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**OIL-FREE FOIL BEARINGS AS A RELIABLE, HIGH PERFORMANCE BACKUP
BEARING FOR ACTIVE MAGNETIC BEARINGS**

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ABSTRACT

Gas turbine engines and other high speed rotating machinery supported by magnetic bearings require some form of backup bearing to ensure reliable and safe operation. To date, this backup capability has been provided by either rolling element bearings or solid lubricated bushings. Both of these solutions have drawbacks - most notably limited life and uncertain dynamic performance. In many cases, the backup bearing system requires substantial maintenance following an activation event. An alternative approach investigated in this work is the use of a compliant foil bearing as a backup bearing. This work discusses tests of this concept on a test rig with a 63 kg rotor. In this application, the foil bearing demonstrated smooth, stable operation during a variety of simulated magnetic bearing failure events, and allowed for continued operation of the rotor following the simulated failures.