

46ESS-70: Open Rotor Propulsion Systems

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Open rotor propulsion systems yield an advantage over the modern high bypass turbofan engine, regarding specific fuel consumption and environmental emissions, which are areas of stringent regulations and high cost in modern times. In the current context, where volatility in fuel prices and concern for the environmental impact due to aviation have become the driving focus of aeronautical research, advanced turboprops have received a renewed interest as a potential solution for the next generation of aircraft. The main objective of this paper is to explain the basic theoretical principles and to compare their advantages, such as high propulsive efficiency, and their disadvantages, such as noise emissions and vibration. In addition, a description of the historic involvement of the open rotor industrial products and their applications is provided, coupled with the exploration of the future development trends, which focus on the advanced counter rotating open rotors and the design challenges that come with them.