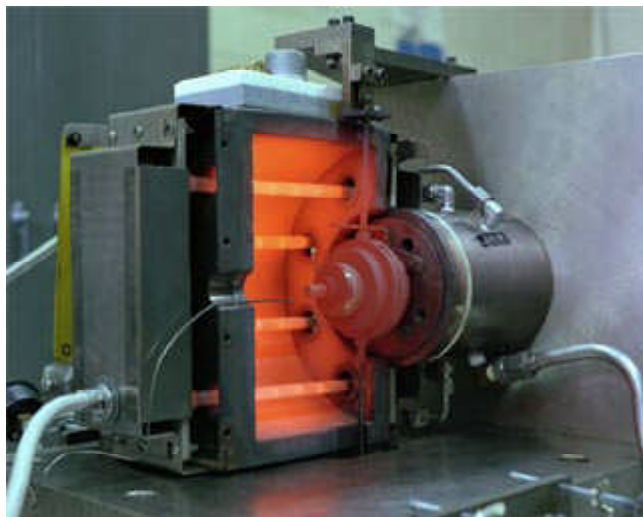


Oil-Free Turbomachinery Being Developed



High-speed Oil-Free foil air bearing operating red-hot with PS304 solid lubricant coating (test rig cover removed for photograph).

NASA and the Army Research Laboratory (ARL) along with industry and university researchers, are developing Oil-Free technology that will have a revolutionary impact on turbomachinery systems used in commercial and military applications. System studies have shown that eliminating an engine's oil system can yield significant savings in weight, maintenance, and operational costs. The Oil-Free technology (foil air bearings, high-temperature coatings, and advanced modeling) is being developed to eliminate the need for oil lubrication systems on high-speed turbomachinery such as turbochargers and gas turbine engines that are used in aircraft propulsion systems. The Oil-Free technology is enabled by recent breakthroughs in foil bearing load capacity, solid lubricant coatings, and computer-based analytical modeling. During the past fiscal year, a U.S. patent was awarded for the NASA PS300 solid lubricant coating, which was developed at the NASA Glenn Research Center. PS300 has enabled the successful operation of foil air bearings to temperatures over 650 °C and has resulted in wear lives in excess of 100,000 start/stop cycles. This leapfrog improvement in performance over conventional solid lubricants (limited to 300 °C) creates new application opportunities for high-speed, high-temperature Oil-Free gas turbine engines. On the basis of this break-through coating technology and the world's first successful demonstration of an Oil-Free turbocharger in fiscal year 1999, industry is partnering with NASA on a 3-year project to demonstrate a small, Oil-Free turbofan engine for aeropropulsion.

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Special recognition: A patent was awarded for NAS PS300 (U.S. Patent 5,866,518).