

Technology Opportunity

Vibration Control by Magnetic Bearings

The National Aeronautics and Space Administration (NASA) seeks to transfer magnetic bearing technology for use in active control of mechanical vibrations.

Potential Commercial Uses

- Turbomolecular vacuum pumps
- Machine tool spindles
- Petrochemical turbomachinery
- Momentum wheels
- Gyroscopes
- Space, aeronautical, and automotive flywheel batteries

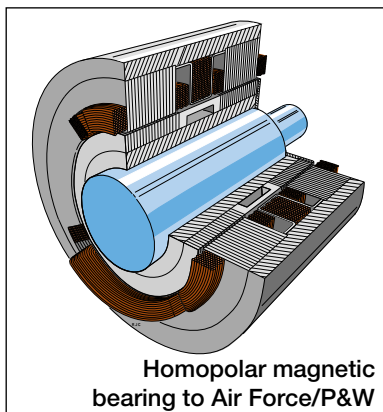
- Commercial aircraft turbine engines
- Auxiliary power units
- Military, aeronautical, and marine engines

Benefits

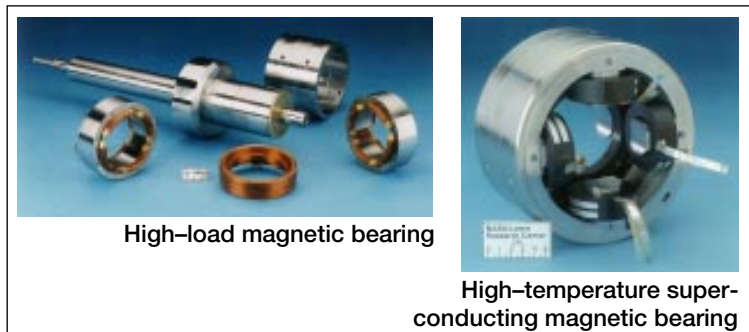
- Noncontacting support
- Active control feature
- No lubrication needed
- Extended machine life
- Reduced maintenance
- Improved reliability
- Fifteen percent lower fuel burn in engines
- Higher rotor speeds obtainable

Lewis Is the Only National Laboratory With In-House Expertise
in Magnetic Bearings for Turbine Engines

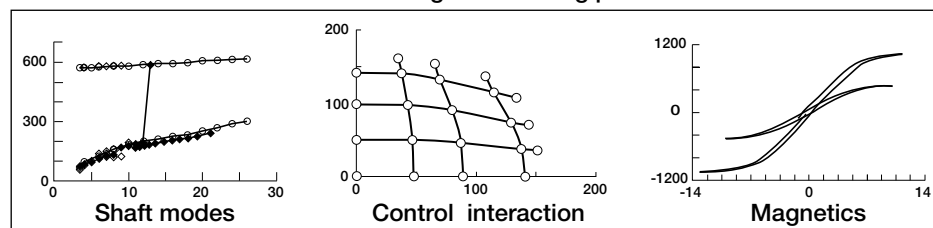
Advises and transfers technology
to military and industry



Advances technology



Measures basic magnetic bearing performance



National Aeronautics and
Space Administration
Lewis Research Center

The Technology

Magnetic bearings are electromagnetic devices designed to provide noncontact support for shafts via magnetic forces. The magnetic forces are produced by using electrical current to energize specially configured electromagnetic coils. With the use of a closed-loop control system, the electrical current can be adjusted continuously, thereby modifying the magnetic forces so that stable levitation and vibration control are produced.

Although active magnetic bearings are in limited use terrestrially, improved performance will be required for aerospace applications. The Lewis Research Center has established the More Electric Engine Project to enable the use of magnetic bearings in future advanced aircraft engines. These engines would operate with no oil, burn 15 percent less fuel, and be more reliable. Under this program, Lewis has increased the load capacity and has explored details of magnetic bearing characteristics that have increased performance. In addition, passive magnetic bearings that may have applications to space mechanisms with limited or slow rotation have been developed.

Options for Commercialization

Seeking partnership with industry to develop and transfer technology.

Contact

Dr. Dexter Johnson
Structural Dynamics Branch
NASA Lewis Research Center
Cleveland, Ohio 44135
Phone: (216) 433-6046
Fax: (216) 977-7051
E-mail dexter.johnson@lerc.nasa.gov

Key words

Magnetic bearings
Magnetic suspension
Vibration control

