

Observation and Analysis of Particle Image Velocimetry

Ethan Makuck

Mechanical Engineering

Dr. Maria-Isabel Carnasciali, Ph.D.

Abstract

The purpose of the work and research conducted during the SURF 2014 program was to evaluate the capability of the THERMOFLOW™ and FLOWCOACH™ setups and the associated FLOWEX™ software recently acquired by the Mechanical Engineering Department at UNH. The experimental setups enabled the visualization and analysis of fluid flows over various objects subjected for testing. This measurement technique is known as Particle Imaging Velocimetry (PIV) and

Figure 3 - Graphical Procedure for PIV analysis with FLOWCOATCH™ apparatus.

devices, much of the time utilized during research was experimental trial and error runs to obtain a consistent operating process. A basic graphical process was created for quick reference (seen in *Figure 3*), along with an extensive walk-through procedure taking the user step by step to gain flow data. Schematics for hardware connections were also drawn during this process to allow quick initial setup for flow analysis. To demonstrate the methods used during the experimental process, a summary of the more detailed procedural steps follows:

Software Setup

- Boot up computer with *FLOWEX™* driver
- Open FLOWEX Web Interface displayed on the desktop.
- Click the image of the PIV device being used to set preliminary equipment parameters automatically. The “General,” “PIV,” and “CFD” settings should automatically be set accordingly.

PIV Camera Setup

- While in the FLOWEX Web Interface, click the “Acquire” tab on the left hand side.
- With all connections made to the PIV camera, under “Launch Camera Control Software” change “Camera Type” to “PIV” in the drop-down menu.
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Figure 5 - Flat plate insert after cold acetone bath.

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Biography

Ethan Makuck is currently a junior at the University of New Haven studying mechanical engineering. The 2014 SURF program was his first experience with research-based work. Ethan plans to continue his experience