

DEVELOPMENT OF CERAMIC MATRIX COMPOSITES FOR 2500°F TURBINE ENGINE APPLICATIONS

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After over 40 years of Research and Development, Ceramic Matrix Composites (CMCs) are now being introduced in gas turbine engines as progress in metallic alloy operating temperatures have reached a plateau. This development at Pratt & Whitney (P&W) follows in the footsteps of the geared turbofan technology that provided the aeronautic industry with the world's quietest, greenest, most efficient and highest performance engines in the world. The geared turbofan increased the propulsive efficiency of commercial engines, CMCs will improve the core thermal efficiency of both commercial and military engines, bringing additional benefits for limiting emissions and reducing fuel consumption. P&W has developed and tested several families of CMCs over the years and is currently standing up a Center of Excellence dedicated to CMCs in Carlsbad, CA to rapidly establish this new technology as a commercial product. Technical, manufacturing and lifecycle cost challenges are addressed in parallel as part of this accelerated development program and are already considering new needs expressed by the industry such as alternative fuels, including hydrogen.