Nowadays, the ultrasonic inspection (UT) is the most common Non Destructive method (NDT) largely applied in the aerospace industry due to its accuracy, reliability and the degree of industrialization. Although UT is widely developed, new manufacturing processes and part concepts are continuously pushing the technology for new improvements and applications. This is the case of the geometries resulting from novel composites manufacturing methods, such as Resin Transfer Moulding (RTM) or Liquid Resin Infusion (LRI). The last allows the fabrication of complex parts with internal stiffeners and closed geometries in one shoot, reducing assembly time but also limiting the accessibility for NDT inspections.

In this sense, one of the critical issues in the aeronautic sector is the improvement of radii inspection capabilities. The requirement of the aeronautic industry of guaranteeing the quality of the primary composite structures implies the inspection of the whole component through certified technologies. This constraint, together with the lack of technological solutions for the inspection of regions with limited accessibility is blocking the industrial implementation of optimized manufacturing processes.

The present work describes the design and development of adaptive hardware solutions for the inspection of internal radii in composite structures. The final positioning tool has been obtained as result of an iterative design process and manufactured through additive manufacturing technology (Powder Bed Laser Fusion, formerly SLS-Selective Laser Sintering) using polyamide. This device was validated for inspection of inner radii of five outboard boxes, belonging to the winglet structure of a Green Regional Aircraft prototype (Clean Sky 2 programme). The inspections under real operational environment demonstrated the validity of the devices, enabling a certified inspection in the whole radii length and reducing the lead time of the process.

**KEYWORDS**

Ultrasonic Testing | Radii Inspection | Composite Structures |