

46ESS-59: Gas Turbines Manufacturing

Marco Abbondanza

The gas turbine manufacturing sector is continuously evolving, and includes some of the most innovative technologies. Due to the severe operating conditions undertaken by gas turbine engines, structural phenomena such as creep, corrosion and fatigue arise throughout the turbomachinery components. A great effort in research is currently being conducted on the technological aspects and advanced materials that can be used to deal with these problems, and the high loads to which the components are subjected to. Following the modern trends of increasing the bypass ratio and overall pressure ratio, to enhance both thermal and propulsive efficiency, more technological improvements are needed.

The future targets for reducing pollution, fuel consumption, noise and costs can only be achieved looking at alternative fuels, more advanced materials, and processes that are more efficient.

The current areas of interest are Additive Manufacturing (AD) and Titanium Aluminides (TiAl), concerning process manufacturing and new materials, respectively. Attention will be drawn toward the technological solutions that the largest gas turbines manufactures are currently adopting, with particular focus on low-pressure turbine (LPT) blades and disk design solutions.