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**DETERMINATION OF MINIMUM REQUIRED FSII DOSAGE FOR USE  
ON USAF AIRCRAFT**

Matthew J. DeWitt, Steven Zabarnick, Theodore Williams, Zachary West, Linda Shafer, Richard Striebich, Scott Breitfield, Charles L. Delaney<sup>2</sup> and Donald Phelps<sup>3</sup>

University of Dayton Research Institute, 300 College Park Dayton, OH 45469-0116 USA

<sup>2</sup>C4e, Inc., 11901 Topperwein Rd., Suite 904, San Antonio, TX, 78233 USA

<sup>3</sup> Air Force Research Laboratory/Propulsion Directorate, 1790 Loop Rd. N. Bldg. 490, WPAFB, OH 45433-7103 USA

Fuel System Icing Inhibitor (FSII) is one of the three required additives in U.S. military aviation fuels JP-5 and JP-8. The primary function of the FSII is to prevent solidification of aqueous liquid within the fuel, which could adversely affect fuel system operation. Di-Ethylene Glycol Monomethyl Ether (DiEGME) is the currently approved FSII, with a required procurement dosage of 0.10-0.15% by volume for both fuels. The use limits are currently 0.03% (JP-5) and 0.07% (JP-8), respectively. Many motivating factors, ranging from logistical/economic issues to application-based concerns, exist for determining if the required procurement and use limits can be reduced. Lower FSII requirements could significantly reduce associated logistical footprint and procurement issues and would render a considerable cost savings. In addition, environmental and material compatibility concerns related to DiEGME could be significantly alleviated.

Due to the varying system complexity and flight regimes experienced by different aircraft platforms, it is difficult to evaluate the required DiEGME dosage for all applications independently. It is beneficial to improve the understanding of the manner by which the FSII prevents ice formation, how it interacts with free and dissolved water, and how it functions in a flowing system. Therefore, studies were undertaken to provide an improved understanding of how FSII functions, especially related to pertinent operating variables. Specific efforts included estimation of the anticipated total water content within aircraft fuel systems, partitioning of FSII between fuel and aqueous phases at sub-ambient temperatures, and flow testing to investigate blockage due to icing. The goal of the overall program is to provide a quantitative basis for the minimum required FSII dosage while maintaining safe operability. An overview of the individual efforts will be provided and experimental data and implications will be discussed.