

NDT assistance for impacts management of "black aircrafts"

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Composite materials can be manufactured in various shapes, forms and compositions, offering unique combination of high strength, light weight and durability capabilities compare to other types of material. This naturally explain why almost all airplanes incorporate some kind of composite materials in their design. And in some cases, they can account for up to 50 to 70 percent of a complete airplane structure. For instance, carbon fiber reinforced polymers have been massively used in latest civil aircrafts such as '787' by Boeing & 'A350' by airbus, including for fuselage panels. Mechanical properties of these materials bring a lot of benefits except regarding impacts which can cause delamination and/or disbonding. It is therefore critical to inspect such materials / component to ensure their complete integrity on the day to day basis. Potential risks are managed by Airbus thanks to a range of dedicated solutions making possible damage assessment by B1 mechanics (non certified NDT personnel). Those aim to simplify and speed-up the part integrity diagnosis and include (1) LineSizing which enable to detect and automatically size discontinuities and (2) LineMap that helps operators to precisely locate those in the reference of the aircraft's digital twin. All results are then linked and reported via the aircraft digital health book 'e-tech 3d repair' which is cloud hosted. This presentation describes the studies carried out to establish dedicated inspection methods based on phased array ultrasonic testing, the development of a tailored mapping solution and of fully automated analysis process, as well as the development and deployment of the associated tools, including PoD studies.