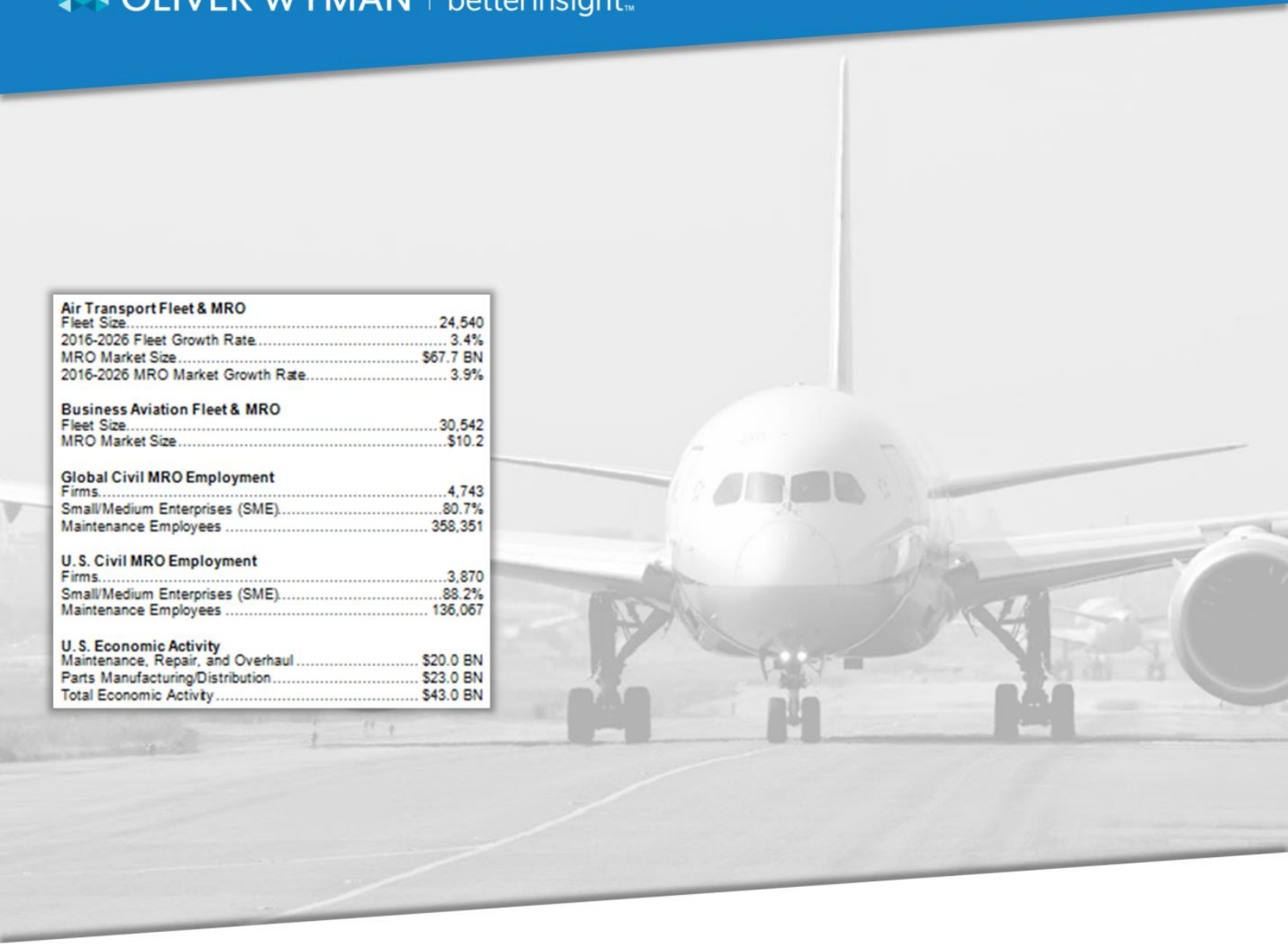
GLOBAL FLEET & MRO MARKET ECONOMIC ASSESSMENT 2016-2026

PREPARED BY:

OLIVER WYMAN | betterinsight™



Air Transport Fleet & MRO	
Fleet Size	24,540
2016-2026 Fleet Growth Rate	3.4%
MRO Market Size	$67.7 BN
2016-2026 MRO Market Growth Rate	3.9%
Business Aviation Fleet & MRO	
Fleet Size	30,542
MRO Market Size	$10.2
Global Civil MRO Employment	
Firms	4,743
Small/Medium Enterprises (SME)	80.7%
Maintenance Employees	358,351
U.S. Civil MRO Employment	
Firms	3,870
Small/Medium Enterprises (SME)	88.2%
Maintenance Employees	136,067
U.S. Economic Activity	
Maintenance, Repair, and Overhaul	$20.0 BN
Parts Manufacturing/Distribution	$23.0 BN
Total Economic Activity	$43.0 BN

ARSA

EXECUTIVE SUMMARY

This is Oliver Wyman's 2016 assessment and 10-year outlook of the commercial airline transport fleet and the associated maintenance, repair, and overhaul (MRO) market. Global airline financial performance is strong, largely attributable to favorable oil prices. While profitability has returned, operators continue to relentlessly scrutinize expenditures; with limited leverage over labor and fuel costs, airlines focus significant attention on maintenance. For an in-depth review of airline profitability, see the 2015-2016 Airline Economic Analysis on www.oliverwyman.com.

New technology will have a profound influence on the MRO industry. Construction of the latest generation aircraft involves the use of carbon fiber composites, hybrid alloys and coatings that impact maintenance frequency and methodologies. Modern aircraft are also self-monitoring, with the capability to report on the condition of hundreds of systems and components, creating gigabytes of data from each flight. Properly harnessed, this data will provides the operator and the MRO information on the health of the aircraft, as well as provide prognostications of impending issues, thus reducing maintenance costs while improving operational performance.

The global commercial air transport fleet stands at over 24,500 aircraft, approximately one-third of which are domiciled in North America. Twenty percent of the global fleet is in Western Europe, and 5% is in Eastern Europe. Asia Pacific, China, and India combined have slightly more than a quarter of the world's fleet. This composition will change over the next 10 years. North America's share is expected to decline 7%, as its net growth is constrained by significant re-fleeting efforts of the large operators. The Asian markets are expected to see the highest growth rates, making it the largest world region over this forecast period and thus the center of development for the MRO industry.

By 2026, 61% of the world's in-service active commercial fleet will have been delivered. The active fleet is forecast to become over 34,400, equating to a compound annual growth rate (CAGR) of 3.4%. It will be comprised of nearly 21,100 new deliveries. With 11,200 aircraft leaving the fleet; 53% of deliveries will be replacement aircraft.

The fleet is comprised of four aircraft classes, each facing a different outlook:

> **Narrow-bodies** are forecast to grow the fastest—from about 13,600 aircraft to over 22,000, a 4.9% average annual growth rate. Thus, their share of the fleet by 2026 s expected to increase from 56% to 64%. The average age of a narrow-body aircraft is forecast to shrink from about 11 years to just under 10 years over that period.

Wide-bodies, the second-largest aircraft class, total over 4,800 aircraft in 2016; it is expected to grow to over 7,200 by 2026, a 4.2% average annual rate of growth. Wide-bodies will continue to make up a 20% share of the fleet, with the average age decreasing from 12 years to 10 years by 2026.

Regional jets share of the fleet in 2016 is 14%, with just under 3,400 aircraft. This class is expected to decrease an average of 1.7% annually, falling to about 2,800 in 2026, or 8% of the active fleet. The average age of a regional jet is expected to remain around 11 years.

Turboprops are also forecast to decline, dropping from nearly 2,700 to just over 2,300 by 2026, an average annual decline of 1.4%. Its share is expected to decline from 11% to 7%. Turboprops are currently the oldest aircraft class, at an average age of 16.7 years, which is expected to fall to just under 15 years during the forecast period.

Fleet size and makeup changes naturally drive adjustments in MRO demand. Globally, the commercial air transport jet and turboprop MRO markets are expected to be $67.7 BN in 2016, growing to over $98.9 BN by 2026. This represents a healthy average 3.9% annual growth rate. The market segments of airframe, engine, component, and line MRO each have a different growth profile:

Airframe MRO, including modifications, is forecast at $16.0 BN for 2016 and $19.2 BN by 2026. The airframe MRO market is a low-margin, labor-intensive segment and has an average annual growth rate of 1.8%, the slowest of all MRO segments. Airlines and affiliated MROs maintain a solid hold on this market.

Engine MRO is expected to be $25.7 BN in 2016. Growing at 5.3% annually, it is expected to reach $43.0 BN by 2026. Unlike airframe MRO, engine manufacturers (known by the acronym OEMs) have a large, growing share of this market. With more spend going to material rather than labor, engine MROs enjoy higher margins.

Component MRO is forecast to be $13.1 BN in 2016, growing to $18.6 BN by 2026, a 3.5% annual growth rate. Like the engine MRO business, much of the component market is contracted to OEMs or independent repair stations, although the extent varies greatly among component types. Similarly, the labor and material mix, and therefore, margins, vary by component type and age.

Line MRO is pegged at $12.8 BN in 2016 and forecast to grow at 3.6% annually to $18.1 BN by 2026. The operationally sensitive nature of line maintenance makes it less prone to contracting. The work is labor-intensive and with limited ground times on a strict schedule operation, it remains a critical element to an airline's operational performance.

The business aviation fleet currently consists of more than 30,500 aircraft requiring roughly $10.2 BN in MRO market activity in 2016. Nearly 64% (19,445) of the business aviation fleet is domiciled in North America.

In terms of economic activity, MRO plays a significant role. In the United States, approximately 3,900 firms with more than 184,000 employees operate in the civil MRO market (including airline and affiliated MRO employees). Small and medium-sized enterprises (SME) account for 88% of U.S. firms and nearly 21% of all employees. There are over 136,000 technicians in the U.S. and approximately 37% are certificated.

For more information and details on accessing the 2016-2026 forecast, submit a request to the association via arsa.org/contact.

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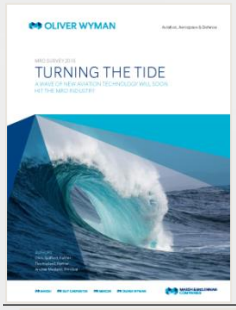
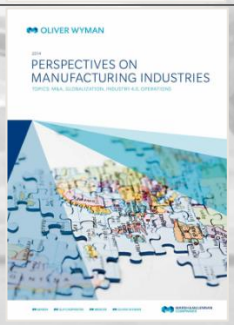


MRO SURVEY 2015 – TURNING THE TIDE

BY 2020, MOST COMPANIES IN THE AVIATION MAINTENANCE, REPAIR, AND OVERHAUL (MRO) SECTOR WILL USE NEW TECHNOLOGY IN FUNDAMENTALLY NEW WAYS.

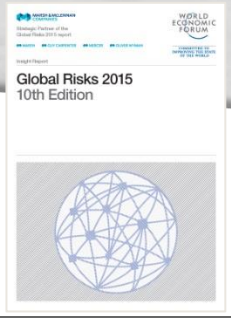
IN COMMERCIAL DRONES, THE RACE IS ON

BY 2035, THE NUMBER OF UNMANNED AERIAL VEHICLE, OR UAV, OPERATIONS EACH YEAR WILL SURPASS THAT OF MANNED AIRCRAFT OPERATIONS, ACCORDING TO THE VOLPE CENTER. WITH REASONABLE AND GLOBALLY COMPETITIVE REGULATIONS, THE US COULD STILL BECOME A LEADER IN THE COMMERCIAL DRONE INDUSTRY.



PERSPECTIVES ON MANUFACTURING INDUSTRIES

A COLLECTION OF VIEWPOINTS ON CHALLENGES FOR INDUSTRIAL COMPANIES, AS WELL AS OPPORTUNITIES AND POTENTIAL COURSES OF ACTION.



GLOBAL RISKS 2015

GLOBAL RISKS 2015 EXAMINES THE NEW RISKS THAT WILL ARISE FROM EMERGING TECHNOLOGIES, INTERSTATE CONFLICTS, EXTREME WEATHER EVENTS, AND OTHER INTERCONNECTED RISKS SUCH AS WATER CRISES.