

Public Abstract

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Department:Mechanical & Aerospace Engineering

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Title:Characterization and Nondimensional Analysis of a Variable Speed Centrifugal Pump

When dealing with centrifugal pumps in the aerospace field, current industry standards dictate the use of single speed drive pumps. The performance of these pumps is then modulated using simply an electro-mechanical valve, which is controlled by an aircraft's onboard CPU. The French pump manufacturer, Intertechnique, has provided the University of Missouri with a variable speed pump for the purposes of this project.

The primary focus of this project is to create control logic which can keep the pump operating at it's best efficiency point. This control software will be developed control the speed of the pump, as well as a control valve attached to the pump. By varying the speed of the pump, as well as the amount of flow being allowed by the valve, the pump should be operating most efficiently just through the use of the software being developed by this project. In order to create this software, however, the pump must be completely understood. That is, the pump must be fully characterized. The completion of this characterization will allow us to achieve and capacity and head within our allowable performance range. By doing this, we will be able to minimize power consumption of the pump, while simultaneously maximizing the life of the pump.