

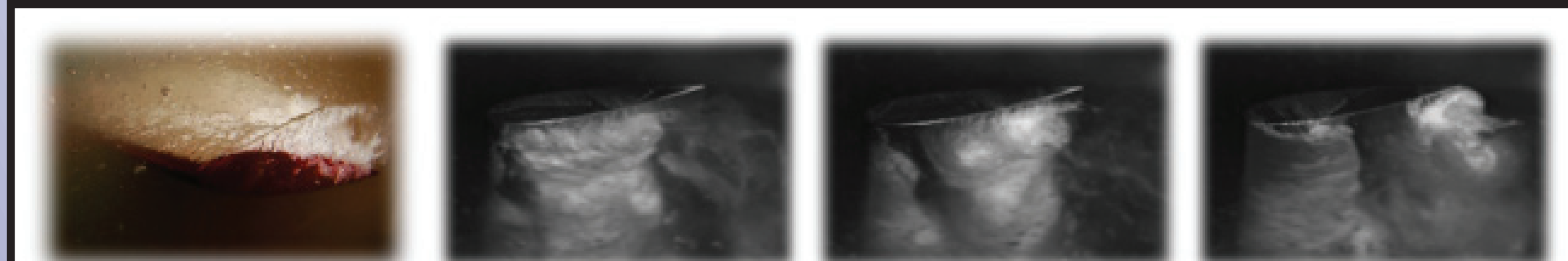


THE UNH HIGH-SPEED CAVITATION TUNNEL (HiCAT)



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CAVITATING NACA 0015 HYDROFOIL IN THE HiCAT

SOME APPLICATIONS

- MARINE RENEWABLE ENERGY (TIDAL CURRENT TURBINES)
- CONVENTIONAL HYDROPOWER
- HIGH-SPEED MARINE VEHICLES
- PROPELLERS



SEAGEN, FRANCIS TURBINE, GHOST, CAVITATING PROPELLER

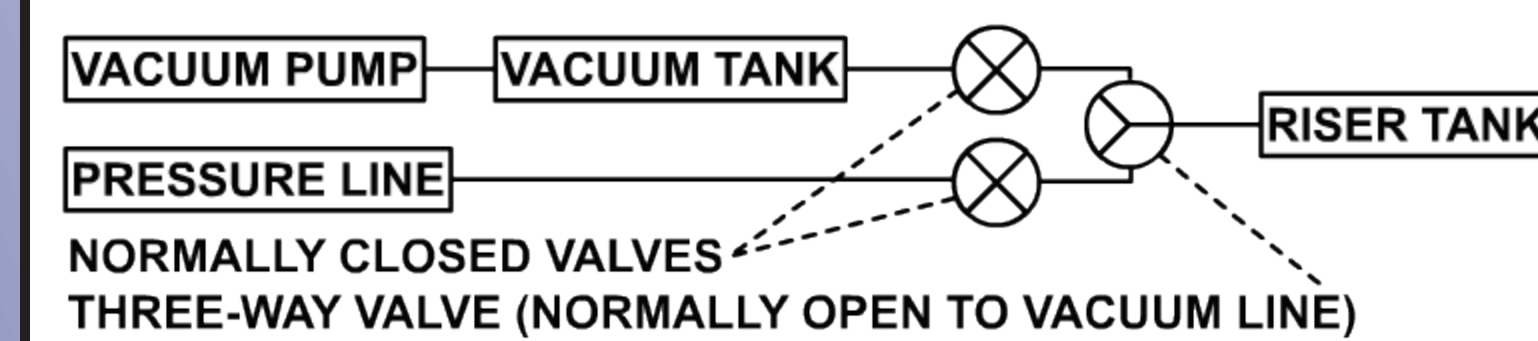
INSTRUMENTATION

- LDV AND HIGH-SPEED STEREO PIV SYSTEMS
- CUSTOM DESIGNED LIFT/DRAW BALANCE
- DATA ACQUISITION SYSTEM:
 - ACQUIRES DATA FROM TWO DIFFERENTIAL PRESSURE SENSORS
 - CONTROLS PRESSURE-REGULATING VALVES
 - ACQUIRES LIFT AND DRAG DATA FROM FORCE BALANCE
 - CAN CONTROL AND READ THE SPEED OF THE MOTOR
 - CAN RECORD TEMPERATURE

RISER TANK

- FOR STEADY WATER-LEVEL HEIGHT
- CONNECTS TO A PRESSURE/VACUUM SYSTEM

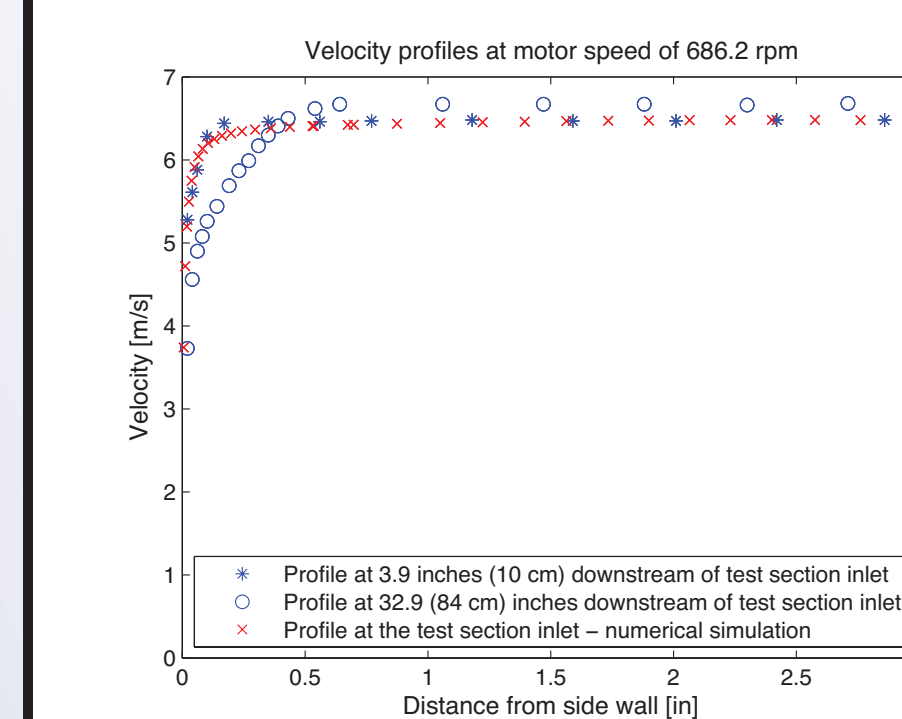
PRESSURE/VACUUM SYSTEM SCHEMATICS:



CONTRACTION:

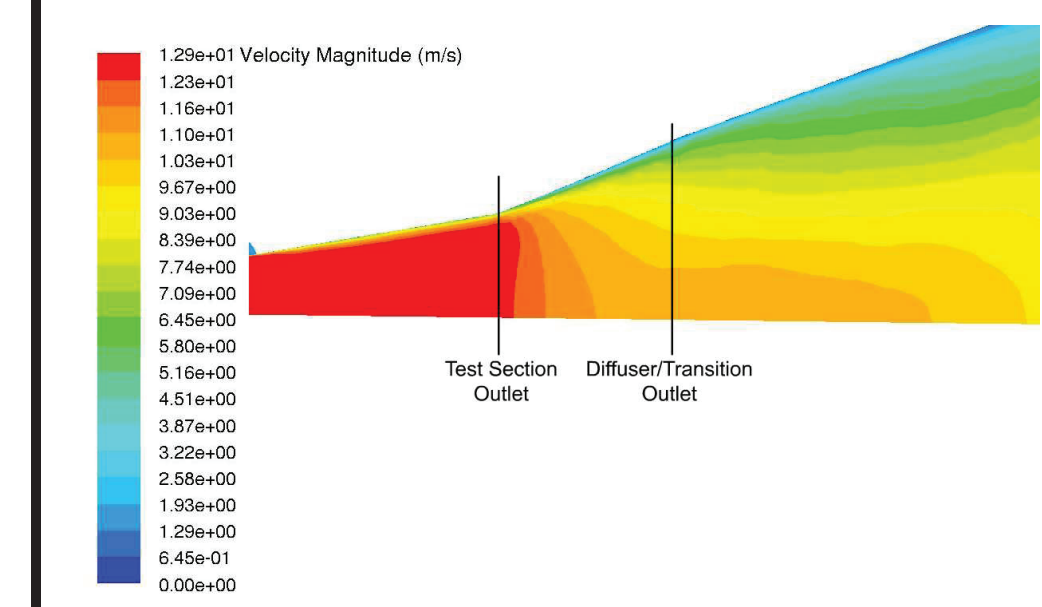
- 5TH-ORDER-POLYNOMIAL SHAPE
- LENGTH/DIAMETER RATIO OF 1.5
- CONTRACTION RATIO OF 7

CFD AND LDV RESULTS:



TRANSITION/DIFFUSER

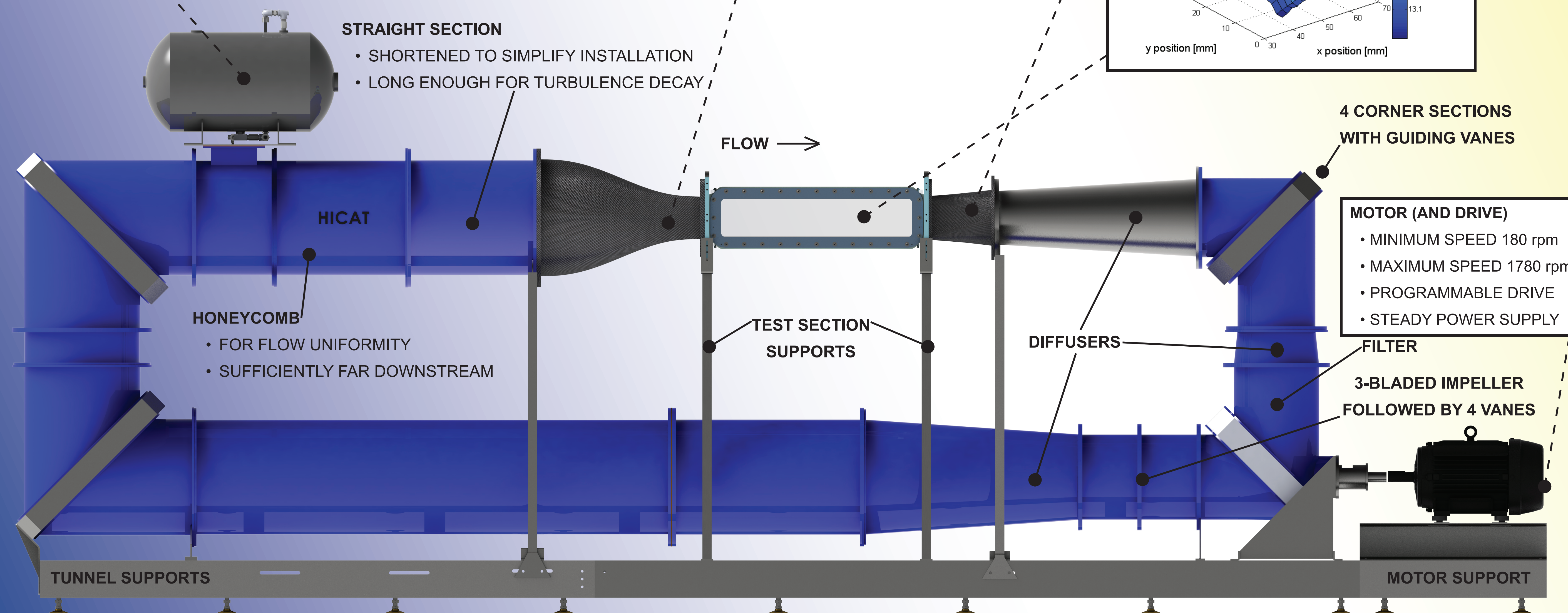
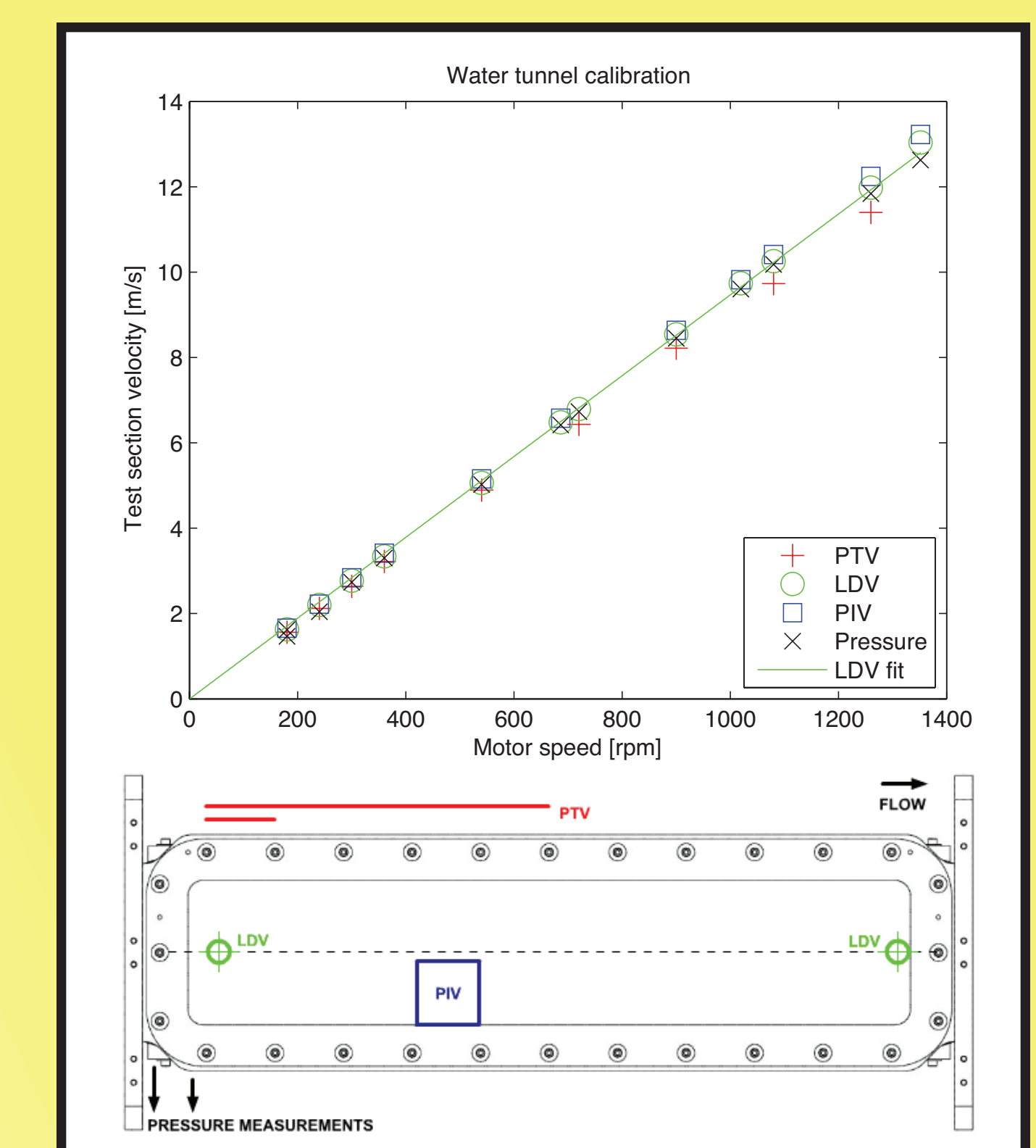
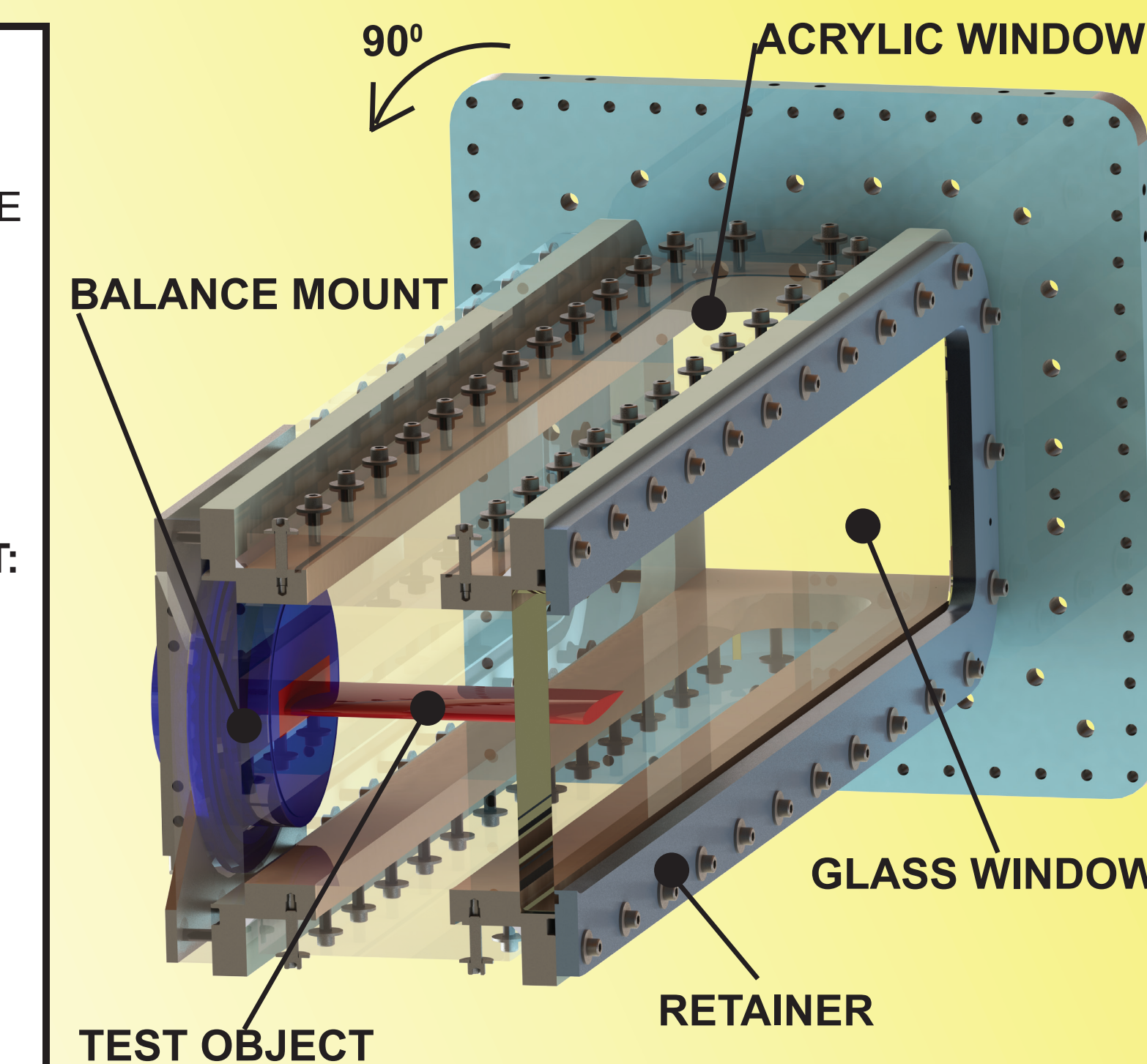
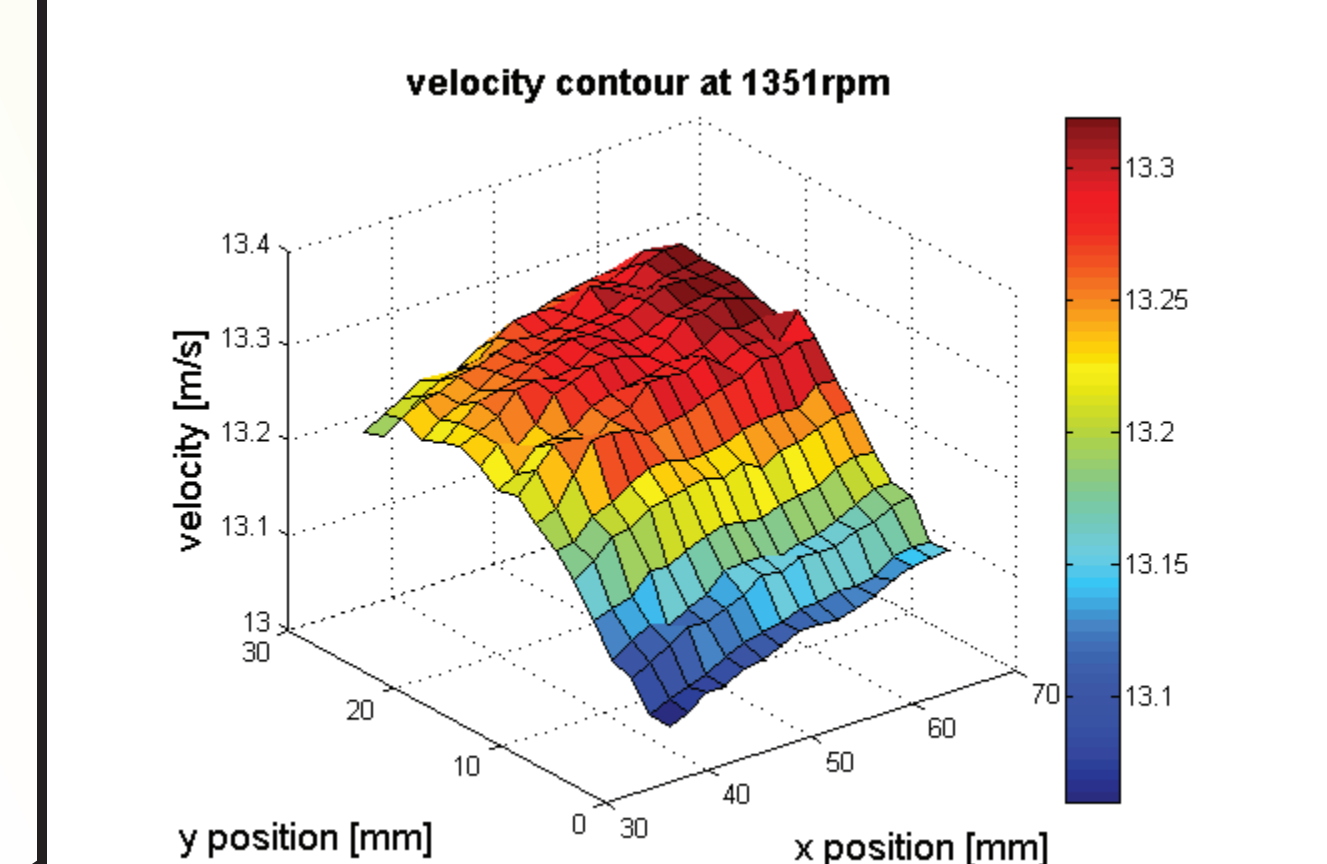
- SQUARE TO ROUND TRANSITION SERVES AS A DIFFUSER
- CONSTANT INCREASE IN CROSS-SECTIONAL AREA IN DOWNSTREAM DIRECTION
- 3.5° EFFECTIVE HALF ANGLE



TEST SECTION

- SIZE: 6" x 6" x 36"
- INDEPENDENTLY CONTROLLED PRESSURE
- FULL OPTICAL ACCESS FROM 2 SIDES
- OPTICAL ACCESS FROM ALL 4 SIDES
- EASILY INTERCHANGEABLE WINDOWS
- CAN BE ROTATED BY 90°

VELOCITY CONTOUR FROM PIV EXPERIMENT:



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