

## **Submission Proposal for the 5th EUCASS Conference (July 1-5, 2013; Munich, Germany)**

**Category:** STRUCTURES AND MATERIALS for Aeronautic and Space Systems

**Topic:** Automated manufacturing of CFRP structures using Fibre Patch Placement (FPP) technologies.

### **Abstract:**

The dry process chain, enabling the use of low-cost materials and highly automated processes, has high potential to reduce significantly the manufacturing costs of composite structures. One of the processes developed by EADS for automated preform manufacturing is the Fiber-Patch-Preforming. The developed robot enables the positioning of unidirectional carbon fibers patches on any position and orientation on the

tool during preforming. The process aims to reduce manufacturing costs as it is a fully automated process as well as composite structures weight through local fibre angle optimization using fibre steering. This paper intends to present new developments of process and design related to the FPP technology and describes its potential for improvement of CFRP manufacturing in the aerospace industry.

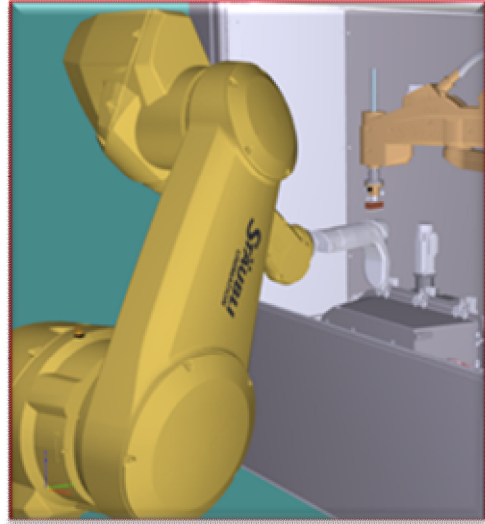
The machine concept first demonstrated in 2008 has been further developed to improve its productivity and the flexibility. The process has already been adapted to manufacture preforms for profiles with various sections. An undergoing machine upgrade will soon enable the manufacturing of 3D structures in one single step using an advanced end-effector and a two robot cooperation.

A software is being developed to enable the design optimisation of composite structures based on cut fiber tapes and manufactured with the FPP process. The software will assist the optimization of the laminate, describe the as-built structure and allow off-line programming of the machine robots.

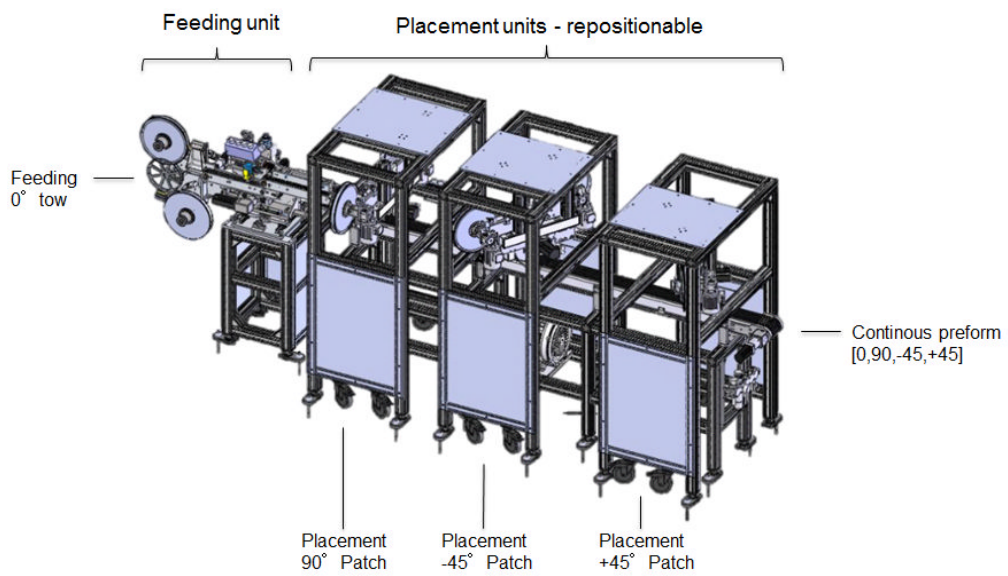
The process enable new laminate design and some first investigations have demonstrated the potential for cost and weight reduction especially for the manufacturing of local reinforcement, small and complex 3D components as well as load oriented reinforcement. The expected benefits of the process for typical CFRP structures will be presented.



2D FPP Machine



3D FPP Machine



Profile FPP Machine

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