LOOP TECHNOLOGY, TAKING COMPOSITE HANDLING SYSTEMS TO THE NEXT LEVEL

FibreFORM – A COMPLETE COMPOSITE HANDLING SYSTEM

FibreFORM is a composite handling and lay-up system, designed to be both modular and scalable.

This product is able to form composite plies into double curvature surfaces making it ideal for laying up fuselage sections, wing skins or engine nacelles. It is perfectly able to achieve concave, convex and omega profiles.

The FibreFORM system contains an array of fixed pitch grippers which can be manipulated so as to generate a double curvature surface whilst the whole time staying perpendicular to the ply surface throughout. The system can operate in fully horizontal and vertical planes, or a combination of both, it will even operate inverted if the deployment system permits.

The minimum configuration for the system is a 3 by 10 gripper array; each strip of 10 grippers can be controlled independently, allowing an infinite variety of surfaces to be replicated. This arrangement is designed to handle plies with maximum dimensions of 1.5m by 0.4m. Through utilising multiple modules in parallel this configuration is expandable. Robot mounted applications can control up to a four module 12 by 10 array whilst a gantry mounted application can handle multiple modules, arranged in parallel, enabling the construction of impressive systems capable of laying up wing skins up to 20m long.
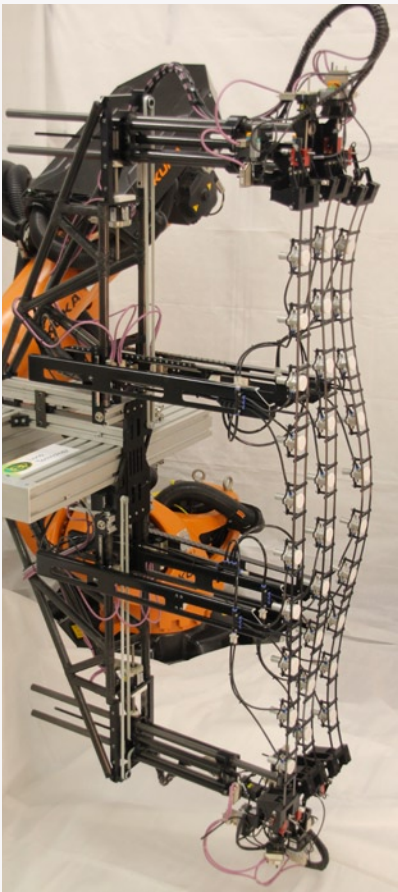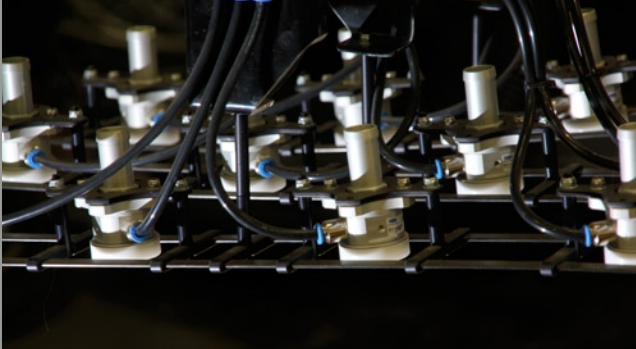
How it Works

FibreFORM utilises high flow vacuum cups to pick up carbon fibre sheets. The vacuum cups provide grip capability for a variety of surface types, both porous and non-porous, however alternative gripping methods such as magnetic or electrostatic can be used to achieve similar results with different materials should this be considered more appropriate. The FibreFORM's flexible mounting system allows flat ply to be formed in mid-air into a 5th order polynomial curve, the formed ply is then accurately positioned on a surface or mould tool.

Software Interface

A powerful software interface is supplied with the system allowing both automatic and manual control of the gripper. Built into the interface is a recipe editor capable of reading CAD data, profiling the surface and automatically generating an appropriate gripper configuration. Particular commands specifying a Ply ID can be sent to the controller at runtime making the gripper configure to its saved geometry.

3D Gripper Matrix Specification

Overall Footprint (X/Y)	2,200mm x 55 – 20,150mm
Pickable Area	1,500mm x 400 – 20,000mm
Surface Complexity	Fifth order polynomial in X and Y directions
Minimum Segment Radius	200mm
X Gripper Density	Mod (Pickable Length / 166) + 1
Y Gripper Density	Mod (Pickable width / 166) + 1
Number of Grippers	X Gripper density x Y Gripper density: 30
Gripper Technology	60mm Vacuum (others available by request)
Positional Repeatability	+/-0.05mm
Total Mass *Including support frame*	90Kg
Operational Plane	Horizontal, Vertical, Inverted

Control Cabinet

Supply	480VAC 3 Phase (16Amp/Phase)
Cabinet Size	(1200mm wide x 400mm deep x 1800mm high)
Control Interface	Ethernet TCP/IP or Profibus *Other interfaces available by request*
Robot Control Interface	Optional
Vision System Interface	Optional
RFID Interface	Optional