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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

PARTICLE IMAGE VELOCIMETRY (PIV) MEASUREMENTS IN THE WAKE OF A CASCADE OF COMPRESSOR BLADES AT STALL

by

Robert C. Quesenbury, Jr.

March 2006

Thesis Advisor:	Garth V. Hobson
Second Reader:	Raymond P. Shreeve

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PARTICLE IMAGE VELOCIMETRY (PIV) MEASUREMENTS IN THE WAKE OF A CASCADE OF COMPRESSOR BLADES AT STALL

Robert C. Quesenbury, Jr.
Lieutenant, United States Navy
B.S., New School University, 1998

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MECHANICAL ENGINEERING

from the

NAVAL POSTGRADUATE SCHOOL
March 2006

Author: Robert C. Quesenbury, Jr.

Approved by: Garth V. Hobson
Thesis Advisor

Raymond P. Shreeve
Second Reader

Anthony J. Healey
Chairman, Department of Mechanical and Astronautical Engineering

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ABSTRACT

The flow around second generation controlled-diffusion compressor blades in cascade at stall was examined through the use of a Particle Image Velocimeter (PIV). This examination was conducted from the trailing edge of the blade well into the wake region. Flow visualization techniques were used to observe and record the behavior of the region of flow separation. The PIV data showed that the separated regions continued to grow up to approximately 10% of blade chord length past the trailing edge. Past this point, these areas began to show signs of becoming entrained in the free stream. The flow visualization highlighted the extent of the backflow. The PIV measurements documented the velocity profiles within the wake region.

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ACKNOWLEDGMENTS

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I. INTRODUCTION

A. BACKGROUND

The study of viscous flow over a set of blades in a linear cascade provides information which is useful in the design of axial flow compressors. The need for smaller and more powerful gas turbine engines to meet the demands of today's aircraft has led to increased requirements for blade loading, improved performance at the design point, and the ability to operate at off-design conditions without compressor stall. This has led to the development of Controlled-Diffusion (CD) blading.

Controlled-Diffusion blades are profiles specifically designed to produce the desired pressure distribution, while avoiding boundary layer separation on the suction side of the blade. This allows higher blade loading, and the result is to require fewer blades to obtain the desired pressure ratio within a compressor stage, or to obtain a higher-pressure ratio per stage with the same number of blades.

The current investigation was a study of the flow through CD compressor blades in the Naval Postgraduate School (NPS) low speed cascade wind tunnel (LSCWT). The CD blading investigated during the current experimentation was designed by Thomas F. Gelder of NASA Lewis Research Center [Ref 1]. The compressor stator profiles were composed of Stator 67B blades, which together with Rotor 67, comprised Compressor Stage 67B. The Stator 67B blades were second generation CD blades, which were an improvement on the Stator 67A, first-generation CD blades designed by Nelson Sanger [Ref 2].

Numerous studies [Refs 3–9] have been performed on the current set of blades, which have primarily involved LDV measurements of the flow in the cascade. Hot film measurements of the unsteady vortex shedding from the leading edge of the blades have also been investigated by Brown [Ref 10] and Lim [Ref 11] at negative incidence (inlet flow angle below the design value).

The first PIV cascade measurements were performed in an annular turbine cascade in 1991 by Bryanston-Cross, et. al. [Ref 12]. Subsequent to that Day, et al [Ref 13], performed PIV measurements in a low-speed turbine. The first successful 2-D PIV

measurements in a transonic compressor, using a specially designed light-sheet injection probe, were reported by Wernet [Ref 14]. More recently, PIV measurements have been performed in a stator of a transonic compressor [Ref 15] and in a turbomachinery propulsor [Ref 16]. While many experimental studies have been performed in turbine cascades [Refs 12 and 17] with PIV measurements, surprisingly few studies have been performed in compressor cascades. Lehr and Bolcs [Ref 18] performed PIV measurements of transonic flow around a set of compressor blades in cascade. They were able to distinguish the shock structure between the blades, which was made unsteady by upstream pulsation of the flow. Unfortunately, they were not able to resolve the boundary layers or wake flow accurately; hence the motivation for the present study.

B. PURPOSE

The objective of the study was the characterization of the flow behavior in the wake of the cascade at stall. Flow visualization and Particle Image Velocimetry (PIV) measurements were used to characterize the flow at varying Reynolds numbers. Besides characterizing the unsteady vortex shedding in the wake, the main purpose for investigating the complexity of the flow patterns was to generate a data set that can be compared to future CFD modeling results.

II. TEST FACILITY AND INSTRUMENTATION

A. LOW SPEED CASCADE WIND TUNNEL

The present study was conducted in the Low Speed Cascade Wind Tunnel (LSCWT) located at the Turbopropulsion Laboratory (TPL). The cascade was powered by a turbo-vane blower that was driven by a 738 KW (550-hp) electric motor, and it was capable of producing a free-stream Mach number of 0.4. Figure 1 shows a schematic of the cascade in the Low Speed Turbomachinery Building. All aspects of the tunnel remained as documented by Nicholls [Ref 6].

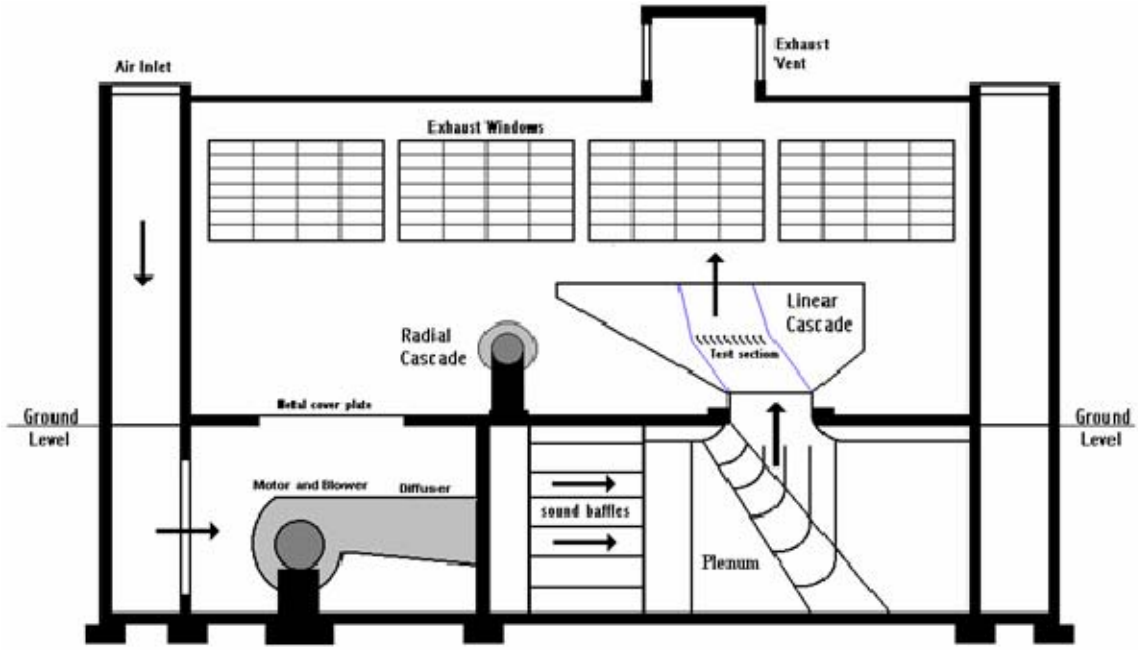

Figure 1. Schematic of the LSCWT [From Ref 7].

B. TEST SECTION

The test section of the LSCWT contained ten stator 67B controlled-diffusion blades. The installation of the blades in the test section was described by Hansen [Ref 3]. A detailed layout of the test section is shown in Figure 2.

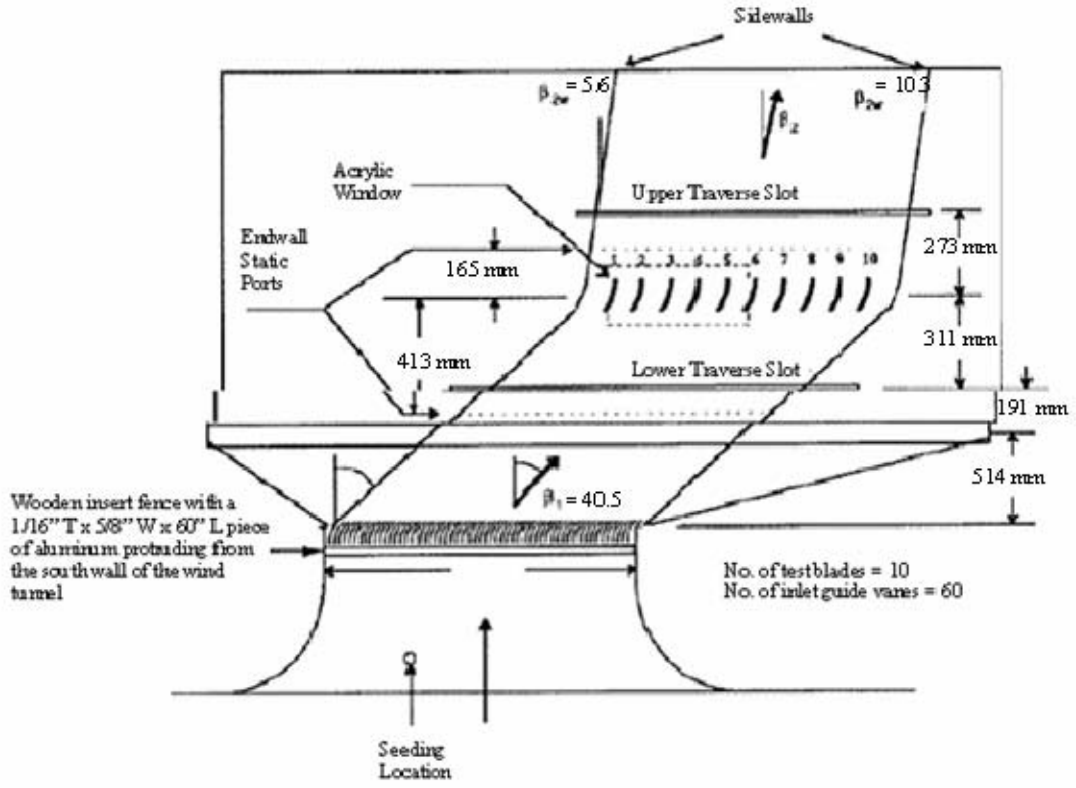

Figure 2. Schematic of the LSCWT test section [From Ref 7].

The blades were scaled from the mid-span section of the Stator 67B [Ref 1]. The coordinates used to machine the blades were documented by Hansen [Ref 3]. Each blade was 254 mm in span, 127.25 mm in chord, and set with a blade spacing of 152.4 mm. Figure 3 shows the blade profile.

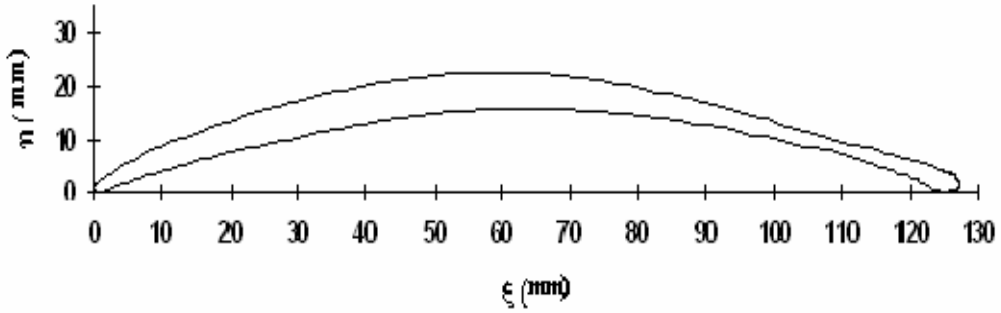

Figure 3. CD blade profile [From Ref 7].

The ten CD blades mounted in the test section with the north wall removed are shown in Figure 4. PIV measurements were conducted in the wake region of blades three and four. Blades three through five were anodized black to minimize laser light backscatter.

Figure 4. CD blades mounted in the LSCWT [From Ref 8].

C. PIV INSTRUMENTATION AND DATA ACQUISITION

The PIV system used during this investigation was a TSI dual Neodimium Yag (Nd:Yag) Imaging System. There were five major subsystems involved: laser and optics, articulated arm, camera, data acquisition system, and seeding mechanism.

The power supplies, laser control boxes, laser pulse mechanism, and data acquisition system are shown in Figure 5.

Figure 5. Part of the PIV system showing the computer, laser power supplies and synchronizer.

The dual ND:Yag Lasers with the associated articulated arm are shown in Figure 6.

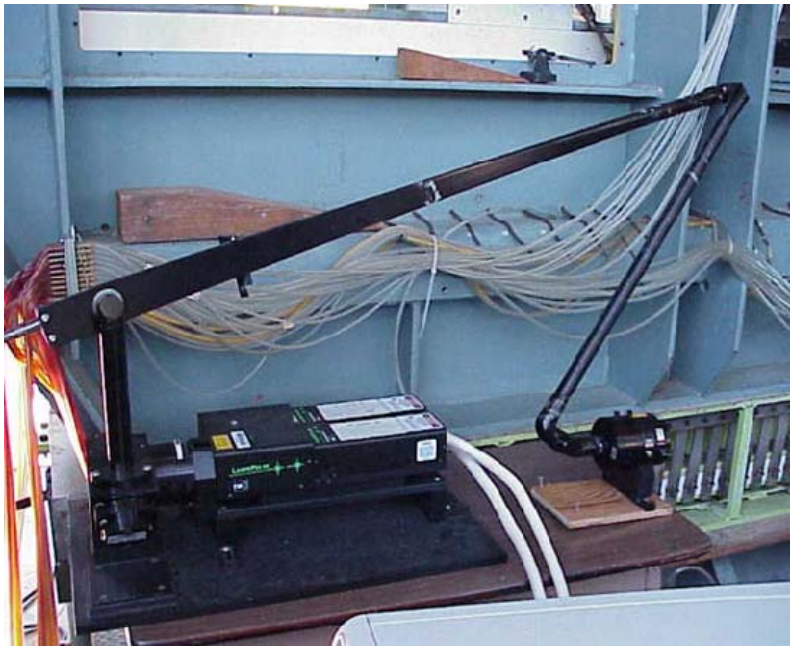

Figure 6. Dual Nd:Yag lasers and articulated arm with probe.

The camera that was used was a TSI model 10-30 component. It is shown mounted on a LDV traversing mechanism in Figure 7.

Figure 7. TSI camera mounted on the LDV mechanism.

1. Laser and Optics

The PIV measurements were performed with the TSI MiniLase II-20, which employed two, 150 mJ Nd:YAG lasers operating at a wavelength of 1064 nm. This system can be utilized from low velocities all the way up to supersonic speeds. Utilizing the appropriate optics, the light beam was converted into a light sheet. This sheet was then pulsed to illuminate the flow. The time between pulses was a user input, and was based on the velocity being measured. Laser pulses had to be set short enough so that reasonable velocity vectors could be determined from the dual images, typically on the order of a few microseconds. For the purposes of this study, the time differential was chosen to be equal to 10 microseconds.

2. Data Acquisition and Processing

The camera was mounted such that the field of view was orthogonal to the flow. Two images were taken, and they were both recorded on the same frame. These images were digitized and analyzed in Insight 6 for the computation and display of the velocity vectors.

Figure 8 is a diagram of the optical laser and data acquisition system. The synchronizer was connected to the laser power supplies by linking each 'Flash Lamp' to its respective 'Fire Lamp' connector, and by linking each 'Q-Switch' to its respective 'Fire Q-Switch' connector.

Figure 9 shows a schematic of the camera connections. The frame grabber had 3 separate cables associated with it; two connected to the synchronizer and one to the camera. The cable with the 68-pin D-connector was attached to the back of the camera, the 44-pin D-connector was attached to the back of the computer, and the 9-pin D-connector was attached to Port B on the back of the synchronizer. The camera's 'Strobe' and 'Trigger' connectors were linked to the synchronizer's 'Camera Feedback' and 'TTL Camera Feedback' connectors, respectively.

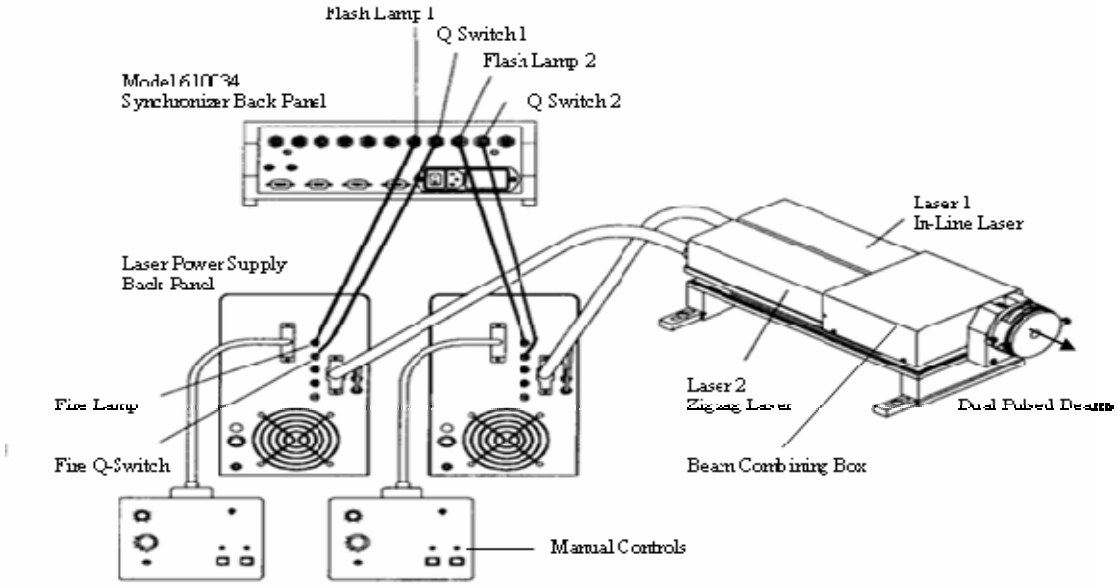

Figure 8. Schematic of the two Nd:YAG lasers hook-up to the TSI synchronizer. [From Ref 19]

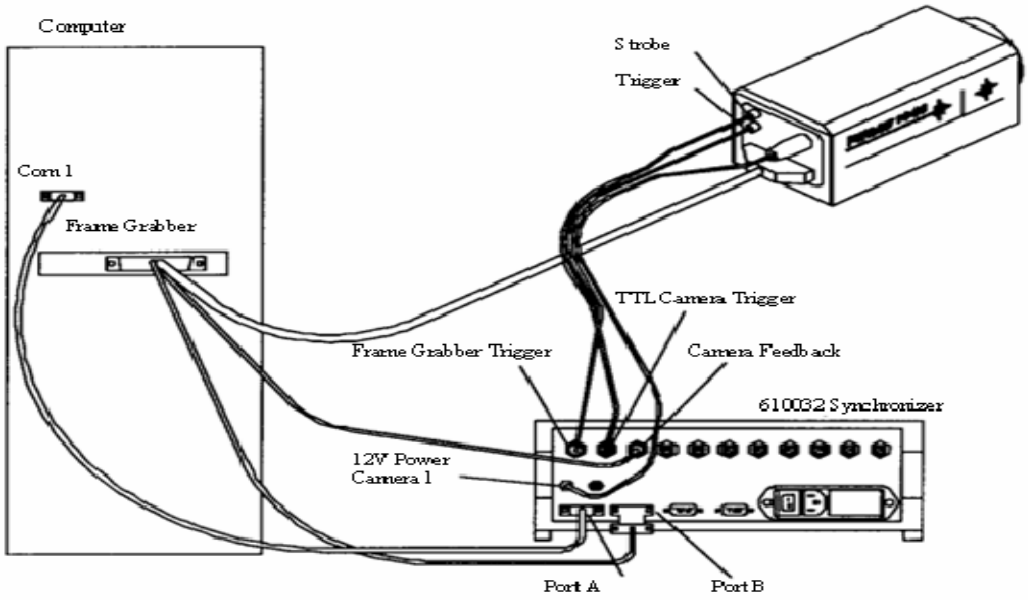

Figure 9. Schematic of the wiring diagram of the PIV camera, synchronizer and frame grabbing card in the computer. [From Ref 19]

III. PIV THEORY OF OPERATION

The principle of PIV measurements is illustrated in Figure 10. Two photo-images of the field of particles were recorded in quick succession. The measurement of the displacements of a particle, *dx* and *dy* , in a known time, *dt* , is the fundamental principle behind the measurement. The data collection system and software provided an approximation of the velocity, u, by computing $\frac{dx}{dt}$. The particle trajectory had to be straight, and the speed along the trajectory relatively constant. This led to the necessity of choosing a *dt* that was small relative to the Taylor microscale of the velocity field.

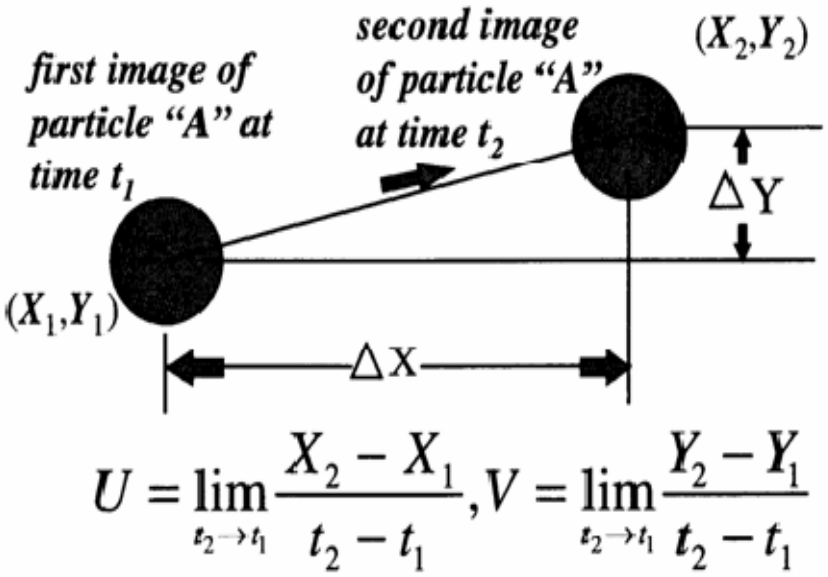

Figure 10. PIV principle [From Ref 19]

Matching image pairs when several particle images are present is a difficult task. The reverse flow that was encountered during the present study complicated this issue further. However, the system software (***Insight 6***) had a 2-Frame Cross-Correlation feature designed to resolve this issue. The recording process placed the first image window on frame 1 and the second image window on frame 2. Each frame only had one pulse of light. ***Insight*** then measured the distance traveled by each particle between the exposures on the two image frames. The processing signal-to-noise ratio was thereby

improved because the system knew the sequence of the first and second pulse images. Additionally, the 2-Frame feature could resolve zero-displacement and reverse flow particles without image shifting.

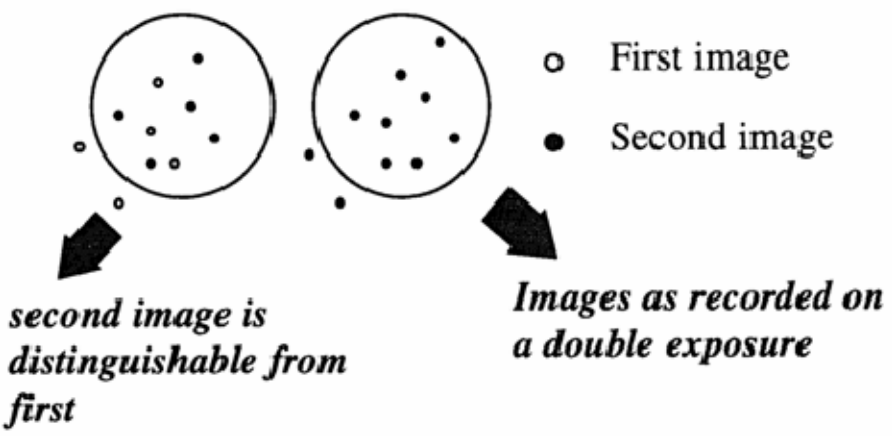

Figure 11. Image pairs [From Ref 19]

Once the images were collected, they were put through a vector editing procedure. This was done to ensure the validity of the vectors that were being evaluated, thereby ensuring the accuracy of the flow field calculations. Spurious vectors were observed to be orders of magnitude larger than their neighbors. A filter was set, and the signal-to-noise ratio at each point was compared to the set value. If the value was within the defined range, then the vector was considered valid. Selection of the filter set-point was critical to ensuring the accuracy of the data that was retained. If the threshold was too high, then good points were eliminated as well. Once these vectors had passed through the filter, they were compared with neighboring points. If they differed by more than the neighborhood average, then they were removed from the data set. Once complete, the vector field was completed by interpolating between the neighboring vectors. If done correctly, this produced an accurate representation of the field of flow [Ref 19].

IV. EXPERIMENTAL PROCEDURE

A. SEEDING

The seeding was provided by a Concept Engineering Spirit 900 smoke generator. This unit was capable of producing a particle size of 0.2-0.3 microns (mass median diameter). The type of seeding and location where the seeding particles were injected into the flow was carefully considered. For the purpose of this investigation, it was determined that the Spirit 900 would provide the proper amount of seeding, and it was placed such that it injected smoke ahead of the inlet guide vanes of the LSCWT. The connection to the seeding wand was made by way of a steel braided hose, as shown in Figure 12.

Figure 12. Smoke generator and location of the seeding wand in the LSCWT.

B. FLOW VISUALIZATION

The flow visualization was performed utilizing a continuous 500 mW argon-ion laser. A laser light sheet was formed in the wake region of the cascade by passing the laser beam through a fiber optic cable and cylindrical-planar lens before entering the tunnel side wall. Movie clips were captured with a handheld Sony TRV350 Digital Handycam. The results were analyzed and compared with the results from the PIV study.

C. PIV MEASUREMENTS

1. Probe Alignment

The TSI ND:Yag lasers were aligned by adjusting the first and second mirrors in the beam combining box. Each reflecting mirror within the articulated arm was removed, cleaned, and reinstalled. The laser system was then pulsed, and the first and second mirror adjustments were realigned until the final laser sheet was bright and continuous, with no scattering.

2. Camera Calibration

The PIV system and its associated articulated arm were set up apart from the wind tunnel so that distance measurements could be taken from a more readily accessible location. A seeding system was set up utilizing a TSI six-jet atomizer as a flowfield generator. The seeding medium that was chosen for this application was olive oil. The camera was set up on a tripod such that it had a viewing angle of the flow field at 90 degrees to the laser-light sheet. The laser system was then started, and the camera lens was adjusted so that the field of view on the computer monitor was in focus. Following this, the distance between the light sheet plane and the camera lens was measured. It was determined that for a distance of 0.6m (2 feet), the camera focal distance indicator needed to be set at 0.3m (1 foot) since the camera lens had an expansion tube installed. The camera was then removed from the tripod and fixed to the traversing mechanism.

3. Particle Seeding

Particle seeding is one of the most important issues involved in making PIV measurements. The selection of the seeding medium and the location where the seeding particles were injected into the flow was critical. The seeding particles had to be the correct size in order to follow the flow, and had to scatter enough light from the incident laser beam. It was determined that the particles that were produced by the Spirit 900 smoke generator were adequate across the entire spectrum of Reynolds numbers applicable to the present study. The seeding location determined the area downstream in the test section that contained enough seed particles to produce a sufficient data rate. The wand was located far enough upstream so that any flow field interference caused by the wand had enough time to mix out before the flow entered the test section [Ref 8].

The seeding system penetration point was made by drilling an access hole into the tunnel just below the inlet guide vanes. The seeding wand position was manually adjusted to center the seeding over the PIV laser light sheet.

4. Data Acquisition

A separate experiment was set up within ***Insight 6*** for each wind tunnel speed setting. The YAG 1 and YAG 2 Q-switch delays were set at 175 microseconds for high, 125 microseconds for medium, and 100 microseconds for low laser power settings. Both YAG lasers were then set on "high." The time between pulses was set at 10 microseconds, the Pulse Repetition Rate was set at the maximum of 15 Hz, the Pulse Delay Time was set at 0.28 milliseconds, and the Camera Trigger Delay Time was set at 10 microseconds. The lasers were powered up from their respective control boxes.

The tunnel was placed in run mode, and the smoke generator was powered up. The tunnel speed was increased from 5.08 cm H_2O (2-inches) to 35.56 cm H_2O (14-inches) plenum pressure, pausing at even (inch) intervals. As the speed was raised, the seeding flow rate was increased just enough to ensure a steady flow was maintained; however, care was taken to maintain a flow rate that was small enough to prevent saturation within the tunnel. The correct amount of smoke needed had been determined during the initial flow visualization experiments.

A snapshot of the flow at each speed was taken by ***Insight 6***. This snapshot was then interrogated with an area of interest from the tip of the blade 3 trailing edge to the top of the field of view, as shown in Figure 13.

The program was then calibrated to ensure the unit of velocity measurement was m/s. The default unit of measurement was pixels. In the "2D Velocity Calibration" ***Insight*** menu option, Velocity was selected as the measurement option. The time differential was entered (10 microseconds), along with the field of view horizontal value (91mm). Once this was complete, then all other velocity values were calculated by the software.

The measurement area was then validated to rid the vector field of any erroneous vectors. For the purposes of this experiment, the default global filters were utilized. The Standard Deviation filter (tolerance set at 3) utilized the global mean and standard

deviation values of the vector field to evaluate the validity of each vector. The Range filter removed any vectors whose velocity was outside of the set range of values (min: -76.118, max: 68.2064). The Double Correlation filter took a correlation map for a particular vector and compared it to the product correlation map for that vector and a neighboring one [Ref 21]. The velocity vector field was further smoothed by utilizing the Smooth filter. This created a weighted average of a velocity vector and its neighboring vectors. Each experiment file was then evaluated by TecPlot software for further analysis, i.e. the extraction of the velocity profiles at stations 10, 11, 12, and 13, as well as the contouring of the velocity and vorticity fields.

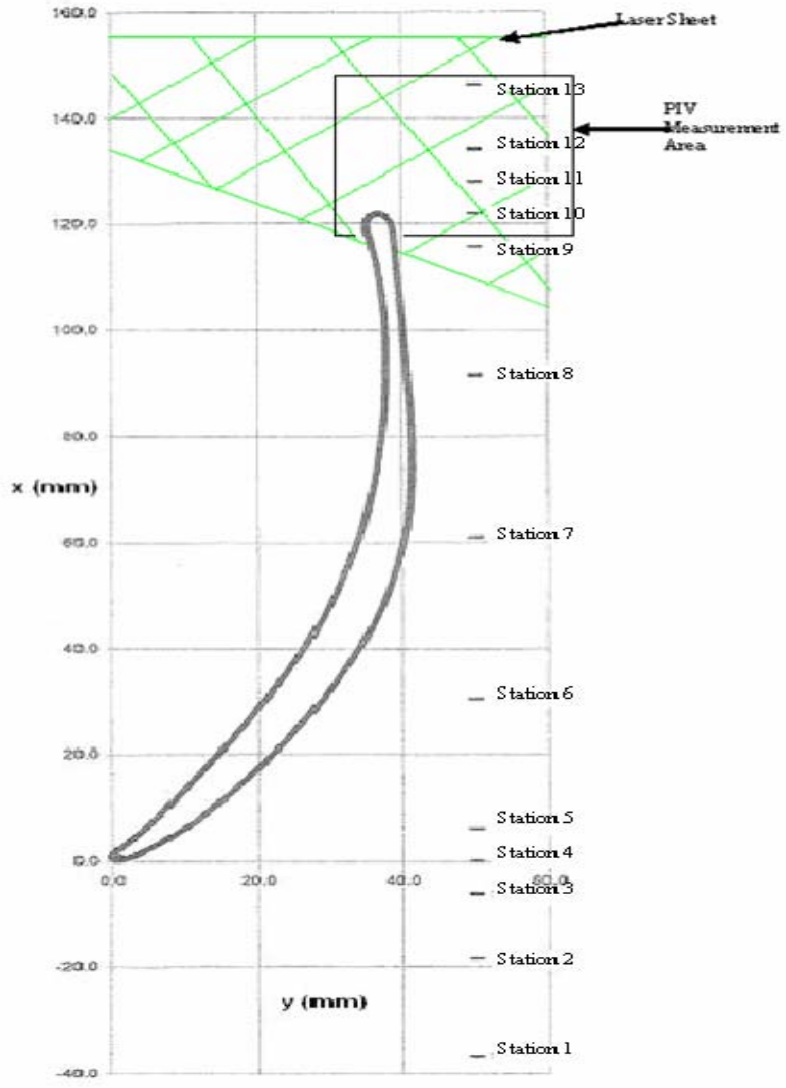

Figure 13. Blade #3 orientation showing PIV measurement location [After Ref 9]

V. RESULTS AND DISCUSSION

A. PRESSURE SURVEYS

Blade surface pressure measurements were taken for the Reynolds numbers applicable to this investigation. The results of the measurements for Re=467,568, Re=613,024, Re=666,631, and Re=720,803 can be seen in Figure 14. The data in the figures are presented in terms of the coefficient of pressure ($C_P = \frac{P - P_\infty}{\frac{1}{2}\rho_\infty U_\infty^2}$) versus fraction of blade chord, x/c. The data for the remaining Reynolds numbers are presented in Appendix F.

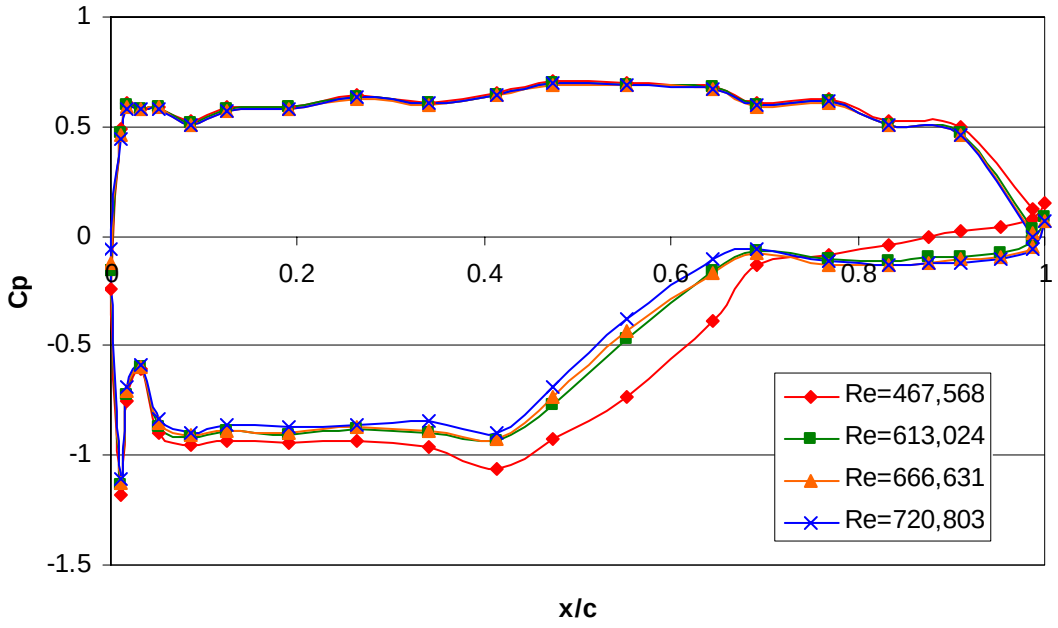

Figure 14. Blade surface pressure distribution at four Reynolds numbers.

As can be seen in this figure, the pressure loading on the blade remained constant on the pressure side of the blade, with a maximum C_P of approximately 0.7; however, the loading on the suction side of the blade reduced significantly after an x/c value of 0.45. The maximum negative C_P value at x/c = 0.4 changed as follows:

- Re = 467,568: C_P = -1.1
- Re = 613,024: C_P = -0.91
- Re = 666,631: C_P = -0.9
- Re = 720,803: C_P = -0.89

Each Reynolds number showed that the suction pressure decreased to near zero at x/c equal to 0.7, beyond which there was no pressure gradient. This indicated the presence of separated flow or a region of reverse flow. Furthermore, it was evident that as the Reynolds number was increased, the C_P distribution began to level off at an x/c value of approximately 0.7, which indicated a stalled region of flow which was turbulent and three dimensional.

B. FLOW VISUALIZATION

Flow visualization was performed on blade three at Reynolds numbers of 467,568 (6-inches) and 666,631 (12-inches). The results are shown in figures 15 and 16. The trailing edge of the blade is marked, and the vertical flow on the suction and pressure sides of the blade is illustrated with arrows. The flow visualization indicated that as the plenum pressure was increased, the growth of the size of the separation zone greatly increased.

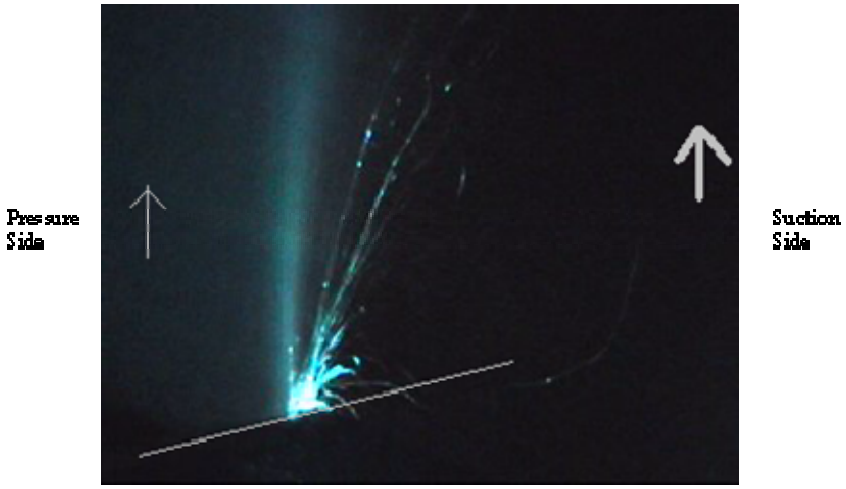

Figure 15. Flow visualization at Re = 467,568

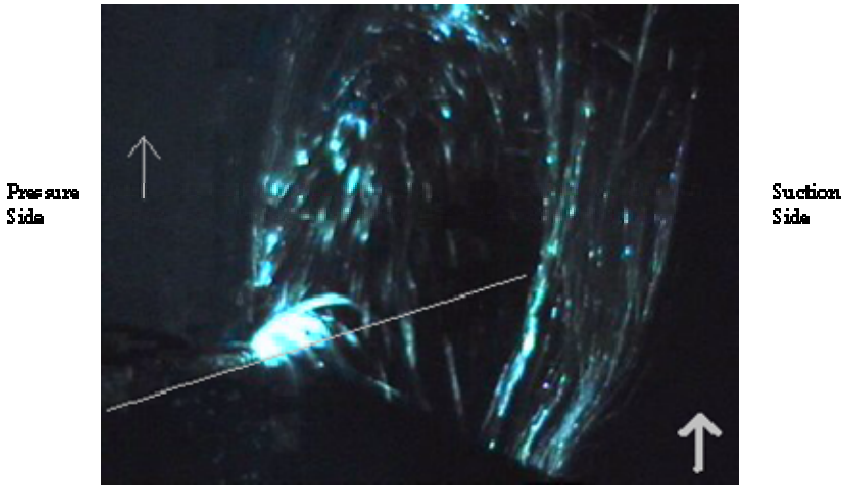

Figure 16. Flow visualization at Re = 666,631

C. PARTICLE IMAGE VELOCIMETRY

1. Velocity Vector Field

Figures 17 – 20 show the velocity vector fields that were measured at four different Reynolds numbers. The vectors are shown superimposed on a flooded contour background, which aids in illustrating the regions of flow. As the Reynolds number was increased, the scale of the velocity vectors was manually reduced so as not to clutter the view of the illustration.

The growth of the wake with Reynolds number is evident in these figures as the recirculation regions started out approximately 35 mm in width at Re = 467,568 and grew to in excess of 50 mm at Re = 720,803.

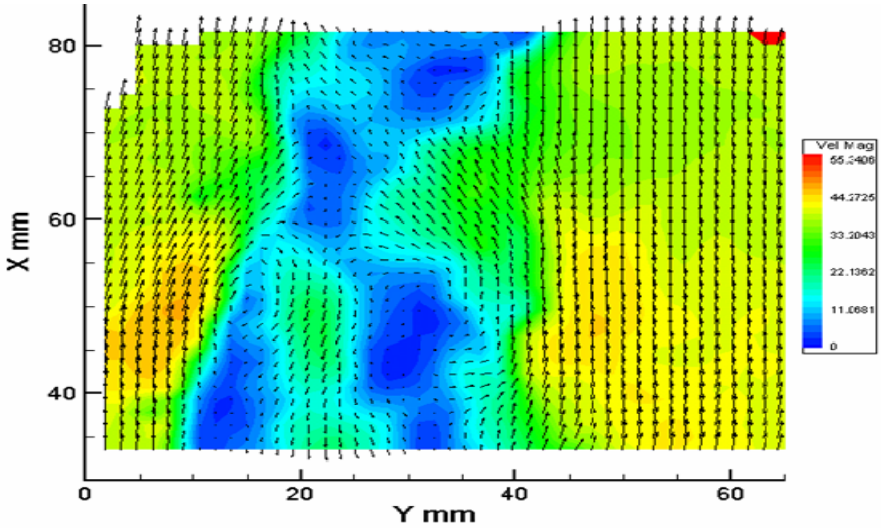

Figure 17. Velocity data at Re = 467,568

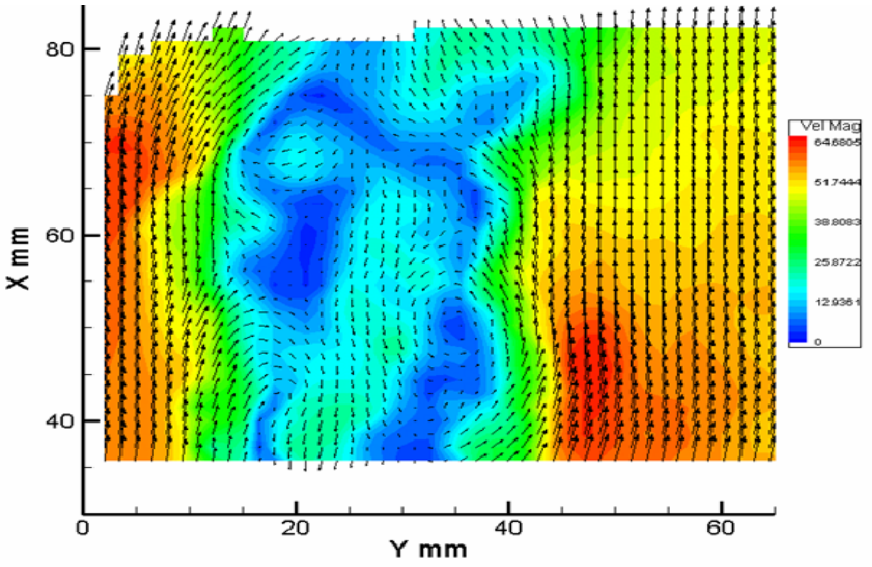

Figure 18. Velocity data at Re = 613,024

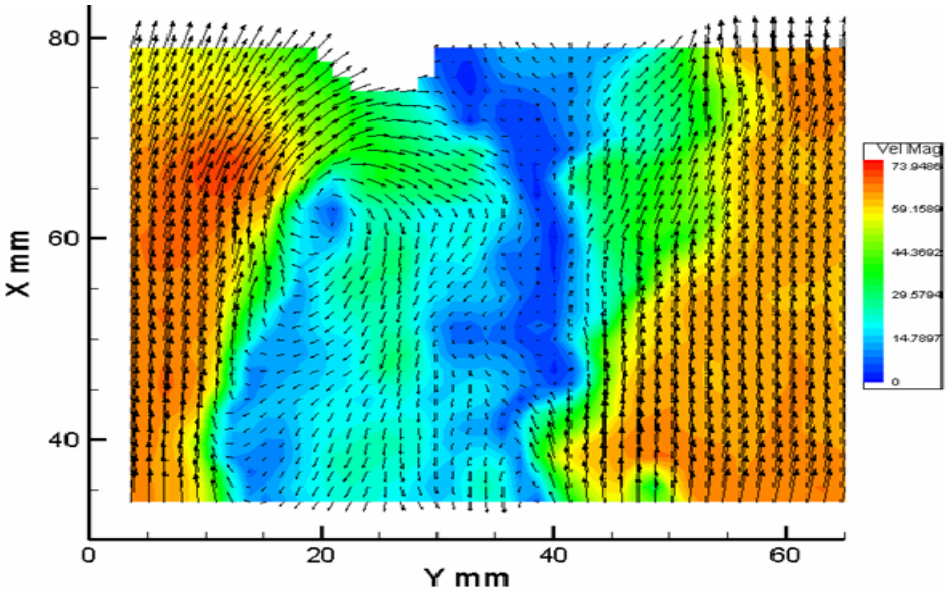

Figure 19. Velocity data at Re = 666,631

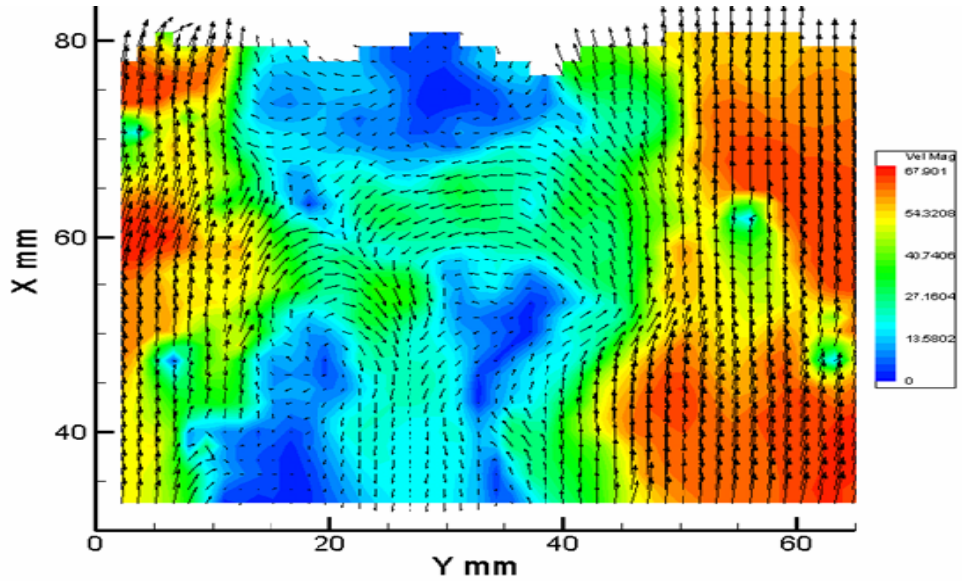

Figure 20. Velocity data at Re = 720,803

Eight velocity frames that were analyzed at a Reynolds number of 666,631 (12-inches) are presented for comparison purposes in Figures 21 and 22. The results for the other surveys can be found in Appendix A. Since the data were taken at the maximum pulse repetition rate of 15 Hz, the time between these images was 67 msec. At a convection velocity (free stream) of 70 m/sec and an overall streamwise survey height of 45 mm the resident time of a vortex in the field was approximately 6 msec. Thus, the pulse repetition rate was an order of magnitude too slow to track individual vortices.

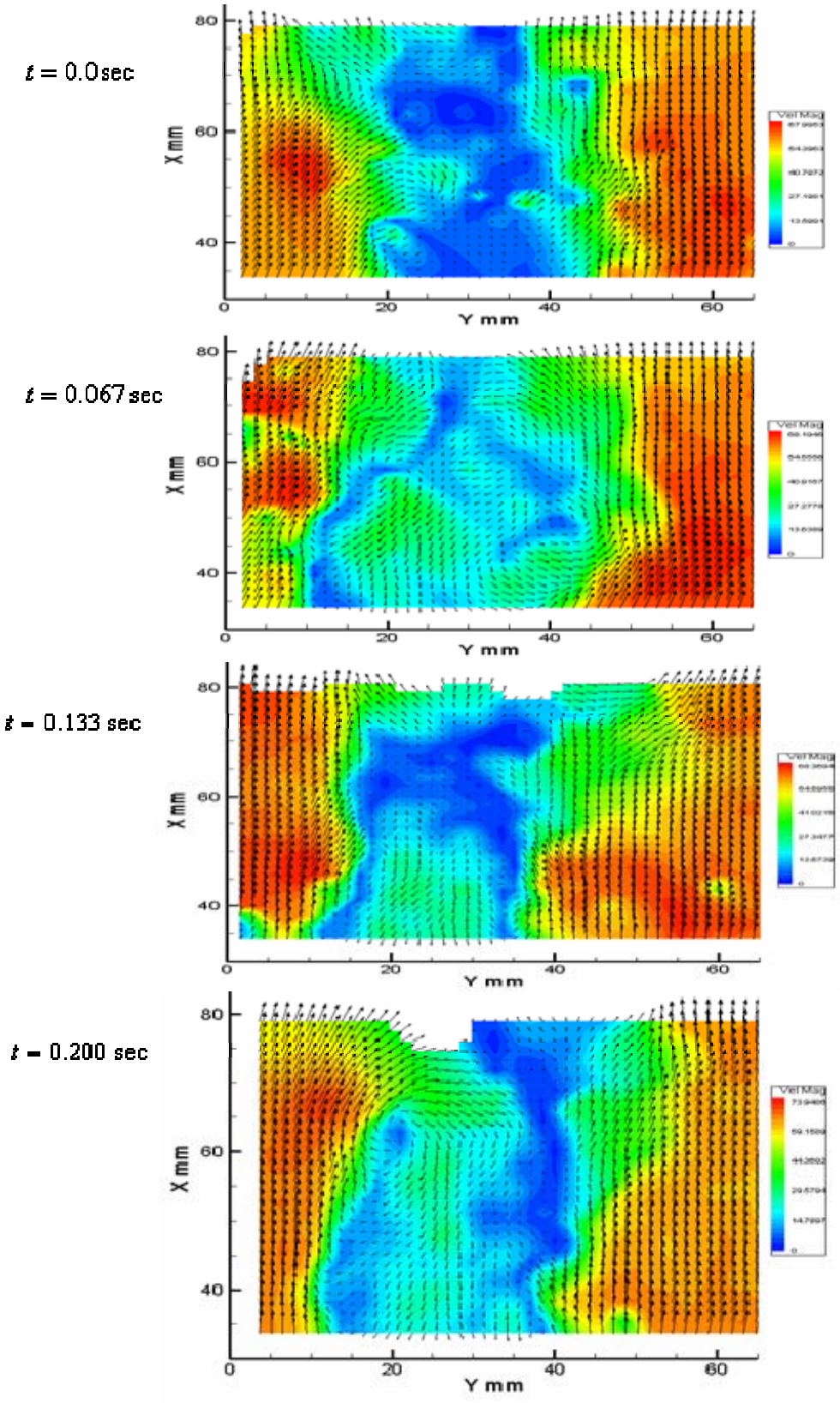

Figure 21. Velocity data at Re=666,631 (Frames 0-3)

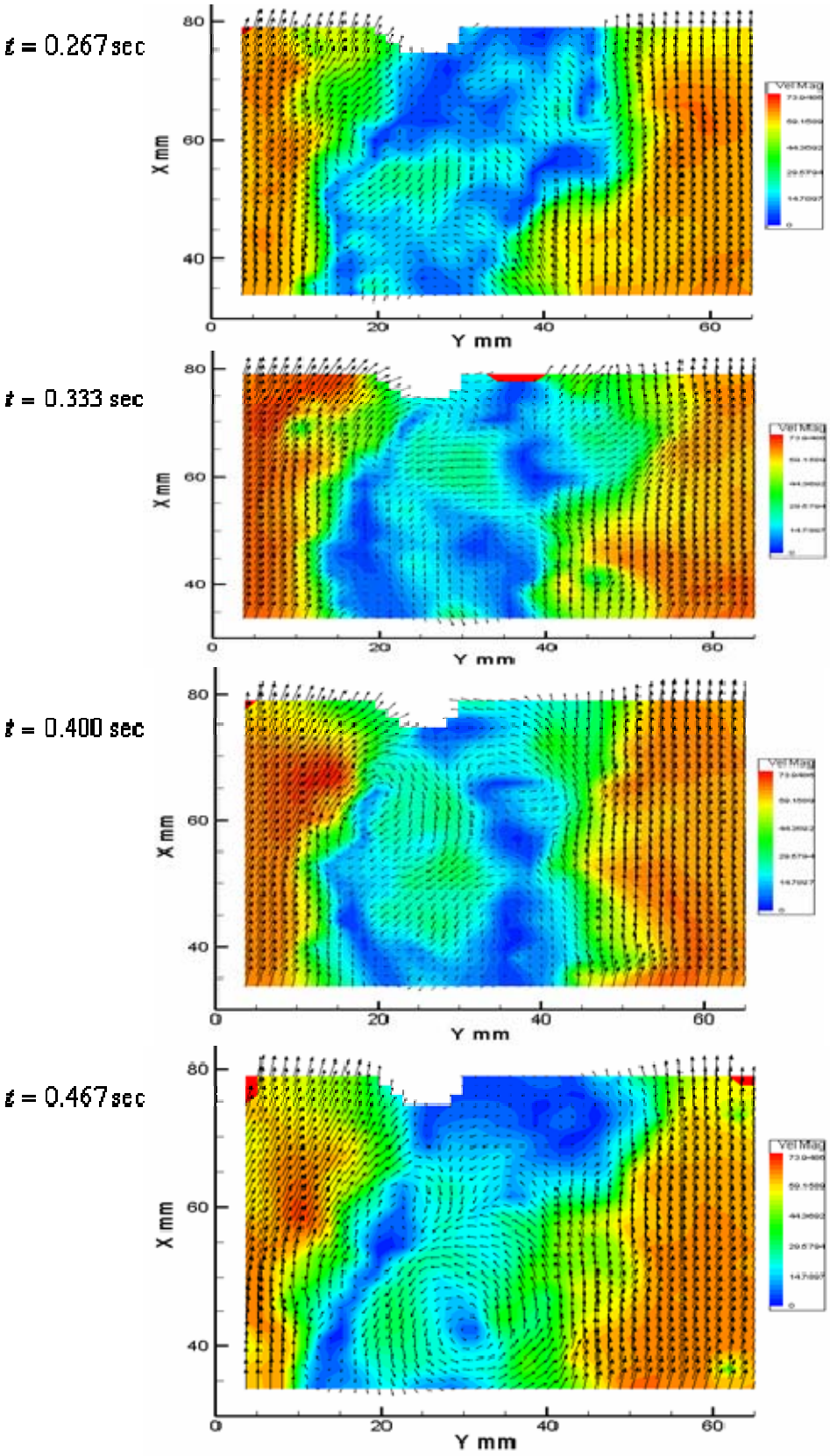

Figure 22. Velocity data at Re=666,631 (Frames 4-7)

2. Velocity Profiles

Velocity profiles were extracted from the complete PIV measured velocity field in the wake region of blade three at varying Reynolds numbers. The information was gathered from a series of 10 frames and then averaged to create a mean velocity profile. These profiles were developed at Station 10 (blade trailing edge), Station 11 (1.05% axial chord), Station 12 (1.10% axial chord), and Station 13 (1.20% axial chord). The results are presented and discussed below for Reynolds numbers of 467,568 (6-inches), 613,024 (10-inches), and 720,803 (14-inches).

a. Reynolds Number Equal to 467,568

Figures 23 - 26 show the graphical results for Re = 467,568 at each station. The velocities are plotted in non-dimensional form. The velocity normalized to an inlet reference velocity (tabulated in Appendix D) is shown plotted versus non-dimensional distance (Y/S), where S was the blade spacing of 0.152m (6 inches). At station 10 (trailing edge), there was no evidence of any mean reverse flow. This was illustrated by the plot, which showed the U velocity component remained greater than zero; however, at station 11, a small amount of reverse flow was measured. Once this flow progressed through station 12 and into station 13, the velocity deficit in the wake decreased. This was indicative of the backflow being washed away into the free stream as flow progressed deeper into the wake region.

At station 11, the mean velocity profile did show a small amount of negative velocity which was inconsistent with the mean at station 10. This discrepancy could be due to the small number of frames (10) over which an average was taken.

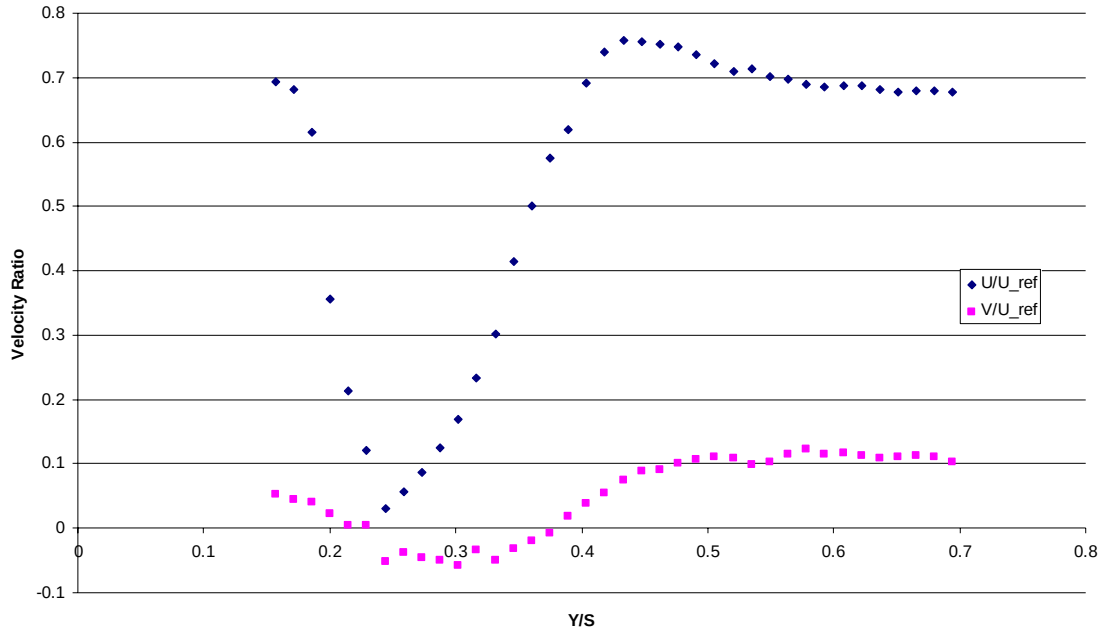

Figure 23. Station 10 survey at Re=467,568

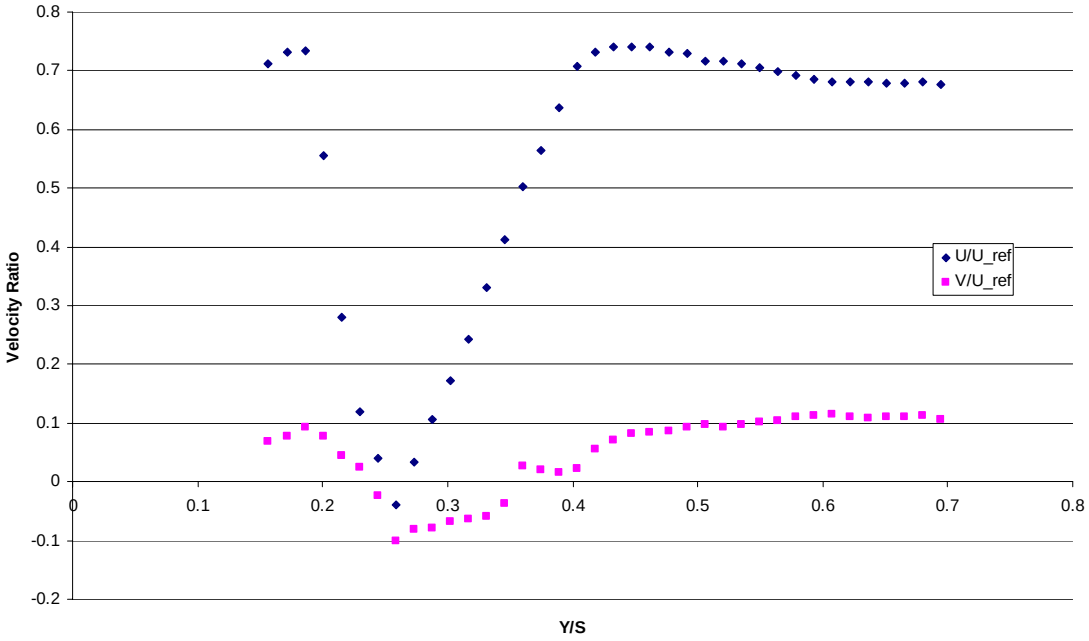

Figure 24. Station 11 survey at Re=467,568

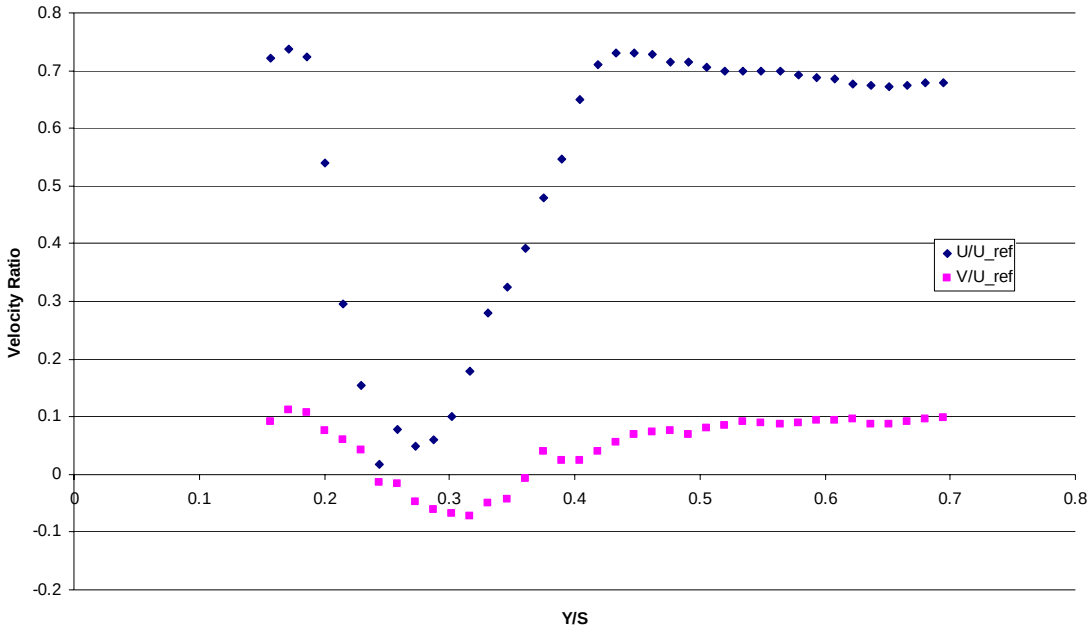

Figure 25. Station 12 survey at Re=467,568

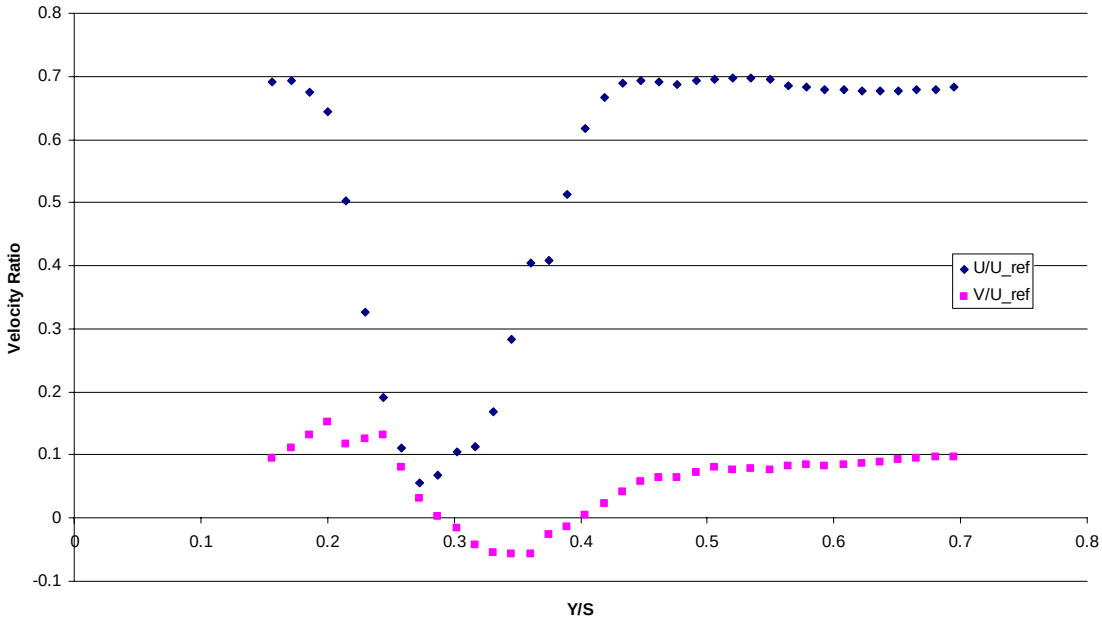

Figure 26. Station 13 survey at Re=467,568

b. Reynolds Number Equal to 613,024

At a Reynolds number of 613,024, there was a large region of reverse flow at station 10. Figures 27 – 30 show the average component velocity profiles at each station. The region of reverse flow was well formed at station 10, and it continued to show signs of growth at stations 11 and 12. The flow that was measured at station 13 indicated that the amount of reverse flow had decreased.

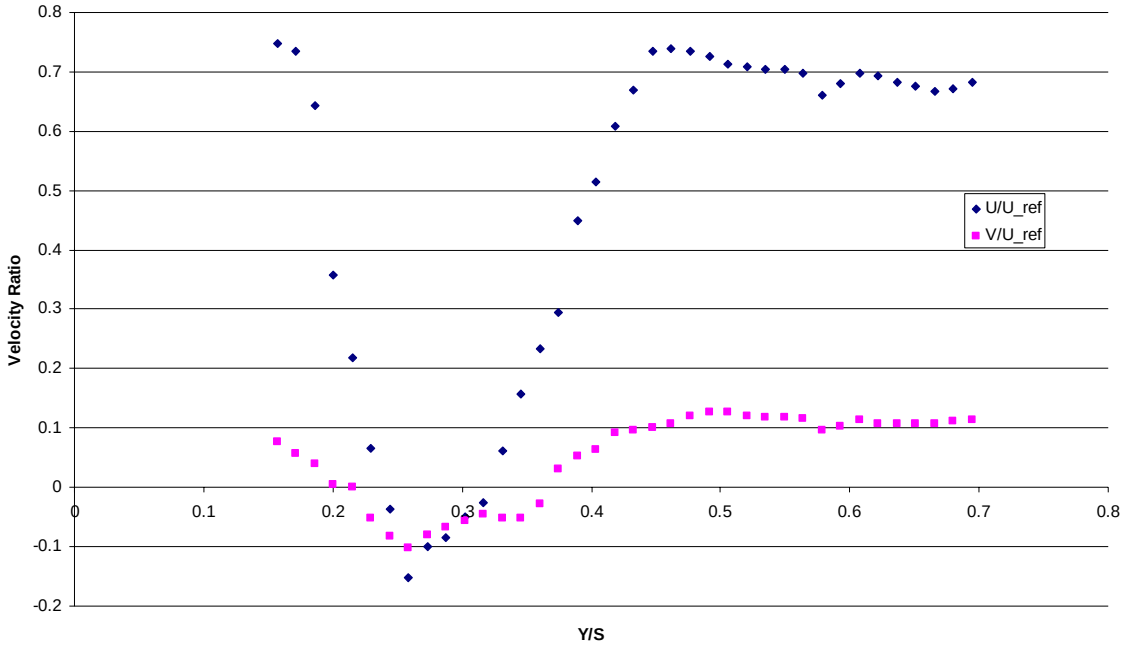

Figure 27. Station 10 survey at Re=613,024

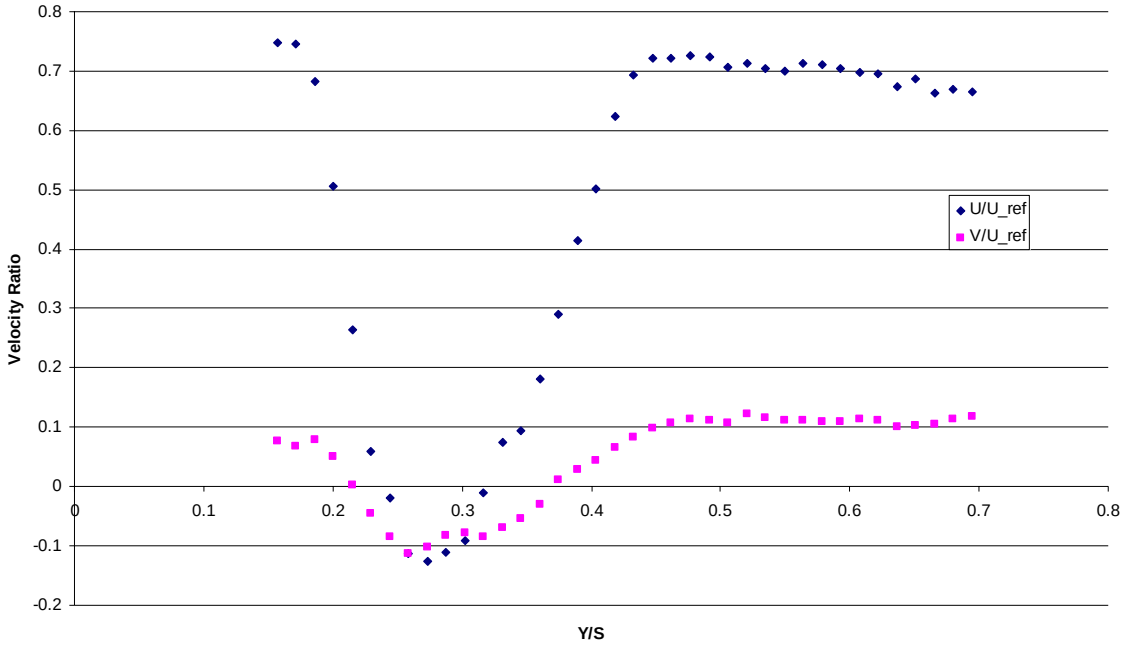

Figure 28. Station 11 survey at Re=613,024

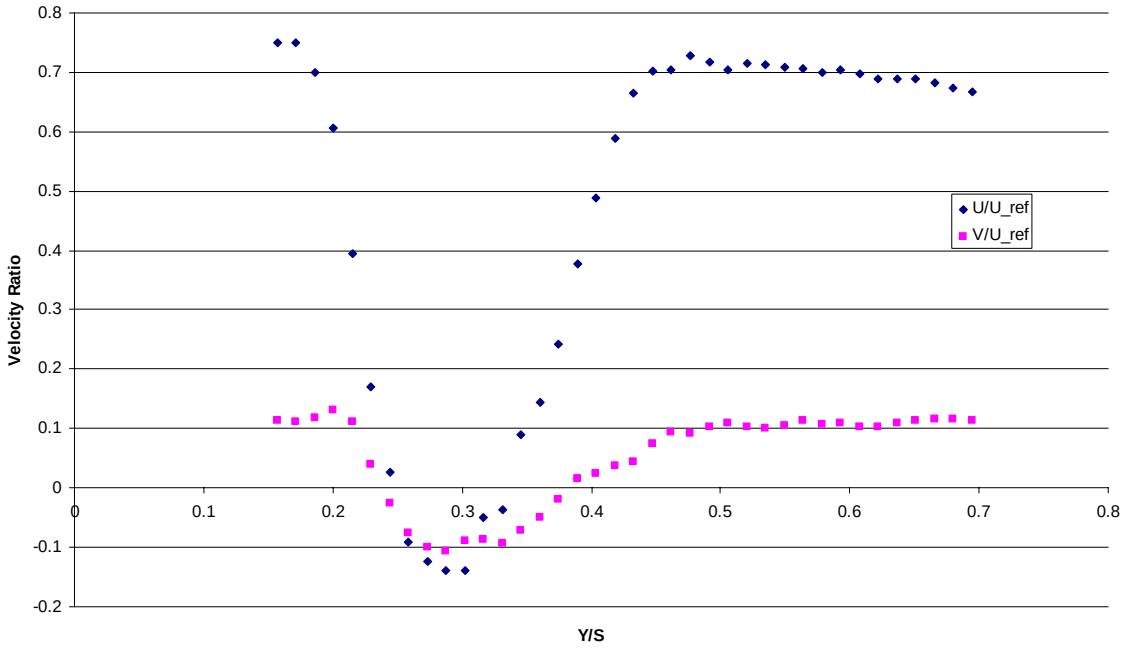

Figure 29. Station 12 survey at Re=613,024

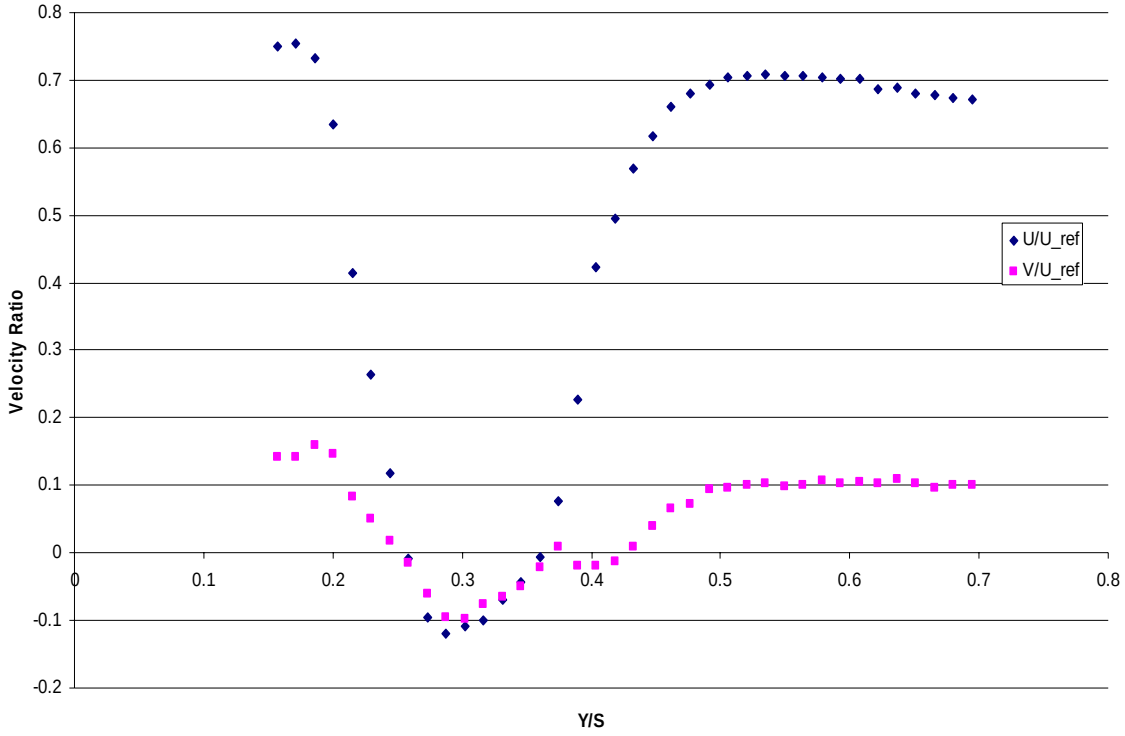

Figure 30. Station 13 survey at Re=613,024

c. Reynolds Number Equal to 666,631

A large amount of reverse flow was measured at a Reynolds number of 666,613, as can be seen in Figures 31-34. This was evidenced by the negative region of the average velocity, which began at Y/s of 0.25 and ended at Y/s of approximately 0.37. The trailing edge of the blade was situated at approximately 0.25 Y/s, which indicated that the region of backflow occurred on the suction side of the blade. The data for stations 11, 12, and 13 were plotted together with the results obtained by Fitzgerald [Ref 9] for comparison. Fitzgerald utilized various amounts of frequency shifting to gather LDV data, due to the backflow regions that existed. As shown, there were some differences in the behaviors of the measured velocity fields. This was, in part, due to the aforementioned frequency shifting. Additionally, if the number of data points that were taken in the present investigation had been increased, the characteristics of the velocity field that were calculated would have improved. The region of backflow existed well before station 10, as the average velocity ratio at the trailing edge was calculated to be at an approximate value of -1.5. This region continued to deepen as flow progressed into

stations 11 and 12, due to the increased distance from the trailing edge. Once again, the trend of the velocity ratio began to move back towards zero as flow moved into station 13.

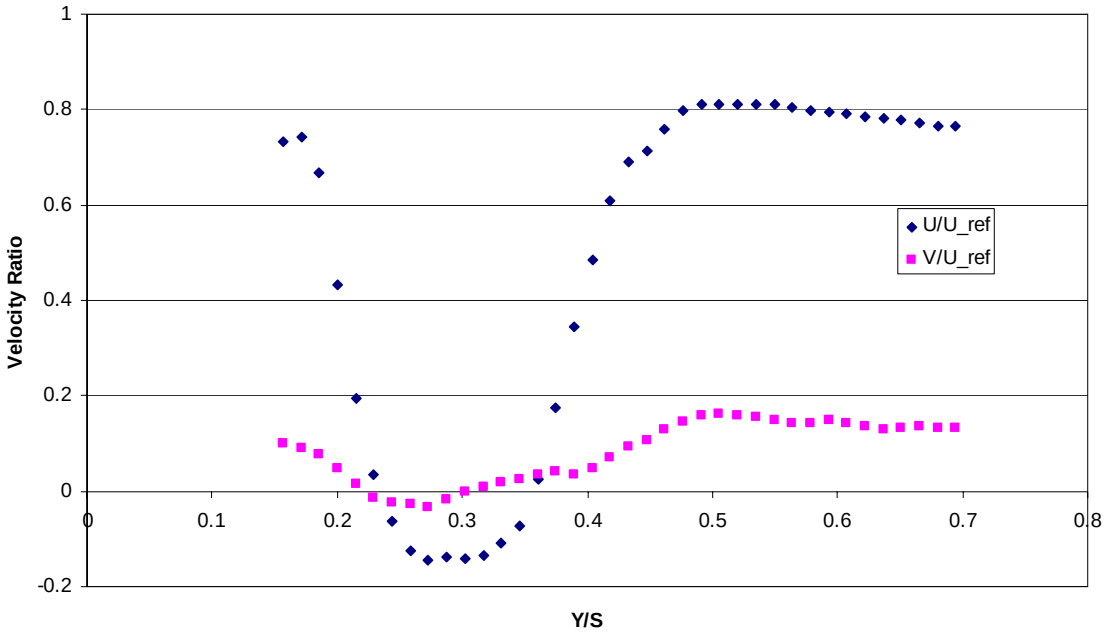

Figure 31. Station 10 survey at Re=666,631

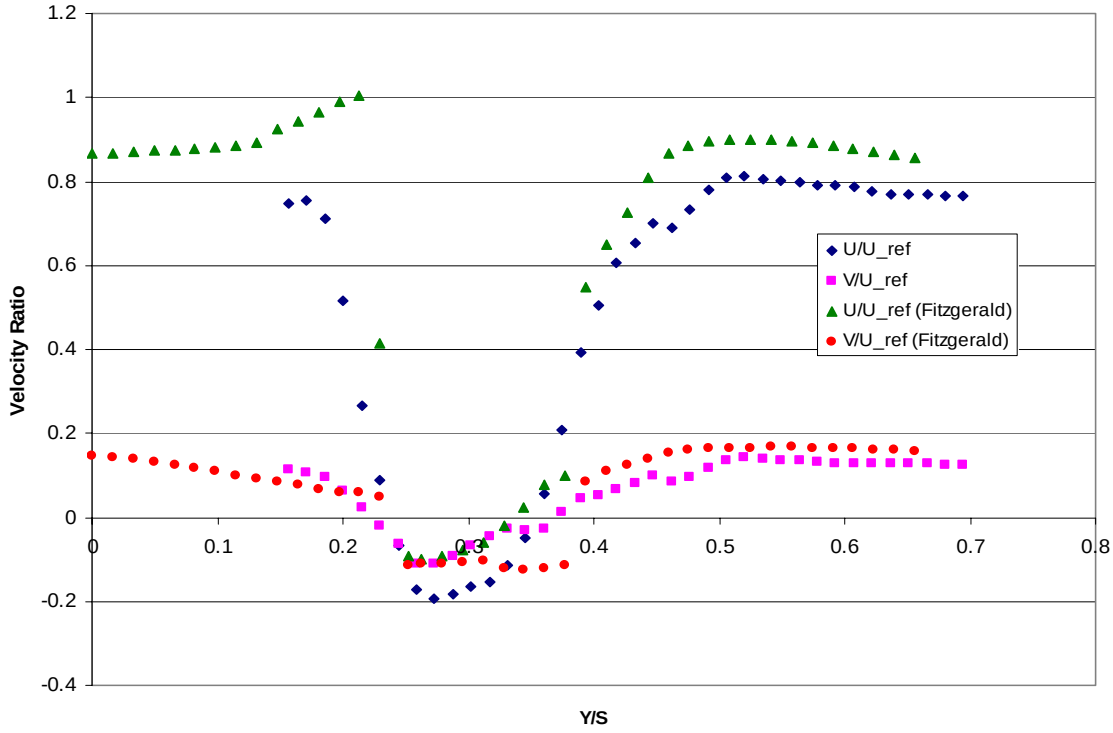

Figure 32. Station 11 survey at Re=666,631

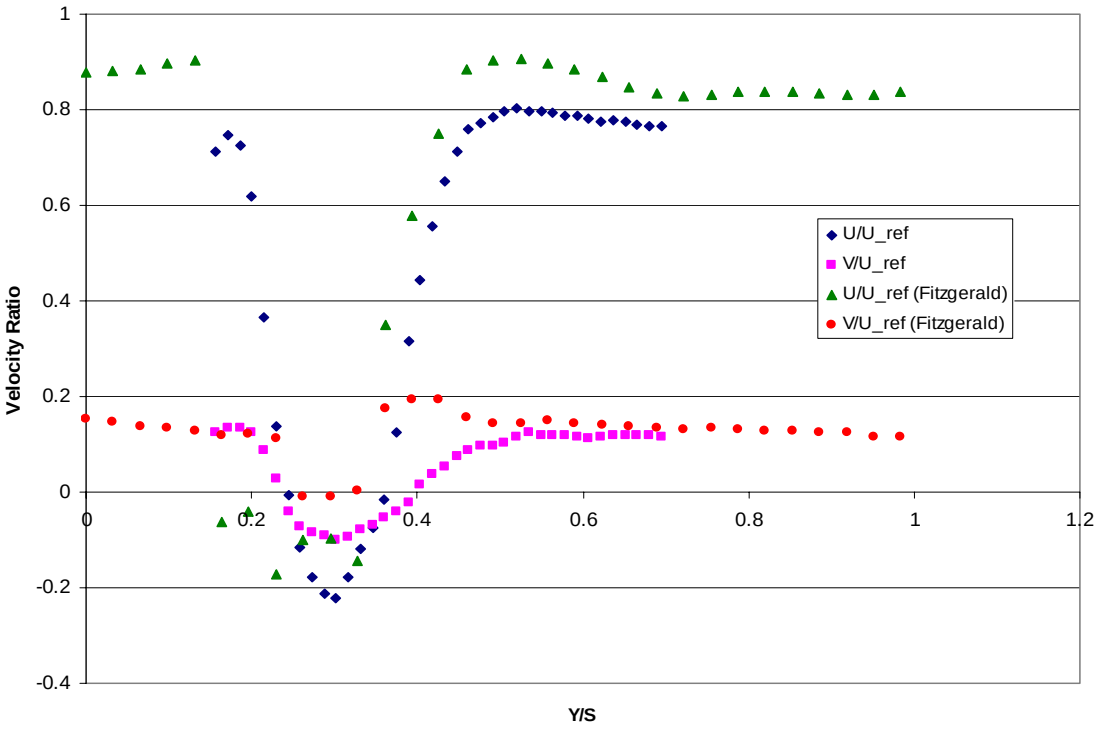

Figure 33. Station 12 survey at Re=666,631

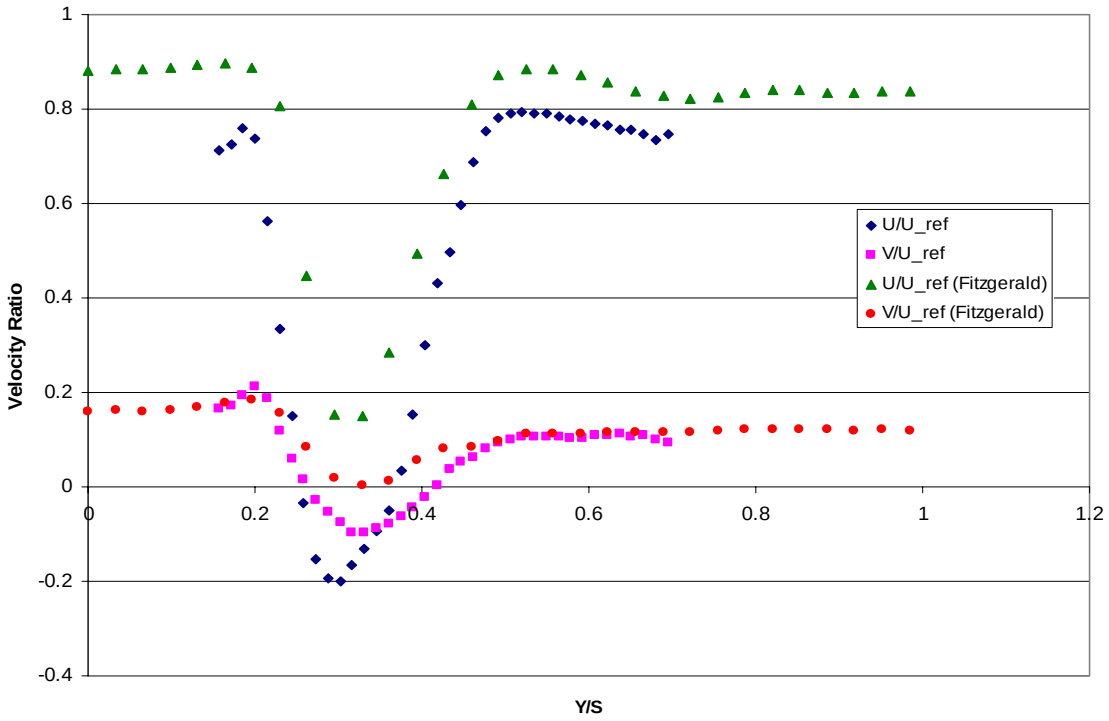

Figure 34. Station 13 survey at Re=666,631

d. Reynolds Number Equal to 720,803

At a Reynolds number of 720,803, a large region of reverse flow was again evident. Figures 35 – 38 show the average velocity profile at each station. The region of reverse flow was well formed at station 10. It continued to show signs of growth at stations 11 and 12, and again showed signs of beginning to be washed away at station 13. This was evidenced by observing the reduction in magnitude of the negative velocity ratio at station 13 as compared to stations 11 and 12.

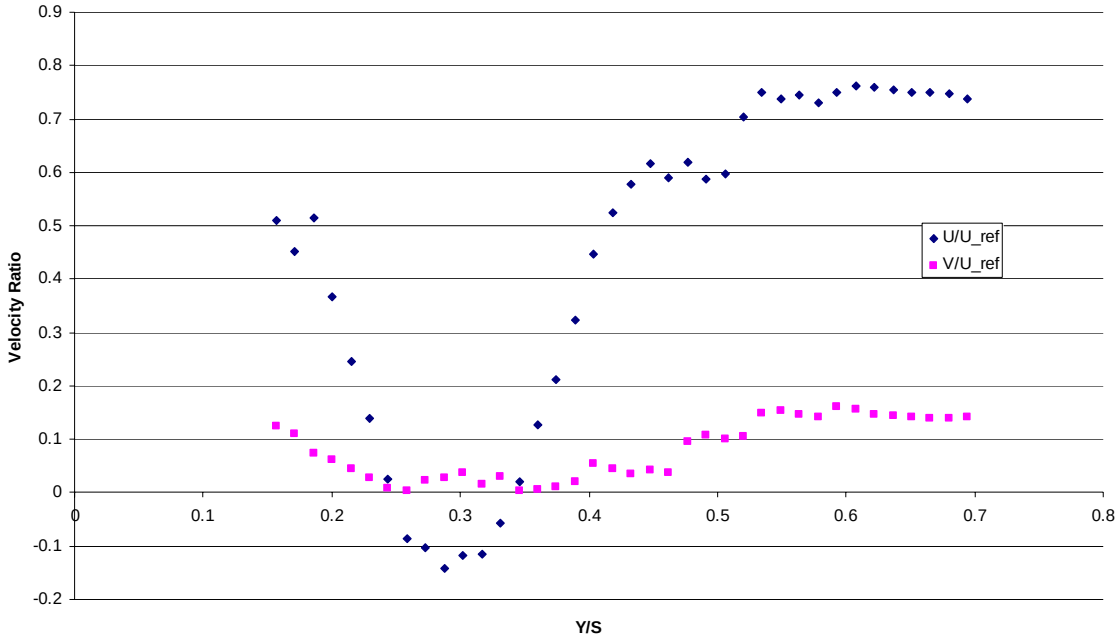

Figure 35. Station 10 survey at Re = 720,803

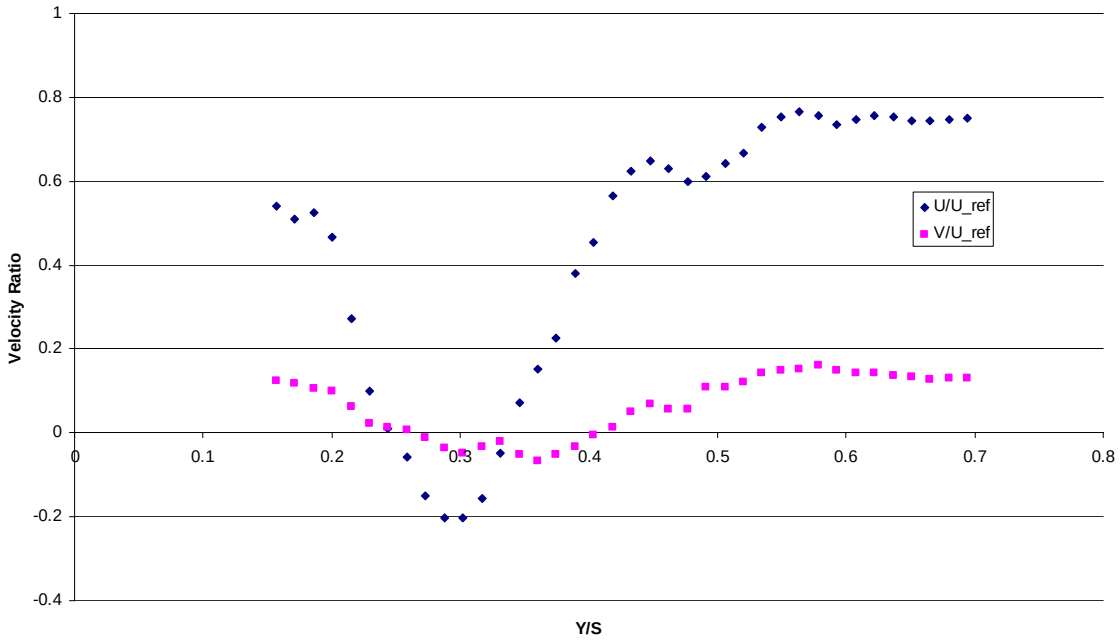

Figure 36. Station 11 survey at Re = 720,803

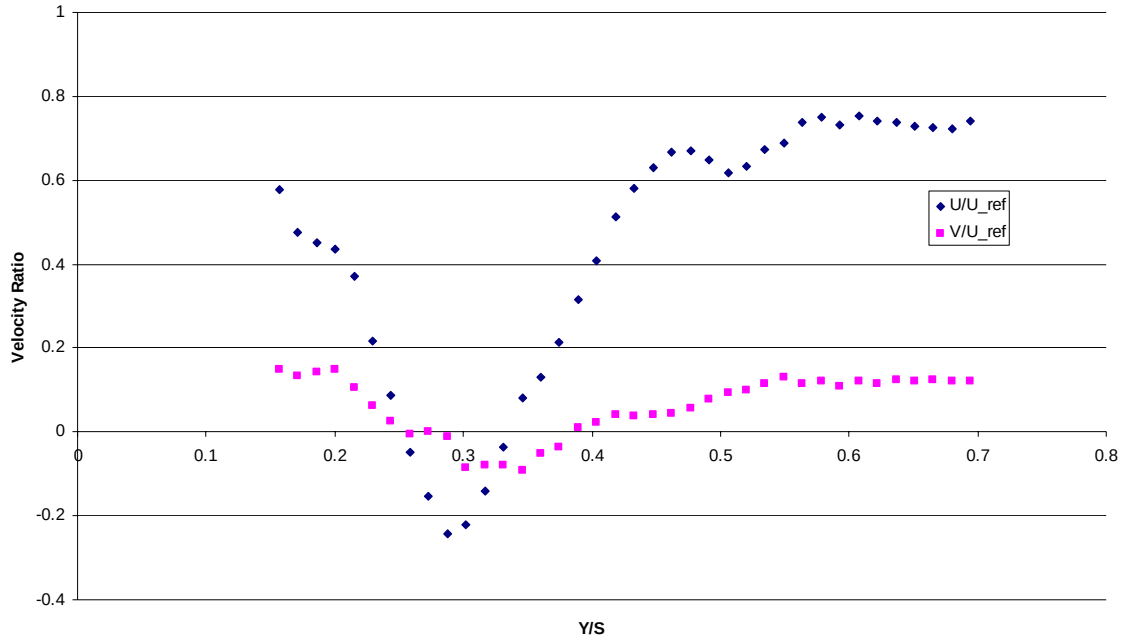

Figure 37. Station 12 survey at Re = 720,803

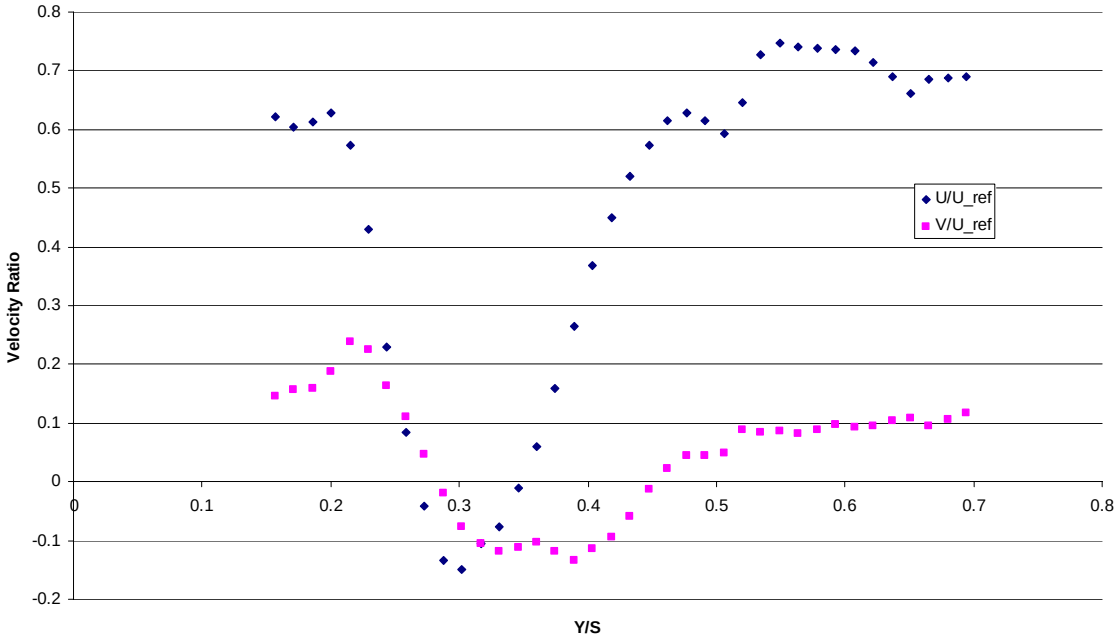

Figure 38. Station 13 survey at Re = 720,803

3. Vorticity

Using the program ***TECPlot 10***, the vorticity was calculated from the vector field. The plots can be seen below in Figures 34, 35, 36, and 37. Due to the fact that the present study was 2-dimensional, the vorticity was perpendicular to the x-y plane, and the direction of the vector depended on the sign of the vorticity. The vortices that were generated exhibited a highly turbulent random shedding pattern.

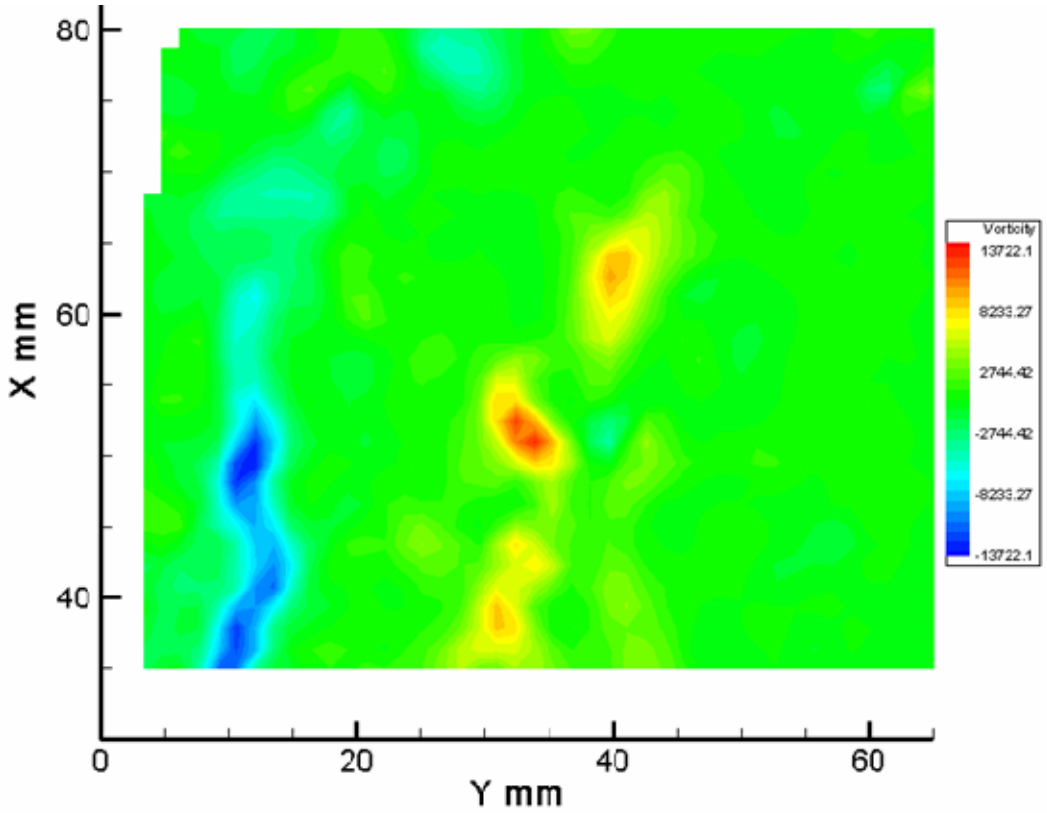

Figure 39. Vorticity data at Re=467,568

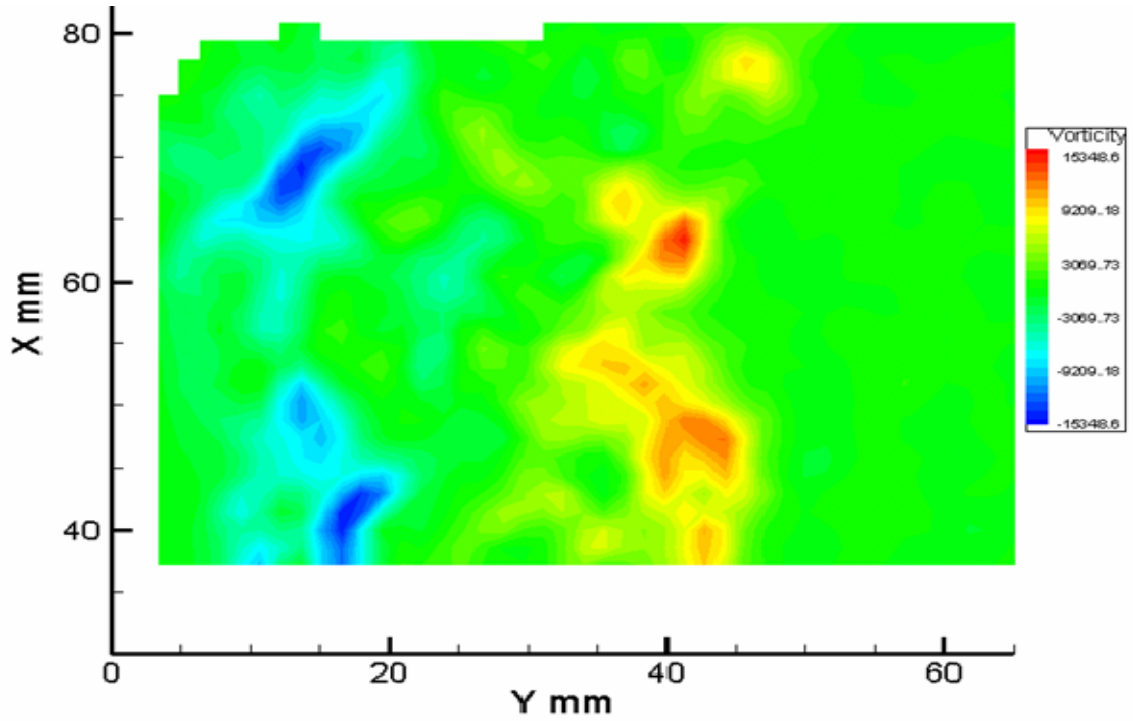

Figure 40. Vorticity data at Re=613,024

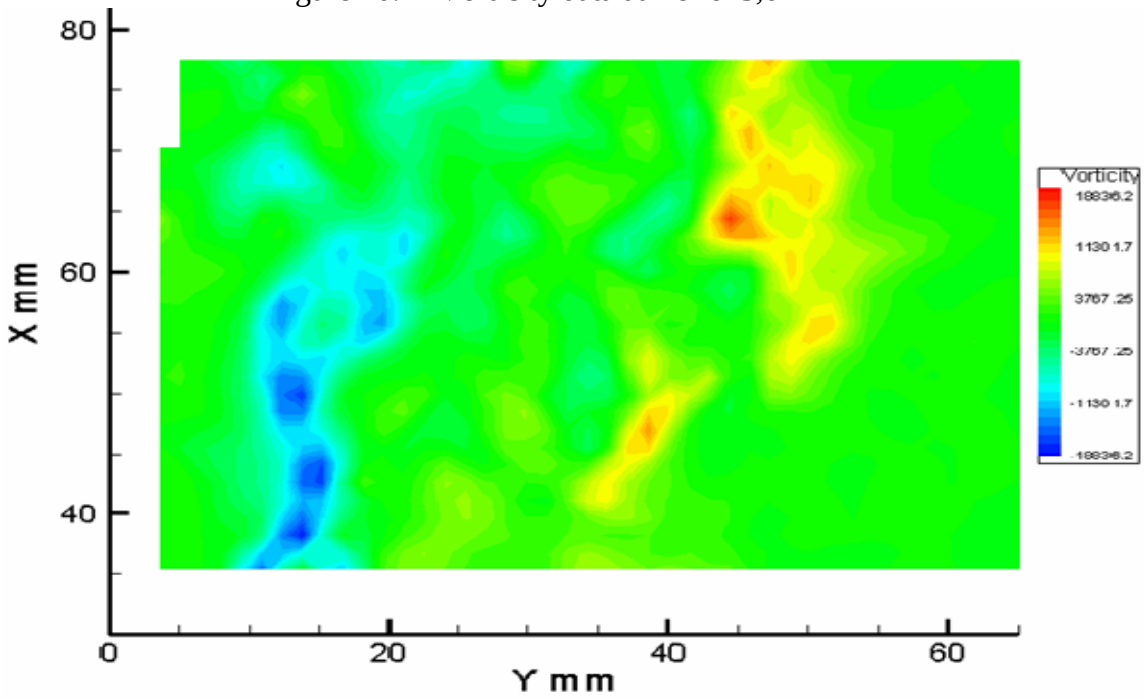

Figure 41. Vorticity data at Re=666,631

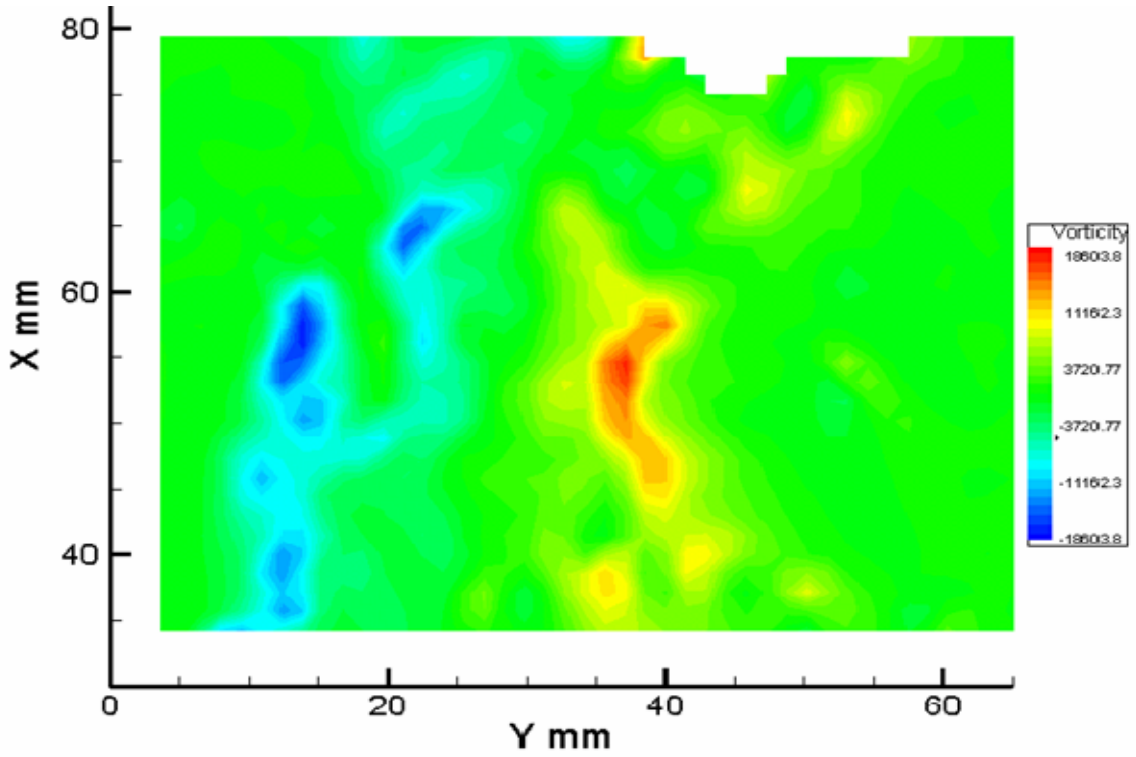

Figure 42. Vorticity data at Re=720,803

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VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

A set of second-generation, controlled-diffusion blades in cascade were experimentally examined at stall in a low speed cascade wind tunnel. The experiment was conducted over a varying range of Reynolds numbers from 268,000 to 700,000.

PIV measurements were taken in the wake of the blade at mid-span. At a Reynolds number of 660,000 the measurements were compared to previously taken LDV data, and reasonable agreement was observed. Compared with the previous investigation, the region of backflow exhibited similar characteristics. The regions continued to grow up to approximately 10% of blade chord length past the trailing edge. Past this point, the regions of reverse flow diminished.

Flow behavior was also recorded in digital movie clips. The presence of the region of separation was visually evident. This visualization showed the complexity of the flow separation. Additionally, reverse flow was seen at the mid span of the blade, and it continued well into the wake region of the flow.

B. RECOMMENDATIONS

Further PIV measurements should be performed from the opposite side of the LSCWT, so that the flow can be investigated from an alternate perspective. A PIV investigation utilizing perhaps as many as a hundred frames [Ref 21] would give rise to increased accuracy in the collected data points. Additionally, three dimensional (stereoscopic) PIV studies should be performed so as to ascertain the complex nature of the vortex street and regions of backflow. Furthermore, CFD analysis should be performed and compared to experimental results.

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APPENDIX A. TSI PIV SYSTEM OPERATING PROCEDURE

1. Connect the cables from the back panel of the synchronizer to the front panels of the laser power supply units.
2. Turn the keys for both laser power supply units.
3. Press and hold, for 3 seconds, the ON button on the laser remote. The laser units should start up, and remain running. If the units secure once the ON button is released, then the button was released too soon.
4. On the laser power supply back panel, put the FIRE Q-SW switch in the EXT. position for computer controlled operation. If it is desired to fire the laser manually, this switch must be in the INT position.
5. On the laser remote, turn the Trigger selection knob to REMOTE.
6. Ensure that the shutters are open. Step 7 should never be completed while the shutters are closed.
7. On the laser remote control, ensure that the Energy toggle switch is set to HIGH.
8. Double click on the INSIGHT desktop icon.
9. From the menu bar, click on "Experiment" and then "Component Setup."
10. Under the "Summary" tab, ensure that all components are listed properly.
11. Under the "Synchronizer Setup" tab, ensure the following settings:

Comm port -	Comm 1
Image Shifter -	Shift Out (+)
	Shift In (+)
Camera Feedback -	(+)
External Trigger In -	(+)
Camera Trigger -	(+)
Frame Grabber -	(-)

Default for remaining settings

12. Under the "Camera Setup" tab, set the Shutter Open time to 255 microseconds.
13. Create a new experiment by clicking on "Experiment" and then "New" from the menu bar.
14. Create a name and folder for the experiment.
15. Click on the "Yag Power Level" button on the lower menu bar. Ensure the following settings for Yag 1 and Yag 2:

High - 175
Medium - 125
Low - 100

16. Click on the “Timing Parameters” button on the lower menu bar to set the dT and Pulse Delay.
17. Place Yag 1 and Yag 2 in “High” from the lower menu bar.
18. Place Data Source in “Camera”.
19. Place Exposure Mode in “Frame Straddle”.
20. Place Capture Mode in “Continuous.”
21. Press the “Camera” icon on the menu bar to begin image capture.
22. Ensure that images are shown on both Frame A and Frame B. If not, adjust the delay time accordingly.
23. Press the “Stop” button on the menu bar to secure image capture.
24. To change from pixels to m/s, click on “Calibration” and then “2D Velocity Calibration.” Change “Measurement” from pixel to velocity. Enter the dT, and then enter the field of view horizontal value. Press “Recalculate” and then “OK”.
25. Click on the “Area of Interest” icon, and then click and drag across the desired interrogation area.
26. Click on “Begin Image Processing” (the green arrow).
27. Click on “Vector”, “Interactive Validation”, and then “Left Field” to activate the applicable filters.
28. Click on the “TecPlot” icon.
29. From the TSI PIV window, click “Select Files” and pick the location of the vector file.
30. Click on the Color tab to change the view.

APPENDIX B. PARTICLE IMAGE VELOCIMETRY IMAGES FOR ADDITIONAL REYNOLDS NUMBERS

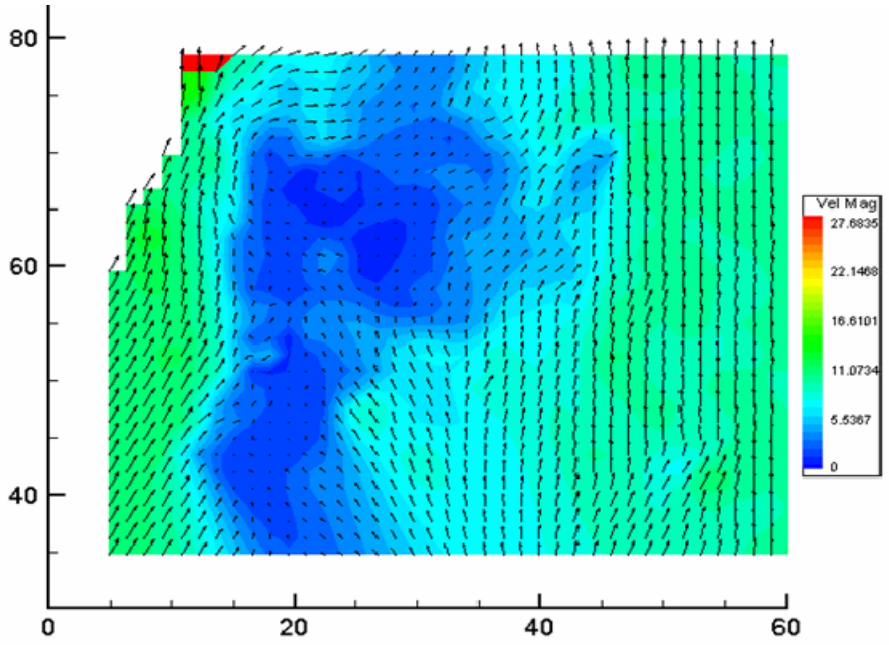

Figure B1. Velocity survey at Re=268,103

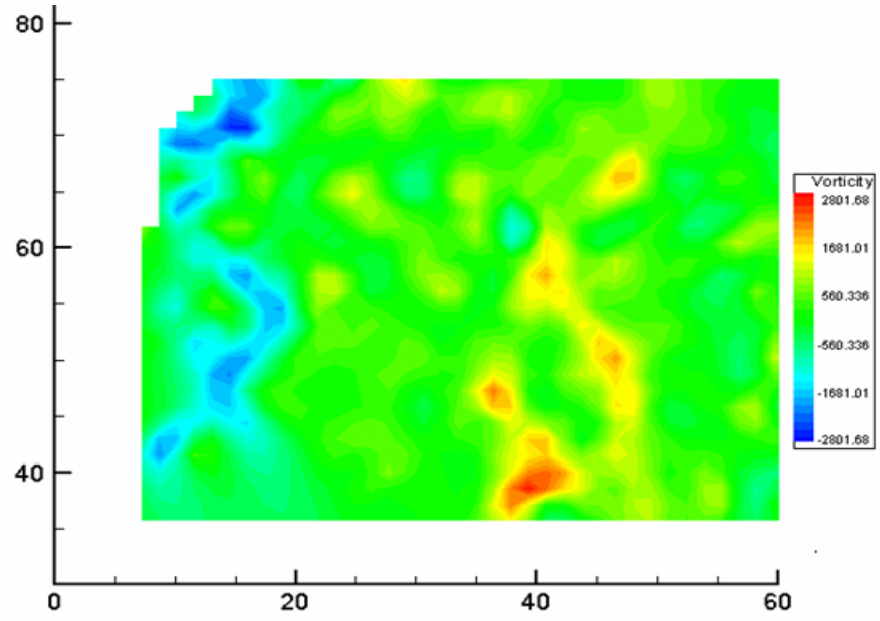

Figure B2. Vorticity survey at Re=268,103

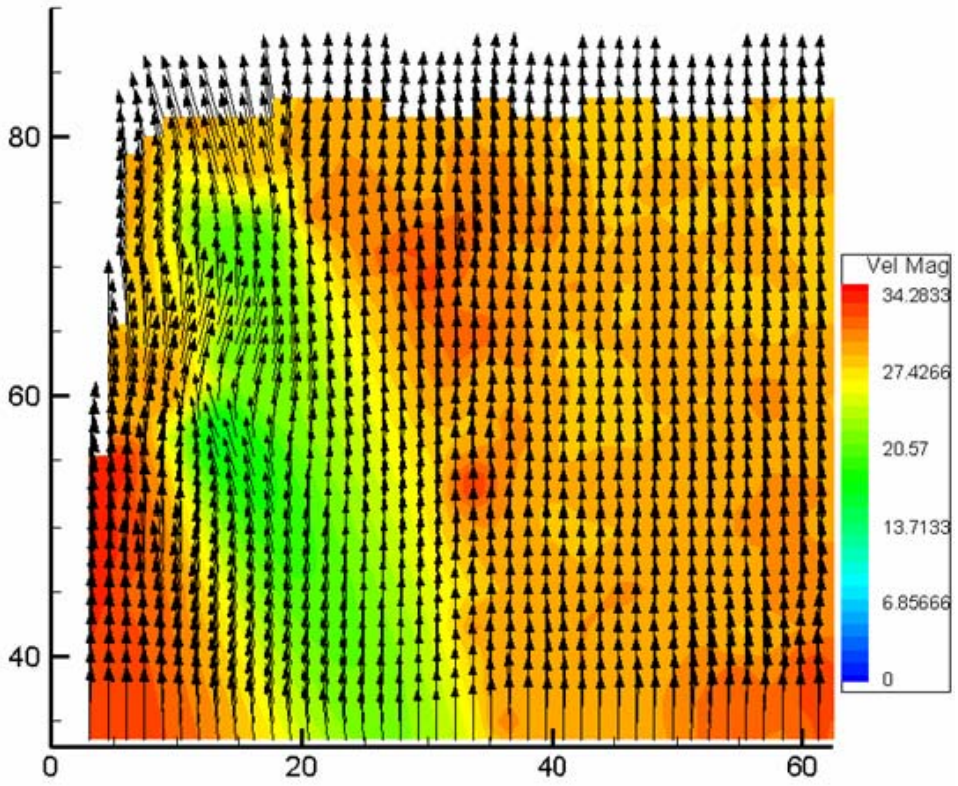

Figure B3. Velocity survey at Re=387,326

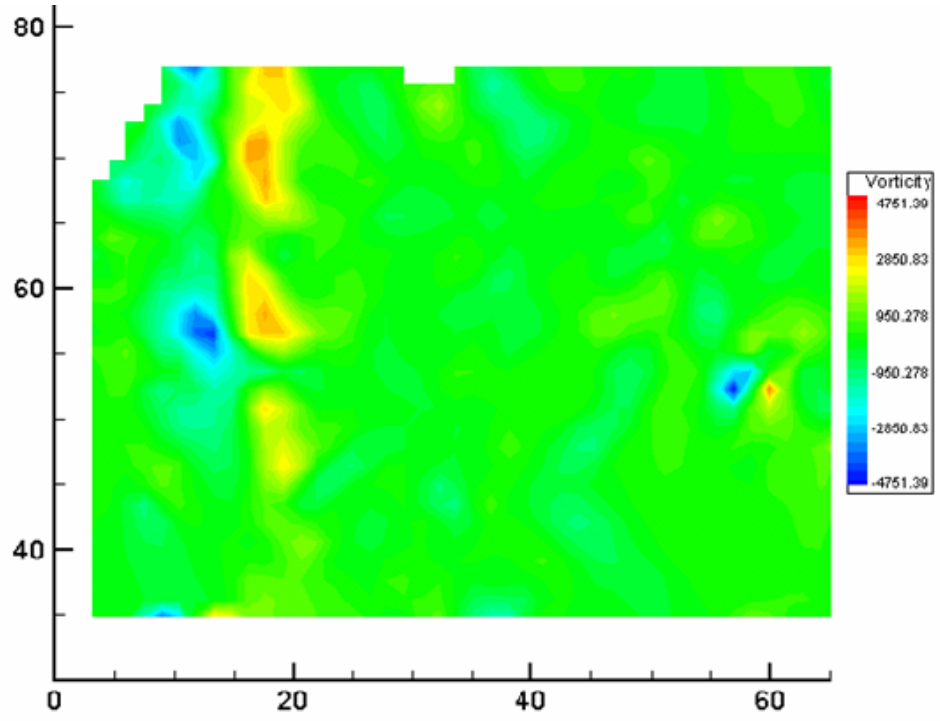

Figure B4. Vorticity survey at Re=387,326

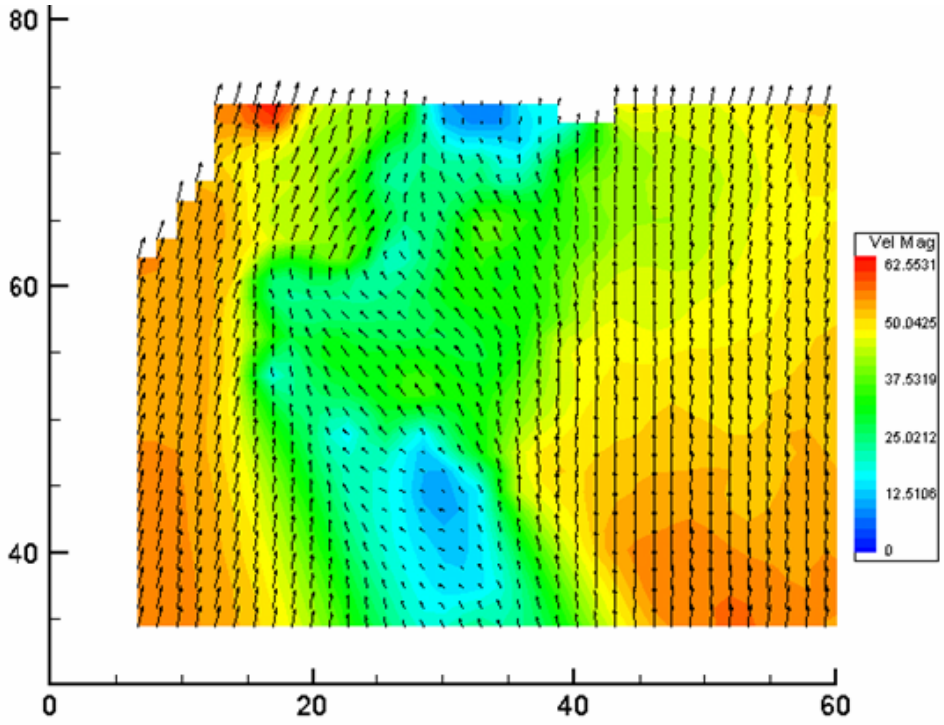

Figure B5. Velocity survey at Re=544,759

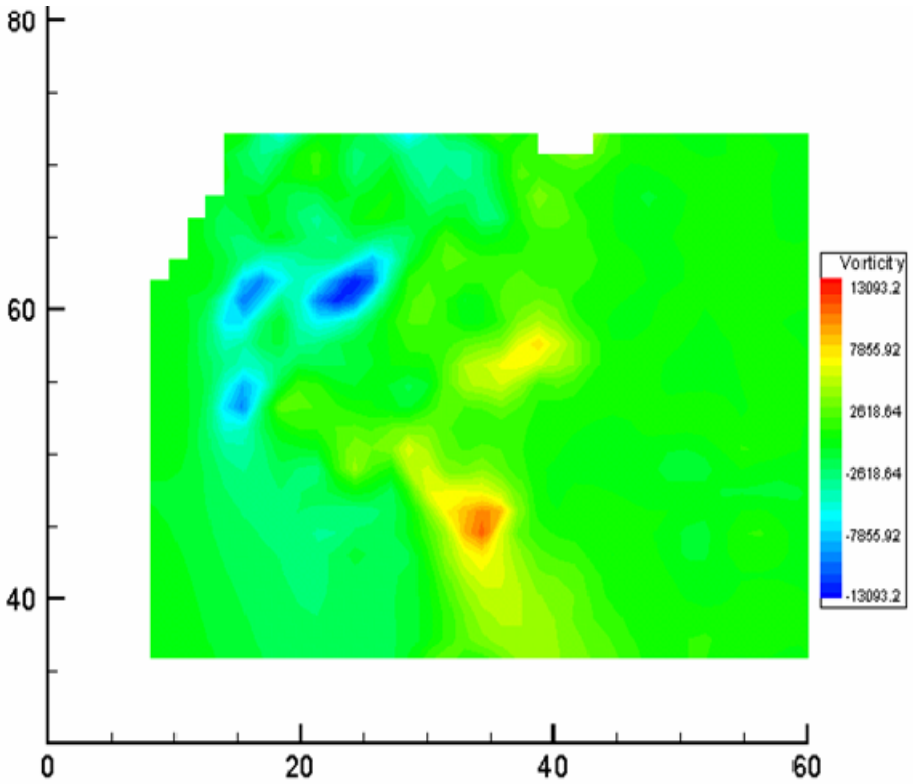

Figure B6. Vorticity survey at Re=544,759

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APPENDIX C. VELOCITY PROFILES

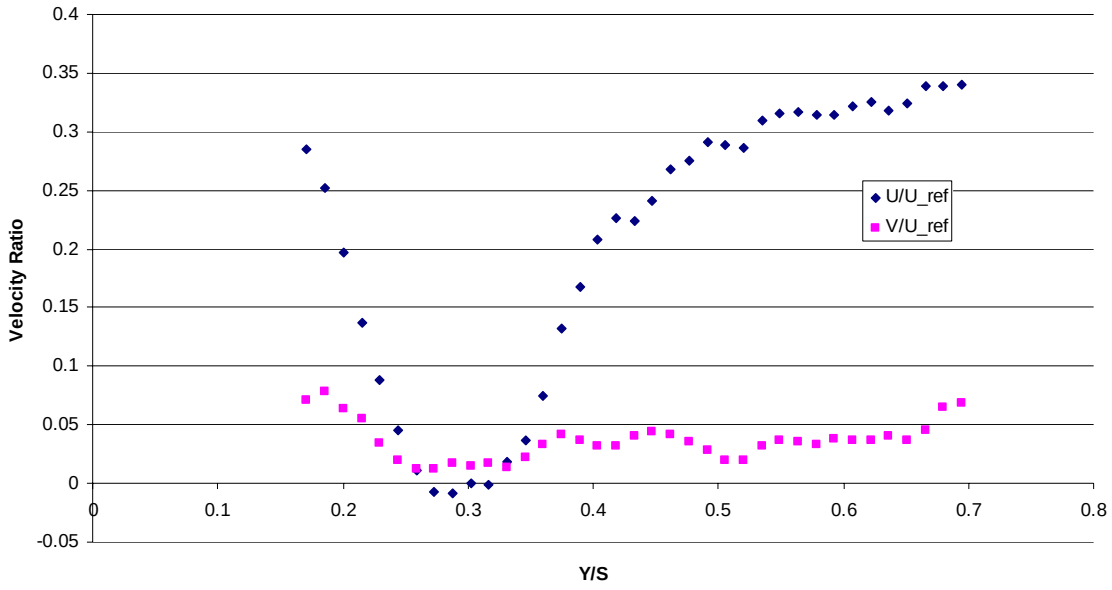

Figure C1. Average velocity at station 10 at Re=268,103

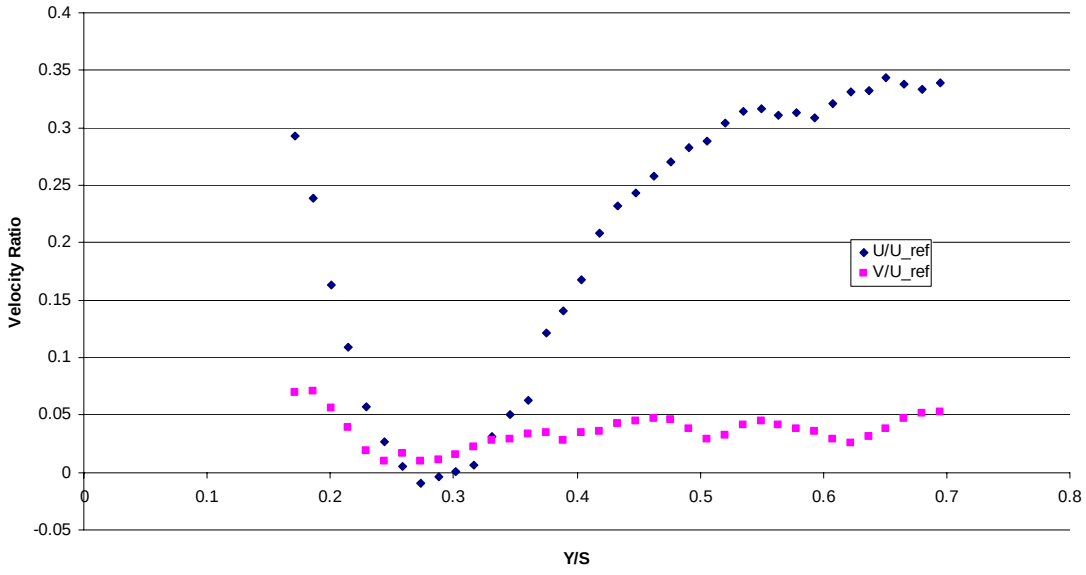

Figure C2. Average velocity at station 11 at Re=268,103

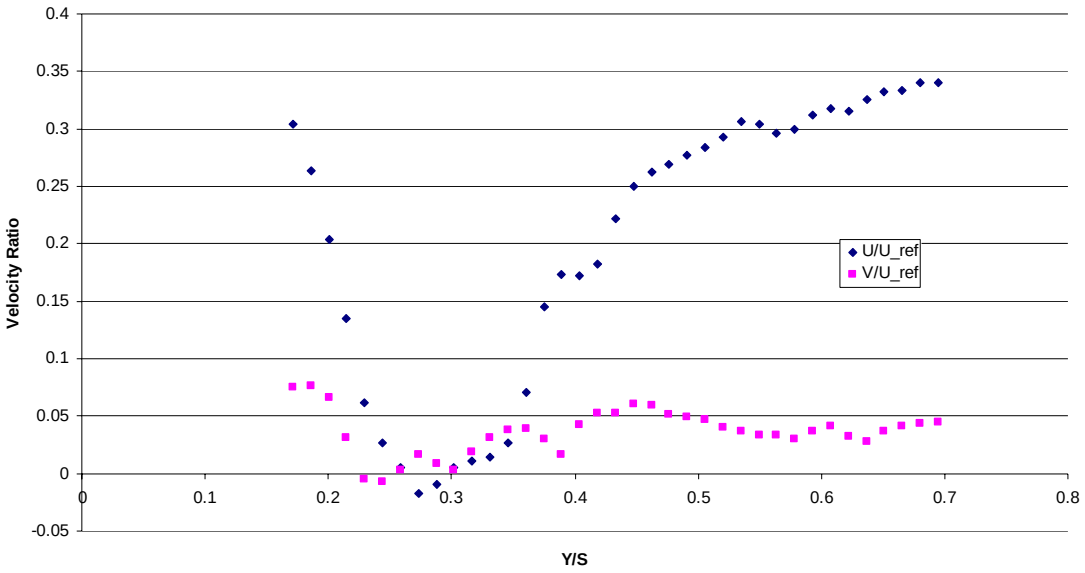

Figure C3. Average velocity at station 12 at Re=268,103

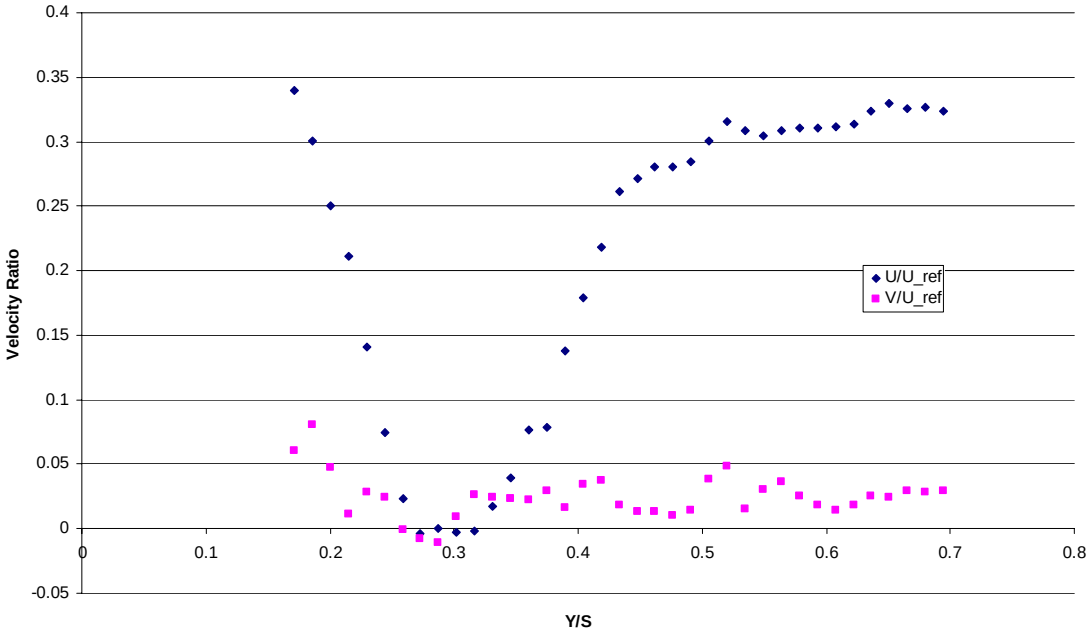

Figure C4. Average velocity at station 13 at Re=268,103

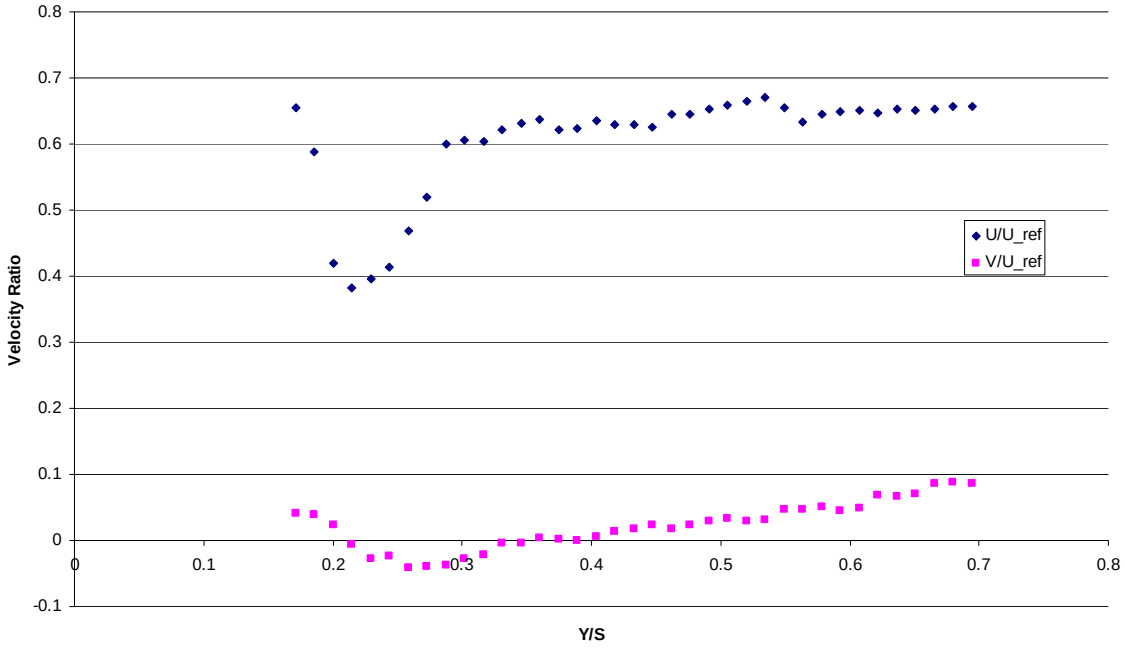

Figure C5. Average velocity at station 10 at Re=387,326

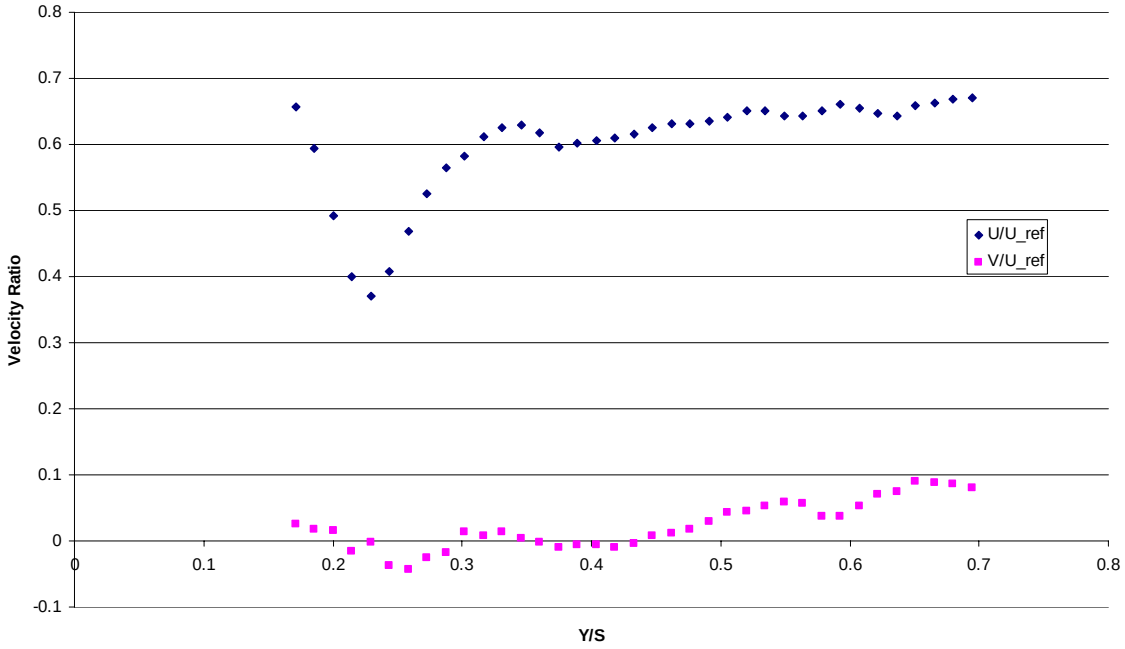

Figure C6. Average velocity at station 11 at Re=387,326

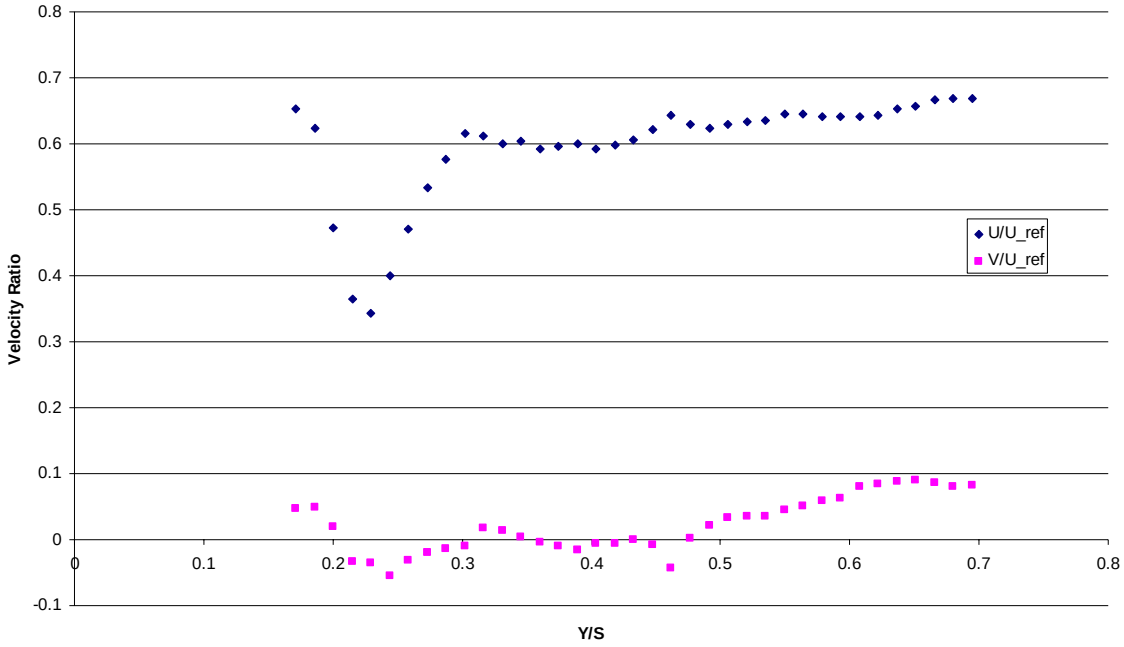

Figure C7. Average velocity at station 12 at Re=387,326

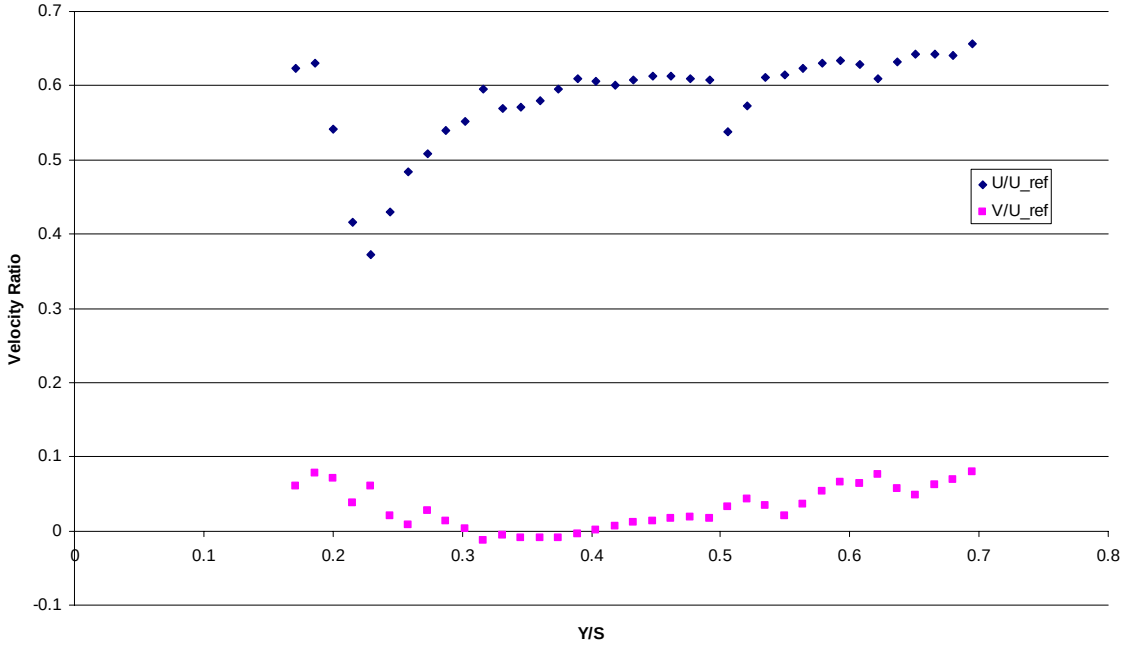

Figure C8. Average velocity at station 13 at Re=387,326

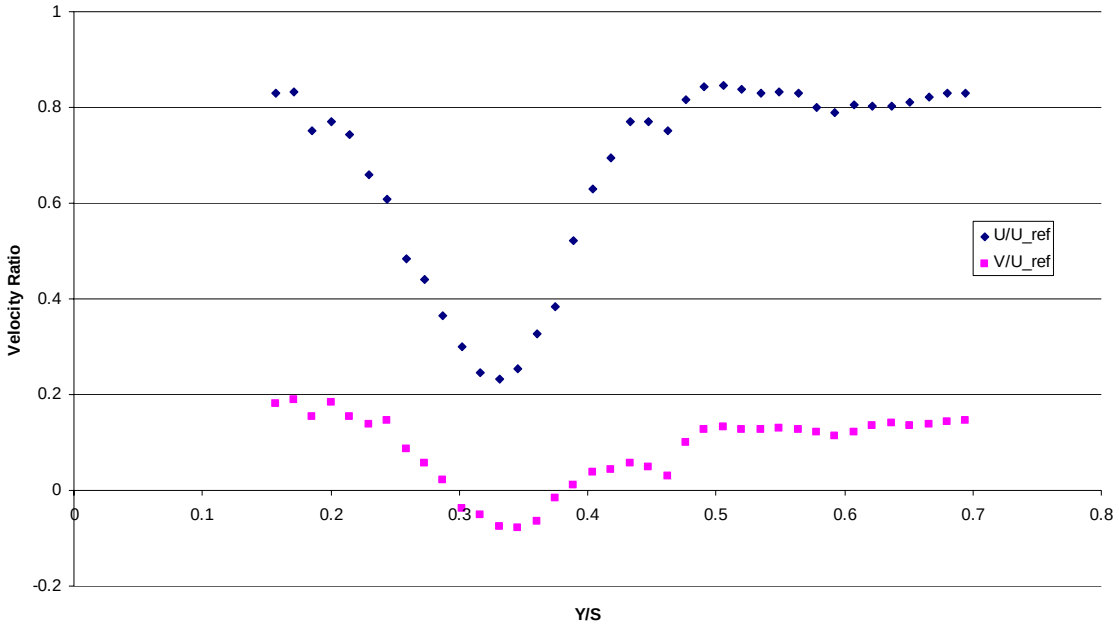

Figure C9. Average velocity at station 10 at Re=544,759

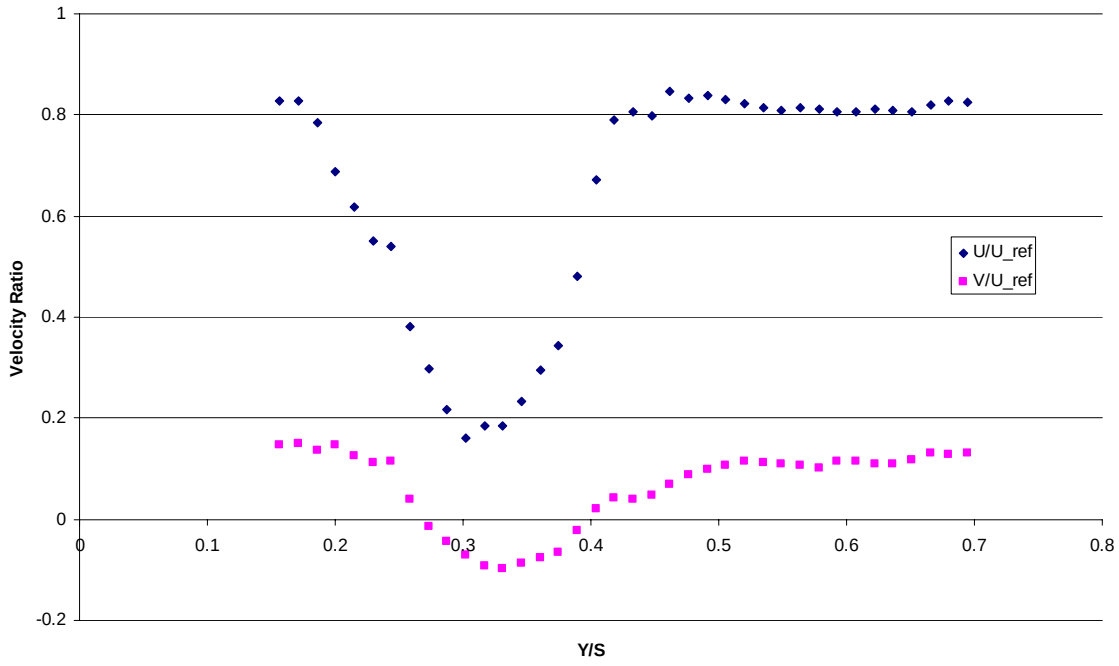

Figure C10. Average velocity at station 11 at Re=544,759

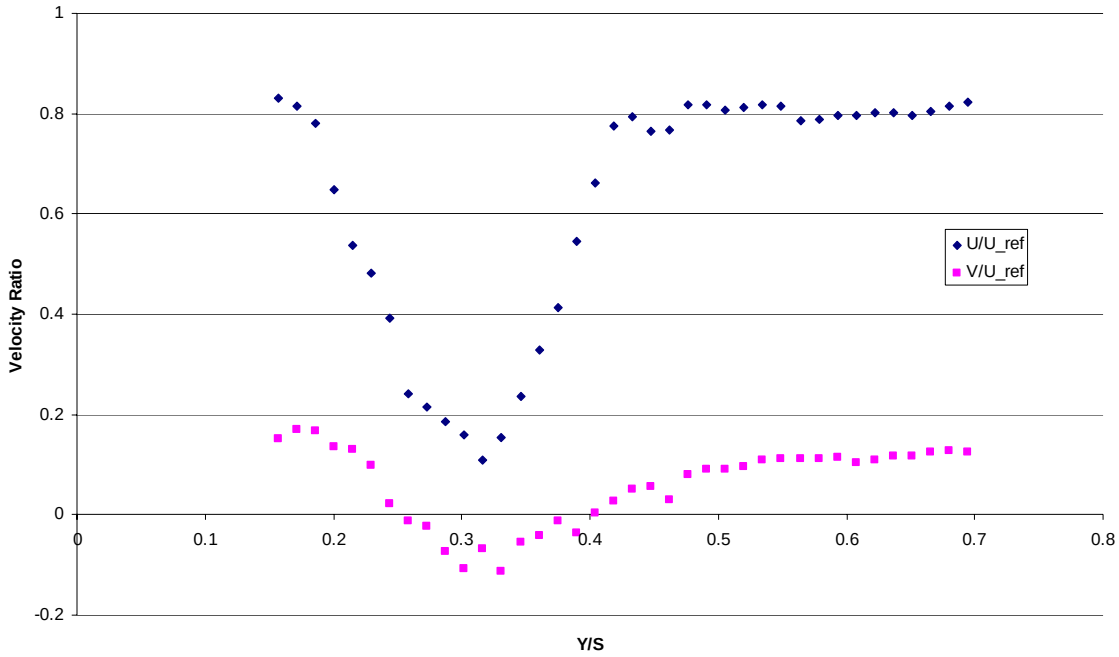

Figure C11. Average velocity at station 12 at Re=544,759

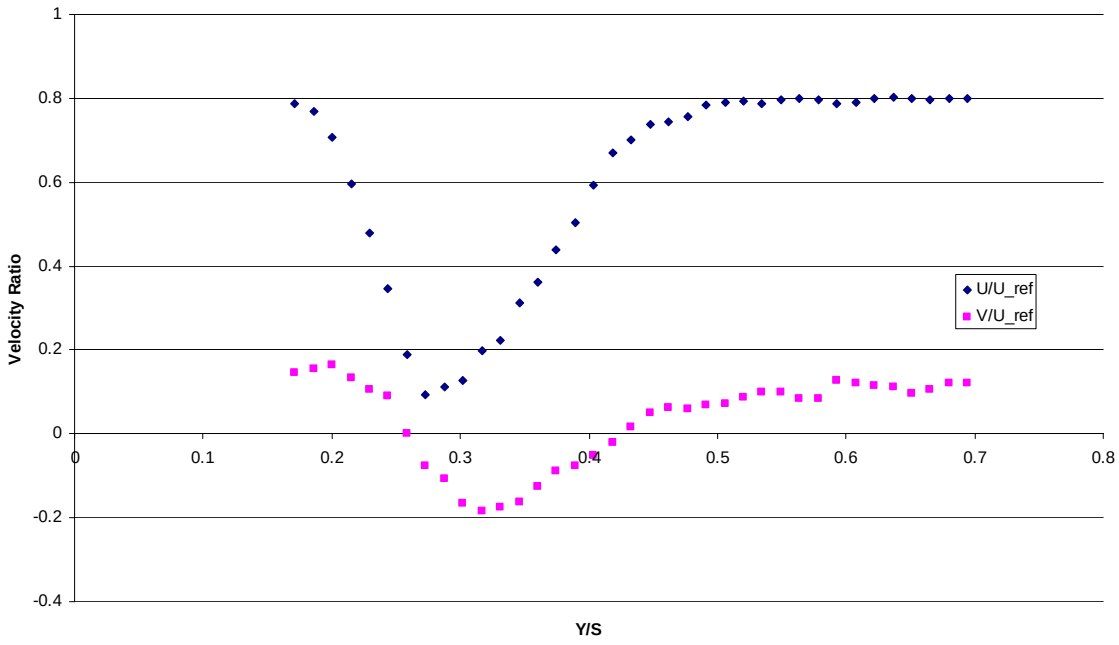

Figure C12. Average velocity at station 13 at Re=544,759

APPENDIX D. PIV RAW DATA

The inlet flow velocity in the test section, V_{ref} $\left[m/s\right]$, was calculated for each survey. Additionally, the characteristic length was determined to be 152.4 mm (6-inches). These calculated values allowed the data to be non-dimensionalized. Shown below are the PIV data presented in tabular form for each of the applicable PIV frames at the associated Reynolds number value. Additionally, the average velocity data for each Reynolds number, averaged across each frame, is provided.

A. REYNOLDS NUMBER 268,103 (2-INCHES)

Average Velocity Data (U_ref = 31.63 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
6.2948656	152.4	0.1713049	9.0001055	0.2845433	2.2586538	0.0714086	1.804440504	2.614516754
8.5105094	152.4	0.1858432	7.9563899	0.2515457	2.471509	0.0781381	1.649156188	2.154934968
10.726153	152.4	0.2003816	6.2372401	0.1971938	2.0125158	0.0636268	2.006441186	1.698435308
12.941797	152.4	0.2149199	4.3552739	0.1376944	1.7358089	0.0548786	2.284586377	1.444262322
15.157441	152.4	0.2294583	2.7975238	0.0884453	1.0850544	0.0343046	1.918317728	1.309471218
17.373084	152.4	0.2439966	1.4302606	0.0452185	0.631887	0.0199775	1.533228654	1.227254001
19.588728	152.4	0.258535	0.3625563	0.0114624	0.4047401	0.0127961	1.66127206	1.166300874
21.804372	152.4	0.2730733	-0.218912	-0.006921	0.4079786	0.0128985	1.955033322	1.473756831
24.020016	152.4	0.2876117	-0.251511	-0.007952	0.5406662	0.0170935	1.865752778	1.385026214
26.235659	152.4	0.30215	-0.004808	-0.000152	0.4638927	0.0146662	2.089304594	1.419056032
28.451303	152.4	0.3166883	-0.034695	-0.001097	0.541359	0.0171154	2.552366057	1.795916478
30.666947	152.4	0.3312267	0.5876437	0.0185787	0.4242455	0.0134128	2.713322267	1.778479743
32.882591	152.4	0.345765	1.1712653	0.0370302	0.687208	0.0217265	2.865930306	1.343088499
35.098234	152.4	0.3603034	2.3759374	0.0751166	1.0427279	0.0329664	3.118758561	1.973161317
37.313878	152.4	0.3748417	4.171414	0.1318816	1.3260538	0.0419239	3.333909825	2.164927288
39.529522	152.4	0.3893801	5.2974178	0.1674808	1.1624957	0.0367529	3.670616116	1.780816013
41.745166	152.4	0.4039184	6.5749954	0.2078721	1.0018395	0.0316737	3.230797706	1.749931275
43.96081	152.4	0.4184568	7.1770819	0.2269074	1.0010894	0.03165	2.812379878	2.097432242
46.176453	152.4	0.4329951	7.0820838	0.223904	1.2730261	0.0402474	2.719786165	1.846819862
48.392097	152.4	0.4475334	7.6292866	0.2412041	1.4153375	0.0447467	2.72686258	1.911176501
50.607741	152.4	0.4620718	8.4602011	0.267474	1.3262162	0.0419291	2.561433856	2.204217686
52.823385	152.4	0.4766101	8.6997525	0.2750475	1.1302278	0.0357328	2.530976527	1.924825581
55.039028	152.4	0.4911485	9.196482	0.2907519	0.8983422	0.0284016	2.375382322	1.473703753
57.254672	152.4	0.5056868	9.1187932	0.2882957	0.6349923	0.0200756	1.912702951	1.501170047
59.470316	152.4	0.5202252	9.0693973	0.286734	0.6142995	0.0194214	1.940051495	1.73475299
61.68596	152.4	0.5347635	9.7836012	0.309314	0.9925919	0.0313813	1.467463739	1.501991566
63.901603	152.4	0.5493019	9.9765298	0.3154135	1.1597027	0.0366646	0.884620578	1.513381423
66.117247	152.4	0.5638402	10.002644	0.3162392	1.1396617	0.036031	0.518271116	1.024483548
68.332891	152.4	0.5783785	9.9504081	0.3145877	1.0672559	0.0337419	0.654680541	1.237494557
70.548535	152.4	0.5929169	9.9530708	0.3146719	1.2109261	0.0382841	0.759080836	1.398433273
72.764178	152.4	0.6074552	10.17915	0.3218195	1.1576767	0.0366006	0.484959591	1.156380292
74.979822	152.4	0.6219936	10.298855	0.325604	1.1584121	0.0366238	0.562779855	0.873829188
77.195466	152.4	0.6365319	10.050556	0.3177539	1.2947259	0.0409335	0.869259673	0.852318823
79.41111	152.4	0.6510703	10.23876	0.3237041	1.1799337	0.0373043	0.897439406	1.031737556
81.626753	152.4	0.6656086	10.735586	0.3394115	1.4468294	0.0457423	0.557970132	0.907729682
83.842397	152.4	0.680147	10.719984	0.3389182	2.0456376	0.064674	0.432790684	0.796568612
86.058041	152.4	0.6946853	10.760541	0.3402005	2.1818363	0.06898	0.458664648	0.790526434

Trailing Edge

Average Velocity Data (U_ref = 31.63 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
6.2948656	152.4	0.1713049	9.2501786	0.2924495	2.2170703	0.0700939	1.553392149	2.191966123
8.5105094	152.4	0.1858432	7.5665628	0.2392211	2.2439086	0.0709424	2.211411386	2.063125222
10.726153	152.4	0.2003816	5.1559059	0.1630068	1.7789104	0.0562412	2.441376971	1.858173067
12.941797	152.4	0.2149199	3.4324417	0.1085185	1.2502178	0.0395263	2.084536816	1.787470529
15.157441	152.4	0.2294583	1.7968214	0.0568075	0.6059037	0.019156	1.714682431	1.399730208
17.373084	152.4	0.2439966	0.851461	0.0269194	0.3169166	0.0100195	1.522387834	1.43444897
19.588728	152.4	0.258535	0.1741461	0.0055057	0.5212254	0.0164788	1.344851302	1.830315026
21.804372	152.4	0.2730733	-0.294605	-0.009314	0.3179125	0.010051	1.502312221	1.777845886
24.020016	152.4	0.2876117	-0.132507	-0.004189	0.361012	0.0114136	1.671823683	1.609926815
26.235659	152.4	0.30215	0.0062554	0.0001978	0.5015811	0.0158578	2.272953542	1.755169959
28.451303	152.4	0.3166883	0.2178932	0.0068888	0.7007557	0.0221548	2.745547297	1.754750259
30.666947	152.4	0.3312267	0.9716531	0.0307194	0.887859	0.0280702	2.781691383	1.392926939
32.882591	152.4	0.345765	1.6018592	0.0506437	0.9270123	0.029308	2.757747768	1.138836915
35.098234	152.4	0.3603034	1.983246	0.0627014	1.0711788	0.0338659	3.074207768	1.124654197
37.313878	152.4	0.3748417	3.8389293	0.1213699	1.0878734	0.0343937	3.714102138	1.512625666
39.529522	152.4	0.3893801	4.4319443	0.1401184	0.8756643	0.0276846	4.331280865	1.126770113
41.745166	152.4	0.4039184	5.3210039	0.1682265	1.0899886	0.0344606	4.53798806	1.56967038
43.96081	152.4	0.4184568	6.5904062	0.2083593	1.1450624	0.0362018	4.178894856	1.455464845
46.176453	152.4	0.4329951	7.3223643	0.2315006	1.354409	0.0428204	3.151670557	2.009330967
48.392097	152.4	0.4475334	7.6833714	0.242914	1.4092215	0.0445533	2.880167765	2.137815756
50.607741	152.4	0.4620718	8.1587029	0.2579419	1.4844942	0.0469331	3.023281797	2.402732663
52.823385	152.4	0.4766101	8.5552065	0.2704776	1.4652493	0.0463247	3.447756432	1.905182297
55.039028	152.4	0.4911485	8.9376649	0.2825692	1.1919857	0.0376853	3.235597321	1.653935565
57.254672	152.4	0.5056868	9.1340892	0.2887793	0.9239334	0.0292107	2.513134495	1.267199204
59.470316	152.4	0.5202252	9.6057451	0.303691	1.0085566	0.0318861	1.463304399	1.221554749
61.68596	152.4	0.5347635	9.927837	0.3138741	1.3208648	0.0417599	1.118467804	1.422504592
63.901603	152.4	0.5493019	10.028936	0.3170704	1.4084716	0.0445296	0.898696156	1.457204899
66.117247	152.4	0.5638402	9.8335383	0.3108928	1.2950743	0.0409445	0.761356431	1.551399691
68.332891	152.4	0.5783785	9.9175945	0.3135503	1.1946969	0.037771	0.619618653	0.947551834
70.548535	152.4	0.5929169	9.7505938	0.3082704	1.126161	0.0356042	0.458158818	0.820692275
72.764178	152.4	0.6074552	10.163103	0.3213121	0.9062495	0.0286516	0.531277013	0.928688608
74.979822	152.4	0.6219936	10.488332	0.3315944	0.8104852	0.0256239	0.802558688	0.980957413
77.195466	152.4	0.6365319	10.511008	0.3323114	0.9893356	0.0312784	0.581376393	0.9914773
79.41111	152.4	0.6510703	10.863643	0.3434601	1.2088475	0.0382184	1.084480106	1.044871484
81.626753	152.4	0.6656086	10.706883	0.338504	1.4808313	0.0468173	0.563546772	0.907661608
83.842397	152.4	0.680147	10.561044	0.3338933	1.6398183	0.0518438	0.359373427	0.623957949
86.058041	152.4	0.6946853	10.733422	0.3393431	1.6743584	0.0529358	0.57789631	0.498054151

Station 11

Average Velocity Data (U_ref = 31.63 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
6.2948656	152.4	0.1713049	9.6074448	0.3037447	2.3851831	0.0754089	0.958222517	1.791454568
8.5105094	152.4	0.1858432	8.349353	0.2639694	2.4145101	0.0763361	1.392946856	2.320739221
10.726153	152.4	0.2003816	6.4540312	0.2040478	2.0951821	0.0662403	2.388527758	2.500752609
12.941797	152.4	0.2149199	4.2538358	0.1344874	0.9763266	0.0308671	1.69124464	1.948329719
15.157441	152.4	0.2294583	1.9640474	0.0620944	-0.147016	-0.004648	1.101135072	1.666478523
17.373084	152.4	0.2439966	0.8491083	0.026845	-0.219908	-0.006953	1.516804436	1.261706081
19.588728	152.4	0.258535	0.1602433	0.0050662	0.1054292	0.0033332	1.529021977	1.304284481
21.804372	152.4	0.2730733	-0.538605	-0.017028	0.5264466	0.0166439	1.998459903	1.288640974
24.020016	152.4	0.2876117	-0.2901	-0.009172	0.2852819	0.0090193	2.422387817	1.641242206
26.235659	152.4	0.30215	0.1494705	0.0047256	0.0993178	0.00314	2.762703874	1.727378717
28.451303	152.4	0.3166883	0.3612774	0.011422	0.5905151	0.0186695	2.662706716	1.375337659
30.666947	152.4	0.3312267	0.4626572	0.0146272	0.9828828	0.0310744	2.628987003	1.302750699
32.882591	152.4	0.345765	0.8572553	0.0271026	1.2047717	0.0380895	2.990481227	0.809802911
35.098234	152.4	0.3603034	2.2491816	0.0711091	1.2188953	0.0385361	3.607889953	1.121823004
37.313878	152.4	0.3748417	4.6051035	0.1455929	0.9557398	0.0302162	4.367179402	2.084832881
39.529522	152.4	0.3893801	5.4989315	0.1738518	0.5365056	0.0169619	4.663702688	4.200494055
41.745166	152.4	0.4039184	5.4307465	0.1716961	1.3597689	0.0429898	4.266762132	3.000607802
43.96081	152.4	0.4184568	5.7629839	0.1821999	1.6785533	0.0530684	4.336368436	2.689356415
46.176453	152.4	0.4329951	7.0152781	0.2217919	1.6646038	0.0526274	4.092059427	2.41123034
48.392097	152.4	0.4475334	7.8991653	0.2497365	1.9180077	0.0606389	3.835370437	2.429356425
50.607741	152.4	0.4620718	8.2847304	0.2619263	1.8773943	0.0593549	3.406859181	2.682756357
52.823385	152.4	0.4766101	8.5210382	0.2693974	1.6178115	0.051148	2.938673598	2.810481676
55.039028	152.4	0.4911485	8.760265	0.2769606	1.5482864	0.0489499	2.584038214	2.726697736
57.254672	152.4	0.5056868	8.9609411	0.2833051	1.4859085	0.0469778	2.105206115	2.59328841
59.470316	152.4	0.5202252	9.2569401	0.2926633	1.2752609	0.0403181	1.288376511	1.881994256
61.68596	152.4	0.5347635	9.6973748	0.3065879	1.1579939	0.0366106	0.807388388	1.329836104
63.901603	152.4	0.5493019	9.6153782	0.3039955	1.0463517	0.033081	0.579524045	1.389457309
66.117247	152.4	0.5638402	9.3776421	0.2964794	1.0748947	0.0339834	0.596632302	1.225823285
68.332891	152.4	0.5783785	9.4699977	0.2993992	0.9612602	0.0303908	0.588698252	0.958129758
70.548535	152.4	0.5929169	9.8732666	0.3121488	1.1573002	0.0365887	0.37826707	0.938506491
72.764178	152.4	0.6074552	10.049829	0.3177309	1.293143	0.0408834	0.507564178	0.87925566
74.979822	152.4	0.6219936	9.9862614	0.3157212	1.0117839	0.0319881	0.513430674	0.599119637
77.195466	152.4	0.6365319	10.298121	0.3255808	0.8673594	0.027422	0.591036445	0.634645703
79.41111	152.4	0.6510703	10.514577	0.3324242	1.1559211	0.0365451	0.672415292	0.652074254
81.626753	152.4	0.6656086	10.564287	0.3339958	1.3202851	0.0417415	0.656441304	0.555736959
83.842397	152.4	0.680147	10.768402	0.340449	1.3757166	0.043494	0.602103587	0.673985892
86.058041	152.4	0.6946853	10.762697	0.3402686	1.4311417	0.0452463	0.556957452	0.862762185

Station 12

Average Velocity Data (U_ref = 31.63 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
6.2948656	152.4	0.1713049	10.743833	0.3396722	1.9241969	0.0608346	0.434119801	1.299933091
8.5105094	152.4	0.1858432	9.5208707	0.3010076	2.562519	0.0810155	1.401316811	2.19829338
10.726153	152.4	0.2003816	7.90929	0.2500566	1.5047376	0.0475731	2.023200321	2.42694124
12.941797	152.4	0.2149199	6.6688799	0.2108403	0.3587381	0.0113417	1.807184201	1.761013372
15.157441	152.4	0.2294583	4.4463978	0.1405753	0.9089411	0.0287367	1.364594847	1.865239442
17.373084	152.4	0.2439966	2.3521543	0.0743647	0.7594095	0.0240092	1.448343518	1.851555371
19.588728	152.4	0.258535	0.7350503	0.023239	-0.030032	-0.000949	1.459121253	1.789678268
21.804372	152.4	0.2730733	-0.10879	-0.003439	-0.241363	-0.007631	1.328371895	1.720108148
24.020016	152.4	0.2876117	0.0142499	0.0004505	-0.3543	-0.011201	1.127611946	1.265553532
26.235659	152.4	0.30215	-0.073187	-0.002314	0.2866667	0.0090631	1.032640173	1.12740975
28.451303	152.4	0.3166883	-0.06695	-0.002117	0.8382584	0.026502	1.575513684	1.094208646
30.666947	152.4	0.3312267	0.5492481	0.0173648	0.7835717	0.0247731	2.635743235	1.13684539
32.882591	152.4	0.345765	1.2321646	0.0389556	0.7289082	0.0230448	3.588134427	1.553111166
35.098234	152.4	0.3603034	2.4175733	0.0764329	0.7186474	0.0227204	3.648679992	2.390524859
37.313878	152.4	0.3748417	2.4755019	0.0782644	0.9372795	0.0296326	2.08489742	1.487591579
39.529522	152.4	0.3893801	4.3456183	0.1373891	0.5166191	0.0163332	3.01439686	1.495545289
41.745166	152.4	0.4039184	5.6664043	0.1791465	1.0752844	0.0339957	3.287338173	1.834367185
43.96081	152.4	0.4184568	6.9103368	0.2184741	1.1744279	0.0371302	3.067019234	1.896487293
46.176453	152.4	0.4329951	8.2521163	0.2608952	0.5786613	0.0182947	2.417095641	1.184250645
48.392097	152.4	0.4475334	8.5961957	0.2717735	0.4350308	0.0137537	2.308914152	1.091196034
50.607741	152.4	0.4620718	8.8822286	0.2808166	0.4238052	0.0133988	2.380559262	0.875998086
52.823385	152.4	0.4766101	8.8778376	0.2806778	0.3180119	0.0100541	2.309064684	0.665144964
55.039028	152.4	0.4911485	9.0048509	0.2846934	0.4395738	0.0138974	2.186986281	0.825595062
57.254672	152.4	0.5056868	9.4920066	0.3000951	1.2047352	0.0380884	0.745448299	1.991074424
59.470316	152.4	0.5202252	9.9738968	0.3153303	1.5326944	0.048457	0.887243836	3.043102464
61.68596	152.4	0.5347635	9.7669699	0.3087882	0.4783231	0.0151225	0.672857348	0.758109977
63.901603	152.4	0.5493019	9.6349176	0.3046133	0.9664322	0.0305543	0.717407693	1.288270752
66.117247	152.4	0.5638402	9.7491288	0.3082241	1.1517111	0.036412	0.755891267	1.614111433
68.332891	152.4	0.5783785	9.8109236	0.3101778	0.8134053	0.0257163	0.756621739	0.799315755
70.548535	152.4	0.5929169	9.8116823	0.3102018	0.5769264	0.0182398	0.810393952	0.579669392
72.764178	152.4	0.6074552	9.8571215	0.3116384	0.4530851	0.0143245	0.845725845	0.411075139
74.979822	152.4	0.6219936	9.9306271	0.3139623	0.5740272	0.0181482	0.752688999	0.383092319
77.195466	152.4	0.6365319	10.232498	0.3235061	0.8146763	0.0257564	0.757195136	0.312062104
79.41111	152.4	0.6510703	10.421327	0.329476	0.7732426	0.0244465	0.911214348	0.254238586
81.626753	152.4	0.6656086	10.305629	0.3258182	0.9356954	0.0295825	0.907834346	0.348623841
83.842397	152.4	0.680147	10.318489	0.3262248	0.9046314	0.0286004	0.437637719	0.286756924
86.058041	152.4	0.6946853	10.239866	0.323739	0.9370868	0.0296265	0.442863736	0.265026982

Station 13

B. REYNOLDS NUMBER 387,326 (4-INCHES)

Average Velocity Data (U_ref = 45.70 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665						
6.2948656	152.4	0.1713049	29.963781	0.655662612	1.901615533	0.041610843	2.399933119	1.87297932
8.5105094	152.4	0.1858432	26.883168	0.588253139	1.789870895	0.039165665	3.316767399	2.147674121
10.726153	152.4	0.2003816	19.188969	0.419889921	1.073521093	0.023490615	8.239129715	3.192268466
12.941797	152.4	0.2149199	17.481338	0.382523802	-0.235520077	-0.005153612	8.439237841	4.716656212
15.157441	152.4	0.2294583	18.129626	0.396709537	-1.262438131	-0.027624467	8.968931765	4.409943143
17.373084	152.4	0.2439966	18.903127	0.413635175	-1.1190667	-0.024487236	8.060254547	3.357962384
19.588728	152.4	0.258535	21.428865	0.468902944	-1.843784917	-0.040345403	7.892514633	3.178738361
21.804372	152.4	0.2730733	23.710733	0.518834417	-1.753341191	-0.038366328	5.869055621	2.683707009
24.020016	152.4	0.2876117	27.43422	0.600311157	-1.72482019	-0.037742236	5.098008373	2.543728263
26.235659	152.4	0.30215	27.719219	0.606547471	-1.227467259	-0.02685924	5.177183209	2.110148964
28.451303	152.4	0.3166883	27.598544	0.603906874	-0.958087664	-0.020964719	4.74888216	1.867163687
30.666947	152.4	0.3312267	28.397282	0.621384733	-0.187109653	-0.004094303	4.515957199	1.789334001
32.882591	152.4	0.345765	28.898197	0.632345677	-0.139138811	-0.003044613	3.939242275	1.819252705
35.098234	152.4	0.3603034	29.162471	0.638128462	0.162326903	0.003552011	4.239673622	1.45478969
37.313878	152.4	0.3748417	28.364387	0.620664915	0.059989662	0.001312684	4.707920904	1.403008342
39.529522	152.4	0.3893801	28.463413	0.622831802	3.63038E-05	7.94394E-07	3.334061917	1.368590677
41.745166	152.4	0.4039184	29.001654	0.634609494	0.246422527	0.005392178	2.82093638	1.191299482
43.96081	152.4	0.4184568	28.747542	0.629049056	0.617609226	0.013514425	2.547125337	1.277008864
46.176453	152.4	0.4329951	28.725526	0.628567315	0.77115773	0.016874349	2.139543584	1.412145564
48.392097	152.4	0.4475334	28.600875	0.625839715	1.110132982	0.02429175	1.238295421	1.433781794
50.607741	152.4	0.4620718	29.489106	0.645275839	0.823052955	0.018009911	1.532069362	1.446602155
52.823385	152.4	0.4766101	29.443763	0.644283647	1.049803213	0.022971624	1.556199617	0.923333819
55.039028	152.4	0.4911485	29.866085	0.65352484	1.300013329	0.028446681	1.537053777	0.83410969
57.254672	152.4	0.5056868	30.076145	0.658121334	1.495211634	0.032717979	1.487226795	0.77019901
59.470316	152.4	0.5202252	30.402397	0.66526033	1.322864829	0.028946714	1.130318087	1.112431688
61.68596	152.4	0.5347635	30.65164	0.670714218	1.440054474	0.031511039	1.285018077	1.075831242
63.901603	152.4	0.5493019	29.940887	0.655161635	2.124548771	0.046489032	0.777329167	1.163284999
66.117247	152.4	0.5638402	28.965266	0.633813262	2.144859259	0.046933463	3.244000111	1.086338638
68.332891	152.4	0.5783785	29.448291	0.644382741	2.333978772	0.051071746	1.837282362	1.345182587
70.548535	152.4	0.5929169	29.654966	0.648905163	2.080031308	0.045514908	1.310617664	1.378480032
72.764178	152.4	0.6074552	29.770274	0.651428313	2.234584961	0.048896826	1.369131393	1.497179253
74.979822	152.4	0.6219936	29.582075	0.647310171	3.138810871	0.068682951	1.162927888	1.867144797
77.195466	152.4	0.6365319	29.849514	0.653162223	3.055339759	0.06685645	1.185765393	1.741724308
79.41111	152.4	0.6510703	29.792546	0.651915675	3.213837717	0.070324677	0.870648753	1.765003932
81.626753	152.4	0.6656086	29.853394	0.653247142	3.936377708	0.08613518	1.131528469	1.543646131
83.842397	152.4	0.680147	29.97615	0.655933258	3.996118122	0.08744241	1.583737394	1.723626836
86.058041	152.4	0.6946853	30.023449	0.65696825	3.936083713	0.086128746	1.422454486	1.510962137

Trailing Edge

Average Velocity Data (U_ref = 45.70 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665						
6.2948656	152.4	0.1713049	30.051591	0.657584046	1.123628244	0.024587051	2.716067848	1.846760656
8.5105094	152.4	0.1858432	27.14	0.593873081	0.796043105	0.017418886	5.594339706	3.591249284
10.726153	152.4	0.2003816	22.497113	0.492278193	0.710205045	0.015540592	7.509745562	3.841786669
12.941797	152.4	0.2149199	18.307818	0.400608709	-0.704552116	-0.015416895	8.927838258	4.73557483
15.157441	152.4	0.2294583	16.939777	0.370673462	-0.047216838	-0.001033191	10.70166214	5.125251409
17.373084	152.4	0.2439966	18.659941	0.408313798	-1.698997597	-0.03717719	7.549546114	4.716047792
19.588728	152.4	0.258535	21.400428	0.468280697	-1.990574811	-0.043557436	6.904699884	4.312236647
21.804372	152.4	0.2730733	24.016098	0.525516367	-1.17727676	-0.025760979	6.433869166	3.549563752
24.020016	152.4	0.2876117	25.822247	0.565038218	-0.80240544	-0.017558106	4.620662651	3.197724659
26.235659	152.4	0.30215	26.628122	0.58267226	0.633562886	0.01386352	3.885545264	3.490878346
28.451303	152.4	0.3166883	27.99501	0.61258227	0.323891865	0.007087349	2.970714419	4.365329212
30.666947	152.4	0.3312267	28.596839	0.62575139	0.606744413	0.013276683	3.171861254	4.095973266
32.882591	152.4	0.345765	28.739533	0.628873806	0.184355466	0.004034036	3.342217096	2.828691659
35.098234	152.4	0.3603034	28.23576	0.617850319	-0.114024977	-0.002495076	3.344267184	1.688634275
37.313878	152.4	0.3748417	27.227696	0.595792026	-0.43156356	-0.009443404	3.285269239	1.602310613
39.529522	152.4	0.3893801	27.522769	0.602248771	-0.277799082	-0.006078755	3.025145219	1.347247601
41.745166	152.4	0.4039184	27.726647	0.60671	-0.277220315	-0.00606609	2.625365067	1.108096381
43.96081	152.4	0.4184568	27.908384	0.610686742	-0.416115045	-0.009105362	1.934880432	1.291577754
46.176453	152.4	0.4329951	28.125	0.615426686	-0.148434525	-0.00324802	1.15134039	1.897150215
48.392097	152.4	0.4475334	28.541273	0.62453552	0.321947421	0.007044801	1.514177799	1.976449872
50.607741	152.4	0.4620718	28.895407	0.63228461	0.539997806	0.011816145	1.79842128	1.531579889
52.823385	152.4	0.4766101	28.813532	0.630493051	0.768554833	0.016817392	1.412698236	1.099247069
55.039028	152.4	0.4911485	29.049214	0.635650207	1.385875094	0.030325494	0.955939974	0.709317591
57.254672	152.4	0.5056868	29.275983	0.640612315	1.983881766	0.04341098	0.752043902	1.220546245
59.470316	152.4	0.5202252	29.772497	0.651476968	2.042052761	0.044683868	0.68840661	1.100809144
61.68596	152.4	0.5347635	29.76266	0.651261715	2.429193744	0.053155224	0.762878104	1.039583647
63.901603	152.4	0.5493019	29.398108	0.643284632	2.666621063	0.05835057	1.105739758	1.166099391
66.117247	152.4	0.5638402	29.389905	0.643105141	2.595207094	0.056787901	1.606929831	1.405095731
68.332891	152.4	0.5783785	29.759303	0.651188251	1.73959507	0.038065538	1.617879574	1.89248988
70.548535	152.4	0.5929169	30.199361	0.660817523	1.731205615	0.037881961	2.315623131	2.388109074
72.764178	152.4	0.6074552	29.952201	0.655409205	2.43162958	0.053208525	1.595294984	1.384197382
74.979822	152.4	0.6219936	29.542272	0.646439217	3.202265223	0.070071449	1.375625082	0.937437318
77.195466	152.4	0.6365319	29.347308	0.64217304	3.429106785	0.075035159	2.307756029	1.247815782
79.41111	152.4	0.6510703	30.112433	0.658915384	4.082948264	0.089342413	0.6751021	1.422196206
81.626753	152.4	0.6656086	30.320314	0.663464192	4.002149081	0.087574378	1.244478308	1.28712742
83.842397	152.4	0.680147	30.572425	0.668980843	3.967981729	0.086826734	1.718736596	1.148397645
86.058041	152.4	0.6946853	30.631187	0.670266675	3.649675077	0.079861599	2.158371849	1.049364472

Station 11

Average Velocity Data (U_ref = 45.70 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665						
6.2948656	152.4	0.1713049	29.851516	0.653206047	2.136144955	0.046742778	2.26184048	1.322229289
8.5105094	152.4	0.1858432	28.523185	0.624139718	2.24482733	0.049120948	2.72559125	1.77203596
10.726153	152.4	0.2003816	21.572745	0.472051305	0.928155968	0.020309759	5.556860853	3.170777207
12.941797	152.4	0.2149199	16.680789	0.365006317	-1.549982539	-0.033916467	6.011611791	3.919088936
15.157441	152.4	0.2294583	15.711269	0.343791448	-1.643043074	-0.035952802	8.752867752	4.746365216
17.373084	152.4	0.2439966	18.265637	0.399685712	-2.539160094	-0.05556149	8.548952794	4.977753462
19.588728	152.4	0.258535	21.518661	0.470867857	-1.400392755	-0.030643168	6.879501499	4.254876998
21.804372	152.4	0.2730733	24.362163	0.533088909	-0.874459331	-0.019134777	6.163418989	3.561055325
24.020016	152.4	0.2876117	26.367584	0.576971198	-0.587631082	-0.012858448	3.873355043	2.784366076
26.235659	152.4	0.30215	28.095038	0.614771073	-0.470087052	-0.010286369	2.651497771	2.731061695
28.451303	152.4	0.3166883	28.002205	0.612739725	0.775307681	0.016965157	2.657907908	3.63533023
30.666947	152.4	0.3312267	27.376924	0.59905742	0.657541581	0.014388218	3.060587446	2.034743563
32.882591	152.4	0.345765	27.634605	0.604695954	0.15289614	0.003345649	3.135969386	1.661839982
35.098234	152.4	0.3603034	27.080061	0.59256151	-0.212414826	-0.004648027	3.226491044	1.513430462
37.313878	152.4	0.3748417	27.232324	0.595893312	-0.480500383	-0.010514232	2.9620144	1.502151405
39.529522	152.4	0.3893801	27.392637	0.599401244	-0.72681333	-0.015904012	2.704497144	1.088088899
41.745166	152.4	0.4039184	27.096863	0.592929177	-0.307141981	-0.006720831	2.216244622	1.126056644
43.96081	152.4	0.4184568	27.31803	0.597768703	-0.293684464	-0.006426356	2.045214858	0.892237601
46.176453	152.4	0.4329951	27.650956	0.605053749	0.016351053	0.000357791	1.65444618	0.667831293
48.392097	152.4	0.4475334	28.390529	0.621236959	-0.358015757	-0.007834043	2.19203024	3.033135071
50.607741	152.4	0.4620718	29.361904	0.642492425	-2.003970379	-0.043850555	3.740974457	8.308463234
52.823385	152.4	0.4766101	28.75779	0.629273314	0.074383169	0.00162764	1.497721353	2.479320183
55.039028	152.4	0.4911485	28.497896	0.623586353	0.95590724	0.020917007	0.819074823	0.694885781
57.254672	152.4	0.5056868	28.781033	0.629781897	1.484765885	0.032489407	0.877999385	1.072259013
59.470316	152.4	0.5202252	28.936656	0.633187218	1.581139005	0.034598228	1.282762024	1.193675719
61.68596	152.4	0.5347635	29.072357	0.636156599	1.648097419	0.036063401	1.261154559	1.223592341
63.901603	152.4	0.5493019	29.521389	0.64598225	2.057229327	0.045015959	1.236123326	0.882354988
66.117247	152.4	0.5638402	29.502079	0.645559724	2.35377979	0.051505028	1.065203208	1.307211082
68.332891	152.4	0.5783785	29.335664	0.641918244	2.697483774	0.059025903	1.118663518	1.356711511
70.548535	152.4	0.5929169	29.278382	0.640664805	2.883418004	0.063094486	0.921514187	1.018545638
72.764178	152.4	0.6074552	29.336692	0.641940753	3.675742902	0.080432011	0.870893798	1.69637517
74.979822	152.4	0.6219936	29.431524	0.644015845	3.851393722	0.084275574	1.018173738	1.435840558
77.195466	152.4	0.6365319	29.843177	0.653023573	4.037561366	0.088349264	1.171405016	1.064513812
79.41111	152.4	0.6510703	29.975242	0.655913388	4.148854804	0.090784569	1.142059021	1.004051095
81.626753	152.4	0.6656086	30.438065	0.666040813	3.898243971	0.085300743	1.098935246	1.129981332
83.842397	152.4	0.680147	30.586977	0.669299271	3.696924469	0.080895503	1.333977727	1.112424007
86.058041	152.4	0.6946853	30.579506	0.669135809	3.791893768	0.082973605	1.163948241	1.057130733

Station 12

Average Velocity Data (U_ref = 45.70 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665						
6.2948656	152.4	0.1713049	28.469896	0.622973651	2.76009099	0.060395864	1.960536055	1.175726618
8.5105094	152.4	0.1858432	28.765947	0.629451801	3.537660979	0.077410525	1.569951534	1.672650574
10.726153	152.4	0.2003816	24.757579	0.54174133	3.233989426	0.070765633	3.73980648	3.837699862
12.941797	152.4	0.2149199	19.00997	0.415973081	1.747882913	0.038246891	1.923821005	6.54472897
15.157441	152.4	0.2294583	17.029795	0.372643222	2.761089954	0.060417723	3.631466313	4.680635378
17.373084	152.4	0.2439966	19.652503	0.430032897	0.899609304	0.019685105	5.035197178	4.848521811
19.588728	152.4	0.258535	22.110671	0.483822123	0.378369572	0.008279422	5.514664206	3.7619062
21.804372	152.4	0.2730733	23.227685	0.508264432	1.204885118	0.026365101	4.540120953	3.216215223
24.020016	152.4	0.2876117	24.673552	0.539902674	0.619930429	0.013565217	3.831685839	2.044794011
26.235659	152.4	0.30215	25.216463	0.551782558	0.096484325	0.002111254	3.850537948	1.920250143
28.451303	152.4	0.3166883	27.17596	0.594659948	-0.57305883	-0.012539581	2.260843083	1.264099494
30.666947	152.4	0.3312267	26.052832	0.570083848	-0.251979639	-0.005513778	3.970834324	2.361215081
32.882591	152.4	0.345765	26.098257	0.571077826	-0.411049761	-0.008994524	3.692297696	2.294613717
35.098234	152.4	0.3603034	26.469528	0.579201921	-0.408825003	-0.008945843	3.194103966	1.742745966
37.313878	152.4	0.3748417	27.219417	0.595610867	-0.463917575	-0.010151369	3.391130196	1.08577621
39.529522	152.4	0.3893801	27.887771	0.610235697	-0.198258301	-0.004338256	3.131849032	0.603179932
41.745166	152.4	0.4039184	27.706192	0.606262404	0.029996158	0.000656371	2.651590973	0.663197717
43.96081	152.4	0.4184568	27.45738	0.600817948	0.322165949	0.007049583	1.479026066	0.750525203
46.176453	152.4	0.4329951	27.808066	0.608491605	0.539940991	0.011814901	1.070967569	0.90751387
48.392097	152.4	0.4475334	27.971027	0.61205749	0.640583209	0.014017138	0.701630316	0.69926637
50.607741	152.4	0.4620718	27.998554	0.612659823	0.787275481	0.017227035	0.67649314	0.483082867
52.823385	152.4	0.4766101	27.87489	0.609953837	0.878224169	0.019217159	0.868288367	0.636443149
55.039028	152.4	0.4911485	27.808064	0.608491558	0.803669286	0.017585761	1.308587063	0.67382826
57.254672	152.4	0.5056868	24.547807	0.537151131	1.484711059	0.032488207	10.01997935	1.731507381
59.470316	152.4	0.5202252	26.158678	0.572399963	1.987887882	0.043498641	5.382661133	1.665441818
61.68596	152.4	0.5347635	27.956849	0.611747245	1.541898987	0.033739584	1.274378967	1.376137847
63.901603	152.4	0.5493019	28.056163	0.613920409	0.901133981	0.019718468	1.403197522	2.435876266
66.117247	152.4	0.5638402	28.454561	0.622638091	1.678193419	0.036721957	1.161528213	1.073059043
68.332891	152.4	0.5783785	28.802828	0.630258828	2.432539042	0.053228425	0.94560703	1.136989141
70.548535	152.4	0.5929169	28.991044	0.634377323	3.018042758	0.066040323	1.133205071	1.607268012
72.764178	152.4	0.6074552	28.728387	0.628629912	2.883542394	0.063097208	0.6994918	1.14567366
74.979822	152.4	0.6219936	27.828447	0.608937576	3.512651422	0.07686327	3.101497788	3.65490273
77.195466	152.4	0.6365319	28.86412	0.631600005	2.634029719	0.057637412	1.11596836	1.740487614
79.41111	152.4	0.6510703	29.325753	0.641701382	2.234844396	0.048902503	0.590874667	1.48557156
81.626753	152.4	0.6656086	29.394036	0.643195536	2.82007506	0.061708426	0.835249093	1.205826522
83.842397	152.4	0.680147	29.287328	0.640860565	3.151196521	0.068953972	0.787515206	0.972117978
86.058041	152.4	0.6946853	30.018156	0.656852425	3.641089859	0.079673739	1.101023069	1.26890693

Station 13

C. REYNOLDS NUMBER 467,568 (6-INCHES)

Average Velocity Data (U_ref = 55.16 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	38.279879	0.693979	2.8844416	0.0522923	5.986983691	3.383658303
6.2948656	152.4	0.1713049	37.643209	0.6824367	2.4439868	0.0443072	4.777617527	4.56416088
8.5105094	152.4	0.1858432	33.88217	0.6142525	2.2640109	0.0410444	5.947581546	4.736877596
10.726153	152.4	0.2003816	19.68273	0.3568298	1.2623762	0.0228857	12.81351048	5.527934582
12.941797	152.4	0.2149199	11.752215	0.2130568	0.223302	0.0040483	17.2510456	6.064301389
15.157441	152.4	0.2294583	6.6983234	0.1214344	0.2320799	0.0042074	17.9209857	5.964397451
17.373084	152.4	0.2439966	1.675164	0.0303692	-2.857556	-0.051805	14.93821111	4.950034187
19.588728	152.4	0.258535	3.1011536	0.0562211	-2.065101	-0.037438	15.99435001	6.872790426
21.804372	152.4	0.2730733	4.7749659	0.0865657	-2.560899	-0.046427	15.96371442	7.143453426
24.020016	152.4	0.2876117	6.912468	0.1253167	-2.792911	-0.050633	15.89973256	7.137469611
26.235659	152.4	0.30215	9.3238471	0.1690328	-3.147913	-0.057069	15.15327118	6.705376562
28.451303	152.4	0.3166883	12.829854	0.2325934	-1.888112	-0.03423	14.30055778	5.147792157
30.666947	152.4	0.3312267	16.659294	0.3020177	-2.721344	-0.049335	12.82952649	5.759737719
32.882591	152.4	0.345765	22.820363	0.4137122	-1.793976	-0.032523	14.32807651	5.685750714
35.098234	152.4	0.3603034	27.570979	0.4998365	-1.05114	-0.019056	13.58100805	6.328474478
37.313878	152.4	0.3748417	31.724897	0.5751432	-0.44422	-0.008053	11.3436503	7.069809145
39.529522	152.4	0.3893801	34.177038	0.6195982	0.993222	0.0180062	8.966488298	7.731562422
41.745166	152.4	0.4039184	38.132	0.691298	2.1478925	0.0389393	5.037738307	6.687022933
43.96081	152.4	0.4184568	40.85115	0.7405937	2.9983723	0.0543577	3.254242903	5.921570543
46.176453	152.4	0.4329951	41.762932	0.7571235	4.0707065	0.0737982	2.432091978	4.518435514
48.392097	152.4	0.4475334	41.732681	0.7565751	4.9427421	0.0896074	1.967691197	3.589543022
50.607741	152.4	0.4620718	41.478721	0.751971	5.0152108	0.0909212	2.176106409	3.00056633
52.823385	152.4	0.4766101	41.238044	0.7476078	5.6160752	0.1018143	2.30114814	2.177083243
55.039028	152.4	0.4911485	40.576388	0.7356125	5.9292354	0.1074916	2.246095381	2.023701957
57.254672	152.4	0.5056868	39.831033	0.7220999	6.129065	0.1111143	1.958009662	1.410165823
59.470316	152.4	0.5202252	39.150594	0.7097642	6.0429454	0.109553	1.903511943	1.224192241
61.68596	152.4	0.5347635	39.359237	0.7135467	5.4190514	0.0982424	1.341160831	1.112939177
63.901603	152.4	0.5493019	38.726552	0.7020767	5.7034857	0.1033989	1.168217834	1.323922496
66.117247	152.4	0.5638402	38.463633	0.6973102	6.3256236	0.1146777	1.043383325	1.207749952
68.332891	152.4	0.5783785	37.999435	0.6888948	6.7827479	0.122965	0.846253891	0.947041511
70.548535	152.4	0.5929169	37.779739	0.6849119	6.3361409	0.1148684	0.624936039	1.529594045
72.764178	152.4	0.6074552	37.92962	0.6876291	6.4465951	0.1168708	0.684359413	1.713386726
74.979822	152.4	0.6219936	37.874941	0.6866378	6.2707418	0.1136828	1.013565235	1.470784861
77.195466	152.4	0.6365319	37.631087	0.682217	6.0397319	0.1094948	0.763353894	1.449478875
79.41111	152.4	0.6510703	37.397368	0.6779798	6.153131	0.1115506	0.62889579	1.40865759
81.626753	152.4	0.6656086	37.487049	0.6796057	6.2524126	0.1133505	0.649312883	0.867197324
83.842397	152.4	0.680147	37.486633	0.6795981	6.103924	0.1106585	0.619393539	0.619836081
86.058041	152.4	0.6946853	37.371426	0.6775095	5.6954366	0.103253	1.219775255	0.938856537

Trailing Edge

Average Velocity Data (U_ref = 55.16 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	39.238509	0.711358	3.774797	0.0684336	5.042449316	2.818340678
6.2948656	152.4	0.1713049	40.421275	0.7328005	4.2664188	0.0773462	2.366534119	3.889572936
8.5105094	152.4	0.1858432	40.531207	0.7347934	5.0749762	0.0920046	1.782355763	4.045361256
10.726153	152.4	0.2003816	30.687249	0.5563316	4.281092	0.0776123	8.064859053	4.491105517
12.941797	152.4	0.2149199	15.501993	0.2810369	2.4950017	0.0452321	14.16051753	5.356966198
15.157441	152.4	0.2294583	6.5265825	0.1183209	1.3316311	0.0241412	16.40970068	5.939125562
17.373084	152.4	0.2439966	2.1617828	0.0391911	-1.351507	-0.024502	16.61615749	7.568181798
19.588728	152.4	0.258535	-2.127977	-0.038578	-5.569051	-0.100962	10.86323987	5.192910157
21.804372	152.4	0.2730733	1.8418338	0.0333908	-4.470276	-0.081042	14.98136041	7.767681634
24.020016	152.4	0.2876117	5.8981561	0.1069281	-4.395692	-0.07969	14.01451273	7.962495853
26.235659	152.4	0.30215	9.5535367	0.1731968	-3.764267	-0.068243	12.19159395	7.489806742
28.451303	152.4	0.3166883	13.366797	0.2423277	-3.480487	-0.063098	11.5334952	6.330750863
30.666947	152.4	0.3312267	18.300134	0.3317646	-3.223011	-0.05843	13.12521318	6.891564455
32.882591	152.4	0.345765	22.777415	0.4129336	-2.082987	-0.037763	13.08704856	7.320013492
35.098234	152.4	0.3603034	27.695352	0.5020912	1.4819172	0.0268658	12.94296877	6.357540892
37.313878	152.4	0.3748417	31.174381	0.5651628	1.0846583	0.0196639	11.60195903	9.396568141
39.529522	152.4	0.3893801	35.136202	0.636987	0.9160368	0.0166069	6.942888975	8.179418104
41.745166	152.4	0.4039184	39.065744	0.708226	1.2836518	0.0232714	3.286276969	6.658036678
43.96081	152.4	0.4184568	40.370389	0.731878	3.1163801	0.0564971	2.405274579	5.926951507
46.176453	152.4	0.4329951	40.811341	0.739872	3.8647201	0.0700638	2.531003148	4.39677403
48.392097	152.4	0.4475334	40.890748	0.7413116	4.5486999	0.0824637	2.463293274	3.148594181
50.607741	152.4	0.4620718	40.90487	0.7415676	4.6822363	0.0848846	2.244131245	2.306498158
52.823385	152.4	0.4766101	40.391675	0.7322639	4.7486831	0.0860893	2.054230666	1.307484249
55.039028	152.4	0.4911485	40.190408	0.7286151	5.0926826	0.0923256	2.027723679	1.526395419
57.254672	152.4	0.5056868	39.544557	0.7169064	5.3364503	0.0967449	1.377907763	1.428868128
59.470316	152.4	0.5202252	39.523538	0.7165253	5.0770903	0.092043	1.627086285	1.367054247
61.68596	152.4	0.5347635	39.238326	0.7113547	5.3495402	0.0969822	1.078234585	1.53136594
63.901603	152.4	0.5493019	38.903038	0.7052763	5.5884875	0.1013141	0.896422435	1.647899371
66.117247	152.4	0.5638402	38.550141	0.6988785	5.7578866	0.1043852	0.668367104	1.934795762
68.332891	152.4	0.5783785	38.235207	0.6931691	6.0641179	0.1099369	0.696150284	1.85237874
70.548535	152.4	0.5929169	37.760406	0.6845614	6.2494071	0.113296	0.643018777	1.591552867
72.764178	152.4	0.6074552	37.597023	0.6815994	6.3800561	0.1156645	0.462631385	1.259819868
74.979822	152.4	0.6219936	37.622738	0.6820656	6.0779019	0.1101868	0.479206351	1.037471797
77.195466	152.4	0.6365319	37.549921	0.6807455	5.9906824	0.1086056	0.596128336	1.056376002
79.41111	152.4	0.6510703	37.441221	0.6787749	6.1542732	0.1115713	0.703089554	0.790687431
81.626753	152.4	0.6656086	37.427007	0.6785172	6.1219408	0.1109851	0.70369107	0.610607344
83.842397	152.4	0.680147	37.596054	0.6815818	6.2472188	0.1132563	0.853389041	0.559962755
86.058041	152.4	0.6946853	37.281466	0.6758786	5.8912686	0.1068033	0.961987449	0.496776386

Station 11

Average Velocity Data (U_ref = 55.16 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	39.740791	0.7204639	5.0604353	0.091741	3.486116147	2.486266652
6.2948656	152.4	0.1713049	40.716424	0.7381513	6.1454602	0.1114115	2.577862308	2.666361941
8.5105094	152.4	0.1858432	39.969311	0.7246068	5.9017477	0.1069933	2.870624986	2.753268389
10.726153	152.4	0.2003816	29.820372	0.5406159	4.2417498	0.076899	6.095676068	5.795951425
12.941797	152.4	0.2149199	16.242733	0.2944658	3.3653985	0.0610116	13.14123168	9.098195717
15.157441	152.4	0.2294583	8.5696211	0.1553593	2.2799932	0.0413342	14.06633274	8.963276693
17.373084	152.4	0.2439966	1.0217311	0.018523	-0.79498	-0.014412	14.93350412	8.573877509
19.588728	152.4	0.258535	4.3385456	0.0786538	-0.888845	-0.016114	18.02030747	9.427773292
21.804372	152.4	0.2730733	2.6868417	0.04871	-2.660167	-0.048226	16.28474798	7.910532533
24.020016	152.4	0.2876117	3.3479402	0.0606951	-3.41549	-0.06192	12.40786291	7.7491461
26.235659	152.4	0.30215	5.5695775	0.1009713	-3.764463	-0.068246	7.635122649	7.427674413
28.451303	152.4	0.3166883	9.8458465	0.1784961	-4.029261	-0.073047	8.814555744	7.060358119
30.666947	152.4	0.3312267	15.38694	0.278951	-2.749091	-0.049838	10.64507923	7.663278603
32.882591	152.4	0.345765	17.91092	0.3247085	-2.334782	-0.042327	12.61544418	6.921803622
35.098234	152.4	0.3603034	21.668946	0.392838	-0.399378	-0.00724	13.3839458	7.113788032
37.313878	152.4	0.3748417	26.389259	0.478413	2.2178365	0.0402073	13.47957547	6.165768822
39.529522	152.4	0.3893801	30.163037	0.5468281	1.3019733	0.0236036	9.581845437	6.459095785
41.745166	152.4	0.4039184	35.862547	0.6501549	1.357607	0.0246122	5.367352255	4.707232069
43.96081	152.4	0.4184568	39.221297	0.711046	2.2236694	0.0403131	2.632741316	3.644389853
46.176453	152.4	0.4329951	40.313278	0.7308426	3.1231409	0.0566197	3.160201252	3.203119548
48.392097	152.4	0.4475334	40.335248	0.7312409	3.7595223	0.0681567	3.344003737	2.983104156
50.607741	152.4	0.4620718	40.162954	0.7281174	4.0640389	0.0736773	2.925225817	1.903026386
52.823385	152.4	0.4766101	39.473895	0.7156254	4.1834655	0.0758424	2.37983156	1.635363085
55.039028	152.4	0.4911485	39.384014	0.7139959	3.825625	0.0693551	2.832246506	2.433649842
57.254672	152.4	0.5056868	38.885745	0.7049627	4.3806869	0.0794178	2.391842536	2.971423944
59.470316	152.4	0.5202252	38.543576	0.6987595	4.7351674	0.0858442	1.422291707	1.910320451
61.68596	152.4	0.5347635	38.52854	0.6984869	5.0420629	0.091408	1.290618438	1.724210026
63.901603	152.4	0.5493019	38.533494	0.6985768	4.9142676	0.0890911	1.280983288	1.560885592
66.117247	152.4	0.5638402	38.617326	0.7000966	4.8050081	0.0871104	1.424631386	1.421008926
68.332891	152.4	0.5783785	38.166192	0.6919179	4.9399725	0.0895572	1.048597628	1.226897802
70.548535	152.4	0.5929169	38.003216	0.6889633	5.135375	0.0930996	1.013830284	0.834023076
72.764178	152.4	0.6074552	37.805127	0.6853721	5.1904051	0.0940973	0.536983921	0.733668422
74.979822	152.4	0.6219936	37.349438	0.6771109	5.24012	0.0949985	0.618798849	0.701783219
77.195466	152.4	0.6365319	37.179884	0.6740371	4.8183687	0.0873526	0.611720946	0.937120101
79.41111	152.4	0.6510703	37.096792	0.6725307	4.7858557	0.0867632	0.504864116	0.821020918
81.626753	152.4	0.6656086	37.155279	0.673591	5.0477236	0.0915106	0.628370445	0.77333471
83.842397	152.4	0.680147	37.439039	0.6787353	5.3161266	0.0963765	0.555995632	0.797942997
86.058041	152.4	0.6946853	37.4196	0.6783829	5.3732187	0.0974115	0.541327847	1.044873539

Station 12

Average Velocity Data (U_ref = 55.16 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	38.144158	0.6915185	5.1982921	0.0942402	2.571354516	5.04161427
6.2948656	152.4	0.1713049	38.212631	0.6927598	6.1112091	0.1107906	3.532005434	5.394126845
8.5105094	152.4	0.1858432	37.274986	0.6757612	7.2850521	0.1320713	4.696710554	6.025046333
10.726153	152.4	0.2003816	35.512818	0.6438147	8.4370643	0.1529562	4.591818883	6.816932889
12.941797	152.4	0.2149199	27.736428	0.5028359	6.4983618	0.1178093	7.942168791	7.743406311
15.157441	152.4	0.2294583	18.015026	0.3265958	6.8825935	0.1247751	7.532128977	9.486332951
17.373084	152.4	0.2439966	10.56103	0.1914618	7.2383891	0.1312253	9.266194857	9.760689724
19.588728	152.4	0.258535	6.1009722	0.110605	4.4621686	0.080895	9.276610725	7.970677958
21.804372	152.4	0.2730733	3.0926406	0.0560667	1.7564152	0.0318422	7.030247546	7.069006256
24.020016	152.4	0.2876117	3.734082	0.0676955	0.1329399	0.0024101	6.211165005	7.353133426
26.235659	152.4	0.30215	5.8090434	0.1053126	-0.831418	-0.015073	5.212733251	8.109219932
28.451303	152.4	0.3166883	6.2851615	0.1139442	-2.392242	-0.043369	5.040236599	7.199029207
30.666947	152.4	0.3312267	9.3193324	0.1689509	-2.981775	-0.054057	7.971100008	7.227296014
32.882591	152.4	0.345765	15.612005	0.2830313	-3.14042	-0.056933	11.08394654	7.56735888
35.098234	152.4	0.3603034	22.331486	0.4048493	-3.177009	-0.057596	9.885090623	6.609130704
37.313878	152.4	0.3748417	22.573797	0.4092422	-1.419678	-0.025737	8.696809167	6.144046134
39.529522	152.4	0.3893801	28.252011	0.5121829	-0.780274	-0.014146	7.557291556	5.042386627
41.745166	152.4	0.4039184	34.030914	0.6169491	0.2712964	0.0049184	3.652440058	4.600182833
43.96081	152.4	0.4184568	36.775935	0.6667138	1.2658252	0.0229482	2.8588716	3.76384505
46.176453	152.4	0.4329951	38.004853	0.688993	2.2740434	0.0412263	2.945347649	3.010568341
48.392097	152.4	0.4475334	38.247414	0.6933904	3.2471607	0.058868	3.049417735	2.589222933
50.607741	152.4	0.4620718	38.164136	0.6918806	3.5727052	0.0647699	2.905830867	2.471853355
52.823385	152.4	0.4766101	37.914623	0.6873572	3.5289872	0.0639773	2.422878166	2.525245321
55.039028	152.4	0.4911485	38.252451	0.6934817	4.0329059	0.0731129	1.923187421	2.686113089
57.254672	152.4	0.5056868	38.403426	0.6962188	4.4414748	0.0805198	1.612442344	1.940284768
59.470316	152.4	0.5202252	38.432797	0.6967512	4.1660512	0.0755267	1.390833323	1.949192285
61.68596	152.4	0.5347635	38.490057	0.6977893	4.3570587	0.0789895	1.199609732	1.987089538
63.901603	152.4	0.5493019	38.310707	0.6945378	4.2120313	0.0763602	0.744797663	1.288897155
66.117247	152.4	0.5638402	37.82372	0.6857092	4.514012	0.0818349	0.447329574	1.642114342
68.332891	152.4	0.5783785	37.695688	0.6833881	4.60984	0.0835722	0.68986509	1.550056733
70.548535	152.4	0.5929169	37.447494	0.6788886	4.5447142	0.0823915	0.888009671	1.32858243
72.764178	152.4	0.6074552	37.464429	0.6791956	4.6467168	0.0842407	0.973603039	1.054154813
74.979822	152.4	0.6219936	37.365223	0.6773971	4.7305442	0.0857604	0.707681477	1.135437397
77.195466	152.4	0.6365319	37.366346	0.6774174	4.8388908	0.0877246	0.59627965	1.323629554
79.41111	152.4	0.6510703	37.351617	0.6771504	5.0627236	0.0917825	0.810265216	1.525037994
81.626753	152.4	0.6656086	37.460265	0.6791201	5.2732636	0.0955994	0.932438557	1.243682141
83.842397	152.4	0.680147	37.511771	0.6800539	5.2965746	0.096022	0.917961666	1.16022893
86.058041	152.4	0.6946853	37.664435	0.6828215	5.308228	0.0962333	0.93698853	1.016710263

Station 13

D. REYNOLDS NUMBER 544,759 (8-INCHES)

Average Velocity Data (U_ref = 64.27 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	53.302959	0.8293599	11.577512	0.1801387	1.477769204	4.973458253
6.2948656	152.4	0.1713049	53.449128	0.8316342	12.210622	0.1899895	1.357605333	4.662334773
8.5105094	152.4	0.1858432	48.294017	0.7514239	9.9858452	0.1553734	7.744470287	4.541007861
10.726153	152.4	0.2003816	49.54259	0.7708509	11.871224	0.1847086	7.606934169	3.806288201
12.941797	152.4	0.2149199	47.800429	0.743744	9.8405956	0.1531134	7.928702144	6.054528929
15.157441	152.4	0.2294583	42.392445	0.6595993	8.9347208	0.1390185	11.04804606	6.324278212
17.373084	152.4	0.2439966	39.070345	0.6079095	9.4100216	0.1464139	9.868870167	5.480088864
19.588728	152.4	0.258535	31.155506	0.4847597	5.553073	0.0864023	14.97263886	8.689577367
21.804372	152.4	0.2730733	28.25271	0.4395941	3.5643811	0.0554595	13.67883324	10.00811798
24.020016	152.4	0.2876117	23.517983	0.3659247	1.3113601	0.0204039	11.21936389	9.789360765
26.235659	152.4	0.30215	19.198621	0.2987182	-2.500547	-0.038907	11.27026127	9.077634584
28.451303	152.4	0.3166883	15.861614	0.2467966	-3.292548	-0.05123	11.44224186	10.28650751
30.666947	152.4	0.3312267	14.932433	0.2323391	-4.843791	-0.075366	12.72590588	10.59197
32.882591	152.4	0.345765	16.378471	0.2548385	-5.120119	-0.079666	14.76244106	10.23644187
35.098234	152.4	0.3603034	20.944552	0.3258838	-4.117855	-0.064071	17.03638073	9.350072507
37.313878	152.4	0.3748417	24.70717	0.3844277	-0.989435	-0.015395	18.25295457	7.547058582
39.529522	152.4	0.3893801	33.518283	0.521523	0.7478718	0.0116364	17.64690603	7.333593337
41.745166	152.4	0.4039184	40.477342	0.6298015	2.4993142	0.0388877	15.84266466	6.367435268
43.96081	152.4	0.4184568	44.664991	0.6949586	2.822558	0.0439172	13.1256083	6.011407874
46.176453	152.4	0.4329951	49.557504	0.771083	3.6852757	0.0573405	11.36744021	6.428648268
48.392097	152.4	0.4475334	49.506027	0.770282	3.0483126	0.0474298	11.08100917	7.534563846
50.607741	152.4	0.4620718	48.230502	0.7504357	1.9425405	0.0302247	11.68327895	8.787419773
52.823385	152.4	0.4766101	52.508711	0.8170019	6.4456723	0.1002905	5.547609229	3.542706894
55.039028	152.4	0.4911485	54.130917	0.8422424	8.0974438	0.125991	4.558133598	2.489418912
57.254672	152.4	0.5056868	54.403898	0.8464898	8.5036879	0.1323119	2.729580305	2.413098037
59.470316	152.4	0.5202252	53.77434	0.8366943	8.2257669	0.1279877	2.020881468	1.846657906
61.68596	152.4	0.5347635	53.370668	0.8304134	8.1235505	0.1263972	1.591990272	1.555767397
63.901603	152.4	0.5493019	53.504391	0.832494	8.2967519	0.1290921	1.19626321	1.494591694
66.117247	152.4	0.5638402	53.317082	0.8295796	8.2006213	0.1275964	0.787097287	1.544249982
68.332891	152.4	0.5783785	51.477397	0.8009553	7.753138	0.1206339	5.080873621	1.564696574
70.548535	152.4	0.5929169	50.691464	0.7887267	7.3276046	0.1140128	6.043638581	1.807425843
72.764178	152.4	0.6074552	51.712302	0.8046103	7.7656998	0.1208293	1.83213351	1.631449491
74.979822	152.4	0.6219936	51.570772	0.8024081	8.6809575	0.1350701	1.97822207	3.069130518
77.195466	152.4	0.6365319	51.608575	0.8029963	8.9974621	0.1399947	1.846520374	2.803397038
79.41111	152.4	0.6510703	52.169412	0.8117226	8.7449015	0.1360651	1.403865717	1.255015511
81.626753	152.4	0.6656086	52.824943	0.8219223	8.9383164	0.1390745	1.219899731	1.237172824
83.842397	152.4	0.680147	53.246353	0.8284791	9.1566343	0.1424714	1.117222765	1.321906277
86.058041	152.4	0.6946853	53.241178	0.8283986	9.4651946	0.1472724	1.516752112	1.525411891

Trailing Edge

Average Velocity Data (U_ref = 64.27 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	53.236798	0.8283304	9.431989	0.146756	1.5289288	5.73039834
6.2948656	152.4	0.1713049	53.141671	0.8268503	9.5826418	0.1491	3.30908977	5.71421903
8.5105094	152.4	0.1858432	50.489703	0.7855874	8.7683843	0.13643	7.28020594	6.70564985
10.726153	152.4	0.2003816	44.132743	0.6866772	9.4766819	0.147451	12.9483769	7.64861724
12.941797	152.4	0.2149199	39.732723	0.6182157	8.1342225	0.126563	17.4193529	7.98375849
15.157441	152.4	0.2294583	35.333626	0.5497686	7.1275155	0.1109	17.3762825	8.25295432
17.373084	152.4	0.2439966	34.642189	0.5390103	7.3895994	0.114977	10.4196289	6.87428767
19.588728	152.4	0.258535	24.525024	0.3815937	2.4784618	0.038563	13.2594419	8.8715392
21.804372	152.4	0.2730733	19.135195	0.2977314	-0.858788	-0.01336	12.9479387	9.6721826
24.020016	152.4	0.2876117	14.014605	0.2180583	-2.882402	-0.04485	12.1828216	9.81617036
26.235659	152.4	0.30215	10.36375	0.1612533	-4.569765	-0.0711	14.0754334	10.7332731
28.451303	152.4	0.3166883	11.902363	0.1851931	-5.958669	-0.09271	16.9577537	12.4391623
30.666947	152.4	0.3312267	11.908721	0.1852921	-6.280651	-0.09772	16.5218293	10.2995515
32.882591	152.4	0.345765	15.038575	0.2339906	-5.535246	-0.08612	15.1036222	9.41905552
35.098234	152.4	0.3603034	18.900015	0.2940721	-4.86892	-0.07576	13.3907428	8.4053616
37.313878	152.4	0.3748417	22.151503	0.3446632	-4.129288	-0.06425	12.6912727	7.86381798
39.529522	152.4	0.3893801	30.941671	0.4814326	-1.498354	-0.02331	13.1829832	8.08630307
41.745166	152.4	0.4039184	43.172047	0.6717294	1.3457589	0.020939	12.8631835	6.93716003
43.96081	152.4	0.4184568	50.77679	0.7900543	2.7791863	0.043242	4.31732459	5.71549475
46.176453	152.4	0.4329951	51.837695	0.8065613	2.552894	0.039721	5.37041568	5.22891352
48.392097	152.4	0.4475334	51.274956	0.7978054	2.986156	0.046463	8.03860952	3.69915746
50.607741	152.4	0.4620718	54.347206	0.8456077	4.3895568	0.068299	4.43777255	3.72590929
52.823385	152.4	0.4766101	53.532241	0.8329274	5.6143562	0.087356	4.00419918	2.69436821
55.039028	152.4	0.4911485	53.966561	0.8396851	6.2762808	0.097655	2.87150309	2.51727354
57.254672	152.4	0.5056868	53.455751	0.8317372	6.9271656	0.107782	2.02273914	2.17280818
59.470316	152.4	0.5202252	52.84119	0.822175	7.3433781	0.114258	1.1421297	1.85166055
61.68596	152.4	0.5347635	52.293226	0.8136491	7.1388732	0.111076	1.93742591	2.11312518
63.901603	152.4	0.5493019	51.949646	0.8083032	7.0958153	0.110406	1.54420354	1.76264788
66.117247	152.4	0.5638402	52.369211	0.8148313	6.8131409	0.106008	0.93554005	2.09447586
68.332891	152.4	0.5783785	52.249758	0.8129727	6.4943847	0.101048	0.71242018	2.73110038
70.548535	152.4	0.5929169	51.769656	0.8055027	7.4146047	0.115366	1.10344936	1.4087982
72.764178	152.4	0.6074552	51.765114	0.805432	7.428331	0.11558	1.26461206	1.31065874
74.979822	152.4	0.6219936	52.094859	0.8105626	6.9588848	0.108276	1.28385624	1.91466702
77.195466	152.4	0.6365319	51.92195	0.8078723	7.0131281	0.10912	1.26002949	1.88273609
79.41111	152.4	0.6510703	51.894465	0.8074446	7.5928352	0.11814	1.46659324	1.40106719
81.626753	152.4	0.6656086	52.65594	0.8192927	8.3622785	0.130112	1.62019669	1.7498388
83.842397	152.4	0.680147	53.144368	0.8268923	8.2932302	0.129037	1.52392125	2.04164062
86.058041	152.4	0.6946853	53.062822	0.8256235	8.3873454	0.130502	1.29120733	1.97113514

Station 11

Average Velocity Data (U_ref = 64.27 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	53.325924	0.8297172	9.8151284	0.1527171	0.634858353	4.736988926
6.2948656	152.4	0.1713049	52.296196	0.8136953	10.971694	0.1707125	0.797730653	4.329039168
8.5105094	152.4	0.1858432	50.240063	0.7817032	10.794888	0.1679615	2.523855676	4.820609073
10.726153	152.4	0.2003816	41.653717	0.6481051	8.6907217	0.1352221	12.28646486	5.573697457
12.941797	152.4	0.2149199	34.484499	0.5365567	8.4173632	0.1309688	19.27123608	7.139275823
15.157441	152.4	0.2294583	30.945508	0.4814923	6.4085817	0.0997134	16.19733476	8.250467374
17.373084	152.4	0.2439966	25.174952	0.3917061	1.4774075	0.0229875	18.1266895	10.19182749
19.588728	152.4	0.258535	15.487288	0.2409723	-0.802601	-0.012488	17.3634714	10.78934858
21.804372	152.4	0.2730733	13.835635	0.2152736	-1.517958	-0.023618	16.56902878	9.597099708
24.020016	152.4	0.2876117	12.003374	0.1867648	-4.640979	-0.072211	17.86466093	9.793158766
26.235659	152.4	0.30215	10.329301	0.1607173	-6.850306	-0.106586	15.8539816	10.22596695
28.451303	152.4	0.3166883	6.9604874	0.1083007	-4.363764	-0.067897	16.28502395	9.768212904
30.666947	152.4	0.3312267	9.9429733	0.1547063	-7.172503	-0.1116	15.09795367	7.074178265
32.882591	152.4	0.345765	15.237563	0.2370867	-3.443773	-0.053583	13.54221664	11.55878378
35.098234	152.4	0.3603034	21.111327	0.3284787	-2.700693	-0.042021	13.80979379	11.10031821
37.313878	152.4	0.3748417	26.607521	0.413996	-0.721968	-0.011233	11.87288016	10.50978704
39.529522	152.4	0.3893801	34.970335	0.544116	-2.267947	-0.035288	11.89705222	8.210917139
41.745166	152.4	0.4039184	42.583461	0.6625714	0.2568601	0.0039966	8.927435342	7.241384729
43.96081	152.4	0.4184568	49.900178	0.7764148	1.7391666	0.0270603	4.750081957	7.184109071
46.176453	152.4	0.4329951	51.073236	0.7946668	3.2048483	0.0498654	5.437291272	7.453621656
48.392097	152.4	0.4475334	49.136451	0.7645317	3.5456283	0.0551677	7.480697176	6.893626565
50.607741	152.4	0.4620718	49.33613	0.7676386	1.8775321	0.0292132	7.655458739	5.993791336
52.823385	152.4	0.4766101	52.619535	0.8187262	5.1315847	0.0798442	2.445506178	2.730222171
55.039028	152.4	0.4911485	52.563922	0.8178609	5.7518472	0.0894951	1.556268071	2.733638788
57.254672	152.4	0.5056868	51.945113	0.8082327	5.8097313	0.0903957	2.031364055	2.252507866
59.470316	152.4	0.5202252	52.221519	0.8125334	6.2012423	0.0964874	0.431289891	1.709141097
61.68596	152.4	0.5347635	52.529091	0.817319	7.0480734	0.1096635	1.151835438	1.476202797
63.901603	152.4	0.5493019	52.390701	0.8151657	7.1178851	0.1107497	1.282579826	0.858996683
66.117247	152.4	0.5638402	50.462521	0.7851645	7.1072888	0.1105849	4.027196026	0.684032515
68.332891	152.4	0.5783785	50.651909	0.7881112	7.183425	0.1117695	2.055457956	0.836162917
70.548535	152.4	0.5929169	51.134524	0.7956204	7.2815373	0.1132961	1.533136135	0.828445328
72.764178	152.4	0.6074552	51.186608	0.7964308	6.7252192	0.1046401	1.220585725	1.255463883
74.979822	152.4	0.6219936	51.44594	0.8004658	7.0811142	0.1101776	0.851249862	1.390681826
77.195466	152.4	0.6365319	51.462907	0.8007298	7.4667872	0.1161784	1.21399953	1.169427035
79.41111	152.4	0.6510703	51.172714	0.7962146	7.4517383	0.1159443	1.601627602	1.150359528
81.626753	152.4	0.6656086	51.670437	0.8039589	8.0789109	0.1257027	1.814364218	1.35474967
83.842397	152.4	0.680147	52.352675	0.8145741	8.2162351	0.1278394	1.480246978	1.679059922
86.058041	152.4	0.6946853	52.955351	0.8239513	8.0963506	0.125974	1.391211956	1.994249986

Station 12

Average Velocity Data (U_ref = 64.27 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665						
6.2948656	152.4	0.1713049	50.670834	0.7884057	9.4286644	0.146704	3.769195708	5.217321811
8.5105094	152.4	0.1858432	49.418634	0.7689223	9.9598047	0.1549682	3.737226704	5.36938882
10.726153	152.4	0.2003816	45.444643	0.7070895	10.497722	0.1633378	6.545868584	5.783326866
12.941797	152.4	0.2149199	38.405416	0.5975636	8.6769699	0.1350081	10.83572822	7.600579281
15.157441	152.4	0.2294583	30.838746	0.4798311	6.7397859	0.1048667	13.20102702	8.648111434
17.373084	152.4	0.2439966	22.230856	0.3458979	5.8538106	0.0910815	11.79933654	9.110571433
19.588728	152.4	0.258535	12.125374	0.188663	-0.004038	-6.28E-05	10.3849093	7.051399652
21.804372	152.4	0.2730733	5.9299655	0.0922665	-4.85317	-0.075512	11.97479748	5.957911855
24.020016	152.4	0.2876117	7.1335515	0.1109935	-6.931653	-0.107852	16.5960418	5.090091588
26.235659	152.4	0.30215	8.1870214	0.1273848	-10.60731	-0.165043	18.23214304	5.16331464
28.451303	152.4	0.3166883	12.796197	0.1991006	-11.84299	-0.184269	15.7229612	5.934944533
30.666947	152.4	0.3312267	14.245371	0.2216488	-11.2374	-0.174847	17.59890869	3.348672102
32.882591	152.4	0.345765	20.008337	0.3113169	-10.37338	-0.161403	16.24281485	5.451577953
35.098234	152.4	0.3603034	23.260828	0.3619236	-8.095533	-0.125961	15.94507635	5.389771568
37.313878	152.4	0.3748417	28.179055	0.438448	-5.764456	-0.089691	14.74526226	5.543879922
39.529522	152.4	0.3893801	32.383183	0.5038616	-4.976402	-0.07743	12.6215748	3.259154855
41.745166	152.4	0.4039184	38.136923	0.5933861	-3.276575	-0.050981	13.21830235	2.155414455
43.96081	152.4	0.4184568	43.01141	0.66923	-1.406568	-0.021885	8.378314627	3.763227512
46.176453	152.4	0.4329951	45.105106	0.7018065	0.9827831	0.0152915	7.238674997	4.856200558
48.392097	152.4	0.4475334	47.359357	0.7368812	3.3088622	0.0514838	5.398497681	6.078341874
50.607741	152.4	0.4620718	47.88161	0.7450072	4.0986581	0.0637725	5.054613719	6.265164772
52.823385	152.4	0.4766101	48.617513	0.7564573	3.8169016	0.0593885	4.672635344	5.098006658
55.039028	152.4	0.4911485	50.316907	0.7828988	4.4289323	0.0689113	2.747269732	3.103911653
57.254672	152.4	0.5056868	50.740162	0.7894844	4.5613648	0.0709719	2.302142969	2.180106397
59.470316	152.4	0.5202252	50.935728	0.7925273	5.5793108	0.0868105	2.277994208	1.935166945
61.68596	152.4	0.5347635	50.670715	0.7884038	6.4468147	0.1003083	2.413382847	1.896311744
63.901603	152.4	0.5493019	51.092836	0.7949718	6.3047494	0.0980979	2.398611585	1.468372299
66.117247	152.4	0.5638402	51.474554	0.8009111	5.4929959	0.0854675	2.350601866	2.606217436
68.332891	152.4	0.5783785	51.276812	0.7978343	5.4721433	0.085143	2.15715007	3.846716462
70.548535	152.4	0.5929169	50.563833	0.7867408	8.1888575	0.1274134	1.552753961	2.488188243
72.764178	152.4	0.6074552	50.768274	0.7899218	7.7726896	0.1209381	1.753515566	2.322668349
74.979822	152.4	0.6219936	51.309044	0.7983358	7.3022399	0.1136182	1.875130352	0.828530165
77.195466	152.4	0.6365319	51.596751	0.8028124	7.2423487	0.1126863	1.988815918	1.276275918
79.41111	152.4	0.6510703	51.43536	0.8003012	6.263921	0.0974626	2.016732598	4.120785991
81.626753	152.4	0.6656086	51.209671	0.7967897	6.8888708	0.1071864	1.25656445	2.189719132
83.842397	152.4	0.680147	51.458132	0.8006555	7.7089668	0.1199466	1.428034424	0.939058047
86.058041	152.4	0.6946853	51.446369	0.8004725	7.7200466	0.120119	1.571863943	1.610563921

Station 13

E. REYNOLDS NUMBER 613,024 (10-INCHES)

Average Velocity Data (U_ref = 73.32 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	54.760688	0.7468724	5.6901754	0.0776074	3.238603275	3.439917644
6.2948656	152.4	0.1713049	53.828696	0.7341612	4.1922602	0.0571776	2.649899948	4.18224484
8.5105094	152.4	0.1858432	47.123811	0.6427143	2.8589784	0.0389932	6.094564012	4.095233273
10.726153	152.4	0.2003816	26.280374	0.3584339	0.2990312	0.0040784	16.96656718	5.524318057
12.941797	152.4	0.2149199	16.063353	0.2190856	-0.032702	-0.000446	20.83297242	4.753572478
15.157441	152.4	0.2294583	4.7623721	0.0649532	-3.825031	-0.052169	17.93423119	5.708111606
17.373084	152.4	0.2439966	-2.657492	-0.036245	-5.975716	-0.081502	11.74523706	4.645816429
19.588728	152.4	0.258535	-11.15456	-0.152135	-7.506635	-0.102382	9.623055068	3.460566094
21.804372	152.4	0.2730733	-7.344998	-0.100177	-5.833839	-0.079567	11.39651225	2.235459647
24.020016	152.4	0.2876117	-6.19196	-0.084451	-4.937308	-0.067339	10.13939197	2.986200977
26.235659	152.4	0.30215	-3.562872	-0.048593	-4.122313	-0.056224	9.829036202	2.644799142
28.451303	152.4	0.3166883	-1.921917	-0.026213	-3.390909	-0.046248	8.688278104	3.532651453
30.666947	152.4	0.3312267	4.5008598	0.0613865	-3.756151	-0.05123	10.8475145	5.267509943
32.882591	152.4	0.345765	11.566286	0.1577508	-3.789187	-0.05168	14.60032539	6.275116204
35.098234	152.4	0.3603034	17.180581	0.2343233	-1.996454	-0.027229	14.66480787	8.332999248
37.313878	152.4	0.3748417	21.61041	0.294741	2.3152784	0.0315777	14.40759402	9.202588247
39.529522	152.4	0.3893801	32.989907	0.4499442	3.8999342	0.0531906	9.603786481	9.428115411
41.745166	152.4	0.4039184	37.657799	0.5136088	4.6896265	0.0639611	14.84733212	6.503040115
43.96081	152.4	0.4184568	44.627186	0.6086632	6.7649935	0.0922667	12.06891658	4.9367752
46.176453	152.4	0.4329951	49.14943	0.6703414	7.0634283	0.096337	6.205280082	4.26068847
48.392097	152.4	0.4475334	53.9413	0.735697	7.4267563	0.1012924	5.029684019	3.271301066
50.607741	152.4	0.4620718	54.185802	0.7390317	7.8603754	0.1072064	5.464427891	2.299233428
52.823385	152.4	0.4766101	53.833795	0.7342307	8.8351786	0.1205016	4.109480783	1.91458543
55.039028	152.4	0.4911485	53.232554	0.7260305	9.2436659	0.1260729	3.384131882	1.677151896
57.254672	152.4	0.5056868	52.315945	0.713529	9.3241716	0.1271709	3.963402365	1.223981887
59.470316	152.4	0.5202252	51.935141	0.7083353	8.8662374	0.1209252	3.486482411	1.478942363
61.68596	152.4	0.5347635	51.568975	0.7033412	8.6327702	0.117741	2.183800577	1.142452969
63.901603	152.4	0.5493019	51.688209	0.7049674	8.6976967	0.1186265	2.267643291	0.892279841
66.117247	152.4	0.5638402	51.2254	0.6986552	8.5646146	0.1168114	2.601839925	2.186122372
68.332891	152.4	0.5783785	48.483177	0.6612545	7.072431	0.0964598	8.748185223	6.452442366
70.548535	152.4	0.5929169	49.858919	0.680018	7.5701394	0.1032479	3.761261138	3.947364745
72.764178	152.4	0.6074552	51.176178	0.6979839	8.4117032	0.1147259	1.197564183	0.907415618
74.979822	152.4	0.6219936	50.85636	0.6936219	7.8167886	0.106612	1.05720234	1.465599585
77.195466	152.4	0.6365319	49.969545	0.6815268	7.8136563	0.1065692	1.65998345	2.015091104
79.41111	152.4	0.6510703	49.603141	0.6765295	7.9178446	0.1079902	1.727446545	1.747534128
81.626753	152.4	0.6656086	48.88135	0.6666851	7.8616099	0.1072233	2.297547469	2.370612276
83.842397	152.4	0.680147	49.214136	0.6712239	8.157347	0.1112568	1.189262263	2.196417163
86.058041	152.4	0.6946853	49.985028	0.681738	8.2683753	0.1127711	1.749557463	1.568872134

Trailing Edge

Average Velocity Data (U_ref = 73.32 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	54.771607	0.7470214	5.6554576	0.0771339	3.489074099	3.929894678
6.2948656	152.4	0.1713049	54.6923	0.7459397	5.0043792	0.0682539	2.541587727	4.449021843
8.5105094	152.4	0.1858432	49.968745	0.6815159	5.8233899	0.0794243	5.417656003	3.751222979
10.726153	152.4	0.2003816	37.159194	0.5068084	3.7330699	0.0509148	16.8074176	4.027497153
12.941797	152.4	0.2149199	19.417174	0.2648278	0.2248419	0.0030666	17.32034763	5.652994092
15.157441	152.4	0.2294583	4.4217084	0.060307	-3.275448	-0.044673	15.13743062	6.736290608
17.373084	152.4	0.2439966	-1.347181	-0.018374	-6.272043	-0.085543	7.66205218	4.141154083
19.588728	152.4	0.258535	-8.282403	-0.112962	-8.2784	-0.112908	9.353402999	4.14518933
21.804372	152.4	0.2730733	-9.19255	-0.125376	-7.545845	-0.102917	12.75694829	2.909881863
24.020016	152.4	0.2876117	-8.144029	-0.111075	-6.01169	-0.081992	13.07180971	3.097796388
26.235659	152.4	0.30215	-6.61293	-0.090193	-5.644177	-0.07698	12.99548355	3.698136164
28.451303	152.4	0.3166883	-0.786835	-0.010732	-6.272605	-0.085551	13.8660884	2.486458609
30.666947	152.4	0.3312267	5.5053362	0.0750864	-5.044367	-0.068799	13.50713955	6.964179931
32.882591	152.4	0.345765	6.9434049	0.0947	-3.936791	-0.053693	16.83629642	7.855734344
35.098234	152.4	0.3603034	13.289832	0.1812579	-2.25814	-0.030798	14.95200415	6.931014669
37.313878	152.4	0.3748417	21.294724	0.2904354	0.8620238	0.011757	14.85552687	6.563299335
39.529522	152.4	0.3893801	30.449685	0.4152985	2.1526313	0.0293594	13.27275116	7.850754627
41.745166	152.4	0.4039184	36.769172	0.501489	3.1747471	0.0432999	9.504948425	10.20040069
43.96081	152.4	0.4184568	45.743568	0.6238894	4.8791037	0.0665453	4.002895634	8.545873288
46.176453	152.4	0.4329951	50.888905	0.6940658	6.0547779	0.0825802	4.39559156	6.34932562
48.392097	152.4	0.4475334	52.894308	0.7214172	7.1877464	0.0980325	5.18002391	4.525662839
50.607741	152.4	0.4620718	52.919986	0.7217674	7.8671	0.1072981	4.649590906	3.666525278
52.823385	152.4	0.4766101	53.220174	0.7258616	8.2992299	0.1131919	3.886522766	2.951923311
55.039028	152.4	0.4911485	52.990679	0.7227316	8.2240978	0.1121672	3.446496381	2.875590843
57.254672	152.4	0.5056868	51.808189	0.7066038	7.8950506	0.1076794	4.785796892	2.923948182
59.470316	152.4	0.5202252	52.262674	0.7128024	8.9544138	0.1221278	2.842837592	1.877343698
61.68596	152.4	0.5347635	51.583916	0.703545	8.4374032	0.1150764	2.902076413	2.491130344
63.901603	152.4	0.5493019	51.263609	0.6991763	8.1809538	0.1115787	3.049015276	2.580823214
66.117247	152.4	0.5638402	52.320803	0.7135952	8.1830988	0.111608	1.797404152	2.505586282
68.332891	152.4	0.5783785	52.044797	0.7098308	8.001959	0.1091375	1.974544349	1.893024331
70.548535	152.4	0.5929169	51.559437	0.7032111	8.0360574	0.1096025	1.528532663	1.989582127
72.764178	152.4	0.6074552	51.14354	0.6975387	8.3050283	0.113271	1.066778297	1.199489182
74.979822	152.4	0.6219936	50.994983	0.6955126	8.2555664	0.1125964	1.068803514	1.022284027
77.195466	152.4	0.6365319	49.344638	0.6730038	7.446451	0.101561	4.926738641	1.812801934
79.41111	152.4	0.6510703	50.401879	0.6874233	7.537504	0.1028028	1.142601981	0.964466202
81.626753	152.4	0.6656086	48.587723	0.6626803	7.6466627	0.1042916	3.276525493	1.714084255
83.842397	152.4	0.680147	49.119167	0.6699286	8.3346584	0.1136751	1.450097322	0.966723169
86.058041	152.4	0.6946853	48.82136	0.6658669	8.6917157	0.1185449	1.133634406	0.878863285

Station 11

Average Velocity Data (U_ref = 73.32 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	54.941564	0.7493394	8.3407321	0.1137579	3.818253085	3.520357142
6.2948656	152.4	0.1713049	55.02491	0.7504761	8.1596197	0.1112878	3.934461333	3.995793796
8.5105094	152.4	0.1858432	51.255319	0.6990633	8.6556906	0.1180536	6.590004265	3.809756228
10.726153	152.4	0.2003816	44.513633	0.6071145	9.5530255	0.1302922	9.05594699	3.83012867
12.941797	152.4	0.2149199	28.948789	0.394828	8.1868887	0.1116597	13.23701428	5.38075398
15.157441	152.4	0.2294583	12.458787	0.1699234	2.8681165	0.0391178	13.43545855	8.330201981
17.373084	152.4	0.2439966	1.9930294	0.0271826	-1.95273	-0.026633	13.58323324	9.48720799
19.588728	152.4	0.258535	-6.651192	-0.090715	-5.536134	-0.075506	14.0593977	9.239147852
21.804372	152.4	0.2730733	-9.138691	-0.124641	-7.319597	-0.099831	11.0921167	7.030833735
24.020016	152.4	0.2876117	-10.19931	-0.139107	-7.715596	-0.105232	8.326124936	5.720341123
26.235659	152.4	0.30215	-10.12385	-0.138078	-6.560159	-0.089473	11.76250266	6.378806745
28.451303	152.4	0.3166883	-3.676192	-0.050139	-6.415196	-0.087496	14.24117962	6.906128859
30.666947	152.4	0.3312267	-2.699341	-0.036816	-6.82588	-0.093097	15.30914519	5.610599264
32.882591	152.4	0.345765	6.5287857	0.0890451	-5.222069	-0.071223	17.62879243	5.339984862
35.098234	152.4	0.3603034	10.648928	0.1452391	-3.697816	-0.050434	15.51941582	5.530641309
37.313878	152.4	0.3748417	17.729433	0.241809	-1.437788	-0.01961	14.43719463	4.549724941
39.529522	152.4	0.3893801	27.713092	0.3779745	1.0967933	0.014959	11.76772784	4.842562314
41.745166	152.4	0.4039184	35.82665	0.4886341	1.7981169	0.0245242	10.42137772	4.527752841
43.96081	152.4	0.4184568	43.147986	0.5884886	2.7628069	0.0376815	8.81147859	3.82740759
46.176453	152.4	0.4329951	48.763391	0.6650763	3.3017142	0.0450316	8.625312159	4.546286285
48.392097	152.4	0.4475334	51.413288	0.7012178	5.4175748	0.0738895	7.491581188	4.221010962
50.607741	152.4	0.4620718	51.618622	0.7040183	6.8689214	0.0936841	5.748603969	4.714237931
52.823385	152.4	0.4766101	53.357432	0.7277337	6.7681169	0.0923093	4.806185467	4.405181599
55.039028	152.4	0.4911485	52.546852	0.7166783	7.5241842	0.1026212	3.70637444	3.941821535
57.254672	152.4	0.5056868	51.640644	0.7043187	7.9829447	0.1088781	3.212676246	3.433582349
59.470316	152.4	0.5202252	52.428768	0.7150678	7.5259564	0.1026453	2.527534935	2.902720717
61.68596	152.4	0.5347635	52.196916	0.7119056	7.4032347	0.1009716	1.949618258	2.68631736
63.901603	152.4	0.5493019	51.990886	0.7090956	7.6941247	0.104939	1.770262177	1.793925155
66.117247	152.4	0.5638402	51.847729	0.7071431	8.2766209	0.1128835	1.944450005	1.428849944
68.332891	152.4	0.5783785	51.300586	0.6996807	7.8444956	0.1069898	0.964407145	1.619734792
70.548535	152.4	0.5929169	51.7004	0.7051337	8.0169217	0.1093415	1.061884096	1.469472351
72.764178	152.4	0.6074552	51.125361	0.6972908	7.4744773	0.1019432	0.963860127	1.257269878
74.979822	152.4	0.6219936	50.588986	0.6899753	7.5566544	0.103064	1.039493881	1.118567519
77.195466	152.4	0.6365319	50.449863	0.6880778	8.0477378	0.1097618	0.892334961	0.80200715
79.41111	152.4	0.6510703	50.501292	0.6887792	8.298934	0.1131879	1.105656055	1.02030583
81.626753	152.4	0.6656086	50.041791	0.6825121	8.4252852	0.1149111	1.012091874	0.941959217
83.842397	152.4	0.680147	49.333246	0.6728484	8.4477794	0.1152179	0.641523231	1.293142941
86.058041	152.4	0.6946853	48.916378	0.6671628	8.3487828	0.1138677	1.056579685	1.270222647

Station 12

Average Velocity Data (U_ref = 73.32 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	54.996547	0.7500893	10.44934	0.1425169	2.902636365	3.764531945
6.2948656	152.4	0.1713049	55.227095	0.7532337	10.359156	0.1412869	4.311051067	4.761445538
8.5105094	152.4	0.1858432	53.639398	0.7315793	11.69682	0.1595311	5.869561745	7.113630861
10.726153	152.4	0.2003816	46.46595	0.6337418	10.775007	0.1469586	7.400844128	10.61603313
12.941797	152.4	0.2149199	30.37959	0.4143425	6.0800594	0.082925	11.62665428	11.8968825
15.157441	152.4	0.2294583	19.325692	0.2635801	3.6336002	0.0495581	13.17693088	11.53578119
17.373084	152.4	0.2439966	8.6158361	0.11751	1.307914	0.0178384	8.70976455	9.626074887
19.588728	152.4	0.258535	-0.604844	-0.008249	-1.007806	-0.013745	6.631672474	9.042662221
21.804372	152.4	0.2730733	-7.061767	-0.096314	-4.39852	-0.059991	6.96555991	5.928367937
24.020016	152.4	0.2876117	-8.799791	-0.120019	-6.948925	-0.094775	6.035461901	5.517338021
26.235659	152.4	0.30215	-7.897734	-0.107716	-7.091371	-0.096718	5.767714495	5.941598681
28.451303	152.4	0.3166883	-7.250544	-0.098889	-5.579231	-0.076094	7.900319589	4.973021325
30.666947	152.4	0.3312267	-5.143421	-0.07015	-4.754807	-0.06485	8.481304342	5.07683705
32.882591	152.4	0.345765	-3.220405	-0.043923	-3.717401	-0.050701	8.084201839	7.045992745
35.098234	152.4	0.3603034	-0.50675	-0.006911	-1.507696	-0.020563	6.92626772	8.17119215
37.313878	152.4	0.3748417	5.6801406	0.0774705	0.5967924	0.0081396	8.989701349	7.314940658
39.529522	152.4	0.3893801	16.639187	0.2269393	-1.395403	-0.019032	9.8011224	6.456245978
41.745166	152.4	0.4039184	31.069546	0.4237527	-1.414091	-0.019287	14.52968342	7.125835325
43.96081	152.4	0.4184568	36.30603	0.4951723	-0.881549	-0.012023	15.01403258	7.907502972
46.176453	152.4	0.4329951	41.758042	0.5695314	0.6781537	0.0092492	13.51467857	8.112418212
48.392097	152.4	0.4475334	45.236723	0.6169766	2.9633474	0.0404166	11.2244189	8.756695852
50.607741	152.4	0.4620718	48.393241	0.6600278	4.7468408	0.0647414	8.433548476	7.932662879
52.823385	152.4	0.4766101	49.811872	0.6793763	5.2307058	0.0713408	7.013817776	7.09557854
55.039028	152.4	0.4911485	50.823272	0.6931706	6.9060536	0.0941906	3.711261325	6.275810351
57.254672	152.4	0.5056868	51.571412	0.7033744	7.0996736	0.0968313	2.049756471	4.999072925
59.470316	152.4	0.5202252	51.722525	0.7054354	7.3879692	0.1007634	1.798120598	4.313336024
61.68596	152.4	0.5347635	51.901121	0.7078713	7.4689094	0.1018673	1.671977191	3.431536859
63.901603	152.4	0.5493019	51.864327	0.7073694	7.2632474	0.0990623	1.427937277	2.362382251
66.117247	152.4	0.5638402	51.721151	0.7054167	7.44632	0.1015592	1.600106778	1.876707145
68.332891	152.4	0.5783785	51.558799	0.7032024	7.8134997	0.1065671	2.005265805	1.636628226
70.548535	152.4	0.5929169	51.398505	0.7010162	7.5967128	0.1036104	1.738376004	1.236097204
72.764178	152.4	0.6074552	51.3925	0.7009343	7.673982	0.1046642	0.734440258	0.882170876
74.979822	152.4	0.6219936	50.384605	0.6871877	7.4741333	0.1019385	0.977262949	0.781306698
77.195466	152.4	0.6365319	50.570564	0.689724	8.0020591	0.1091388	1.269656129	2.23089056
79.41111	152.4	0.6510703	49.838854	0.6797443	7.480711	0.1020282	1.097723172	1.615445998
81.626753	152.4	0.6656086	49.699335	0.6778415	7.1185702	0.0970891	1.265682329	1.655146204
83.842397	152.4	0.680147	49.418983	0.6740178	7.3654319	0.100456	1.256246088	1.62283371
86.058041	152.4	0.6946853	49.163711	0.6705362	7.3145282	0.0997617	0.681744842	1.352521152

Station 13

F. REYNOLDS NUMBER 666,631 (12-INCHES)

Average Velocity Data (U_ref = 78.65 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	57.722651	0.733918	7.9761516	0.1014132	6.83691013	5.913653541
6.2948656	152.4	0.1713049	58.315488	0.7414557	6.9775553	0.0887165	6.035472362	6.941657328
8.5105094	152.4	0.1858432	52.44871	0.6668622	5.9484856	0.0756324	8.029409805	7.575137168
10.726153	152.4	0.2003816	33.918681	0.431261	3.6848349	0.046851	17.42717445	8.671013875
12.941797	152.4	0.2149199	15.399041	0.195792	1.2914911	0.0164207	21.28406429	9.176288484
15.157441	152.4	0.2294583	2.6624806	0.0338523	-1.063326	-0.01352	19.13513358	9.127791257
17.373084	152.4	0.2439966	-4.94936	-0.062929	-1.844375	-0.02345	18.36972682	8.656089897
19.588728	152.4	0.258535	-9.740848	-0.123851	-2.210327	-0.028103	15.72299791	6.943762833
21.804372	152.4	0.2730733	-11.28169	-0.143442	-2.525685	-0.032113	11.44758084	5.218134992
24.020016	152.4	0.2876117	-10.96349	-0.139396	-1.483287	-0.018859	8.340764003	5.092980316
26.235659	152.4	0.30215	-11.04735	-0.140462	-0.191783	-0.002438	8.097273148	6.077283458
28.451303	152.4	0.3166883	-10.59186	-0.134671	0.7139149	0.0090771	9.520459333	7.268243039
30.666947	152.4	0.3312267	-8.503556	-0.108119	1.3958962	0.0177482	9.971929617	8.175917361
32.882591	152.4	0.345765	-5.624458	-0.071512	1.9191639	0.0244013	10.06697491	9.257669358
35.098234	152.4	0.3603034	1.9529318	0.0248307	2.7501227	0.0349666	13.38085568	11.0555764
37.313878	152.4	0.3748417	13.695958	0.1741381	3.2147488	0.0408741	16.80910993	13.09098924
39.529522	152.4	0.3893801	26.985862	0.3431133	2.8229991	0.0358932	17.63097359	12.68703818
41.745166	152.4	0.4039184	38.154076	0.4851122	3.6815643	0.0468095	17.33925276	9.551052603
43.96081	152.4	0.4184568	47.937242	0.6095008	5.5835616	0.0709925	14.64820425	8.510408728
46.176453	152.4	0.4329951	54.280733	0.6901555	7.3349489	0.0932606	10.06416507	8.267980031
48.392097	152.4	0.4475334	56.083435	0.7130761	8.4894906	0.1079401	9.264716189	8.390457428
50.607741	152.4	0.4620718	59.623159	0.7580821	10.256712	0.1304096	4.294075756	7.922634522
52.823385	152.4	0.4766101	62.685088	0.7970132	11.358121	0.1444135	2.739335429	5.741827605
55.039028	152.4	0.4911485	63.762988	0.8107182	12.482318	0.1587072	1.361538409	3.690840046
57.254672	152.4	0.5056868	63.748752	0.8105372	12.644564	0.16077	1.129070005	3.078686174
59.470316	152.4	0.5202252	63.77822	0.8109119	12.606933	0.1602916	1.266237871	2.545326551
61.68596	152.4	0.5347635	63.875504	0.8121488	12.213549	0.1552899	0.925454525	2.262840767
63.901603	152.4	0.5493019	63.846274	0.8117772	11.783516	0.1498222	1.412970746	1.859670815
66.117247	152.4	0.5638402	63.176354	0.8032594	11.245939	0.1429871	1.378450057	1.697885087
68.332891	152.4	0.5783785	62.625878	0.7962604	11.314088	0.1438536	1.705942016	1.510300361
70.548535	152.4	0.5929169	62.42388	0.7936921	11.670697	0.1483878	2.097888435	1.500391807
72.764178	152.4	0.6074552	62.136328	0.790036	11.243324	0.1429539	1.994670778	1.341979097
74.979822	152.4	0.6219936	61.81425	0.7859409	10.623255	0.13507	1.594321193	1.057855877
77.195466	152.4	0.6365319	61.538308	0.7824324	10.167551	0.1292759	1.125220394	0.760523466
79.41111	152.4	0.6510703	61.128395	0.7772205	10.320293	0.131218	1.191660177	1.230187562
81.626753	152.4	0.6656086	60.578582	0.7702299	10.568137	0.1343692	1.335540747	1.539952462
83.842397	152.4	0.680147	60.266221	0.7662584	10.461122	0.1330085	1.247102285	1.700530479
86.058041	152.4	0.6946853	60.304482	0.7667448	10.551859	0.1341622	1.437479511	1.155058467

Trailing Edge

Average Velocity Data (U_ref = 78.65 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	58.701369	0.746362	8.9203734	0.1134186	5.635417991	5.071535392
6.2948656	152.4	0.1713049	59.348898	0.754595	8.403368	0.1068451	5.555742496	5.451416537
8.5105094	152.4	0.1858432	55.93431	0.71118	7.6338669	0.0970612	5.736898589	6.282350868
10.726153	152.4	0.2003816	40.585055	0.516021	4.8542193	0.0617193	12.87450817	8.084390396
12.941797	152.4	0.2149199	20.81423	0.2646437	1.7840487	0.0226834	20.94151431	10.63997487
15.157441	152.4	0.2294583	7.0717033	0.0899136	-1.492505	-0.018977	19.80283499	11.28292187
17.373084	152.4	0.2439966	-5.250786	-0.066761	-5.119661	-0.065094	14.94594735	7.911377007
19.588728	152.4	0.258535	-13.42424	-0.170683	-8.541236	-0.108598	10.36613914	6.350045322
21.804372	152.4	0.2730733	-15.22636	-0.193596	-8.713343	-0.110786	9.966584695	6.740762126
24.020016	152.4	0.2876117	-14.32766	-0.18217	-7.196937	-0.091506	10.9157612	6.698355427
26.235659	152.4	0.30215	-13.07727	-0.166272	-5.391443	-0.06855	11.42775244	6.531547862
28.451303	152.4	0.3166883	-12.12992	-0.154227	-3.53323	-0.044923	11.75548287	5.894787308
30.666947	152.4	0.3312267	-9.0647	-0.115254	-2.115975	-0.026904	11.58685009	5.355616583
32.882591	152.4	0.345765	-3.778241	-0.048039	-2.278622	-0.028972	12.90830335	4.924578724
35.098234	152.4	0.3603034	4.3500061	0.0553084	-2.220339	-0.028231	15.33545155	5.364107571
37.313878	152.4	0.3748417	16.447648	0.2091246	1.0052972	0.0127819	17.95977409	8.207410989
39.529522	152.4	0.3893801	30.937059	0.393351	3.4413773	0.0437556	21.09671411	10.01326601
41.745166	152.4	0.4039184	39.854422	0.5067314	4.2340786	0.0538344	21.41770056	9.523119207
43.96081	152.4	0.4184568	47.64467	0.6057809	5.3594798	0.0681434	15.73734975	8.77939941
46.176453	152.4	0.4329951	51.352298	0.6529218	6.5361607	0.0831044	11.36394204	8.754903535
48.392097	152.4	0.4475334	54.973816	0.6989678	7.7648446	0.0987266	8.493047927	8.685427396
50.607741	152.4	0.4620718	54.299573	0.6903951	6.8037489	0.0865067	13.3180055	4.864628142
52.823385	152.4	0.4766101	57.781513	0.7346664	7.4766387	0.0950622	8.167209304	3.17863192
55.039028	152.4	0.4911485	61.435135	0.7811206	9.1200159	0.115957	4.160516443	2.904298321
57.254672	152.4	0.5056868	63.719906	0.8101705	10.613307	0.1349435	1.906272437	1.906388256
59.470316	152.4	0.5202252	64.049023	0.814355	11.204229	0.1424568	1.224759489	1.80279921
61.68596	152.4	0.5347635	63.325984	0.8051619	10.886881	0.1384219	1.775135018	1.935625561
63.901603	152.4	0.5493019	62.988319	0.8008686	10.684498	0.1358487	1.487155585	1.801431821
66.117247	152.4	0.5638402	62.829742	0.7988524	10.627942	0.1351296	1.163191468	1.823952216
68.332891	152.4	0.5783785	62.344787	0.7926864	10.366334	0.1318034	2.521184518	1.742937739
70.548535	152.4	0.5929169	62.186842	0.7906782	10.033373	0.1275699	2.013938818	1.529358107
72.764178	152.4	0.6074552	61.954188	0.7877201	10.062385	0.1279388	1.910362396	1.767726099
74.979822	152.4	0.6219936	61.055979	0.7762998	10.227596	0.1300394	2.17346664	2.134101166
77.195466	152.4	0.6365319	60.599674	0.7704981	10.058297	0.1278868	1.481439832	1.904018964
79.41111	152.4	0.6510703	60.620013	0.7707567	10.009833	0.1272706	1.466230709	1.704364313
81.626753	152.4	0.6656086	60.474433	0.7689057	10.042294	0.1276833	1.899416513	1.195356319
83.842397	152.4	0.680147	60.296158	0.766639	9.9186355	0.1261111	2.003881446	1.030381535
86.058041	152.4	0.6946853	60.114652	0.7643312	9.8729922	0.1255307	1.967215734	1.307377182

Station 11

Average Velocity Data (U_ref = 78.65 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	56.084727	0.7130925	9.8571541	0.1253294	8.535967403	5.154436121
6.2948656	152.4	0.1713049	58.730349	0.7467304	10.477934	0.1332223	6.229911836	3.54870115
8.5105094	152.4	0.1858432	56.973334	0.7243908	10.523822	0.1338058	9.406150922	6.203628437
10.726153	152.4	0.2003816	48.633338	0.6183514	9.8585668	0.1253473	13.83713536	8.546636654
12.941797	152.4	0.2149199	28.674846	0.364588	6.7838424	0.0862536	14.55895763	10.87396581
15.157441	152.4	0.2294583	10.884091	0.1383864	2.2886783	0.0290995	14.77839262	12.52680163
17.373084	152.4	0.2439966	-0.598109	-0.007605	-3.076885	-0.039121	16.61230141	13.27190731
19.588728	152.4	0.258535	-9.068222	-0.115298	-5.717679	-0.072698	16.9082883	14.00275699
21.804372	152.4	0.2730733	-13.9656	-0.177566	-6.731814	-0.085592	14.56939644	13.58488134
24.020016	152.4	0.2876117	-16.70958	-0.212455	-7.0205	-0.089263	9.630204215	10.27998487
26.235659	152.4	0.30215	-17.50222	-0.222533	-7.871173	-0.100078	6.447844815	5.476576199
28.451303	152.4	0.3166883	-14.05563	-0.178711	-7.478264	-0.095083	8.125093532	5.154487977
30.666947	152.4	0.3312267	-9.435286	-0.119965	-6.112733	-0.077721	11.68612406	6.546876603
32.882591	152.4	0.345765	-6.015313	-0.076482	-5.38916	-0.068521	12.62041808	6.628356265
35.098234	152.4	0.3603034	-1.125924	-0.014316	-4.12742	-0.052478	12.40477355	6.085544905
37.313878	152.4	0.3748417	9.7836414	0.1243947	-3.118833	-0.039655	15.61114537	6.868498165
39.529522	152.4	0.3893801	24.924463	0.3169035	-1.804195	-0.02294	19.0924889	7.973938253
41.745166	152.4	0.4039184	34.936121	0.4441973	1.2058481	0.0153318	20.00164758	8.517199054
43.96081	152.4	0.4184568	43.729897	0.5560063	2.9607144	0.0376442	15.97003837	8.134433455
46.176453	152.4	0.4329951	51.0442	0.6490044	4.198755	0.0533853	10.38002986	7.431218512
48.392097	152.4	0.4475334	55.988238	0.7118657	5.9655892	0.0758498	6.533520568	6.786137927
50.607741	152.4	0.4620718	59.64422	0.7583499	6.8951732	0.0876691	3.525261563	5.072312635
52.823385	152.4	0.4766101	60.589498	0.7703687	7.6953029	0.0978424	2.459179732	3.63471808
55.039028	152.4	0.4911485	61.576077	0.7829126	7.5414923	0.0958867	1.199364409	3.22304469
57.254672	152.4	0.5056868	62.724981	0.7975204	8.0200388	0.1019712	1.670815227	2.233245268
59.470316	152.4	0.5202252	63.124875	0.8026049	8.9993317	0.1144225	1.418338701	1.612085073
61.68596	152.4	0.5347635	62.746277	0.7977912	9.7753224	0.1242889	2.111181074	2.220678995
63.901603	152.4	0.5493019	62.755043	0.7979026	9.3933303	0.119432	1.616032058	1.594173642
66.117247	152.4	0.5638402	62.483211	0.7944464	9.2429162	0.1175196	1.412361031	1.401289162
68.332891	152.4	0.5783785	61.984734	0.7881085	9.2487725	0.1175941	1.38211379	1.425851844
70.548535	152.4	0.5929169	61.895272	0.786971	9.1751601	0.1166581	1.486480321	1.869930746
72.764178	152.4	0.6074552	61.39986	0.7806721	8.9262243	0.113493	1.575254074	2.189874136
74.979822	152.4	0.6219936	60.894715	0.7742494	9.2028697	0.1170104	1.630244844	1.677580812
77.195466	152.4	0.6365319	61.206678	0.7782159	9.3851209	0.1193277	1.560472632	1.714692078
79.41111	152.4	0.6510703	61.048164	0.7762004	9.4079682	0.1196182	1.724389101	1.642667065
81.626753	152.4	0.6656086	60.433166	0.768381	9.2880292	0.1180932	1.680136565	1.798295535
83.842397	152.4	0.680147	60.175577	0.7651059	9.3553282	0.1189489	1.650247069	1.213273016
86.058041	152.4	0.6946853	60.202046	0.7654424	9.1425552	0.1162436	1.873831006	0.884919149

Station 12

Average Velocity Data (U_ref = 78.65 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	55.971709	0.7116556	13.035297	0.165738	10.63791452	4.462689042
6.2948656	152.4	0.1713049	56.956445	0.724176	13.533684	0.1720748	11.62337387	7.24438651
8.5105094	152.4	0.1858432	59.773367	0.7599919	15.23421	0.1936962	5.760509937	6.89624893
10.726153	152.4	0.2003816	58.037621	0.7379227	16.590516	0.2109411	3.794784688	7.077260846
12.941797	152.4	0.2149199	44.208131	0.5620868	14.792079	0.1880748	8.62251122	9.334318538
15.157441	152.4	0.2294583	26.346727	0.334987	9.3041536	0.1182982	11.31430128	12.56827299
17.373084	152.4	0.2439966	11.772174	0.149678	4.5652885	0.0580456	8.657145633	13.19737478
19.588728	152.4	0.258535	-2.587296	-0.032896	1.193195	0.0151709	7.641621303	14.37137049
21.804372	152.4	0.2730733	-12.06882	-0.15345	-2.309534	-0.029365	4.231994673	10.78014548
24.020016	152.4	0.2876117	-15.34915	-0.195158	-4.217228	-0.05362	5.720332739	7.283349852
26.235659	152.4	0.30215	-15.83888	-0.201384	-6.004037	-0.076339	6.804508905	8.454137245
28.451303	152.4	0.3166883	-13.10227	-0.16659	-7.566025	-0.096199	7.584186907	9.271935112
30.666947	152.4	0.3312267	-10.23655	-0.130153	-7.497412	-0.095326	5.693842702	9.482603978
32.882591	152.4	0.345765	-7.421713	-0.094364	-6.918245	-0.087962	6.649173121	8.778713258
35.098234	152.4	0.3603034	-4.04462	-0.051426	-6.101355	-0.077576	8.721244785	8.04499991
37.313878	152.4	0.3748417	2.7366063	0.0347947	-5.0345	-0.064011	8.983438495	8.67982313
39.529522	152.4	0.3893801	11.994275	0.1525019	-3.374194	-0.042901	13.421479	9.552698704
41.745166	152.4	0.4039184	23.608204	0.3001679	-1.60958	-0.020465	14.8239521	7.601617512
43.96081	152.4	0.4184568	34.013899	0.4324717	0.2095144	0.0026639	18.26417155	6.815421281
46.176453	152.4	0.4329951	39.102802	0.4971749	3.0435702	0.0386977	17.88230506	6.284147489
48.392097	152.4	0.4475334	46.877928	0.5960321	4.2495171	0.0540307	13.04259664	6.928325681
50.607741	152.4	0.4620718	54.087855	0.6877032	4.9973735	0.0635394	8.405648902	7.156841603
52.823385	152.4	0.4766101	59.242381	0.7532407	6.3275428	0.0804519	5.032977924	5.842755844
55.039028	152.4	0.4911485	61.459884	0.7814353	7.2570347	0.09227	3.672061747	4.464905613
57.254672	152.4	0.5056868	62.128453	0.7899358	7.816853	0.0993878	2.939572824	3.580269625
59.470316	152.4	0.5202252	62.307239	0.792209	8.2473583	0.1048615	2.190826564	2.804229516
61.68596	152.4	0.5347635	62.291404	0.7920077	8.2994121	0.1055234	1.541526529	2.601190193
63.901603	152.4	0.5493019	62.221776	0.7911224	8.3027386	0.1055657	1.428277485	2.607662073
66.117247	152.4	0.5638402	61.780024	0.7855057	8.4109566	0.1069416	1.394537012	2.144274304
68.332891	152.4	0.5783785	61.280808	0.7791584	8.1568477	0.1037107	1.556086506	2.094229281
70.548535	152.4	0.5929169	61.055855	0.7762982	8.2036871	0.1043063	1.633709041	2.104486194
72.764178	152.4	0.6074552	60.572369	0.7701509	8.6227422	0.1096344	1.77113114	2.089595665
74.979822	152.4	0.6219936	60.09664	0.7641022	8.6817995	0.1103852	1.620123903	1.603921091
77.195466	152.4	0.6365319	59.535057	0.756962	8.7424297	0.1111561	1.836202666	1.621935758
79.41111	152.4	0.6510703	59.580476	0.7575394	8.4053315	0.1068701	1.919670199	1.819299704
81.626753	152.4	0.6656086	58.688245	0.7461951	8.706423	0.1106983	3.643124273	1.377067745
83.842397	152.4	0.680147	57.871192	0.7358066	7.9379088	0.100927	5.224460624	3.736695035
86.058041	152.4	0.6946853	58.729383	0.7467182	7.4122658	0.0942437	3.761594304	4.649944522

Station 13

G. REYNOLDS NUMBER 720,803 (14-INCHES)

Average Velocity Data (U_ref = 85.04 m/s)

Y	s	Y/s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.0267665	0.1567665	43.379367	0.5101054	10.577346	0.1243808	19.50990914	7.317417479
6.2948656	152.4	0.0413049	0.1713049	38.42568	0.4518542	9.2918058	0.1092639	26.24550104	7.596039688
8.5105094	152.4	0.0558432	0.1858432	43.869232	0.5158658	6.3481116	0.0746485	17.00212791	8.810105467
10.726153	152.4	0.0703816	0.2003816	31.198407	0.3668674	5.2864587	0.0621644	20.77347129	7.615321845
12.941797	152.4	0.0849199	0.2149199	20.954125	0.2464032	3.7794439	0.0444431	20.65987223	6.333820907
15.157441	152.4	0.0994583	0.2294583	11.820809	0.1390029	2.3016887	0.027066	20.98774758	5.488425724
17.373084	152.4	0.1139966	0.2439966	2.2104167	0.0259927	0.7557729	0.0088873	20.58127364	5.825417505
19.588728	152.4	0.128535	0.258535	-7.408963	-0.087123	0.2987774	0.0035134	16.28804667	5.875232752
21.804372	152.4	0.1430733	0.2730733	-8.679221	-0.10206	1.9327157	0.0227271	15.50738232	4.77487316
24.020016	152.4	0.1576117	0.2876117	-12.13863	-0.14274	2.2788134	0.026797	12.19726292	5.907971136
26.235659	152.4	0.17215	0.30215	-10.06537	-0.11836	3.1401619	0.0369257	10.30205008	5.542219151
28.451303	152.4	0.1866883	0.3166883	-9.848203	-0.115807	1.3176729	0.0154947	8.819556246	5.26477315
30.666947	152.4	0.2012267	0.3312267	-4.932217	-0.057999	2.5306938	0.0297589	10.815407	8.819324
32.882591	152.4	0.215765	0.345765	1.8020266	0.0211903	0.305454	0.0035919	15.24948461	9.60154439
35.098234	152.4	0.2303034	0.3603034	10.821033	0.1272464	0.4655038	0.0054739	16.09494202	10.75864545
37.313878	152.4	0.2448417	0.3748417	18.077868	0.2125808	1.0172086	0.0119615	15.85101706	9.931956215
39.529522	152.4	0.2593801	0.3893801	27.576808	0.3242804	1.8424976	0.0216662	11.26626413	6.903070082
41.745166	152.4	0.2739184	0.4039184	38.084458	0.4478417	4.6599851	0.0547976	9.896021814	11.64629359
43.96081	152.4	0.2884568	0.4184568	44.61059	0.5245836	3.7937946	0.0446119	8.504533517	10.96548995
46.176453	152.4	0.3029951	0.4329951	49.048889	0.5767743	3.0374111	0.0357174	9.096054315	9.887485617
48.392097	152.4	0.3175334	0.4475334	52.425071	0.6164754	3.506297	0.0412311	6.962360005	8.314025827
50.607741	152.4	0.3320718	0.4620718	50.242967	0.5908157	3.1360136	0.0368769	9.163180005	6.591533105
52.823385	152.4	0.3466101	0.4766101	52.633199	0.6189228	8.1075104	0.0953376	10.29228703	7.632461295
55.039028	152.4	0.3611485	0.4911485	49.960005	0.5874883	9.0864348	0.106849	19.17950556	8.182272825
57.254672	152.4	0.3756868	0.5056868	50.782496	0.5971601	8.618411	0.1013454	17.72064846	8.932530719
59.470316	152.4	0.3902252	0.5202252	59.765906	0.7027976	9.0195302	0.1060622	7.837010353	5.513047301
61.68596	152.4	0.4047635	0.5347635	63.704877	0.7491166	12.644355	0.1486871	4.20714241	4.817127894
63.901603	152.4	0.4193019	0.5493019	62.818676	0.7386956	13.166104	0.1548225	7.236878504	3.828787674
66.117247	152.4	0.4338402	0.5638402	63.327872	0.7446834	12.539547	0.1474547	5.161530672	3.712122767
68.332891	152.4	0.4483785	0.5783785	62.091528	0.730145	12.06184	0.1418373	6.937843767	5.793838835
70.548535	152.4	0.4629169	0.5929169	63.833549	0.7506297	13.615795	0.1601105	1.816554152	2.607194899
72.764178	152.4	0.4774552	0.6074552	64.734926	0.7612291	13.244914	0.1557492	1.396260135	2.158965246
74.979822	152.4	0.4919936	0.6219936	64.506313	0.7585408	12.378474	0.1455606	1.427828725	1.850626404
77.195466	152.4	0.5065319	0.6365319	64.118431	0.7539797	12.17918	0.1432171	0.950334464	1.723008616
79.41111	152.4	0.5210703	0.6510703	63.711807	0.7491981	11.998934	0.1410975	0.609731323	2.076916203
81.626753	152.4	0.5356086	0.6656086	63.736335	0.7494865	11.876434	0.139657	1.02115416	2.276719147
83.842397	152.4	0.550147	0.680147	63.502552	0.7467374	11.818726	0.1389784	1.608503632	2.534906669
86.058041	152.4	0.5646853	0.6946853	62.782746	0.7382731	12.010509	0.1412336	2.212612308	2.114974051

Trailing Edge

Average Velocity Data (U_ref = 85.04 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	45.959923	0.5404506	10.650417	0.1252401	20.55938682	7.220431846
6.2948656	152.4	0.1713049	43.326803	0.5094873	9.9977071	0.1175648	19.4642669	6.391437618
8.5105094	152.4	0.1858432	44.729966	0.5259874	8.9281671	0.1049879	15.50761655	6.826580967
10.726153	152.4	0.2003816	39.708504	0.4669391	8.5690743	0.1007652	13.09103973	5.151153116
12.941797	152.4	0.2149199	23.256545	0.2734777	5.4398507	0.0639681	16.524065	5.756004027
15.157441	152.4	0.2294583	8.3631095	0.0983432	1.8553842	0.0218178	16.50120314	6.367701565
17.373084	152.4	0.2439966	0.748165	0.0087978	1.190172	0.0139954	17.52169462	7.412611588
19.588728	152.4	0.258535	-5.008781	-0.058899	0.5290503	0.0062212	17.37213804	9.467113157
21.804372	152.4	0.2730733	-12.79957	-0.150512	-1.060336	-0.012469	15.48241922	8.351135274
24.020016	152.4	0.2876117	-17.32892	-0.203774	-3.193982	-0.037559	12.76819507	4.035515048
26.235659	152.4	0.30215	-17.27758	-0.20317	-4.229783	-0.049739	11.17667626	6.529885158
28.451303	152.4	0.3166883	-13.21459	-0.155393	-2.926122	-0.034409	11.12229726	7.805719853
30.666947	152.4	0.3312267	-4.236819	-0.049821	-1.879536	-0.022102	11.82889366	6.597484469
32.882591	152.4	0.345765	5.9814456	0.0703368	-4.323819	-0.050845	13.4581352	5.8030145
35.098234	152.4	0.3603034	12.91902	0.151917	-5.737495	-0.067468	16.92446722	5.792692771
37.313878	152.4	0.3748417	19.34519	0.2274834	-4.253977	-0.050023	17.62976315	5.452400727
39.529522	152.4	0.3893801	32.262609	0.3793816	-2.887233	-0.033951	15.12373609	7.772008618
41.745166	152.4	0.4039184	38.719782	0.4553126	-0.554501	-0.00652	13.26377362	7.77768092
43.96081	152.4	0.4184568	48.024084	0.5647235	0.9984655	0.0117411	8.667329189	8.508535256
46.176453	152.4	0.4329951	53.079749	0.6241739	4.148003	0.0487771	7.051573909	8.252180601
48.392097	152.4	0.4475334	55.032651	0.6471384	5.7700405	0.0678509	4.937451065	8.450436871
50.607741	152.4	0.4620718	53.649538	0.6308742	4.9102982	0.057741	9.322711016	6.376131771
52.823385	152.4	0.4766101	50.841117	0.5978495	4.8044002	0.0564958	16.22548773	7.611422257
55.039028	152.4	0.4911485	51.959726	0.6110034	9.1316805	0.107381	13.50310405	9.386254118
57.254672	152.4	0.5056868	54.577772	0.6417894	9.2053166	0.1082469	15.46720568	7.215168784
59.470316	152.4	0.5202252	56.771906	0.6675906	10.214433	0.1201133	13.92718176	6.311726422
61.68596	152.4	0.5347635	61.94631	0.7284373	12.034906	0.1415205	4.692585207	4.233005079
63.901603	152.4	0.5493019	64.146256	0.7543069	12.737472	0.1497821	3.068994704	3.308830671
66.117247	152.4	0.5638402	65.017626	0.7645535	12.977808	0.1526083	1.442502714	2.891218925
68.332891	152.4	0.5783785	64.432714	0.7576754	13.589039	0.1597958	2.045961026	3.757135095
70.548535	152.4	0.5929169	62.403241	0.7338105	12.556473	0.1476537	7.944915043	2.518959932
72.764178	152.4	0.6074552	63.594326	0.7478166	12.260858	0.1441775	4.2616501	2.10756801
74.979822	152.4	0.6219936	64.350275	0.756706	12.241187	0.1439462	1.390720606	2.203266894
77.195466	152.4	0.6365319	63.981685	0.7523716	11.605341	0.1364692	2.294145559	2.621501031
79.41111	152.4	0.6510703	63.272535	0.7440326	11.375741	0.1337693	4.802379133	2.81990539
81.626753	152.4	0.6656086	63.374332	0.7452297	10.878886	0.1279267	3.147640794	2.577321262
83.842397	152.4	0.680147	63.526545	0.7470196	11.037853	0.129796	1.999836496	2.274353527
86.058041	152.4	0.6946853	63.681116	0.7488372	11.118717	0.1307469	1.537591194	2.064602845

Station 11

Average Velocity Data (U_ref = 85.04 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	49.152961	0.5779981	12.590095	0.1480491	20.11689528	4.460023806
6.2948656	152.4	0.1713049	40.348542	0.4744655	11.46574	0.1348276	22.32329344	4.167975667
8.5105094	152.4	0.1858432	38.48004	0.4524934	12.155943	0.1429438	23.15508842	3.657887022
10.726153	152.4	0.2003816	36.995765	0.4350396	12.651866	0.1487755	15.9524294	6.280965364
12.941797	152.4	0.2149199	31.56621	0.3711925	8.8861719	0.104494	14.99582895	9.986507777
15.157441	152.4	0.2294583	18.391606	0.2162701	5.2952129	0.0622673	19.67641974	12.09748455
17.373084	152.4	0.2439966	7.529653	0.0885425	2.2736814	0.0267366	18.87716893	11.85683572
19.588728	152.4	0.258535	-4.018774	-0.047257	-0.517794	-0.006089	16.4688246	12.64826403
21.804372	152.4	0.2730733	-13.15976	-0.154748	0.098071	0.0011532	15.38686219	14.14725745
24.020016	152.4	0.2876117	-20.73327	-0.243806	-1.084977	-0.012758	8.056329322	11.54728597
26.235659	152.4	0.30215	-18.76641	-0.220677	-7.21013	-0.084785	11.02311014	5.572137599
28.451303	152.4	0.3166883	-12.05139	-0.141714	-6.730188	-0.079141	11.31350182	7.662338535
30.666947	152.4	0.3312267	-3.177235	-0.037362	-6.863709	-0.080712	9.990466723	7.196562622
32.882591	152.4	0.345765	6.8520186	0.0805741	-7.664443	-0.090128	8.948367361	5.530936386
35.098234	152.4	0.3603034	11.160844	0.1312423	-4.444951	-0.052269	13.4020996	6.127565186
37.313878	152.4	0.3748417	18.204699	0.2140722	-3.049985	-0.035865	14.81041061	6.350887107
39.529522	152.4	0.3893801	26.830804	0.315508	0.9537025	0.0112148	16.51877501	7.365576321
41.745166	152.4	0.4039184	34.806672	0.4092977	1.9252447	0.0226393	16.77076371	9.183777336
43.96081	152.4	0.4184568	43.627879	0.5130277	3.3859409	0.0398159	16.91826633	9.842724781
46.176453	152.4	0.4329951	49.454973	0.5815495	3.3164411	0.0389986	14.88358875	9.875553427
48.392097	152.4	0.4475334	53.651048	0.6308919	3.4251901	0.0402774	11.54201598	8.134400279
50.607741	152.4	0.4620718	56.599812	0.6655669	3.7981681	0.0446633	8.967556139	6.794827106
52.823385	152.4	0.4766101	57.039731	0.67074	4.9124694	0.0577666	7.908647699	5.708113133
55.039028	152.4	0.4911485	55.266423	0.6498874	6.6540026	0.0782456	9.156726029	6.174998323
57.254672	152.4	0.5056868	52.44089	0.6166615	8.0725568	0.0949266	17.91585588	6.500743418
59.470316	152.4	0.5202252	53.941034	0.6343019	8.4368397	0.0992103	19.50704139	4.828280263
61.68596	152.4	0.5347635	57.352951	0.6744232	9.8528918	0.1158619	18.35861729	4.757081214
63.901603	152.4	0.5493019	58.452483	0.6873528	11.086585	0.1303691	13.27134648	5.036587829
66.117247	152.4	0.5638402	62.870718	0.7393076	9.8791788	0.116171	5.200738202	3.403981052
68.332891	152.4	0.5783785	63.853782	0.7508676	10.33399	0.1215192	1.879550777	3.284584104
70.548535	152.4	0.5929169	62.180333	0.7311892	9.3668931	0.1101469	7.279363099	4.368932794
72.764178	152.4	0.6074552	64.182225	0.7547298	10.352283	0.1217343	1.7119541	3.450607955
74.979822	152.4	0.6219936	63.035773	0.7412485	9.8194125	0.1154682	2.749233157	3.448884647
77.195466	152.4	0.6365319	62.861659	0.7392011	10.538338	0.1239221	2.773168497	3.366430875
79.41111	152.4	0.6510703	62.020887	0.7293143	10.186919	0.1197897	3.472530738	3.038639022
81.626753	152.4	0.6656086	61.800532	0.7267231	10.476817	0.1231987	4.609285643	2.472705038
83.842397	152.4	0.680147	61.419383	0.7222411	10.232727	0.1203284	7.453654413	2.301934357
86.058041	152.4	0.6946853	62.971077	0.7404877	10.343515	0.1216312	2.471127955	1.872740634

Station 12

Average Velocity Data (U_ref = 85.04 m/s)

Y	s	Y/s	U_ave	U/U_ref	V_ave	V/U_ref	U Std Dev	V Std Dev
4.0792219	152.4	0.1567665	52.810515	0.6210079	12.443454	0.1463247	17.97224798	3.631491031
6.2948656	152.4	0.1713049	51.347469	0.6038037	13.394304	0.1575059	18.3738953	4.327566659
8.5105094	152.4	0.1858432	52.070129	0.6123016	13.582343	0.1597171	11.77053922	3.170507666
10.726153	152.4	0.2003816	53.406064	0.6280111	15.936468	0.1873997	7.976576958	7.545363192
12.941797	152.4	0.2149199	48.715678	0.572856	20.176744	0.2372618	7.100391362	11.31784576
15.157441	152.4	0.2294583	36.501831	0.4292313	19.192628	0.2256894	12.73027224	13.8229252
17.373084	152.4	0.2439966	19.59623	0.2304354	13.888709	0.1633197	12.86190213	15.37227684
19.588728	152.4	0.258535	7.2331722	0.0850561	9.3538941	0.1099941	13.72179602	14.72923876
21.804372	152.4	0.2730733	-3.58181	-0.042119	3.8974037	0.0458302	14.22964563	10.87359524
24.020016	152.4	0.2876117	-11.33671	-0.13331	-1.56845	-0.018444	10.38132892	10.41259548
26.235659	152.4	0.30215	-12.67464	-0.149043	-6.577629	-0.077347	9.371787969	10.00548423
28.451303	152.4	0.3166883	-8.860805	-0.104196	-8.926387	-0.104967	8.575900377	8.542233464
30.666947	152.4	0.3312267	-6.585857	-0.077444	-10.03875	-0.118047	13.04629697	8.473676739
32.882591	152.4	0.345765	-0.843001	-0.009913	-9.438573	-0.11099	13.65351993	9.602010076
35.098234	152.4	0.3603034	5.0415424	0.0592844	-8.828964	-0.103821	14.99659292	10.62397909
37.313878	152.4	0.3748417	13.493494	0.1586723	-10.14641	-0.119313	14.8079421	10.01135986
39.529522	152.4	0.3893801	22.456414	0.2640688	-11.34648	-0.133425	19.45867164	10.43626304
41.745166	152.4	0.4039184	31.401012	0.3692499	-9.783391	-0.115045	22.28156043	10.67677992
43.96081	152.4	0.4184568	38.222269	0.4494622	-7.958023	-0.09358	21.45761364	9.485264157
46.176453	152.4	0.4329951	44.244078	0.5202737	-5.09514	-0.059915	17.67791136	8.932764433
48.392097	152.4	0.4475334	48.687046	0.5725194	-1.171578	-0.013777	14.47617649	7.786980938
50.607741	152.4	0.4620718	52.366842	0.6157907	1.9774005	0.0232526	12.14881136	7.652162278
52.823385	152.4	0.4766101	53.482354	0.6289082	3.8183408	0.0449005	11.51705845	10.06188568
55.039028	152.4	0.4911485	52.376894	0.6159089	3.7576229	0.0441865	21.01824422	10.39437152
57.254672	152.4	0.5056868	50.461203	0.593382	4.1743908	0.0490874	18.83635436	9.391374443
59.470316	152.4	0.5202252	55.007836	0.6468466	7.4717203	0.0878612	12.21408774	6.260544975
61.68596	152.4	0.5347635	61.802188	0.7267426	7.0652172	0.0830811	3.67268114	7.710589565
63.901603	152.4	0.5493019	63.472382	0.7463827	7.3762264	0.0867383	2.071101242	5.900910794
66.117247	152.4	0.5638402	62.944471	0.7401749	6.9923742	0.0822245	2.014840011	6.874841841
68.332891	152.4	0.5783785	62.789285	0.73835	7.5886485	0.0892362	1.804340742	4.110099708
70.548535	152.4	0.5929169	62.532156	0.7353264	8.2886017	0.0974671	2.757713797	2.253214929
72.764178	152.4	0.6074552	62.358399	0.7332831	7.9434078	0.0934079	2.902001901	2.244732937
74.979822	152.4	0.6219936	60.773027	0.7146405	8.1374166	0.0956893	4.245503518	2.308886062
77.195466	152.4	0.6365319	58.638599	0.6895414	8.7570023	0.1029751	10.14301941	2.15845565
79.41111	152.4	0.6510703	56.190637	0.6607554	9.203044	0.1082202	17.58464696	2.947716078
81.626753	152.4	0.6656086	58.267229	0.6851744	8.0413245	0.0945593	10.32265467	3.24429555
83.842397	152.4	0.680147	58.50065	0.6879192	8.998957	0.1058203	8.142281661	1.309738351
86.058041	152.4	0.6946853	58.669477	0.6899045	9.8834885	0.1162216	7.322640769	1.410414214

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APPENDIX E. BLADE SURFACE PRESSURE DATA FOR OTHER REYNOLDS NUMBERS

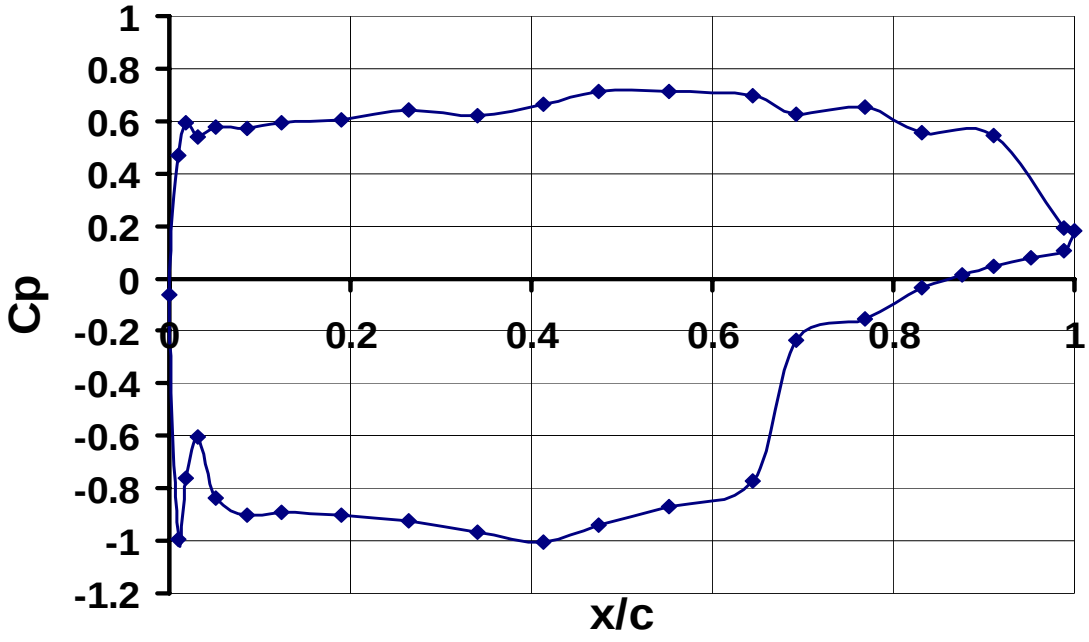

Figure E1. Cp vs. x/c (Re=268,103)

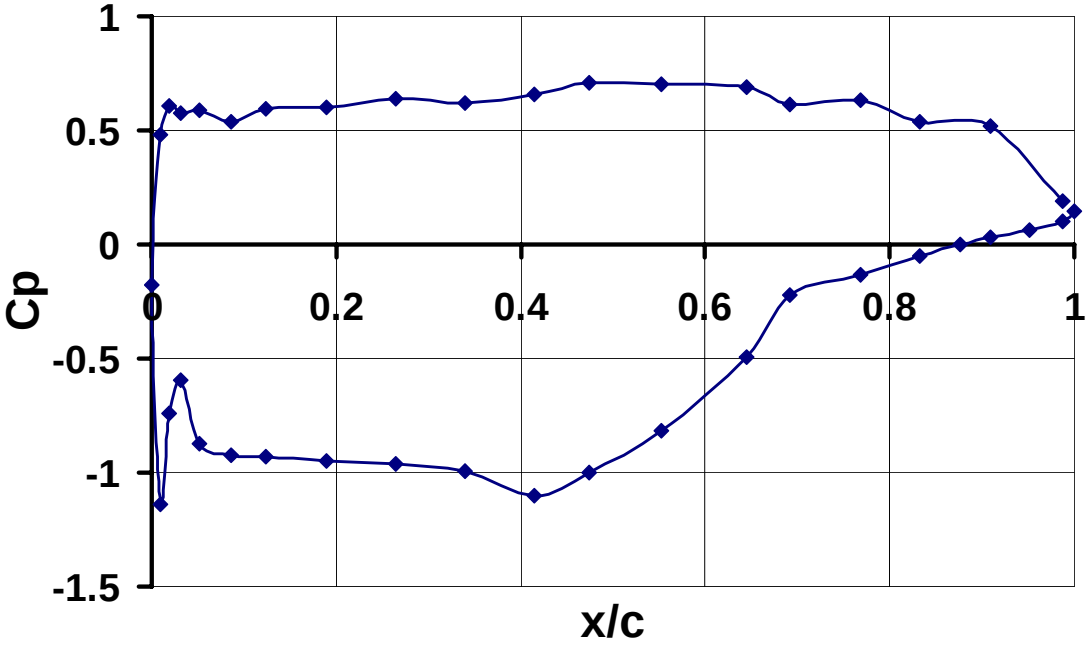

Figure E2. Cp vs. x/c (Re=387,326)

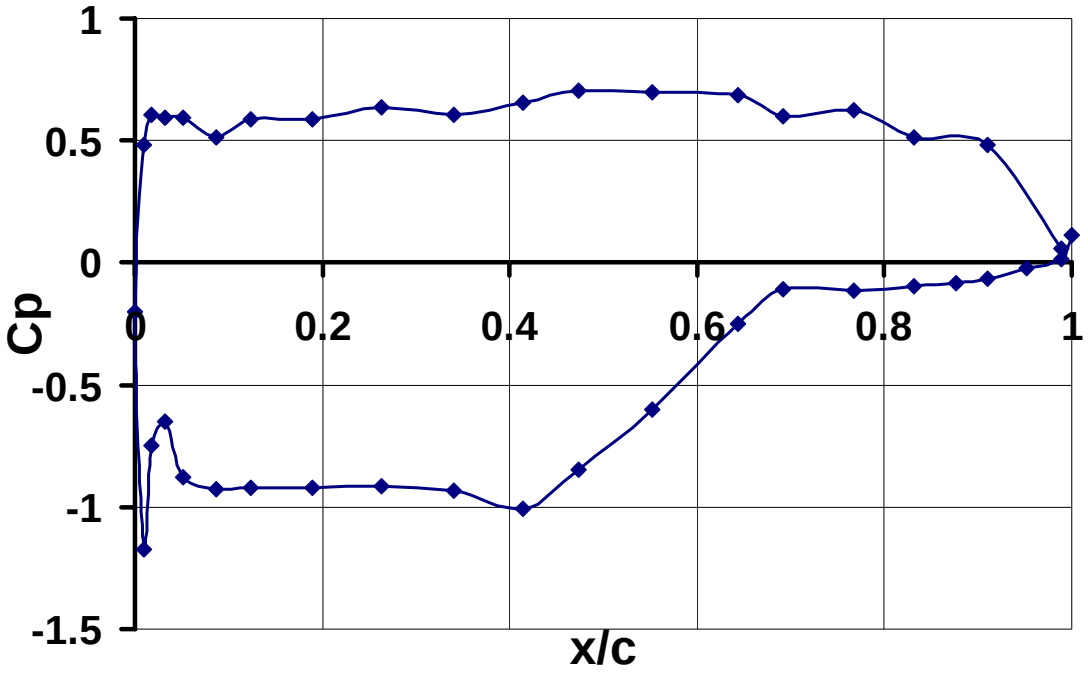

Figure E3. Cp vs. x/c (Re=544,759)

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