

Abstract Submitted
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Development of Small-Scale Submersible PIV System JENNA CLARKE, ALINE COTEL, HANS TRITICO, University of Michigan — A low-cost, small-scale submersible Particle Imaging Velocimetry (PIV) device has been developed to characterize unsteady flow in natural environments. PIV systems provide high accuracy, non intrusive, planar flow measurements of velocity and vorticity. Since this device is intended for the field, it is designed to be portable. This is accomplished using a powerful handheld laser, beam chopper, microprocessor, and the proper lenses, in conjunction with a one mega pixel CCD video camera. The system consists of two connected waterproof cases; one housing the camera and the other the laser/chopper system. The apparatus is fully self-contained and can be operated using a laptop computer on shore or on a floating platform. The system is also unique in that it was developed for under \$8000 USD. The PIV device was tested in a small creek in Michigan. Eddy diameter, circulation, orientation, and convective velocity were characterized. The design of a submersible PIV system like this one will lead to a better characterization of naturally occurring flows and a greater understanding of what conditions aquatic life find acceptable. This knowledge will prove most useful in river and shoreline restoration, as well as in the design of new coastal management plans to alleviate human impact on coastal regions.

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