

Master's Thesis Defense Announcement
Mechanical and Aerospace Engineering Department
University of Texas at Arlington

**DEVELOPMENT OF AN ELECTRO-PNEUMATIC SERVO CLUTCH AND
INDUSTRY-LEVEL CONTROLLER**

By

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Abstract

This thesis covers the simulation and development of an electro-pneumatic servo clutch used on an FSAE racecar. This project utilizes a sophisticated simulation and various techniques to increase performance such as utilizing pulse-width and pulse-frequency modulation and the use of a 36V supply with constant current limiting to drive the solenoids. The clutch is actuated using a pneumatic cylinder with the internal pressure modulated using commercially available CNG fuel injectors.

This thesis also describes the development of the electronic controller designed using analog circuits, as well as the integration of digital circuits to control operations such as launch control and half-shifts into the neutral gear.

Reliability and consumer-level-integration are both key priorities, thus all necessary components for the paddleshifter system are designed into robust and convenient assemblies which can easily be packaged on a racecar with severe space limitations.

Integration of the pneumatic shifting and servo clutch allows for increased acceleration performance and less driver distraction during dynamic events.