

## **THE STATE AND PROSPECTS OF DEVELOPMENT OF THE WORLD AIR AND MARKET FOR RENOVATION OF AIR TECHNOLOGIES**

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Over the past three years, the aviation industry has been negatively affected by the reduction of the defense sub-industry in the United States. But some growth is expected, associated with an increase in defense budgets in the U.S., Britain, France, Japan, a number of countries in the Middle East and other countries; relatively stable growth in global GDP; lower prices for oil and other raw materials; and continued growth in demand for passenger transportation. So, it is expected that the military aircraft industry will emerge from the crisis, and the commercial will continue its decade-long trend of above-average growth (in 2015 the volume of aircraft production was twice as high as in 2005). [1]

The number of people in the world using air transport is increasing, because the prosperity is growing and visa processes are becoming easier. Revenues for individual countries, regions and companies are growing as a consequence. Thus, according to Airports Council International (ACI) estimations, European aviation industry earns 4.1% of the GDP and provides about 12,300,000 workplaces [2].

Demand in the field is being met by an increase in the number of aircraft with the latest technology and an attempt by airlines to improve their efficiency by filling every available seat (the average workload today is about 80%). Airlines continue to work with manufacturers to utilize every available inch of airplane space to maximize operational efficiency and revenue, while providing service to meet customer requirements for schedule, comfort and ticket costs. Air ports are also a key element in meeting demand to reach the necessary departure and arrival locations. Today, 47 aviation metropolitan areas concentrate more than 90% of long-haul flights and about one million passengers per day. The growing demand for these cities creates specific problems - 39 cities out of 47 are experiencing different levels of congestion. [3]

In terms of consumption, the industry is directly dependent on the needs of the aviation industry. It is predicted that up to 2030, more than 80% of global demand for aircraft will be concentrated in the countries belonging to the Organization for Economic Cooperation and Development and the countries of the Asia-Pacific region. In the first group of countries the demand for air transportation has not increased dramatically, but the airlines are replacing older and less efficient aircraft. However, in the other group the demand for airplanes will be increased by the growth of the number of transportations of both passengers and cargo.

Thus, the key objectives for the development of aircraft construction by 2020: to reduce fuel consumption by 20% and weight by 50% [4].

From the 34900 new Aircraft sold between 2017 and 2036, 34170 are projected to become pass-throughs, of which 5950 will be converted and operational over the analysis period, 1220 converted to cargo, and 11710 will no longer be operational and will be replaced by more energy-efficient models. With 730 new and 1,220 converted cargo ships for the period under analysis, 1,160 will no longer be in service. Thus, the total number of large aircraft in the world is expected to be 42530 in 20 years [5].

Accordingly, it is forecasted that the world market of services for maintenance, repair and renewal of commercial aircraft will amount to \$67.7 billion in 2018 and will grow to \$98.9 billion in 2026, which means that the average annual growth rate will be 3.9%. The reasons for the active growth of the MRO services market:aging and the need to replace many popular passenger models (767 and 747) [6]; the conversion of older models (MD-11, L-1011, DC-8/9, B-747) into vans and the need to service them in this role; the need for more energy-efficient aircraft models; increasing the complexity of maintenance and its dependence on the aviation employees in terms of information [7]; the need for specialized equipment and training of workers for new aircraft models; active entry of aircraft manufacturers (especially the hull and components) into the markets of maintenance and repair; increasing tendency for active reduction of service and renewal by airlines, especially by low-cost airlines [8].

New technologies will have a decisive influence on the development of the market of aircraft maintenance and renewal services. The latest generation of aircraft manufacturing requires the use of carbon-fiber composites, hybrid alloys and coatings, which will influence the frequency of aircraft maintenance techniques. Modern air vessels also have a function of self-monitoring, with the ability to inform on the status of hundreds of systems and components, forming a gigabit of data during each flight. When properly analyzed, this data will form a picture of the aircraft's condition and also provide predictions of possible problems, allowing you to reduce costs while increasing operational performance at the same time.

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