



# Electric Component Laboratory



GSPEL Laboratory

GVSC's Ground System Power and Energy Laboratory (GSPEL) Team operates the Electric Component Laboratory (ECL) which supports research, development, characterization and testing of high-voltage, high power components necessary for military vehicle electrification and hybrid-electric technology. This lab's research extends to a testing cell in the Propulsion Laboratory that has programmable power absorption and supply capabilities with voltage, current and power, and controls a 350-horsepower AC dynamometer. Component testing on vehicle is also available. The ECL provides temperature and humidity-controlled environments, as well as 346 kW and 373 kW AC dynamometers to fully test various components.

## Benefits

The ECL offers several benefits:

- Testing of high voltage, high power components
- Analyze future electrical power generation and control technologies for the Army
- Provides power quality, transients, and harmonic distortion
- Variable coolant temperature and flow rate over a large range
- (Future) Certified and accredited testing to ISO17025
- Thermal chamber for component level testing
- MIL-PRF-GCS600 testing
- Resistive and Capacitive load banks to simulate a wide variety of load types
- Pressure testing of coolant cooled components using high sensitivity pressure transducers



**G40-2B ISG**

## Components Tested

The ECL can test multiple types of components:

- Advanced Electric Machines
- High Voltage Alternators
- Motor controllers
- Power Inverters
- DC/DC Converters



**Niehoff Alternator 600VDC**

## Capabilities

### ECL Dynamometer

- 373 kW 4 Quadrant AC Dynamometer
- 3,321 Nm torque from 0 - 1000 RPM
- 0 – 12,000 RPM total speed range

### CELL 10 Dynamometer

- 346 kW 4 Quadrant AC Dynamometer
- 1,245 Nm torque from 0 - 2000 RPM
- 0 – 12,000 RPM total speed range

### Thermal Chamber

- Temperature range of -30 to +177°C
- Humidity range of 10% to 95% RH, 85°C Max temp and 4°C minimum dew point
- 439 Liter capacity

### AV-900 250kW Dual Power Supply

- Voltage: 8 to 900 V
- Current: +/- 1000 ADC
- Power: +/- 250 kW

### AC and DC Load Banks

- Up to 250 kW power absorption

### Acquisition of mechanical and electrical parameters

- Phase to Phase measurements
- Active, apparent and reactive power
- Mechanical power
- Power factor and efficiency
- Fundamental frequency
- Total Harmonic Distortion
- Voltage & Current Transients
- Cooling characteristics; Thermal, pressure, flow rate



*AC Dynamometer*



*Power Cycling Station*



*ECL & Cell 10*