About the Editor

Mark F. Ahlers
Mr. Ahlers is a Technical Fellow in thermal and fluid flow network analytical tool and process development at the Boeing Company. He has spent more than 25 years developing the analytical tools and process that form the basis for Aircraft Thermal Management on Boeing commercial airplane programs, in addition to supporting thermal design efforts for the International Space Station, launch vehicle proposals, and commercial and research satellite programs. As BCA's first Thermal Marshal, Mr. Ahlers was responsible for the technical oversight of thermal analysis activities on the 787 program.
Aircraft Thermal Management: Integrated Energy System Analysis (IESA)

The simultaneous operation of all systems generating, moving, or removing heat on an aircraft is simulated using integrated analysis which is called Integrated Energy System Analysis (IESA) for this book. The purpose of this analytical modeling is to understand, optimize, and validate more efficient system architectures for removing or harvesting the increasing amounts of waste heat generated in commercial and military aircraft.

In the commercial aircraft industry IESA is driven by the desire to minimize airplane operating costs associated with increased system weight, power consumption, drag, and lost revenue as cargo space is devoted to expanded cooling systems.

In military aircraft thermal IESA is also considered to be a key enabler for the successful implementation of the next-generation jet fighter weapons systems and countermeasures.

This book contains a selection of papers relevant to aircraft thermal management IESA published by SAE International. The papers cover both recently developed government and industry-funded thermal management IESA, such as the Integrated Vehicle Energy Technology (INVENT) program, and older published papers still relevant today which address modeling approaches. While the modeling discussed primarily refers to military aircraft, the same tools and methods may be adapted for commercial aircraft simulations following minor modifications.

Additional information on the closely related topic of Aircraft Thermal Management is available from SAE AIR 5744 issued by the AC-9 Aircraft Environmental System Committee and the book Aircraft Thermal Management: System Architectures (PT-177).

Aircraft Thermal Management: Integrated Energy System Analysis is an excellent source of technical information on a subject that is becoming increasingly important in addressing aircraft overall performance.