

# 3D Simulation and Validation of Collaborative Work Systems – Safety, Ergonomics and Productivity Assessment with “ema Work Designer”

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*(Workshop Presentation)*

## Abstract

Using collaborative robots (“cobots”) for supporting work tasks with high physical and psychological demands (“un-ergonomic tasks”) is a very promising approach for compensating the aging workforce in Europe and improving health and productivity in the industrial sector. However, it is not easy to design collaborative work systems according to safety, ergonomics and productivity standards from a technical and a social point of view. Many details of the applied technologies have to be taken into account and workers should be allowed to participate in the work system design proactively in order to consider their practical knowledge and increase their acceptance for the implemented solution. “ema Work Designer” is a software tool that enables to design manual and semi-automatic (= collaborative) work systems according to safety, ergonomics and productivity standards like DIN ISO/TS 15066, EAWS and MTM. The interactive 3D visualization supports technical experts in work station design and facilitates communication with workers. This presentation will show a use case that was developed in the EU-founded SOPHIA-Project with the company Hankamp Gears. Based on the current manual work station, a solution for integrating the UR16e cobot was designed as a collaborative work system together with technology specialists, social scientists and representatives from the target company. ema Work Designer software was used to validate the geometrical set-up of the work station in interaction with the cobot platform. Moreover, it was used to assess the performance of the current and the future work system, for example showing a reduction of active manual production time (measured with MTM) by 18 seconds/cycle (= -28%) and ergonomic work load (measured with EAWS) by 31,5 points (= -59%).