Humbly dedicated to

The Lotus Feet of My Parents
ACKNOWLEDGEMENT

The author would like to express heart full gratitude to Dr. R. Sellamuthu, Ph.D., Professor, Department of Mechanical Engineering, who incessantly guided throughout the project and provided with timely advice and suggestions throughout the course work.

The author is grateful to Pro-Chancellor, Br. Abhayamrita Chaitanya, Vice Chancellor, Dr. P. Venkat Rangan, Registrar, Dr. Sankaran K., Post Graduate Dean, Dr. Krishnashree Achuthan and Dean- Engineering, Dr. Sasankan Ramanathan for the valuable support extended by them and providing the necessary infrastructure.

The author would like to thank the Defence Research and Development Organization (DRDO), New Delhi, India, for providing the financial support for conducting this project. (Project No: ERIP/ER/1003934/M/01/1345 dated 26th July 2011)

The author also thanks the doctoral committee members Dr. S. Thirumalini, Chairperson Department of Mechanical Engineering, Dr. Meera Balachandran, Associate Professor, Department of chemical and Materials Engineering and Dr. K. Rameshkumar, Former Chairman, Department of Mechanical Engineering, for their timely suggestions and directions.

Earnest gratitude to Mr. Cherian Paul and Mr. Nidhin Raj Ph.D. scholars in the Department of Mechanical Engineering for their zealous support throughout the work.

The author would like to thank all the faculties and lab assistants of the Mechanical Engineering Department of our School of Engineering for their help to carry out this work successfully.

February 2017

Karthik.V.Shanthar