Integrated Modeling of Aircraft, Engine and Subsystems for the Evaluation
of Thermal System Concepts for Long Range Strike Aircraft

Ernest S. Hodge, Marvin R. Glickstein, and Shane Mason Modelogics, Inc.

The Air Force Research Laboratory Propulsion Directorate (AFRL/PR) recently (March 2005) completed studies (Versatile Affordable Advanced Turbine Engine (VAATE) Thermal Management Study) to develop and validate technologies required to transition advanced propulsion engines to a 5000 mile range Long Range Strike Aircraft (LRSA). Unique to these studies was a teaming arrangement involving nine companies (3 airframe companies, 3 engine manufacturers, 2 subsystem suppliers, and one model integrator), who all agreed to share engineering models and use a common modeling toolset. This modeling toolset named Model Engineer was developed by Modelogics, Inc. In this paper Modelogics will describe these studies and show how Model Engineer was used to perform these studies.

The paper describes the application of Model Engineer to the design and system level evaluation of thermal management concepts for LRSA. It will describe some of the concepts, and the methods used to construct an operational simulation of the conceptual systems. It will further describe the approach used to provide mission level evaluation of each simulation, and will show typical results of the evaluations, and discuss the significance of such results. Finally, description will be provided of future planned application of the design methods, and expansion of the methods to broaden the area of application.