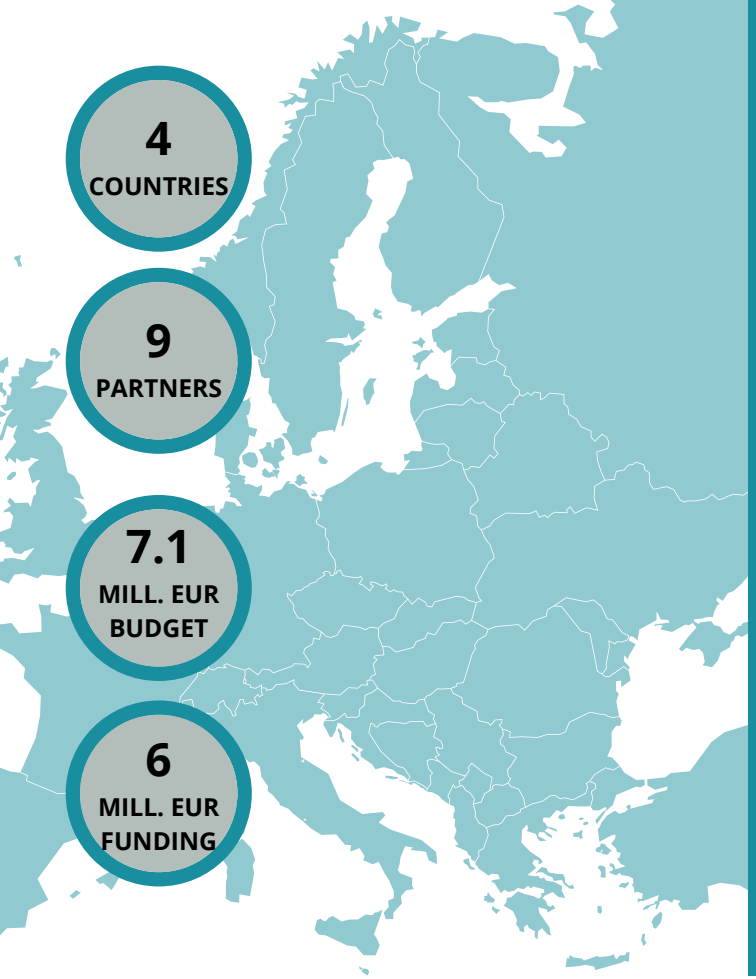

Discover more about

DrapeBot

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DrapeBot
Collaborative Draping of Carbon Fiber Parts

Collaborative Draping of Carbon Fibre Parts

WHAT WE DO

The DrapeBot project will demonstrate an efficient human-robot collaborative draping process for carbon fibre-composite parts.

WHO FUNDS US

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101006732.

PROFACTOR
STIIMA
Sistemi e Tecnologie Industriali Intelligenti per il Manifatturiero Avanzato
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ABELE INGENIEURE
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DLR
IT+Robotics
dallara
Balti GmbH
Composite Technology
Università degli Studi di Padova

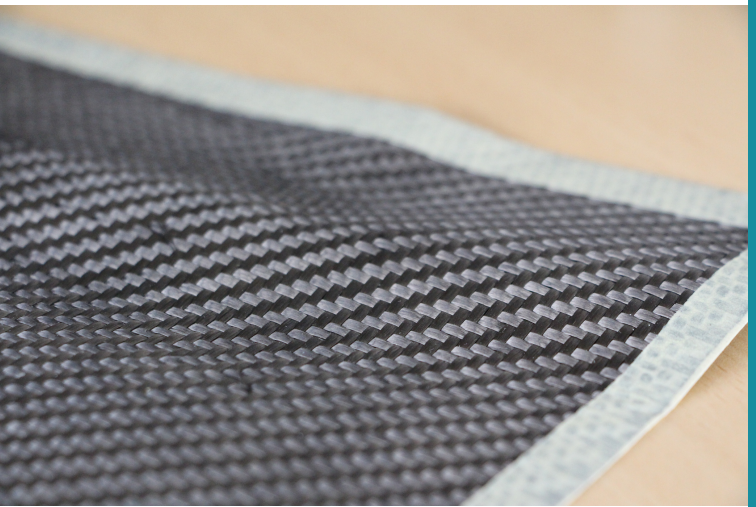
OBJECTIVES

Draping is the process of placing soft and flexible patches of carbon or glass fibre fabric on a 3D shape during the manufacturing of fibre-reinforced composite parts. While robotic draping has made substantial progress, there are still many draping tasks that require human dexterity and flexibility. To combine these, DrapeBot aims at the development of

- an efficient human-robot collaborative environment, in which a robot and a human can collaborate during the transfer (pick&place) of the fabric and during the draping of the material.

- gripper systems with additional instrumentation to help during the interaction with the human worker and to ensure the accuracy and quality of the draping process.

- an environment in which a human worker can safely collaborate with the large robotic systems, where trust and usability are key non-technical aspects that need to be addressed.



RESULTS

The main result of the project will be two integrated robotic workcells, demonstrating different levels of collaboration.

The “DrapeCell” will consist of a single robot with a large gripper to handle patches of several meters in length. This will be done jointly with a human operator. Additional sensors integrated into the gripper will allow the monitoring of positional accuracy and draping quality. The robot will drape large areas of lower curvature, while the human will work on smaller areas with e.g. corners.

The “TEZ” will include two robots on a linear axis, of which each will be equipped with a smaller gripper to demonstrate joint handling of fabric by two robots. The collaborative aspect will take place in a shared workspace where robot and human work alternatingly on the task.

Both workcells will enable a higher degree of automation for draping of medium and large size parts with complex geometry.

EXAMPLES

Aerospace industry

Draping will be demonstrated on the example of a rib (structural hull component) of about 4m length with tight corners. About 30 patches of material have to be placed, where two robots will perform the pick and place operation, while the human operator is performing the final draping.

Automotive industry

A complex automotive component, such as the front hood will be used for demonstration. The front hood will have a size of 2 x 1.5m and will require the joint, collaborative transport of material and high positional accuracy. Quality requirements are particularly high as the final layer will be visible on the surface.

Maritime industry

The blade of a ship propeller will be used to demonstrate collaborative draping. The length of the part is 1.5m. It will require collaborative transfer of the material as well as joint draping by the human and the robot. A variety of patch sizes and shapes will be draped in this use case.