

EU Project opens the door for intelligent production

Intelligent inspection technology ensures zero defects and high production rates

In aerospace industry, very large components (e.g. wing covers) are made of carbon fiber composite materials. Different challenges are related to the processing of such materials. The complexity that comes with carbon fiber composites often lead to anomalies and defects during production. The EU project ZAero develops intelligent inspection technology to detect problems in production at an early stage. As the project is entering into its third year, solutions for industry are now getting available as prototypes.

Very high quality standards have to be met in the aerospace industry. In order to guarantee production of defect-free components, a great deal of effort needs to be put into quality control. Lightweight carbon fiber reinforced plastics (CFRP) components are nowadays largely used in aerospace industry. Production of such parts requires multiple stages of processing. Several difficulties arise in this context. For example, carbon fibers remain deformable over many stages of the production process. This makes handling difficult and error-prone. Furthermore, resin injection and curing need to be done carefully to avoid porosities.

Continuous process monitoring for zero defects

In order to avoid defects during production, the EU project ZAero develops technologies for consistent monitoring of production. Data from different production stages (lay-up, curing) is collected in a manufacturing database. This database represents a “digital twin” of the real part as it appears in production. Intelligent data processing and mechanical simulations from Dassault Systèmes provide information about the severity of defects. In addition to that, logistical simulation by PROFACTOR delivers information about the overall production. This enables a global view on the production and reveals how defect rates and re-work decisions affect, for example, completion time of a specific order.

Industrial reference implementation

The ZAero project has already started into its third and final year. Installation of monitoring systems into industrial environments were done at the facilities of Danobat and Ideko as well as FIDAMC and MTorres. The deployed sensor systems were demonstrated to work well in the respective environments. Data collection, simulation, and decision support modules were successfully demonstrated. Experiments showed that the developed technologies have the potential to boost production of large carbon fiber composite parts. This is an important contribution to reach high production rates with up to 60 Airbus A320 planes per month. Preliminary project results will be presented at a dedicated booth by PROFACTOR at the JEC World fair in March 2019 in Paris.

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ZAero fact sheet

ZAero	Zero-defect manufacturing of composite parts in the aerospace industry
Coordinator	PROFACTOR GmbH
Partners:	Airbus Defence and Space GmbH, Infactory Solutions, Dassault Systèmes SE, M Torres Diseños Industriales SA, IK4 - IDEKO S Coop, Danobat S Coop, FIDAMC
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Sensor system for monitoring of the lay-up process with automated fiber placement (AFP).