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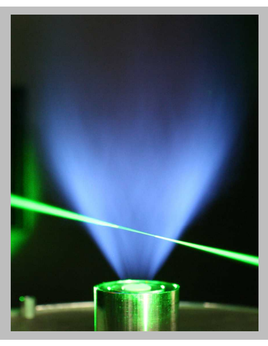

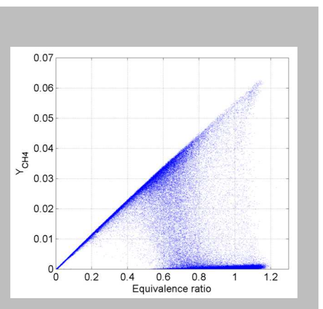

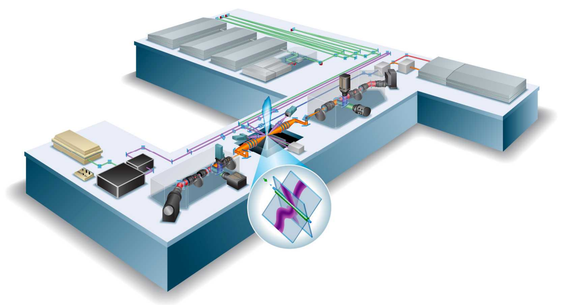

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Data Acquisition System

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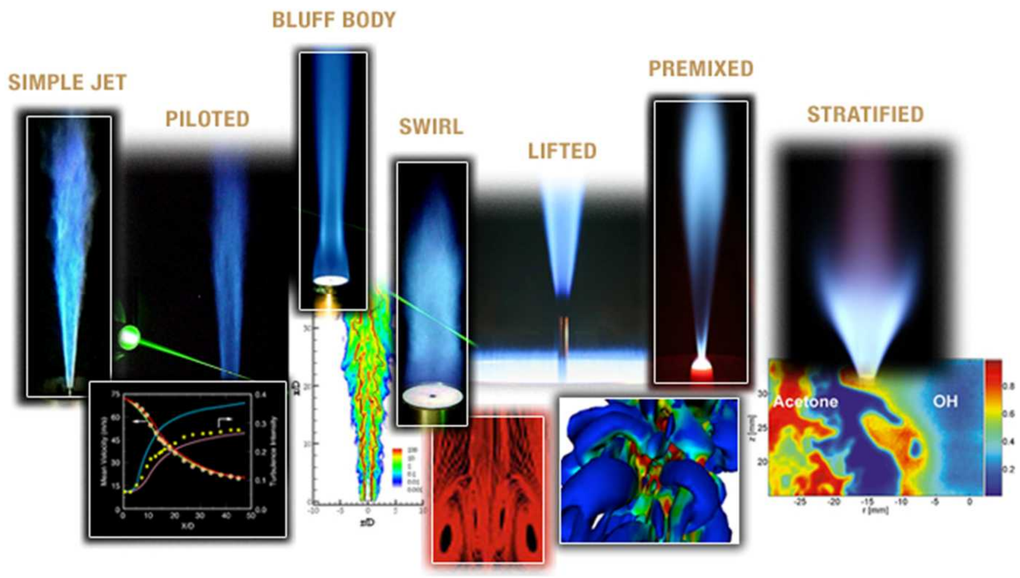
Abstract

The objective of this project is to overhaul the Turbulent Combustion Laboratory's Data Acquisition System. Towards that end, a new Data Acquisition Software is being created using the visual programming language, LabView. At the present, a Current Value Table design has been implemented with the intent of being expanded to a full Acquisition system.

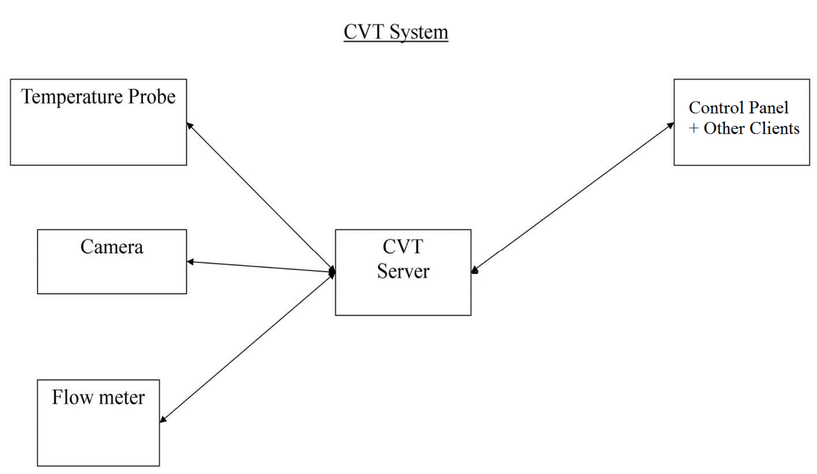
Introduction



The Turbulent Combustion Laboratory (TCL) studies the properties of turbulent flames with different flow geometries and fuel mixtures in order to accelerate development of predictive computational combustion models. This research is primarily done via the analysis of Rayleigh and Raman scattering of a laser beam shot through the flame. The focus of this project is to refurbish the software running the TCL's Data Acquisition System.

Procedure

Implementation of the new system will be done with LabView—a visual programming language. Creation of the new Data Acquisition Software will take advantage of the LabView's unique programming features, namely its ease of parallel computing and its emphasis on modularity. Towards that goal, two different designs are being considered. The first is a Server-Client system. Such a set-up will have a number of Servers coordinating and administering to various Client Computers, each one managing a different component of the Laboratory. The second design is the Current Value Table (CVT) system. The CVT, in essence, consists of a Table of values and commands stored on a single central Server Computer. Then, numerous Client Computers, each one also controlling an individual component of the Lab, will send or receive data and commands through this central Table.



Results

The choice was made to implement and test the CVT design. As of now, a simple CVT Server with two CVT Clients has been set up, with the two CVT clients capable of performing basic read/write operations on the Table stored on the CVT Server. This arrangement forms the foundation of the fully-fledged CVT Data Acquisition System being created for the Lab.

Conclusion

The next steps in the software's development are to upgrade the CVT software to the point that it can run the instruments and data collection units in the Lab; with regards to that objective, numerous CVT Clients need to be created and tailored to each individual component of the Lab. After that, the CVT program will be assessed against the current Data Acquisition software in place (which right now is the Server-Client design) in order to determine which system is the best for the Turbulent Combustion Laboratory.

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