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RESEARCH REPORT

Unsettled Domains Concerning Electric Propulsion Technology for Commercial Aircraft

Ravi Rajamani, PhD

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About the Editor

Dr. Ravi Rajamani is an independent consultant in the aerospace and energy sectors with many years of experience in the application of systems engineering principles, data analytics, and model-based methods to controls, diagnostics, and prognostics, especially for propulsion systems. He has three books to his name including *Electric Flight Technology: The Unfolding of a New Future*. In addition, Dr. Rajamani is the author of many book chapters, journal and conference papers, and has several patents. Prior to his current job, Ravi worked at Meggitt, United Technologies Corporation, and the General Electric Company. He has a PhD from University of Minnesota and an MBA from University of Connecticut. His earlier degrees were a BTech from IIT, Delhi, and an MSc from IISc, Bangalore. He is active within various SAE technical committees dealing with prognostic health management (PHM) and electric propulsion. He is also active in the PHM Society, serving on its board of directors. He has been elected a fellow of SAE International and of IMechE. He currently serves as the editor in chief of the *SAE International Journal of Aerospace*. In addition, he has a research appointment at the University of Connecticut and is a visiting professor at Cranfield University.

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Abstract

According to some, electric propulsion is already on its way down the "trough of disillusionment." This report argues that while there are some concerns with associated technologies, such pessimism is unwarranted. Yes, battery systems can be more energy dense; charging standards are late in being developed; it is not clear what technologies and architectures will win out for which sectors; we still have to figure out how to deal with thermal management issues at all levels in future designs; and what might be the certification standards for electric aircraft. But that does not mean that these issues will not be addressed. Yes, these unsettled questions may take a little longer to solve than originally estimated, but there is full expectation within the industry that electric propulsion for commercial aircraft will succeed. In this SAE EDGE Research Report we present points of view from leading researchers in the industry who are thinking deeply about solving these problems.

NOTE: SAE EDGE™ Research Reports are intended to identify and illuminate key issues in emerging, but still unsettled, technologies of interest to the mobility industry. The goal of SAE EDGE™ Research Reports is to stimulate discussion and work in the hope of promoting and speeding resolution of identified issues. SAE EDGE™ Research Reports are not intended to resolve the issues they identify or close any topic to further scrutiny.

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