

46ESS-17: Thrust Reverse System – Civil Aircraft

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As civil aircraft manufacturers provide models increased in gross thrust and weight with higher landing airspeeds, the problem of stopping an aircraft after touchdown becomes more relevant. Hence, modern thrust reverse systems are required for better aerodynamic performance, and for a satisfactory integration with the new generation of high by-pass ratio turbofans.

The extremely complex aerodynamics of thrust reverse led the research in the past to experimental approach for the technology, but for a few years, the improved power of modern computational resources allows to investigate on the thrust reverse process with CFD analysis. Manufacturers also spend resources for the improvement of air vectoring performance in the thrust reverse phase, testing innovative mechanical devices and aerodynamic configurations; these solutions are the result of optimisation processes for braking efficiency and mechanical stress of components.

The present work provides a brief resume about mechanics and aerodynamics of thrust reverse operations and the evolvement of thrust reverse technology for civil applications. It illustrates the state-of-art of thrust reverse system with detailed description of applications currently in use, and the main directions of the scientific research about the topic, with possible future trend.