



Energy Storage Laboratory



GSPEL Laboratory

GVSC's Ground Systems Power and Energy Laboratory (GSPEL) Team operates the Energy Storage Laboratory (ESL), an ISO/IEC 17025 accredited laboratory. The ESL is a specialized research and testing facility dedicated to the advancement of energy storage technologies, with a focus on batteries across multiple levels of integration, including cells, modules, and full battery packs and systems. The ESL provides comprehensive support for the research, development, characterization, validation, and qualification of a wide range of electro-chemical energy storage technologies.

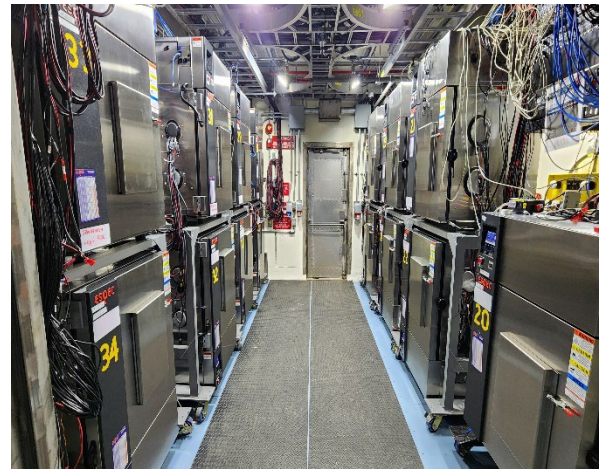
Test Protocols and Qualifications

- MIL-PRF-32143
- MIL-PRF-32565
- MIL-B-11188
- GPMH24000-TOP-6T-Lithium-Ion Qualification (Partially Qualified, Full Qualification end of 2025)
- GPMH25000-TOP-6T-VLRA Qualification (Fully Qualified)

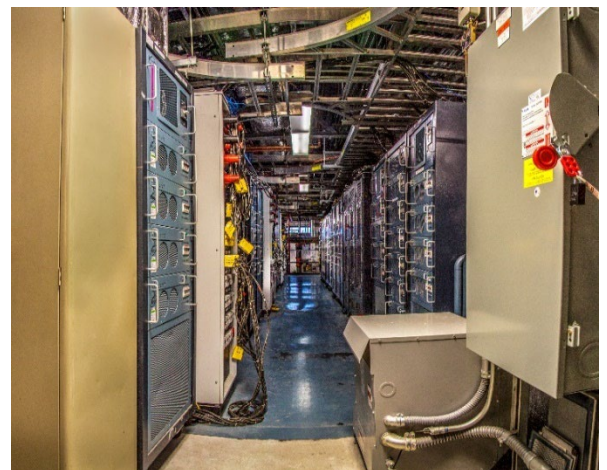
Capabilities/Benefits

Cradle-to-grave R&D and testing support for all DoD ground vehicle energy storage systems, including new technologies and chemistries.

- Performance to specification
- Life Cycle to Failure (Service Life)
- Cold Cranking
- Deep Cycle / High Temperature Deep Cycle
- Reserve Capacity
- Full Charge Capacity
- Hybrid Pulse Power Characterization (HPPC)
- Charge/Discharge Characterizations
- Impact Test
- Contact the ESL for other supported tests



Internal Cell/Module Test Room



Cell, Module & Battery Cycling Equipment

Equipment

Battery Cyclers

Brand	Model	Quantity of units	# of Channels per unit*	# Thermocouples Channels per unit	Voltage		Current		Temperature	
					Range	Tolerance	Range	Tolerance	Range	Tolerance
Bitrode	LCV3-100-36	1	3	7	0 to +54VDC	±.05VDC	±100ADC	±.1ADC	-40 to 190°C	±2.5°C
Bitrode	MCV48-50-5	2	48	48	0 to +5VDC	±.005VDC	±50ADC	±.05ADC	-40 to 190°C	±2.5°C
Bitrode	LCV12-50-24	2	12	16	0 to +32VDC	±.036VDC	±50ADC	±.05ADC	-40 to 190°C	±2.5°C
Bitrode	LCV4-100-36	1	4	8	0 to +54VDC	±.05VDC	±100ADC	±.1ADC	-40 to 190°C	±2.5°C
Bitrode	LCV4-100-60	7	4	8	0 to +60VDC	±.06VDC	±100ADC	±.1ADC	-40 to 190°C	±2.5°C
Bitrode	LCV8-100-60	3	8	12	0 to +60VDC	±.06VDC	±100ADC	±.1ADC	-40 to 190°C	±2.5°C
Bitrode	LCV2-1000-48	1	2	4	0 to +72VDC	±.07VDC	±1000ADC	±1.0ADC	-40 to 190°C	±2.5°C
Aero-Vironment	AV900	2	2	-	0 to +900VDC	±1.35VDC	±500A	±1.13ADC	-	-
Aero-Vironment (coming 2026)	AV900	1	2	-	0 to +900VDC	±1.35VDC	±500A	±1.13ADC	-	-
Elektro-Automatic (coming 2026)	EA-PUB -11500-120 (5 modules)	3	1	-	0 to +1500VDC	±0.75VDC	±600ADC	±0.6ADC	-	-

*Channels within each unit may be placed in parallel for higher currents

Temperature Conditioners/Chambers

Brand	Model	Quantity of units	Temperature		Internal Volume	Cooling Change Rate	Heating Change Rate
			Range	Tolerance			
ESPEC	BTZ-175	5	-65 to 150°C	±0.5°C	1.5 ft ³	5°C/min	5°C/min
ESPEC	BTZ-475	20	-65 to 150°C	±0.5°C	4 ft ³	2.5°C/min	2.75°C/min
Cincinnati Sub-Zero	ZPHS-8-1.5-1-H/AC	1	-65 to 150°C	±0.5°C	8 ft ³	14°C/min	17°C/min
Tenney	T10RC-1.5	3	-65 to 150°C	±0.3°C	10 ft ³	4°C/min	5.5°C/min
Russells	GB-64-6-6-AC	2	-65 to 150°C	±1°C	64 ft ³	3°C/min	3.8°C/min
Thermotron	SE-2000-6-6	1	-65 to 150°C	±0.7°C	69.3 ft ³	3.4°C/min	5.3°C/min
Test Equity	1000 Series	1	-73 to 175°C	±0.5°C	7 ft ³	3°C/min	8°C/min
Russells-BTC2	PCUB-4000-15-15	1	-54 to 88°C	±1°C	1377 ft ³	< 1°C/min	< 1°C/min
Russells-BSC1 (coming 2025)	ECUB-4000-15-15	1	-65 to 150°C	±1°C	700 ft ³	< 1°C/min	< 1°C/min
Russells-BSC2 (coming 2025)	ECUB-2000-H-MS	1	+20 to 100°C	±1°C	700 ft ³	< 1°C/min	< 1°C/min
AVL-BTC3 (coming 2026)	TBD	1	-54 to 88°C	±1°C	1350 ft ³	TBD	TBD
Russells (coming 2026)	WB-1440-40-40-WC	2	-70 to 125°C	±1°C	1440 ft ³	1.5°C/min	1.5°C/min
Russells (coming 2026)	WB-754-30-30-WC	1	-70 to 125°C	±1°C	754 ft ³	2.1°C/min	2.1°C/min



Outdoor Pack Test Chambers



FOR FURTHER INFORMATION:
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