Design of Specialized Spray Nozzles

Team 16

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Background

Introduction

The purpose of this project is to design a single specialized nozzle capable of creating patterns in the air with a single stream of water. This would be achieved through application of fluid mechanics, control systems and programming. Existing water spray systems used for recreational and agricultural reasons all use multiple nozzles. The nozzles use orifices to control the flow rate and pressure.

Objectives

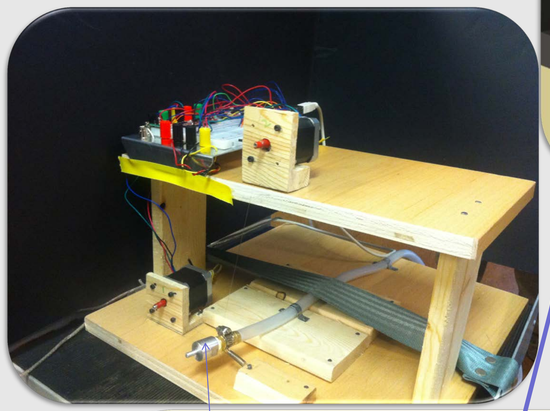
- **Business opportunity** in advertisement and entertainment
- **Promoting** research and innovative technology

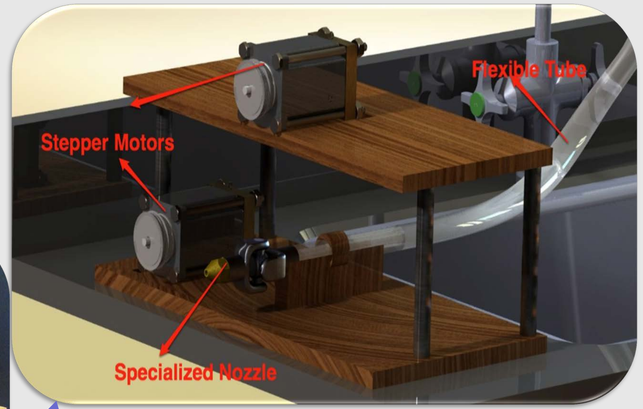
Constraints

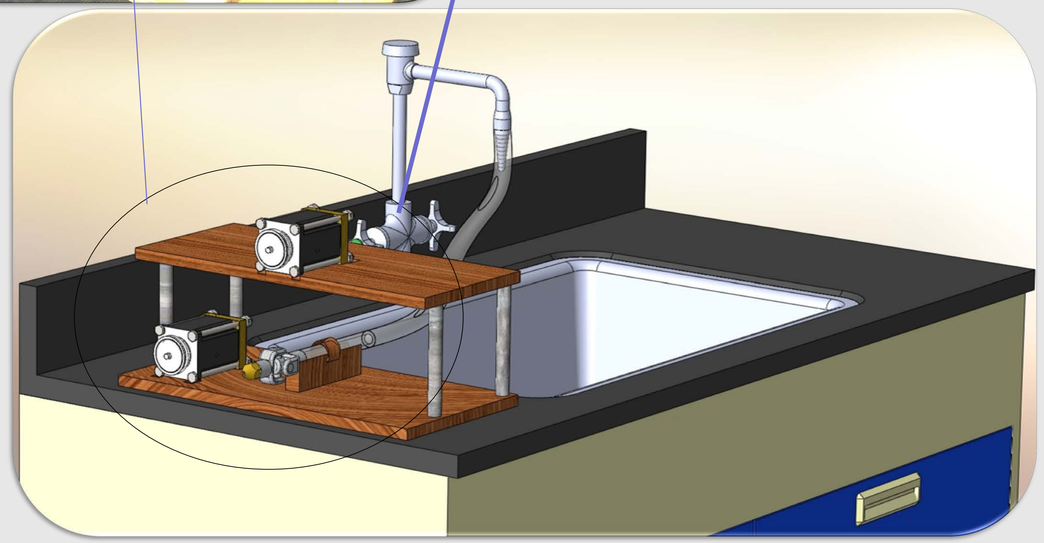
- **Five-year** life time
- **Corrosion** resistance
- **Safety Laws** limit the **pressure** and **speed** of water at the nozzle exit
- The **pressure** of the faucet is **fixed**

The Design

After testing 3 different designs the team concludes that the stepper motor design is the most efficient







Conclusion

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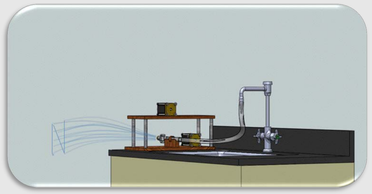
The current prototype achieves the objectives by creating simple patterns and letters of water in the air. It merely represents the data input method used for the control of the nozzle's mechanism.



Term1- Nozzle motion

.Theoretical calculations

.Nozzle design

.Test of drivers and motors

.Universal joint prototype and CAD

Term2- Water patterns

.Finalize stepper motor model

.Stepper motor design CAD

.Final prototype

Future- behavior in air

.Simulation and calculation of water behavior pass the nozzle

.Test multiple liquids

.Test effect of changing the nozzle type and diameter