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www.elsevier.com/locate/procedia8th Conference of the International Sports Engineering Association (ISEA)**Poster Session II, July 14th 2010 – Abstracts****Development of a new product for unrestrained heart rate measurement in swimming: a user centered design approach**Vincent van Rooijen, Lenneke de Voogd-Claessen^{*}, Kristina Lauche, Vincent Jeanne, Roald van der Vliet*^{*}Delft University of Technology, Faculty of Industrial Design, Landbergstraat 15, 2628 CE, Delft, The Netherlands - H.deVoogd-Claessen@tudelft.nl*

In order to avoid under-training or over-reaching, training efforts need to be targeted at the performance and physiology of the individual athlete. Despite multiple training load indicators that are available in principle, coaches still rely on lap times as direct feedback during regular trainings (fig. 5). Other measures such as VO₂ levels and lactate are too invasive to be used during regular trainings. Despite being a good training load indicator tool, heart rate monitors are not used by the top swimming coaches during trainings because they do not fulfill the coaches' needs.

Philips Research together with the technical University of Delft have developed a heart rate monitor (HR-monitor) that is designed to fit the special needs of the coaches of the Dutch national swimming team. The use of remote heart rate measurement with a camera, based on remote PPG, makes it possible to measure the heart rate without the use of restraining sensors.

During the entire design process the coaches and swimmers of the Dutch national swimming team were involved to create a user-centered design to fit the needs of this special target group.

Results of the design process are a working and user tested prototype and concept designs which will be further developed into a final product design.

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Key words: Heart rate; Heart rate measurement; Heart rate monitor; Swimming; Camera, Training; product design, user-centred design
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