Swimming as a sporting event has always been one of the three most popular spectator sports at the summer Olympic Games. However, the sporting and recreational elements are not the only reasons for the popularity of swimming. It has been well documented that aquatic exercises in general and specifically swimming enhance cardiovascular fitness, improve flexibility and muscular strength. Nevertheless, in terms of kinematics monitoring technologies and biomechanical analysis, swimming has sat on the sideline compared to the existing systems for over-ground human activities. Waterproofing, installation, calibration and maintenance in the harsh aquatic environment are immediate challenges to deal with in designing a measurement system for the analysis of swimming locomotion.

**WATERPROOF SENSORS FOR MOTION ANALYSIS AND COORDINATION**

EPFL laboratory of movement analysis and measurement (LMAM) has developed swimming analysis system based on using wearable inertial sensors that allows a cycle-by-cycle monitoring of the coordination and performance. This system enables investigating the relation between kinematics, anthropometry and energy requirements of swimming. A simultaneous monitoring of several users’ technique is possible without interfering with other users’ measurements. The system provides a pervasive, quantitative and rapid feedback to the user, available during a break in a swimming session. The system was validated in crawl and breaststroke.

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**SWIMMING: PACE AND COORDINATION ADJUSTMENTS TO MINIMIZE ENERGY EXPENDITURE**

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Waterproof inertial sensor for swimmers.

Cycle-by-cycle monitoring of the performance and coordination in crawl and breaststroke.