

In this paper, a novel active power filter (APF), which utilizes a highly reliable and efficient dual-buck inversion topology, is designed and integrated to a more electric aircraft (MEA) power grid to eliminate harmonics, correct power factor of supplies, and minimize the effect of unbalanced loads. The harmonic cancellation method, which provides a three-phase reference current in phase with the positive sequence of fundamental voltage, and the hysteretic current control method are adopted to control the proposed APF. After the parameters are carefully designed, which is swiftly followed by operational principle analysis, the proposed APF is integrated into a 125-kVA frequency-wild (360-800 Hz) hybrid high-voltage alternating current/high-voltage direct current MEA power grid. System-level simulations are carried out within the whole flight phases, with and without the proposed APF. The results show that the system harmonics and power factor can be strictly limited within the requirements of the most recent military aircraft electrical standard MIL-STD-704F with the proposed APF.