Introduction to Wake Lab

- Learn to use a small wind tunnel, hot wire or film, pitot probe, and digital oscilloscope. Acquire data to a PC for later analysis.
- "Hot Wires, Wakes, and Drag Measurement" is the main handout on how to do the lab.
- The other handouts are background information on digital scopes, hot wires, etc.
- Does everyone know how to compute a power spectrum?

Wake Physics

- Look at Drag, by integrating wake. How do the measurements change with downstream location? With airfoil AOA? With tunnel speed? etc. How does the NACA0010 compare to the NACA2415?
- Look at the mean wake profiles. How do these change? Are they self-similar?
- Look at fluctuation profiles. Self-similar?
- Look at details of fluctuations. What do the spectra look like? Try the 1/8-in. and 1/16-in. cylinders in addition to the ½-in. diam. cylinder. Try the wire cylinders, even smaller. What happens at lower Reynolds no.?
- How does tunnel speed affect the wake?
- Can you scale distance and tunnel speed?

Issues with Performing the Labs

- You will need to study the information about the flow physics and equipment, before the lab
- There are more things that can be done in the labs than you will have time to do. Select a plan. Note that it will take time to learn and adjust the apparatus!
- All three pre-planned labs involve flow physics that cannot be computed very accurately at present; they address real issues that require experiments
- Save time for writing your report, in the usual format: Introduction, Apparatus, Results, Summary. See the suggestions on the website
- The second-week lab entry allows you to iterate once

Issues with Performing the Labs, 2

- We hope to make this course more of a project/tutorial course
- Pick up the ball and run with it! We will coach you
- We encourage interaction with Prof. Schneider and the TA and the other students
- We will try to drop by for a few minutes during each group's lab time, just to see how things are going and to offer suggestions.
- Feel free to drop by Prof. Schneider's office for a few minutes to discuss how things are going. He is at the lab most of the time, typically from 0645-1715, M-F, in Room 13C in the NE corner.