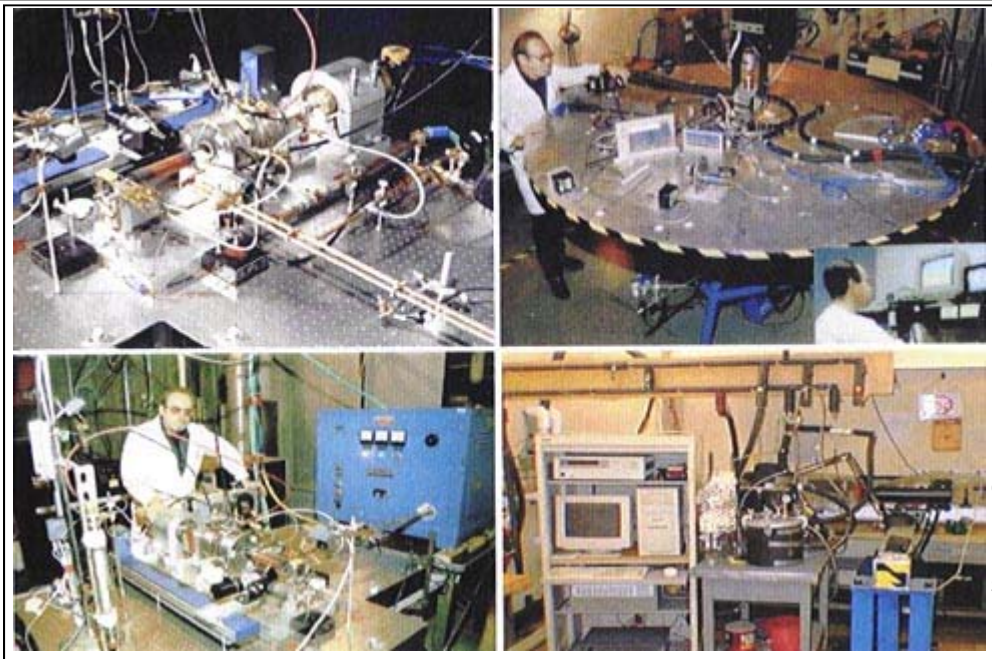
Heat Transfer R&D Facilities



Description:

Conduct basic and applied heat transfer research applicable to power system thermal management. Basic science issues of concern include: advanced heat pipes, effects of vibration and bdy forces on capillary driven heat transfer, thermal energy storage systems, micro-scale heat transfer and fluid dynamics incorporating MEMs-type high heat flux electronics cooling, and transport phenomena in rotating systems. The labs includr a clean room, fabrication area, dry box, welding apparatus, cryogenic and liquid metal temp vacuum stations, heat transfer fluid processing and purification apparatus, Dantec laser measurement system, CO2 laser for concentrated heat load on micro-scale systems, state of the art centrifuge facility rated for steady state and transient acceleration, a camera-equipped microscope, and multiple cool baths and power supplies of various ratings. A thermal lab includes space designated for ammonia research. These facilities are primarily used for analytical and experimental evaluations of two phase systems, from micro to micro scale, for thermal energy acquisition, transport and storage.

Purpose:

Perform R&D thermal management of power electronics, electric actuators and rotating machinery for existing and advanced aircraft and spacecraft.

Products:

- Rotating Heat Pipe for Generators - Licensed patent to Industry
- Miniature Heat Pipe Fill Process - 10X improvement in accuracy over other methods
- Cryogenic to liquid metal temperature Heat Pipe design, fabrication and testing.
- Advance Component Cooling Mechanisms - High Power Density.
- State of the art acceleration facilities, 8-ft diameter centrifuge, for researching acceleration transients typical of aerospace vehicles.

Availability:

Primarily in-house research, U.S. Government agency use, DoD contractors and dual use/defense conversion use-limited on an as available basis.

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