

# **Development of composite tail rotor blades with lattice structures through the use of additive manufacturing techniques**

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**Keywords.** composite materials, lattice structures, additive manufacturing, helicopter blades.

## **Abstract.**

The main objective of the article is the practical development of a novel structural solution for the IAR330 tail rotor blade, manufactured from advanced composite materials and through the implementation of lattice structures, in order to achieve high structural resistance and a considerable reduced mass, compared to the actual version of the blade.

Exposed to the aerodynamical and vibrational loads similar to those manifested during a hovering flight, the finite element model of the blade shows high resistance, in comparison to the metal alloy model of the blade.

Experimental validation of the finite element analysis results is realized with a reduced scale model, by taking into consideration different types of exterior loads.

The article presents the structural solution in general terms, leaving open the possibility of applying it to both tail rotor blades and also main rotor blades of any helicopter with similar performances as the Romanian Air Force IAR330.