

# H2020, REMODEL project: Revolutionizing the handling of soft materials with dual-arm robots

The **Robotic tEchnologies for the Manipulation of cOmplex Deformable Linear objects (REMODEL)**, is a four year funded project by the European Commission under the Horizon 2020 programme. This project was launched towards the latter phase of 2019 and would commence until the October of 2023, and it aims at developing and combining different technologies to provide robotic manipulators with the ability to manipulate **DLOs (Deformable Linear Objects i.e., cables, hoses, etc.)**. This project consortium has eleven partners and a budget of **€5.9 million, fully funded by the European Commission**.

The project REMODEL aims to reduce the psychophysical stresses of the workers, by introducing robot platforms to perform the repetitive manipulation tasks of these DLOs (which are currently being performed manually by human workers). The intention is not to replace the workers with robotic platforms, but to transition them to more qualified and decision-making roles. The industries that predominantly require efficient DLO manipulation include switchgear manufacturing, wire harness manufacturing and assembly, and hose packaging, to name a few. These applications are the initial areas of focus which the project consortium intends to automate.

The impact of REMODEL is particularly important for European industries, as they currently face challenges in achieving flexibility and efficiency to improve their competitive position in the world market. The shortage of a strong workforce in the industrial sector has necessitated the outsourcing of the aforementioned processes (requiring extensive DLO manipulation), to regions outside of Europe, having a lower labor cost, and subsequently compromising the global competitiveness of the overall industrial sector.

The idea proposed by the REMODEL project is to create an incremental skill-based robot knowledge system, with a few iterations of Teaching by Demonstration, allowing the robot to operate with less supervision, such that, the worker can focus on supplementary tasks with higher levels of complexity, thereby increasing productivity. The worker can teach the robot the sequence of operations to manipulate the DLOs, and the developed application could be easily reconfigurable to adapt to the varying changes in the product. The project intends to develop robot platforms capable of manipulating flexible materials (DLOs), to optimize manufacturing processes **by integrating the best attributes of dual-arm robot manipulators** (i.e. speed, accuracy, strength and repeatability for less skilled tasks) **and humans** (i.e. physical dexterity, cognitive reasoning, creativity).

Tampere University is one of the partner universities in REMODEL. Professor **Jose Luis Martinez Lastra** from the faculty of Engineering and Natural Sciences understands the need



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for automating the handling of flexible material with unpredictable dynamic behaviors. He emphasizes on the technological, economic and human aspects on the outcome of REMODEL.

Professor Lastra leads Tampere University's FASTLab whose research areas include automation, industrial informatics, industrial cyber-physical systems, robotics and artificial intelligence. FASTLab is experienced in performing teaching by demonstration for industrial robots and is leading the work package for developing the system and user interface for the project. FASTLab is working closely with the use case for wiring harness manufacturing for automotive industries and wiring harness assembly, to develop their specific solutions.

Additionally, REMODEL has other highly accomplished and reputed partners. The project is coordinated by Alma Mater Studiorum – Università Di Bologna, which is also an active research partner. The use cases being evaluated and researched are implemented in the facilities of I.E.M.A. s.r.l., Elimco Aerospace SLU, Elvez, Volkswagen Poznan, and Enki, and are the industrial partners. The research partners include Università degli Studi della Campania - Luigi Vanvitelli, Fundacion Tecnalía Research & Innovation, Tampere University, Technische Universitaet Muenchen and Politechnika Poznanska.

The REMODEL project materialized in response to the European Commission **H2020** call on **Technologies for Factories of the Future** under the grant agreement 870133. More information regarding REMODEL and the active partners could be obtained from the website <https://remodel-project.eu/>.

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