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**SOFC-Gas Turbine Hybrid System for Aircraft Applications:
Modeling and Performance Analysis** NISCHAL SRIVASTAVA, JUAN ORDONEZ, THOMAS BRINSON, Center for Advanced Power Systems, Florida State University, Tallahassee, FL 32310 — There is a growing interest in fuel cells for aircraft applications. Fuel cells when combined with conventional turbine power plants offer high fuel efficiencies. The feature of fuel cells (SOFC, MCFC) used in aircraft applications, which makes them suitable for hybrid systems, is their high operating temperature. Their dynamic nature, both electrical and thermodynamic, demands a dynamic study of the complete hybrid cycle. In this paper we present a model for a SOFC/Gas Turbine hybrid system and its implementation in Matlab-Simulink. The main focus of the paper is on the dynamic analysis of the combined SOFC/GT cycle. Various configurations of the hybrid system are proposed and simulated. A comparative study of the simulated configurations, based on the first and second laws of thermodynamics, is presented. An exergy analysis for the chosen configuration is used to perform a parametric study of the overall hybrid system performance.

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