

THE SHIFTING LANDSCAPE *for* THE MAINTENANCE, REPAIR AND OVERHAUL MARKET



Aerospace, Defense & Government Services Report

*The Shifting
Landscape for the
MRO Market*

The BlackArch Partners Aerospace, Defense and Government Services (ADGS) team continuously monitors the international aerospace industry for key developments that impact our clients. Foremost among the recent developments we are seeing is the shifting landscape in the North American aircraft maintenance, repair and overhaul (MRO) market. These evolving dynamics have prompted significant discussion at BlackArch Partners that we would like to share with our readers. First, we will assess the current state of the North American MRO market and then we will share our thoughts on the market-changing trends we are seeing in the North American MRO space.

The North American fleet is forecasted to add roughly 3,700 new aircraft over the next 10 years, with the vast majority of these aircraft serving as replacements to existing aircraft. This fleet replacement trend coupled with the premise that newer aircraft generally require less maintenance could dampen growth, however, we see airlines' transition to a younger fleet as a more gradual process with some significant rollout delays. Although the MRO market is relatively mature, several key trends could continue to develop over the next decade to create opportunities for independent MRO providers:

*The MRO market
includes a diverse
mix of
businesses that
provide engine,
non-engine
component,
airframe and line
maintenance
operations*

- 1) Surge in retired aircraft will increase used parts supply and lower input costs*
- 2) Higher growth in the non-engine components maintenance sector*
- 3) Return of wide-body "heavy checks" to North America*
- 4) Increased use of composite material and digital data collection in airframe maintenance*
- 5) Line maintenance opportunities in "out-of-network" regional geographies*
- 6) Original Equipment Manufacturer (OEM) focus in engine maintenance*
- 7) Higher growth in international MRO markets*
- 8) Consolidation of the North American fleet to 10 primary aircraft models*

Chart A: North American MRO by Sector:

Sector	Description	Observations
Non-Engine Components Maintenance	<ul style="list-style-type: none"> ■ Involves maintenance, repair and overhaul of non-engine components such as flight controls and fuel systems ■ Slightly lower margin than engine maintenance with more labor intensity ■ Highly fragmented among competitors 	<ul style="list-style-type: none"> ■ Fastest growing North American MRO sector due to increased overall flight hours and lack of significant efficiency improvements in non-engine components ■ Opportunity for significant margin improvement through used parts
Airframe Maintenance	<ul style="list-style-type: none"> ■ Consists of lower frequency, detailed "heavy-check" airframe maintenance, repair and overhaul that typically removes an aircraft from service ■ Traditionally low-margin work with high labor intensity, but some scalability exists with improved technology 	<ul style="list-style-type: none"> ■ North American market has experienced shift of "heavy-check" MRO work to China and other Asian markets ■ Rising labor costs will bring "heavy checks" back to North America ■ Independent MROs must be equipped to service composites with digital data
Line Maintenance	<ul style="list-style-type: none"> ■ Consists of higher frequency, routine "A-check" air frame maintenance, repair and overhaul that typically occurs overnight or between flights ■ Typically completed by airlines in-house at major network airports 	<ul style="list-style-type: none"> ■ Significant opportunities exist for independent MROs than can service out-of-network regional geographies that are too cost prohibitive for airlines ■ Independent MROs must be equipped to service composites with digital data
Engine Maintenance	<ul style="list-style-type: none"> ■ Generally involves off-wing maintenance, repair and overhaul that restores engine performance capability ■ High-margin MRO work with parts as the primary input cost ■ OEMs have ~60% market share 	<ul style="list-style-type: none"> ■ Growing OEM focus on engine maintenance packages to differentiate products and capture steady cash flow ■ Focus on efficient engine design will decrease overall work but opportunities exist for significant margin improvement through used parts

1) Surge in retired aircraft will increase used parts supply and lower input costs
Trends in MRO

Over the last decade, the North American MRO market has been redefined by several key trends. Among these has been the rapid rise of used and refurbished parts in engine and non-engine components maintenance. In 2013, the aircraft used parts market was nearly \$3.5 billion, and is expected to grow to nearly double that size over the next decade. A surge of retiring aircraft will dramatically increase the supply of used parts to meet a steep demand increase, as operators remain laser focused on cost reduction and seek to lower their maintenance spending. Over the past few years, non-engine components maintenance providers have achieved significant margin improvement and other competitive advantages by strategically positioning themselves to widely adopt the emerging used parts trend.

2) Higher growth in the non-engine components maintenance sector

In the non-engine components sector, independent providers hold a dominant market position, providing nearly half of the maintenance work on a number of components such as flight controls, fuel systems, hydraulics and landing gears. In contrast to the engine maintenance sector, OEMs currently provide less than one-third of the maintenance on nearly all component systems in the non-engine components maintenance sector. Moreover, the North American non-engine components market is projected to grow modestly over the coming decade as increased flight hours take a heavy toll on consumable aircraft components.

3) Return of wide-body “heavy checks” to North America

Another trend in the North American MRO market has been the increased outsourcing of airframe maintenance “heavy checks” to developing markets. The high labor costs associated with airframe maintenance has driven nearly two-thirds of North American wide-body airframe maintenance to China and other developing markets in Asia over the past decade. Rising labor costs in developing markets coupled with the low likelihood of upward wage pressure domestically have historically brought outsourced work back to North America. With this in mind, many North American independent MRO providers are building out additional expertise and infrastructure in North America to execute a wave of comprehensive wide-body airframe maintenance.

4) Increased use of composite material and digital data collection in airframe maintenance

The airframe maintenance sector will also be heavily influenced by changing technology over the next decade. Increased use of composite material and digital data collection on airframes will fundamentally change the way MRO providers operate. Independent MROs are already investing heavily to incorporate new technologies into processes that will significantly improve their margins and achieve some scalability in what has traditionally been a labor intensive sector.

5) Line maintenance opportunities in “out-of-network” regional geographies

Line maintenance is distinct from airframe maintenance in that it does not remove commercial aircraft from service and includes more routine pre-flight and daily checks. Although airlines outsource the majority of their airframe maintenance, they complete most of their line maintenance operations in-house. For many airlines, however, completing line maintenance at “out-of-network” remote regional airports is often too costly. Recently, independent MROs specializing in used parts and technologically capable line maintenance in more “out-of-network” regional locations have been successful.

6) Original Equipment Manufacturer (OEM) focus in engine maintenance

In recent years, OEMs have increased their focus in the engine maintenance space, introducing one-stop-shop MRO maintenance into purchase contracts that provide flight hour cost savings for operators and steady streams of cash flow for OEMs. In 2014, OEMs will provide over half of the engine maintenance work in the North American MRO market, a trend that we believe will build as OEMs continue to rely on low pricing and comprehensive MRO offerings to win business. Although the North American engine maintenance market could shrink over the next decade due to improved engine design and efficiency, used parts capability and expertise will remain pivotal for independent MRO providers.

7) Higher growth in international MRO markets

While specific opportunities in line maintenance MRO exist in the North American market, broader MRO opportunities will present themselves in international markets over the coming decade. The international MRO market is expected to grow at more than double the rate of the North American MRO market over the next 10 years due to a rapid increase of aircraft in India, China and the Middle East. Historically, MROs that have positioned themselves in fast growing markets as both experienced and technology enabled providers have found competitive advantages.

8) Consolidation of the North American fleet to 10 primary aircraft models

Perhaps the most important trend in North American MRO over the next decade will be the development of a more top-heavy North American aircraft fleet. By 2024, maintenance of 10 aircraft models is expected to represent well over 80% of the total North American MRO market. Although two narrow-body aircraft models will dominate the MRO market, wide-body aircraft will still account for a majority of MRO work. Over the same period, MRO on older model aircraft will also climb rapidly as aircraft from older vintage years enjoy increasing economically useful lives. Positioning for this fleet shift and developing focused expertise will be pivotal for independent MRO providers.



Aerospace, Defense & Government Services

*Significant
Operational &
Transactional
Experience*

Aerospace, Defense & Government Services represent increasingly important industries for the U.S. economy and its ongoing security and stability. At BlackArch Partners, our Aerospace, Defense & Government Services practice is led by professionals who combine significant operational and transactional experience in the industry. We focus on businesses within these sectors that provide a critical service or product and are well positioned for sustained growth.

 <i>has been acquired by</i> <i>a portfolio company of</i> 	 <i>a portfolio company of</i> <i>has been acquired by</i> 	 <i>a portfolio company of</i> <i>has been acquired by</i> 	 <i>has been acquired by</i> <i>and</i> 	 <i>a division of Xe Services</i> <i>has been acquired by</i>
 <i>has been acquired by</i> 	 <i>a portfolio company of</i> <i>has been acquired by</i> 	<p>Fuel and Line Service Operations of</p> <i>has been acquired by</i> 	 <i>has been recapitalized by</i> 	 <i>has been acquired by</i>

Subsectors

- *Aviation Services*
- *C4ISR*
- *Commercial Aerospace*
- *Government Services*
- *Military Aerospace*
- *Stability Services*
- *Tactical Products*
- *Training/Simulation*

*Aerospace,
Defense &
Government
Services Team*

Gordie Vap
(704) 414-6307
Vap@BlackArchPartners.com

Visit and Connect:
[BlackArch
Website](#)



BlackArch Partners is a leading middle-market investment bank offering a full spectrum of advisory services to financial sponsors, private companies and diversified corporations. BlackArch addresses the needs of entrepreneurs, founders and shareholders of private companies with specialized services that include M&A advisory, strategic advisory and private capital solutions. Based in Charlotte, N.C., with offices in Houston, T.X., BlackArch features a total of 12 industry-focused practices that covers all sectors of interest to middle-market investors, and its professionals have closed over 300 transactions in 16 countries on four continents.

EMAIL

info@blackarchpartners.com

PHONE

704.414.6300

CHARLOTTE NC

227 West Trade Street
Suite 2200
Charlotte, NC 28202
704.414.6300

HOUSTON TX

4400 Post Oak Parkway
Suite 2370
Houston, TX 77027
713.380.4300

The information, opinions and views contained in this white paper were prepared by BlackArch Partners LP ("BlackArch Partners"), and as such constitute BlackArch Partners' judgment, and are subject to change without notice. The information presented in this white paper is provided for informational purposes by BlackArch Partners, and as such, is not a research report, as such term is defined by applicable law and regulations, nor is it intended to be a solicitation regarding any securities transaction and or investment relationship.

While the information contained herein is believed by BlackArch Partners to be reliable, BlackArch Partners makes no representation or warranties as to the accuracy, reliability or completeness of such information. The information, products and services discussed in this white paper are provided on an "AS IS," "WHERE IS" and "WHERE AVAILABLE" basis. BlackArch Partners does not warrant the information or services provided herein or your use of the information contained herein generally, either expressly or impliedly, for any particular purpose and expressly disclaims any implied warranties, including but not limited to, warranties of title, non-infringement, merchantability or fitness for a particular purpose. BlackArch Partners will not be responsible for any loss or damage that could result from the utilization of any information or services made available to you via this white paper.

The financial instruments discussed in this white paper may not be suitable for all investors, and investors must make their own investment decisions using their own independent advisers as they believe necessary and based upon their specific financial situations and investment objectives. Past performance is not necessarily indicative of future results. No part of this material may be copied or duplicated in any form or by any means, or redistributed, without BlackArch Partners' prior written consent. BlackArch Partners and/or its affiliates may seek to provide investment banking services for companies mentioned in this white paper.



Securities offered through BlackArch Securities LLC, member of FINRA and SIPC.

CHARLOTTE NC
227 West Trade Street
Suite 2200
Charlotte, NC 28202
704.414.6300

HOUSTON TX
4400 Post Oak Parkway
Suite 2370
Houston, TX 77027
713.380.4300

WEB, EMAIL AND SOCIAL
www.BlackArchPartners.com
info@blackarchpartners.com

