

Assembly, no assembly, self assembly in additive manufacturing for aerospace applications

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A key issue for the production of sound mechanical systems is the assembly. Matter of fact, several system failures have been ascribed to poor connection between the different parts of the system.

In order to avoid these problems, the choice of adequate processes, able attain the desired shapes, and proper parameters, able to attain the design tolerances, is a crucial point. Nevertheless, some processes are perfectly tuned to fabricate intricate shapes but lack in precision, whilst others are suited to obtain very tight tolerances but only for simple shapes.

Additive manufacturing is one of those processes which in the last years mostly influenced the design of the components, due to its capacity to produce intricate shapes, still taking into account the general lack in precision during their manufacture. Thus, the assembly of components produced by such technique is often difficult, sometimes impossible, and in most cases leads to poor couplings.

Yet, the peculiarities of additive manufacturing can introduce new opportunities for the assembly, even changing the well consolidated "Design for assembly" into "Design for assembly by additive manufacturing".

Aim of this presentation is to outline the ability of additive manufacturing to modify some paradigms of the assembly, either in traditional assembly, in no assembly and self assembly operations.