

УДК 629.7.03

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INCREASING THE RESOURCE AND SERVICE LIFE OF GAS TURBINE ENGINES

Aircraft are evolving towards higher speeds, higher altitudes, higher payloads, lower fuel consumption, and lower emissions. Improvement of these indicators, first of all, is achieved by improvement of the main engine indicators. Let's consider modern changes in the main GTE parameters by way of example of developments made by the world leaders in the engine industry:

1. PRATT & WHITNEY company creates GTF™ engines.

“At the heart of aviation’s transformation and drive to net zero emissions is a revolutionary concept: a geared fan that fundamentally changed how more sustainable propulsion works. This gear system has quickly become the foundation of our industry’s future and re-set the bar on the good that all other advanced technologies can deliver – from advanced materials to hybrid-electric systems to sustainable aviation fuels.

The GTF engine is the only geared propulsion system in service that is delivering industry-leading sustainability benefits, mature dispatch reliability and world-class operating costs. Simply put, is the quietest, greenest and most efficient family of engines for single-aisle aircraft. With more than 1,400 aircraft and more than 18 million engine flight hours of service experience, the dependable path to growing your business and improving your environmental stewardship is here”. [1]

2. The ROLLS-ROYCE company creates the UltraFan engine.

“UltraFan is a demonstrator aero engine – the largest in the world – containing a suite of new technologies that deliver greater fuel efficiency, which in turn means lower emissions and greater sustainability.

Those technologies are scalable, capable of being developed to create an engine with a thrust range of 25,000lb to more than 100,000lb, for narrowbody or widebody aircraft that may be developed from the 2030s” [2].

3. GENERAL ELECTRIC Aviation and Safran company are working on the CFM International RISE (Revolutionary Innovations for Green Engines) technology demonstration program.

“The CFM International RISE (Revolutionary Innovation for Sustainable Engines) Technology Demonstration Program was launched on June 14, 2021. Program goals include reducing fuel consumption and carbon dioxide (CO₂) emissions by more than 20% compared to today’s most efficient engines, as well as ensuring compatibility with alternative energy sources like Sustainable Aviation Fuels (SAF) and hydrogen to provide more sustainability benefits” [3].

The modern world is unthinkable without modern GTEs, as the absolute majority of passenger and military aircrafts operate exclusively on gas turbine engines.

Analyzing the modern development of engines, we can conclude that the future development of GTEs must be more than 20% more efficient than current generation engines, they must reduce carbon dioxide emissions by 80-100%, operate on a new generation of aviation fuel – Sustainable Aviation Fuel™ (SAF).

REFERENCES

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