

46ESS-47: Active clearance control system

ZIANG GAO

Gas path sealing continues to be a fundamental concern in aircraft and ground-based turbine engines. Technical drivers include the need to operate the engines at high efficiency and to minimize maintenance requirements to keep operating costs at their minimum. Blade tip sealing has remained a challenging problem since the development of the gas turbine engine.

Improved blade-tip sealing in both the high pressure compressor (HPC) and high pressure turbine (HPT) can provide dramatic reductions in the performance of the gas turbine. Implementation of active clearance control systems, especially in the HPT, can dramatically improve engine service life or time-on-wing.

In this presentation, mechanisms of tip clearance formation and variation and relevant main influence factors were analysed. Three different active clearance control (ACC) systems were reviewed. Benefits of ACC systems are summarized as lower fuel consumptions, less emissions and lower maintenance costs due to efficiency improvement. Furthermore, key technologies of ACC and the future directions were also discussed.