**I. PROJECT MANAGER QUALIFICATIONS**

Dr. Jacob Swanson is an Associate Professor of Engineering in the **Twin Cities Engineering Program** in the Department of Integrated Engineering at Minnesota State University Mankato. He is also an Adjunct Associate Professor in the Department of Mechanical Engineering (ME) at the University of Minnesota. He was previously a Research Associate in the Department of Engineering at the University of Cambridge, UK and before that, a graduate of UMN’s Mechanical Engineering Department. Prof. Swanson is internationally recognized for his work on emissions from engine combustion engines, including those from gas turbines. He has published 39 papers and given more than 80 conference presentations on these topics. He is currently advising about 25 students as part of his ENGR Design course. He has 3-4 other external projects supporting about eight undergraduate students. He annually supports, by co-advising, on average 1-2 graduate students in the Particle Technology Laboratory and Engine Research Labs at the University of Minnesota. **He is a recognized expert in the fields of air quality and aircraft emissions.** His specific experience, as related to aircraft, includes a significant amount of real world, field experience measuring aircraft emissions all over the world:

* Participated in previous LCCMR-funded air quality monitoring project
* Participated in UK “SAMPLE” campaigns in the United Kingdom (UK) and Switzerland aimed at determining a methodology for measuring aircraft gas turbine particulate matter
* Operation of the Cambridge Intermediate Pressure Gas Turbine Combustion (CIPCF) facility (supported by Rolls Royce) at the University of Cambridge
* Participation in US EPA “VARIAnTII” “VARIAnTIV” sample campaigns in Tennessee and Minnesota that were also aimed at determining a methodology for measured aircraft gas turbine particulate matter.

**II. ORGANIZATIONAL DESCRIPTION**

**Twin Cities Engineering (TCE)** is a program of the Department of Integrated Engineering of Minnesota State University, Mankato. TCE has the purpose of expanding the pool of qualified engineers in the Twin Cities Metro area by establishing an affordable, accessible, and unique option for the region’s engineering students. TCE offers an inclusive and innovative learning experience that has attracted non-traditional students and veterans at a higher rate than traditional students. The BSE degree program includes several features that differentiates it from traditional engineering degree programs. TCE addresses the entire learning experience and not simply one component of the curriculum. Five features, designed to produce desired attributes in BSE graduates, are as follows.

* Trans-disciplinary thinking
* Industry-sponsored, project-based-learning
* Experiential learning in context
* Competency-based assessments
* Significant exposure to professionalism, design, creativity, and innovation