NAVAIR Aircraft Platform Interface Laboratory

Electromagnetics

The Electromagnetic Laboratory researches, develops, demonstrates, and tests electromagnetic, electromechanical, and electric power technologies related to electromagnetic aircraft launch systems. The laboratory has, as its premier equipment, a complete linear motor system capable of accelerating to 90 meters/sec and then decelerating to a stop. This complete linear motor system can be used for investigations of advanced and enabling technologies and their application to high-energy linear motors. These include high-energy linear motor phenomena, advanced control techniques, advanced power electronics and circuits, and energy storage technologies.

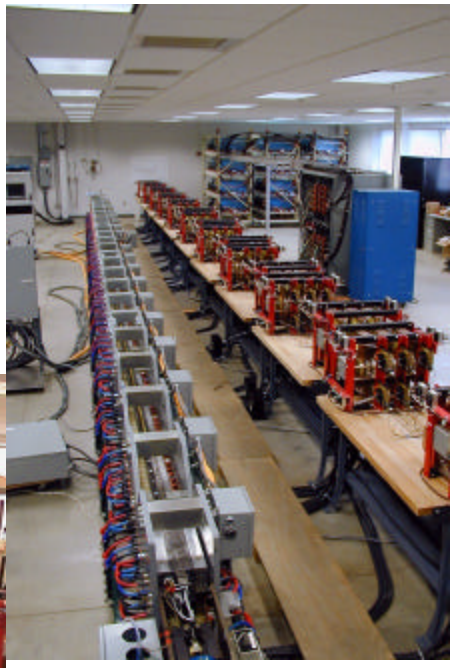
The Electromagnetic Laboratory is equipped with a complete linear motor system that can serve as a test bed for advanced and enabling technologies. The system includes a 1-MJ energy storage device, a 30-MVA power conversion system, a 60-foot linear motor, and a control system. It is completely instrumented.

Expertise and facilities at the Electromagnetic Laboratory are being used to investigate:

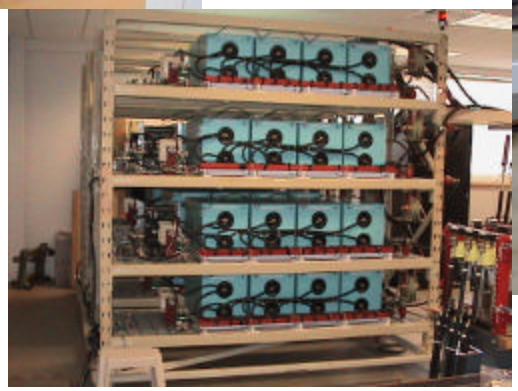
- Feasibility of eliminating the majority of sensors from a linear motor control system without sacrificing performance
- Feasibility of developing high-permeability magnetic materials for use in large electric machines
- Effects of component and subassembly failures on motor performance

New areas of interest include research in advanced motors and generators related to new electromagnetic circuits.

Variable voltage, variable frequency power supply, and set of load banks



Linear motor system



1-MJ capacitor bank

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Partnering Opportunities

Several mechanisms exist for partnering with NAVAIR Lakehurst. These include cooperative research and development agreements (CRADAs), commercial services agreements (CSAs), and education partnership agreements (EPAs). Under a CRADA, Lakehurst engineers and scientists work cooperatively with their peers in industry or academia on mutually beneficial research and development. The Navy has been given statutory authorization, via CSAs, to use Navy facilities to perform specific types of work for private parties. EPAs allow collaboration between NAVAIR Lakehurst and educational institutions.

Potential Applications

The Electromagnetic Laboratory is already being used by a number of naval and commercial groups, including the Office of Naval Research. The Office of Naval Research is using the laboratory to investigate new thermal management techniques and their application to linear motors, as well as new power electronic switches for use in high power electric conversion systems. Other interested users include high-technology companies investigating new control schemes for linear motors, and universities. Other potential areas of application include material handling systems, elevators, and roller coasters.

For More Information

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NAVAIR Lakehurst's Aircraft Platform Interface Facility was opened in August 2002. This 66,000-square-foot research and development facility supports the Navy's aircraft launch and recovery and support equipment missions. The technical capabilities covered by the 14 laboratories in this facility include power control systems; modeling, simulation, and data analysis/management; optical and lighting systems; integrated diagnostics; component evaluation; and applied technology. The synergism provided by collocating these teams of engineers, scientists, and technicians in one building further enhances this state-of-the-art facility.

NAVAIR Lakehurst researches, develops, tests, and procures aircraft launch and recovery systems and support equipment for Navy and Marine Corps aviation.