

# Performance Cycle Analysis of A Two-spool, Separate-exhaust Turbofan With Interstage Turbine Burner

K. H. Liew\*, E. Urip†, and S. L. Yang‡  
*Michigan Technological University, Houghton, MI 49931-1295*  
J. D. Mattingly§  
*Mattingly Consulting, Bothell, WA 98011*  
*and*  
C. J. Marek\*\*  
*NASA Glenn Research Center, Cleveland, OH 44135*

This paper presents the performance cycle analysis of a dual-spool, separate-exhaust turbofan engine, with an Interstage Turbine Burner serving as a secondary combustor. The *ITB*, which is located at the transition duct between the high- and the low-pressure turbines, is a relatively new concept for increasing specific thrust and lowering pollutant emissions in modern jet engine propulsion. A detailed performance analysis of this engine has been conducted for steady-state engine performance prediction. A code is written and is capable of predicting engine performances (i.e. thrust and thrust specific fuel consumption) at varying flight conditions and throttle settings. Two design point engines were studied to reveal trends in performance at full and partial throttle operations.