OPTICAL SENSORS: AN OPPORTUNITY FOR FASTER AIRCRAFT DEVELOPMENT?

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At the beginning of 2007, Airbus launched a four-year restructuring programme referred to as 'Power8'. Power8 aimed to build a fully integrated company that would be leaner, more efficient and more productive in order to improve the Airbus' competitiveness. One the eight levers was to develop faster new aircrafts. This new way of working has been applied for the A350 XWB reducing by 2.5 years the development cycle. It has reduced by about one year the industrialization cycle of a completely new aircraft although this one is more than 50% in weight manufactured with composite materials.

This article deals about the challenges faced on the development of the A350 components specially composite parts, in a difficult environment constrained by tight development schedule, productivity goals, weight targets, new high performance materials, new stronger lighting strike protection requirements, harmonization inside airbus, high level of quality required for allowables never used before, and constraints linked to the assembly of composite parts. In particular it was the first time that a long range aircraft was designed with carbon fuselage panels. The A350 fuselage's structural design comprises carbon fibre panels and frames, together with metallic cross-beams - a departure for Airbus which has traditionally used aluminium for the bulk of the fuselage structure. The goal was to achieve a very mature technology both from the technical and the manufacturing point of view. For this, an ambitious demonstrator programme has been launched to ensure both "maturity and certification" compliance of the design.

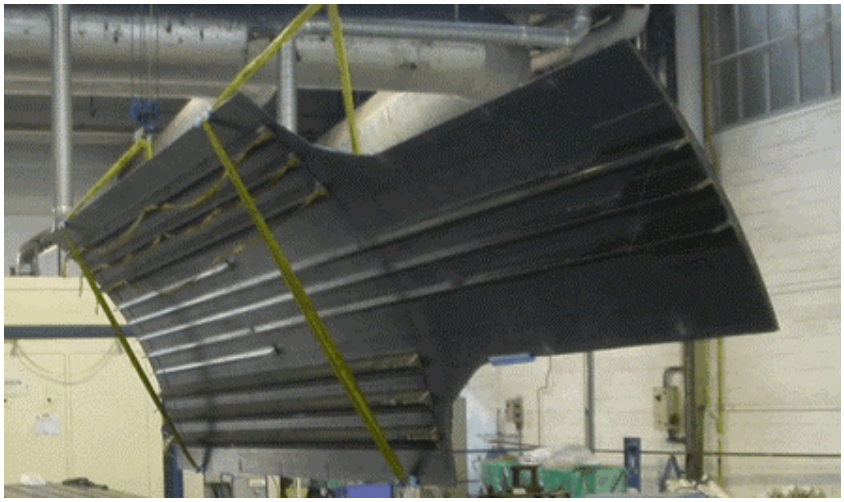

Figure 1- 16m-long shell demonstrator

Embedment of very low intrusive sensors like optical fibre sensors represents a real importunity to monitor lot of process parameters during the manufacturing of these demonstrators. One goal can be to detect possible indications during the manufacturing process anticipating the presence of defects and therefore enabling a sooner actuation to mitigate problems and avoiding systematic repetitions. Then these sensors can be used during test campaigns completing data habitually obtained by electric gauges. Finally it can also reduce or even eliminate partially the number of Non Destructive Inspections that today are mandatorily performed during the production of composite parts.