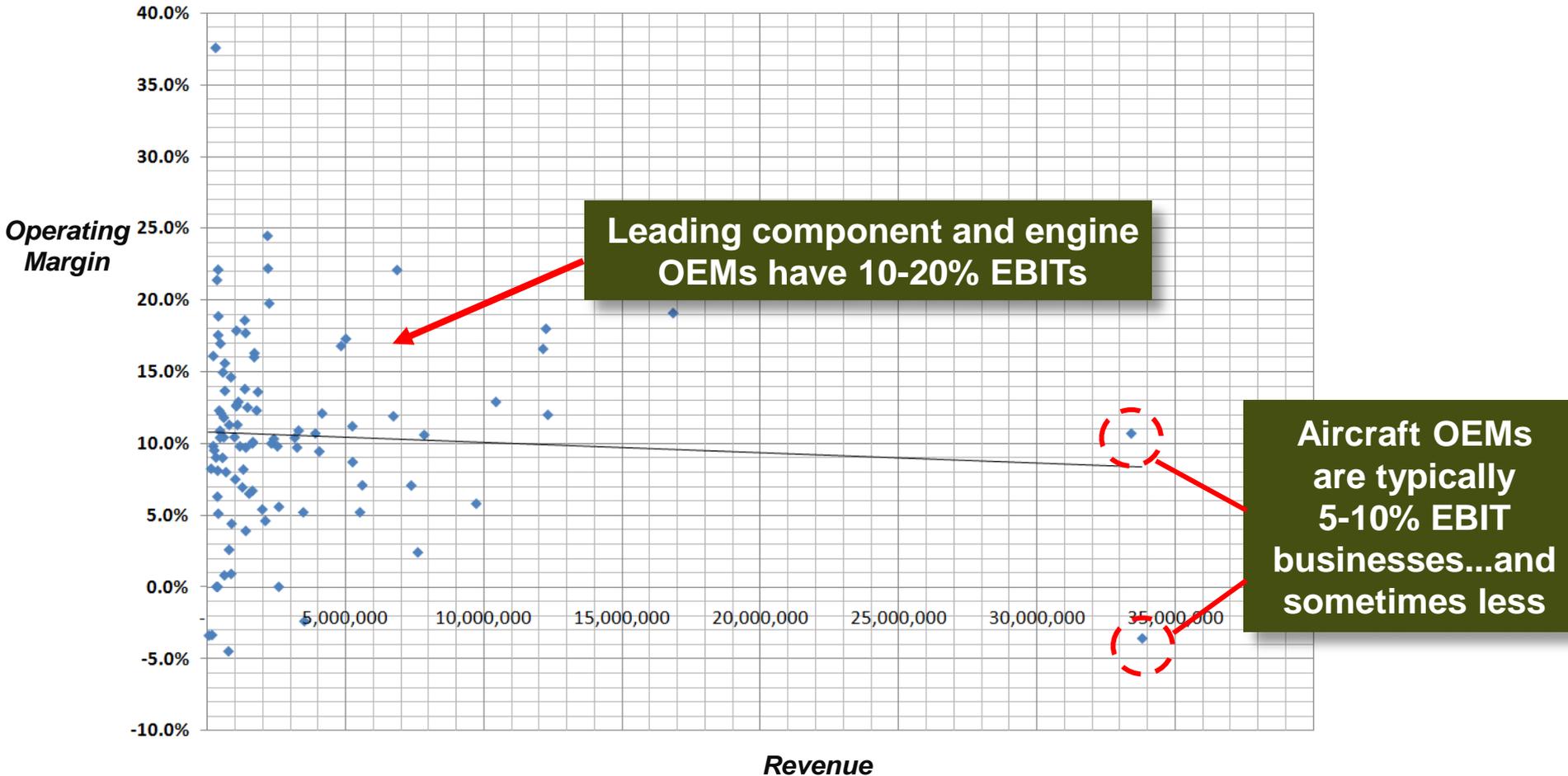
- Launched EDGE in 2012 to create coordinates services brand
- Major player in flight training distribution, and consumables management
- Two new GoldCare contracts

Sources: ICF SH&E, EADS Vision 2020

#2: ...As They Seek To Shift The Risk/Reward Structure In The Aerospace Industry

Aircraft OEMs
Major MRO
Players

Aerospace Business Operating Margin vs. Revenue (\$000)



Source: ICF SH&E analysis; based on 2008 data

#2: Airbus Has Expanded Its Market Presence With Many New Integrated MRO Contracts



Recent contract wins for Airbus Flight Hour Services

Operator	Aircraft type	Fleet	Year	Scope
CHINA SOUTHERN	A380	5	2011	Integrated component support
SINGAPORE AIRLINES	A330	15	2011	Total aircraft support
	A330	19	2008	Integrated component support
	A340	5	2010	Integrated component support
	A380	15	2007	Integrated component support
BRITISH AIRWAYS	A380	12	2011	Integrated component support
四川航空公司 SICHUAN AIRLINES	A330	3	2009	Integrated component support
THAI	A380	6	2012	Integrated component support
Vietnam Airlines	A330	10	2010	Integrated component support

Source: ATI/ACAS, various news sources

#3: Licensed Service Centers Will Become The New MRO Support Paradigm

Hamilton Sundstrand authorizes Mubadala Aerospace for Boeing 787 MRO

Hamilton Sundstrand Corporation and Mubadala Aerospace have finalized a wide-ranging strategic agreement under which Mubadala Aerospace will be a key part of the support network for servicing Hamilton Sundstrand products and systems on the Boeing 787. The deal, a first for Hamilton Sundstrand, includes a licensing agreement for Mubadala Aerospace to provide maintenance, repair and overhaul (MRO), through Mubadala-owned companies Abu Dhabi Aircraft Technologies (ADAT), SR Technics and Sanad Aero Solutions (Sanad).

Another Recent License Agreement

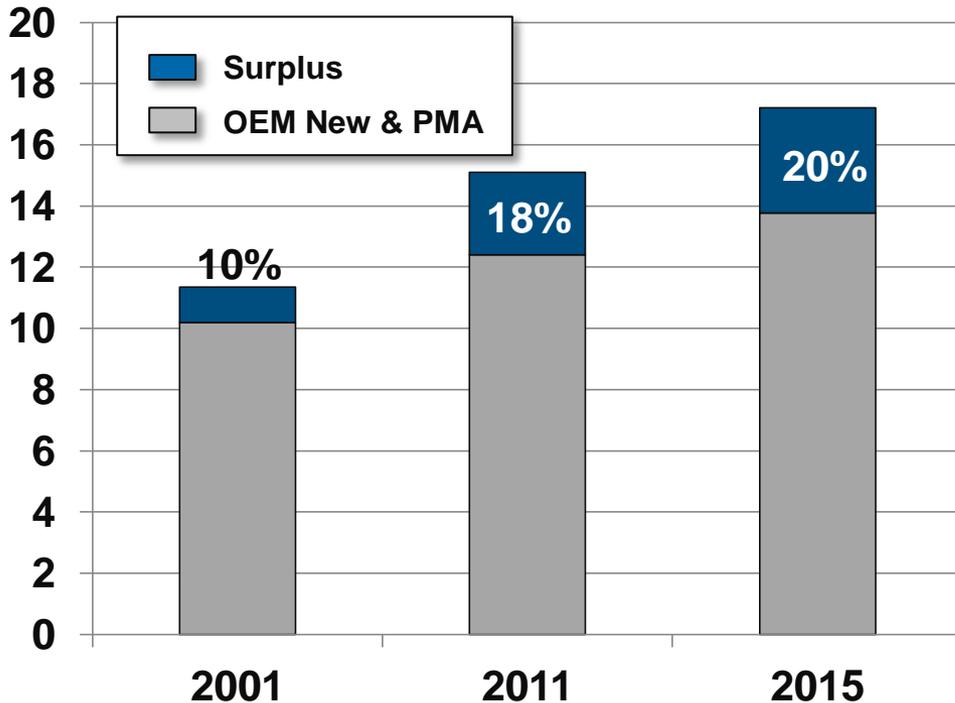


- The engine licensed service center network model being replicated by component OEMs (e.g. following success of CF34 / AE3007 / CFM56 networks)
- The licensed service center model has several benefits for OEMs
 - Improved ROIC – can address emerging market growth without adding bricks & mortar
 - Greater influence on quality/build standards
 - ...while offering customers choice
- The upshot: creates opportunities for well-positioned independent MROs on new generation equipment

Surplus Parts
20%
Penetration

#4: Surplus Parts Usage Will Continue To Grow And Reach 20% Penetration By 2015...

*Air Transport MRO Market
Use Of Service Parts And Alternatives**



- Airlines and MROs consume about \$2.3B of surplus parts per year; aggregate dealer revenue is \$3.3B
- About half of surplus consumption is driven by BER components
- Nine major players supply 57% of all surplus
- 80% of surplus now comes from cannibalized aircraft
- Aircraft retirements have increased, resulting in many serviceable components entering the surplus market – particularly from newer generation aircraft

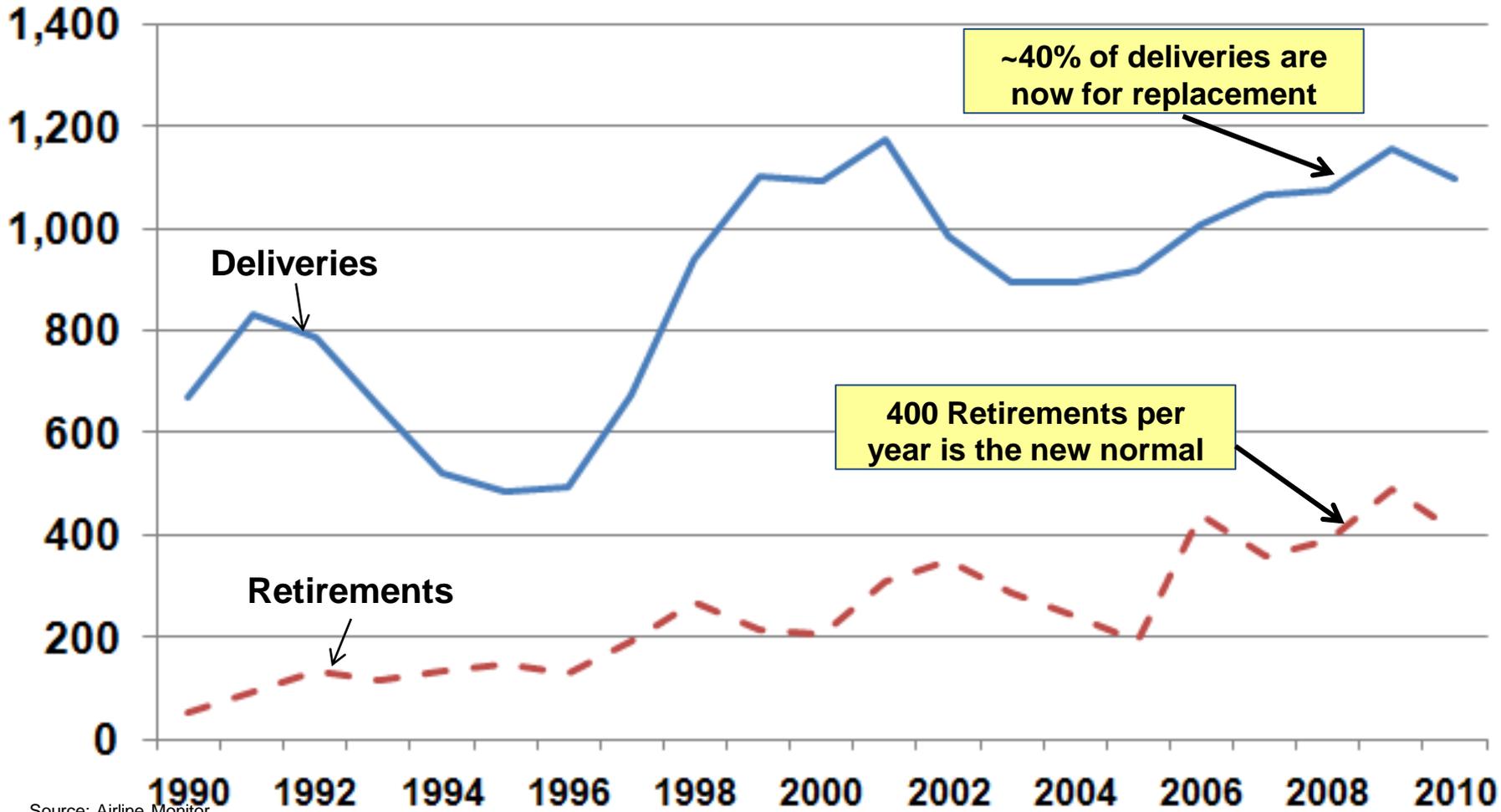
* Includes engines, components and airframe parts

Source: ICF SH&E analysis

#4: ...As High Fuel Prices Drive A Structural Increase In Retirements

Aircraft

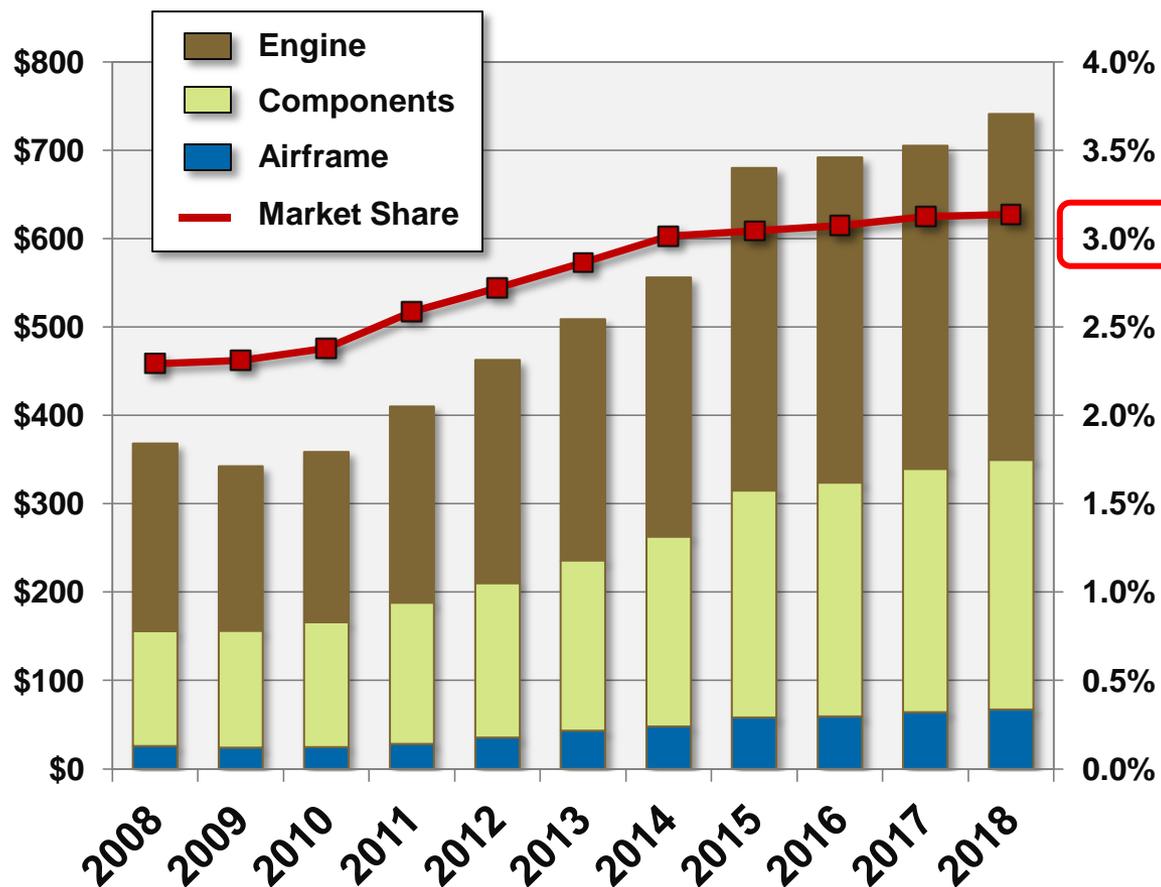
Air Transport Retirements and Deliveries



Source: Airline Monitor

#5: PMA Penetration Will Level Out At ~3% By Mid-Decade

Air Transport PMA Market Forecast In \$ Millions

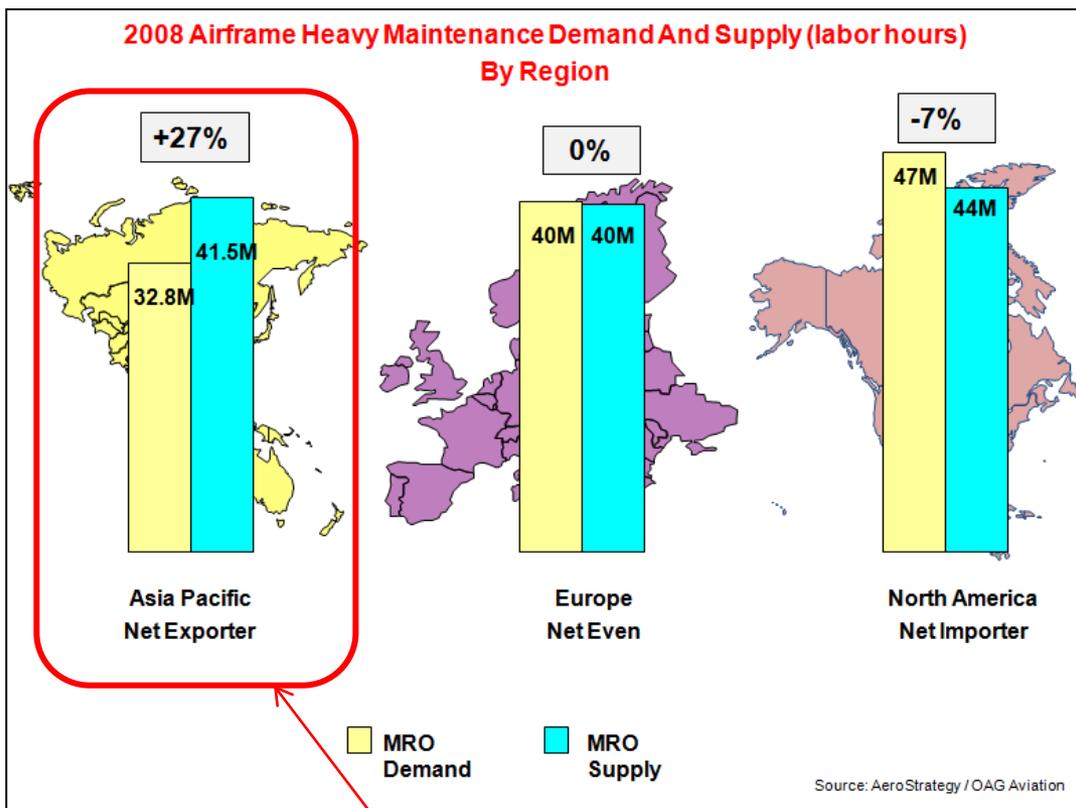


- The licensed service center model has slowed PMA penetration in engines and will soon impact components
- Leasing companies remain unconvinced that support of PMA makes sense
- Interiors and Class C parts will drive PMA growth

"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

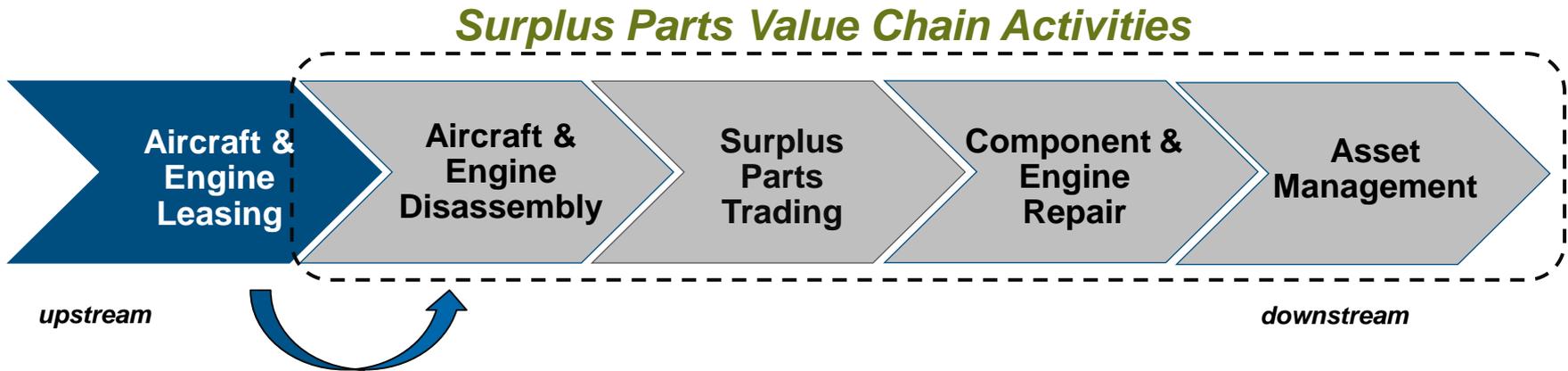
#6: Heavy Check Migration From North America To Asia Will Peak



- **Increasing fuel costs drive up maintenance ferry flight costs**
- **Capacity in Asia and Latin America is filling up driving up labor rates**
- **After a decade of double digit GDP growth, emerging markets are experiencing continued inflation and annual labor rate increases**
- **Southeastern US labor rates now comparable to leading emerging market MRO's**
- **Excess facility supply in North America provides competitive advantage (very cheap facility costs)**

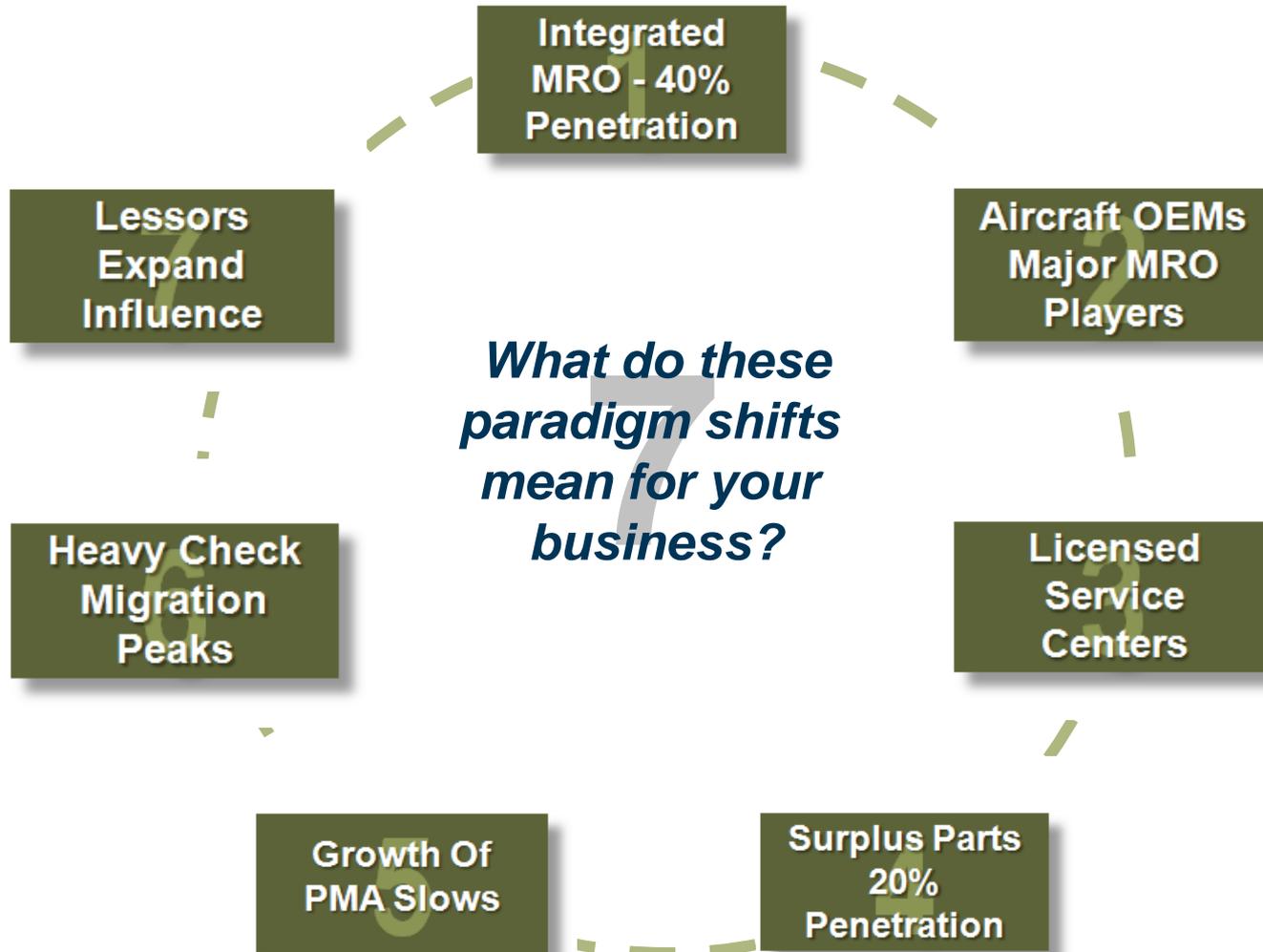
Migration to Asia Pacific from N. America peaking?

#7: Lessors Will Expand Their Influence In MRO Starting With Asset Management



- **80% of surplus material now comes from parting out aircraft and engines**
- **Lessors are therefore moving downstream into parts trading, repair and asset management**
- **Four of the five largest surplus component traders are owned by lessors**
- **Will lessors integrate maintenance and asset management into their offerings?**

The Seven Predicted Paradigm Shifts Have Important Implications For MRO Market Participants



Thanks and Questions



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