Control Electronics Facilities

Purpose:

To perform the research, design, test, develop, and implement electronic control systems, digital electronic systems, and motors for space and ground-based applications and experiments.

Control Electronics Development Laboratory

This laboratory provides MSFC with the capability to perform research, design, development and implementation of both microprocessor and discrete component-based electronic control systems for space flight vehicles and experiments. In-house programs include a wide variety of circuit designs, ranging from linear low-power amplifiers for precision control systems, to multi-kilowatt (kW) switch-mode amplifiers for propellant flow and thrust vector control of ascent vehicles. Circuit designs range from linear low power amplifiers for precision control systems, to multi-kilowatt (kW) switch mode amplifiers for propellant flow and thrust vector control of ascent vehicles. Modern control techniques utilizing neural networks, fuzzy logic, and adaptive controls are developed in this laboratory. Typical equipment comprising the laboratory includes dynamometers; an environmental chamber; a laminar flow bench; oscilloscopes; servo and logic analyzers; resistive, capacitive, and inductive meters; transistor curve tracers; precision voltage and current references computers; and logic programmers.

Programs supported in this lab include ISS/Environmental Control and Life Support System (ECLSS) Urine Processor Assembly (UPA) Power Module and Data Module, g_LIMIT, Equiaxed Dendritic Solidification Experiment (EDSE), Self-Diffusion in Liquid Experiment (SDLE), Quench Module Insert (QMI), Bridgman Unidirectional Dendrite in a Liquid Experiment (BUNDLE) and Magnetic Levitation (MagLev).

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Control Electronics Facilities

Digital Signal Processor (DSP) Systems Development Laboratory

To provide MSFC with the capability to perform research, design, development and implementation of digital electronic systems for space-and Earthbound science experiments, signal conditioning, thermal control, instrumentation, and control systems.

In-house programs include the Differential Ion Flux Probe with Mass measurement (DIFP-M) for ProSEDS, ISS/ Environmental Control and Life Support System (ECLSS) UPA, Advanced Health Management System (AHMS) for SSME, Equiaxed Dendritic Solidification Experiment (EDSE), Fast Trac Engine (MC-1). Typical equipment includes power supplies, oscilloscopes; digital multimeters; logic analyzers; resistance, capacitance, and inductance meters; transistor curve tracers; micro-controllers; computers; logic device programmers; and embedded control software and firmware development tools.

Supporting verification of contractor-developed flight and ground hardware, this laboratory provides real-time support for anomaly investigation of MSFC flight systems. This laboratory supports the development of embedded control systems based on surface mount technology from concept to prototype hardware, and provides design, fabrication and test of Thin Quad FlatPak (TQFP) chip based DSP systems.

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Motor Development Laboratory

This Laboratory provides MSFC with the capability to perform test and characterization of vendor supplied electric motors of different technologies such as DC Brush, Permanent Magnet Brushless DC (BLDC), Stepper , and Induction, for both flight and ground applications. Typical equipment includes dynamometers; power, current, voltage, and phase meters, motor controllers and power sources.

Programs supported in this lab include ISS/ Environmental Control and Life Support System (ECLSS) UPA, Quench Module Insert (QMI), Self-Diffusion in Liquid Experiment (SDLE).

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