

CASE STUDY

ECM proves feasibility of PCB Stator motors for marine HVAC applications

Overview

The American Bureau of Shipping (ABS) and ECM were selected by the Massachusetts Maritime Academy and the U.S. Maritime Administration (MARAD) to help determine the feasibility of replacing a conventional motor with a printed circuit board (PCB) stator motor.

Benefits

Motors developed with ECM's PCB Stator technology and PrintStator design software have many benefits for HVAC systems. On large cargo ships and military vessels, the weight of these motors and generators really adds up. Reducing motor weight with ECM's PCB Stator technology translates to reduced drag, increased fuel range and increased weight capacity of maritime vessels. Additionally, increasing motor efficiency allows for fuel and carbon emissions to be reduced.

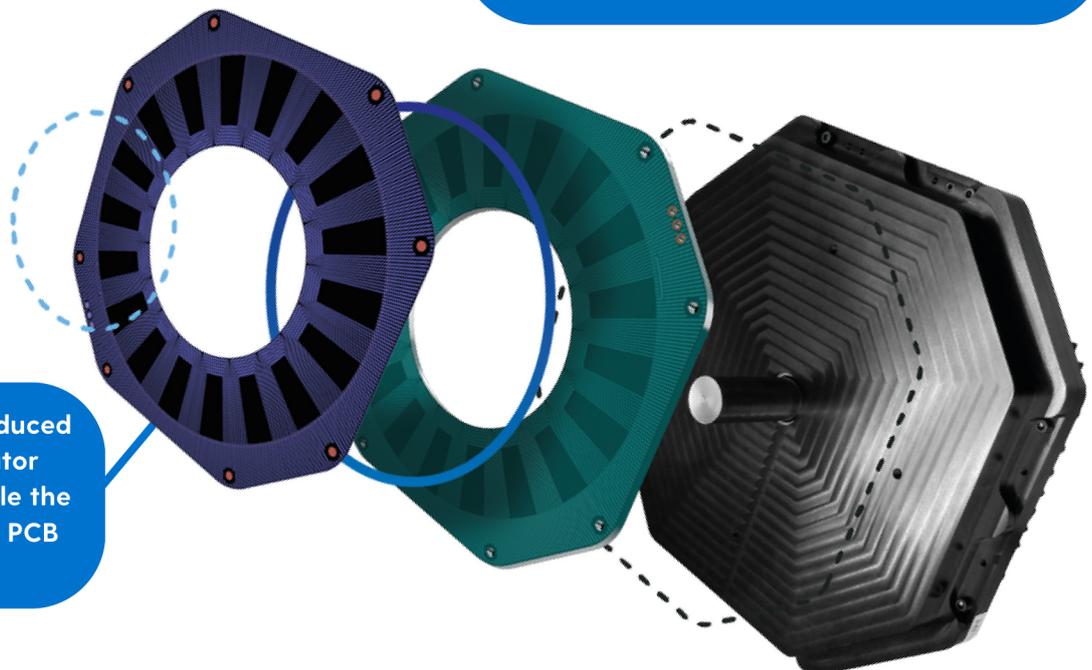


“The use of ECM’s PCB stator technology onboard ship and the related motor prototyping process were new concepts and were demonstrated as viable, reducing onboard weight and increasing motor efficiency.”

Roy Blieberg,
ABS Vice President,
Engineering



A Gerber File produced by ECM's PrintStator software to enable the production of the PCB motor.



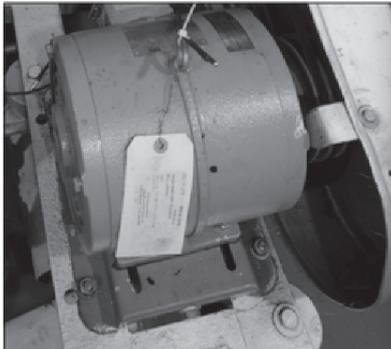


Results

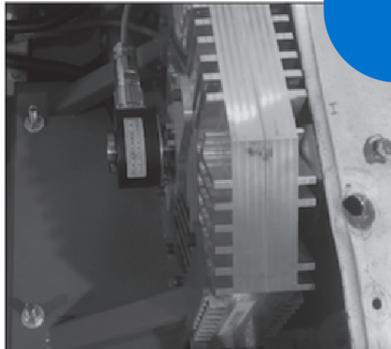
ECM replaced the 3HP air handler motor on MARAD's US Kennedy with a 3HP motor integrated with PCB stator technology. The legacy motor that was replaced weighed 45kg and ran at an efficiency of 87.5%. ECM's solution weighed a third of the size of the legacy motor at 15kg and ran at an efficiency of 91.6%. ABS issued a "Statement of Maturity" for ECM's PCB stator technology and confirmed the reduction of onboard weight and increased motor efficiency.

"The ABS NTQ services offer guidance on early adoption and efficient implementation of new technologies – demonstrating the level of maturity – and that potential risks have been systematically reviewed."

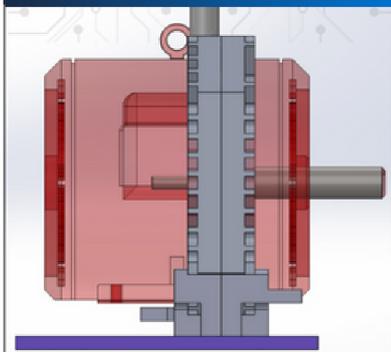
Smarty Matthew John,
ABS Manager for Advanced
Technology and Research



TECO CONVENTIONAL MOTOR
3HP; 87.5% EFFICIENCY
45KG (99LB)



ECM PCB STATOR MOTOR
3HP; 91.6% EFFICIENCY
15KG (33LB) | 60% LIGHTER



Next Steps

ECM recently returned to the US Kennedy for a second retrofit project. This time, ECM's PCB stator motor replaced the air handler's belt drive with a direct drive solution, further reducing system volume and weight while increasing system efficiency. The direct drive upgrade further increased motor efficiency to 93%.

ECM is now integrating PCB stator technology and the PrintStator design platform into a variety of HVAC applications; aboard maritime vessels, but also into the general commercial and residential HVAC market. Increased efficiency and a significant weight reduction are only a few of the many benefits when a motor is upgraded with a PCB stator, making the technology valuable to almost any industry.

For more information, please email info@pcbstator.com or visit pcbstator.com/design-your-own to learn more about our 5-step integration process.

