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In the making: SA-PIV applied to swimming practice JOSJE VAN HOUWELINGEN, Eindhoven University of Technology, WILLEM VAN DE WATER, Delft University of Technology, RUDIE KUNNEN, GERTJAN VAN HEIJST, HERMAN CLERCX, Eindhoven University of Technology — To understand and optimize the propulsion in human swimming, a deep understanding of the hydrodynamics of swimming is required. This is usually based on experiments and numerical simulations under laboratory conditions.. In this study, we bring basic fluid mechanics knowledge and experimental measurement techniques to analyze the flow towards the swimming practice itself. A flow visualization setup is build and placed in a regular swimming pool. The measurement volume contains five homogeneous air bubble curtains illuminated by ambient light. The bubbles in these curtains act as tracer particles. The bubble motion is captured by six cameras placed in the side wall of the pool. It is intended to apply SA-PIV (synthetic aperture PIV) for analyzing the flow structures on multiple planes in the measurement volume. The system has been calibrated and the calibration data are used to refocus on the planes of interest. Multiple preprocessing steps need to be executed to obtain the proper quality of images before applying PIV. With a specially programmed video card to process and analyze the images in real-time feedback about swimming performance will become possible. We report on the first experimental data obtained by this system.

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